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SC Court of Appeals

THE STATE OF SOUTH CAROLINA
In the Court of Appeals

APPEAL FROM THE SOUTH CAROLINA
PROCUREMENT REVIEW PANEL
Willie D. Franks, Chairman

Appellate Case No. 2026-000914
Panel Case No. 2025-5

In Re: Haren Construction Co., Inc.

Project No. P24-6052-PG
Beaufort-Waddell Mariculture
Maturation Ponds Maintenance – Re-Bid

Paragon Inc. of South Carolina, LLC, Chief Procurement Officer, State Fiscal Accountability Authority, and South Carolina Department of Natural Resources,

of which Paragon Inc. of South Carolina, LLC and Chief Procurement Officer, State Fiscal Accountability Authority are the Appellants/Respondents, South Carolina Department of Natural Resources is the Respondent/Appellant, and Haren Construction Co., Inc. is the Respondent.

**RECORD ON APPEAL
VOLUME FOUR**

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South Carolina Procurement Review Panel

Honorable Willie D. Franks
Chairman

Honorable Margaret A. Collins, Vice Chairman
Honorable Wendy E. Williams
Honorable Margaret D. Jordan

Pamela M. Gillins
Business Manager



Honorable Sandra McGuckin
Honorable Paul M. Koch
Honorable Lawrence C. Melton

Stephen O'Keefe
General Counsel

RECORD OF CASE 2025-5

In Re: Appeal by Haren Construction Co., Inc.

**SC Department of Natural Resources
Contract for Beaufort-Waddell Mariculture
Maturation Ponds Maintenance – Re-Bid
Project No. P24-6052-PG**

12/02/2025



PRP000001
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November 26, 2025

VIA FEDEX

Tracking No: 8864 0627 3762

John St. C. White
Chief Procurement Officer
1333 Main Street, Suite 700
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RE: Case No. 2026-004
IN RE: Appeal by Haren Construction Co., Inc.
Project No.: P24-6052-PG
Beaufort-Waddell Mariculture Maturation Ponds Maintenance

Dear Mr. White:

Attached please find Haren Construction Co., Inc.'s Request for Further Administrative Review of the above-referenced matter. We appreciate you forwarding the enclosed request to the South Carolina Procurement Review Panel, along with our filing fee check in the amount of \$250 payable to the SC Procurement Review Panel.

Thank you for your time and further consideration of this matter.

Sincerely,

HUDSON LAMBERT PARROTT, LLC

A handwritten signature in black ink, appearing to read 'Greg Placone', is written over the typed name 'Gregory Placone, Esq.'.

Gregory Placone, Esq.

DGP/ejh
Enclosures
cc: P. Nicholas Nybo (via email only)

STATE OF SOUTH CAROLINA

COUNTY OF RICHLAND

IN RE: Appeal by Haren Construction Co.,
Inc.Project No. P24-6052-PG
Beaufort-Waddell Mariculture Maturation
Ponds Maintenance – Re-BidBEFORE THE SOUTH CAROLINA
PROCUREMENT REVIEW PANELREQUEST FOR FURTHER
ADMINISTRATIVE REVIEW

Case No. 2026-004

Haren Construction Co., Inc. (“**Haren**”), pursuant to S.C. Code Ann. § 11-35-4210(6), requests further administrative review (the “**Appeal**”) of the Protest Decision issued by the Chief Procurement Officer for Construction (CPOC) on November 19, 2025, granting Paragon Inc. of South Carolina, LLC’s (“**Paragon**”) protest of the South Carolina Department of Natural Resource’s (the “**Department**”) Intent to Award to Haren the contract for the Beaufort-Waddell Mariculture Maturation Ponds Maintenance – Re-Bid project (the “**Project**”).¹ Haren further requests a hearing before the Procurement Review Panel (the “**Panel**”).

FACTUAL AND PROCEDURAL BACKGROUND

I. THE PROJECT’S INTENDED FUNCTION AND DESIGN

On August 12, 2025, the Department published an advertisement for construction services for the Project, which involves the renovation of SCDNR’s Waddell Mariculture Center (WMC) in Bluffton, SC. (Protest Decision at 2.)

For the WMC to function as intended and designed, seawater is pumped into an elevated concrete holding tower where it is then released by a series of valves and pulled by gravity to several in-ground ponds via a network of underground piping ranging from 8” to 12”. (Ex. G to Protest Decision.) Seawater is held in the ponds for fish maturation and then drained into a concrete

¹ The Protest Decision and exhibits thereto are attached as **Exhibit 1**.

outlet structure where the fish are harvested. (*Id.*) The drained seawater is then discharged into a drainage ditch and returned to the saltmarsh. (*Id.*)

As part of the Project, the Department seeks replacement of the main line piping network from the elevated concrete holding tower to the in-ground ponds; rehabbing the concrete holding tower, including cleaning, coating, and replacement of all piping; replacement of concrete outlet structures in the ponds; replacement of pond liners; and associated minor grading (the “**Work**”). (*Id.*)²

The technical specifications for construction of the Project address, among other things, cast-in-place concrete.³ The cast-in-place concrete technical specifications require the prospective contractor to provide materials and labor necessary to install all concrete required to complete the Project, including “footings, foundations, retaining walls, slabs on grade, and other incidental concrete Work,” as well as “setting of utility structures to grade, *setting of precast concrete curb grouting around pipe at manholes, manhole bases*, and general repairs caused by utility Work.” (Ex. 3 at 223 (emphasis added).)

The Project drawings depicting yard piping require a pressurized system cleanout to grade (PCOTG) on new yard piping mains every 500 feet.⁴ Detail Sheet GC-2 calls for a pre-cast concrete box with a traffic cover (i.e., a manhole) to be placed at each PCOTG. (*See* Ex. 4 at 7.) Critically for this Appeal, the Project’s design calls for approximately 8500 linear feet of yard piping at the Project, meaning that there are approximately 17 manholes required in the yard piping itself. (*See* Ex. 4 at 2–7.) In addition, the Project’s design calls for a pre-cast utility vault to be

² In further illustration of the Work, selected drawings for the Project are attached as **Exhibit 2**.

³ The bid documents disseminated by the Department are attached as **Exhibit 3**.

⁴ Annotated Project drawings depicting yard piping and related details are attached as **Exhibit 4**.

installed at each of the five ponds. (*See id.* at 1, 8.) Each pre-cast utility vault functions similarly to a manhole and provides access to valves and piping at the pond, bringing the total of pre-cast utility vault and manhole structures to 22. (*See id.*)

The Project does not involve the construction or renovation of any buildings. (Ex. G to Protest Decision.) All Work will be performed on the Department's property. (Protest Decision at 4.)

II. THE PARTIES

Haren is a construction firm specializing in engineered water improvement projects, focusing on water treatment plants, wastewater treatment plants, pumping stations, raw water impoundments, pipeline constructions, and other miscellaneous water projects.⁵ Recently, Haren successfully completed two fish hatchery projects similar to the Project.⁶

Haren possesses a South Carolina General Contractors-Public Utility license with subclassifications of Water and Sewer Lines ("**WL License**") and Water and Sewer Plants ("**WP License**"); and a South Carolina General Contractors-Highway license ("**HY License**").⁷

⁵ Homepage, HARENCONSTRUCTION.COM, <http://www.harenconstruction.com/> (last visited November 25, 2025).

⁶ *Fish Hatchery Renovations – Jim Hinkle Spring River State*, HARENCONSTRUCTION.COM, <http://www.harenconstruction.com/project/97> (last visited November 25, 2025); *Lake Burton Fish Hatchery*, HARENCONSTRUCTION.COM, <http://www.harenconstruction.com/project/55> (last visited November 25, 2025).

⁷ South Carolina Department of Labor, Licensing, and Regulation, Homepage, LLR.SC.GOV, <https://llr.sc.gov/> (follow "LOOK UP A LICENSE" hyperlink, then select "Contractors" from the dropdown menu, then enter license number 11112).

Paragon advertises itself as offering commercial, residential, and multi-family construction services.⁸ Paragon does not possess a WL License. Rather, Paragon possesses a South Carolina General Contractor-Building license (“**BD License**”); a South Carolina General Contractor-Specialty license with the subclassification of Nonstructural Renovations (“**NR License**”); and a South Carolina Mechanical Contractors license with subclassifications of Plumbing “(**PB License**”); Electrical (“**EL License**”), and Packaged Equipment (“**PK License**”). (Protest Decision at 2.)

III. THE DEPARTMENT’S DETERMINATION OF NON-RESPONSIBILITY

The Department structured the solicitation and bid documents to seek bids for a sole prime contractor to construct the Project. (Protest Decision at 3.)⁹ The Department received bids for the Project from Haren and Paragon, and Paragon was the apparent low bidder. (Protest Decision at 2.)

After receiving bids, the Department contacted the South Carolina Department of Labor, Licensing, and Regulation Contractors Licensing Board (“**LLR**”) for guidance on which license would be required for the Project. (See Ex. G to Protest Decision.) The LLR responded that “the Water & Sewer Line classification is *more than likely what is required*.” (*Id.* (emphasis added).) The Department also reviewed the Project plans, specifications, and the Architect-Engineer’s (“**A-**

⁸ Homepage, PARAGONBUILDERSSC.COM, <https://www.paragonbuilderssc.com/> (last visited November 25, 2025).

⁹ A prime contractor “is an entity which contracts directly with an owner to perform general or mechanical construction.” S.C. Code Ann. § 40-11-20(20). A sole prime contractor is “the prime contractor for a project on which there is only one prime contractor.” S.C. Code Ann. § 40-11-20(24).

E”) estimate of the Project’s probable cost and determined that more than approximately 80% of the Work requires a WL License. (*See id.*)¹⁰

On October 17, 2025, the Department informed Paragon of its determination that Paragon was a non-responsible bidder pursuant to S.C. Code Ann. § 11-35-1810 because Paragon’s PB License did not enable it to act as a sole prime contractor for the Project. (Ex. E to Protest Decision.)¹¹ On October 20, 2025, the Department posted a notice of its intent to award a contract for the Project to Haren for the base bid work plus the work of alternate 1. (Ex. F to Protest Decision.) On October 27, 2025, Paragon filed a notice of intent to protest. (Ex. A to Protest Decision.) On October 30, 2025, the Department filed a response to Paragon’s notice of intent with the CPOC. (Ex. G to Protest Decision.) In its response, the Department explained that the PB License is not appropriate for the Project because the Work does not involve the construction or renovation of buildings. (*Id.*) The Department’s response also noted that the LLR had issued a citation to Paragon on August 4, 2025 for engaging in contract work or submitting a bid without proper licensure. (*Id.*)¹²

¹⁰ The solicitation and bid documents do not expressly state the licensure required to perform the Work.

¹¹ A responsibility determination is a determination that the bidder has the legal and technical ability to perform. *See* S.C. Code Ann. Regs. 19-445.2125(A)(1). “[T]he lack of a proper license to do the work solicited in a state contract will always render a bidder nonresponsible.” *Protest of Roofco, Inc.*, Panel Case No. 2000-14(I). *See also* S.C. Code Ann. § 40-11-200(B) (“It is a violation of this chapter for an awarding authority . . . to consider a bid . . . unless the bidder has first obtained the licenses required by this chapter. Bids or contracts submitted by contractors may not be reconsidered or resubmitted to an awarding authority . . . if the contractor was not properly licensed at the time the initial bid or contract was submitted.”).

¹² A copy of the citation issued to Paragon is attached as **Exhibit 5**.

On November 4, 2025, Paragon filed its formal protest of the Department's intent to award a contract, asserting that its PB License under S.C. Code Ann. § 40-11-410(5)(f) enabled it to bid the Project as a sole prime contractor. (Ex. A to Protest Decision.)

IV. THE CPOC'S PROTEST DECISION

On November 19, 2025, the CPOC issued his Protest Decision granting Paragon's protest. The CPOC framed the controlling issue as whether the Department's determination that more than 51% of the Work required a WL License to the exclusion of a PB License was "clearly erroneous, arbitrary, capricious, or contrary to law." (Protest Decision at 4.) Without referencing the bid documents and technical specifications for the Project, the CPOC concluded that neither the WL License nor the PB License appears to contemplate or exclude the water storage tank, water distribution line, and drainage line work involved in the Project, and, therefore, both licenses allow the licensee to perform the Work. (*Id.* at 6.) Accordingly, the CPOC granted Paragon's bid protest and remanded to the Department to proceed in accordance with the Procurement Code. (*Id.* at 7.) Haren timely filed this Appeal and seeks further administrative review for the reasons set forth herein.

STANDARD OF REVIEW

The Panel conducts a *de novo* administrative review of the Department's responsibility determination. *See Appeal by SGA | Narmour Wright Design*, Panel Case No. 2022-2 (citing S.C. Code Ann. § 11-35-4410(1)(a)). The Department must be afforded broad discretion with respect to responsibility determinations, which are matters of business judgment, because the Department "must bear the brunt of difficulties experienced in obtaining the required performance." *See In re: Protest of Value Options, et al.*, Panel Case No. 2001-7 at 6 (quoting *News Printing Co., Inc. v. U.S.*, 46 Fed. Cl. 740 (2000)). The Panel must not "substitute its judgment" for that of the

Department or “disturb [its] findings” so long as the Department “follow[ed] the requirements of the Procurement Code, fairly consider[ed] all proposals, and [was] not actually biased.” *See Protest of Coastal Rapid Public Transit Authority*, Panel Case No. 1992-16.

The Panel must affirm the Department’s responsibility determination unless Paragon proves by a preponderance of the evidence that the Department’s responsibility determination was “clearly erroneous, arbitrary, capricious, or contrary to law.” *See* S.C. Code Ann. § 11-35-2410(A); *Protest of Brantley Construction Co., Inc.*, Panel Case No. 1999-3. Paragon bears the burden to “demonstrate a lack of reasonable or rational basis for the [Department’s] decision or subjective bad faith on the part of the [Department] or clear and prejudicial violation of relevant statutes and regulations which would be tantamount to a lack of reasonable or rational basis.” *See In re: Protest of Value Options, et al.*, Panel Case No. 2001-7 at 7 (quoting *Robert E. Derecktor of Rhode Island, Inc. v. Goldschmidt*, 516 F. Supp. 1085 (D. R.I. 1981)).

ARGUMENT

I. THE DEPARTMENT DID NOT CLEARLY ERR IN DETERMINING THAT PARAGON IS NON-RESPONSIBLE BECAUSE MORE THAN 51% OF THE WORK DOES NOT FALL UNDER PARAGON’S PB LICENSE.

It is blackletter law in South Carolina that a prime contractor may only bid and perform work within the scope of its license(s). S.C. Code Ann. § 40-11-270. However, a sole prime contractor may offer to perform work outside the scope of its license(s) provided that a certain percentage of the work falls within the scope of its license(s). S.C. Code Ann. § 40-11-340. An entity licensed under S.C. Code Ann. § 40-11-410(3)(c) (WL License) may bid and perform work as the sole prime contractor if 40% or more of the work falls under that classification. An entity licensed under S.C. Code Ann. 40-11-410(5)(f) (PB License) may bid and perform work as the

sole prime contractor if 51% or more of the work falls under that classification. S.C. Code Ann. § 40-11-340.

Here, the controlling issue is whether Paragon proved that the Department's determination that more than 51% of the work involved in the Project falls under a WL License, and not under a PB License, was "clearly erroneous, arbitrary, capricious, or contrary to law" under S.C. Code Ann. § 11-35-2410(A).

A. More than 51% of the Work falls under Haren's WL License.

Reviewing the applicable licensing statutes reveals that more than 51% of the Work falls under a WL License, which only Haren maintains in this instance. Specifically, S.C. Code Ann. § 40-11-410(3)(c) provides the scope of work covered by a WL License:

"Water and Sewer Lines" which includes *construction work on water mains, water service lines, water storage tanks*, sewer mains, sewer lines, lift stations, pumping stations *and appurtenances to water storage tanks*, lift stations, pumping stations, pavement patching, backfill, *and erosion control as a part of construction*, and which includes connection at the building of all lines to the appropriate lines contained in commercial structures, *installation and repair of a project involving manholes, the laying of pipe for storm drains* and sewer mains, *all necessary connections, and excavation and backfilling, and concrete work incidental thereto.*

. . . General contractors in this license subclassification *may not engage in water and sewer line work from the right-of-way to a residential structure unless the entity is a subcontractor to a licensee holding a plumbing subclassification.*

(emphasis added).

The CPOC incorrectly and reversibly relied on the last sentence of section 40-11-410(3)(c) to determine that "[t]he primary focus of this license is public utility water and sewer service lines within the utility right-of-way or easement." (Protest Decision at 5.) The CPOC's reasoning is flawed. The WL License excludes *only* residential structures, leaving that work to contractors possessing a PB License, like Paragon. The exclusion of residential structures from the WL License

does not support the CPOC's conclusion that the WL License is primarily focused on or otherwise limited in any way to work within a public utility right-of-way or easement.

After misconstruing the "primary focus" of the WL License, the CPOC further departed from the text of section 40-11-410(3)(c) to conclude that the WL License does not appear to contemplate the water and drainage line work of the type on this Project. (Protest Decision at 6.) The CPOC, however, ignored that the WL License is the only subclassification covering "*the installation and repair of a project involving manholes.*" S.C. Code Ann. § 40-11-410(3)(c). This language is broad and is not limited to the installation and repair of manholes themselves; rather, this language brings any project involving the installation and repair of manholes within the scope of a WL License.

The plain text of section 40-11-410(3)(c) is determinative of this appeal—the bid documents for the Project require at least 17 manholes, not including the precast vaults at each of the five ponds which function as manholes. This Work is further described in the technical specifications for the Construction of the Project as "setting of utility structures to grade, *setting of precast concrete curb grouting around pipe at manholes, manhole bases*, and general repairs caused by utility Work." (Ex. 3 at 223 (emphasis added).) In addition, the CPOC ignored that the WL License expressly covers water storage tanks, appurtenances to water storage tanks, and the incidental grading and concrete work involved in the Project.

There is nothing "murky" about the scope of work falling under the WL License (*See* Protest Decision at 7 n.5.) It is apparent from the plain text of section 40-11-410(3)(c) that the WL License is the *only* subclassification which contemplates the Work.

B. More than 51% of the Work does not fall under Paragon's PB License.

Put simply, Paragon's PB License does not allow it to lawfully perform more than 51% of the Work as the sole prime contractor for the Project. S.C. Code Ann. § 40-11-410(5)(f) provides the scope of work covered by a PB License:

"Plumbing" which includes the installation, replacement, alteration, and repair of all plumbing including solar water heating when performed solely within property lines and not on public easements or rights-of-way except to make connections to water meters or sewer taps as allowed by the utility owner; and *the installation, alteration, and repair of all piping, fixtures, and appliances related to water supply, including pressure vessels and tanks, and excluding municipal or related water supply systems*; venting and sanitary drainage systems for all fluid and semi-fluid and organic wastes; roof leaders; water-conditioning equipment; piping and equipment for swimming pools; *and installation of a system of pipes, fittings, fixtures, drains, and all necessary component parts upon the premises or in a building to supply water to buildings and to convey sewage or other waste products from buildings. . . .*

(emphasis added). Relying on section 40-11-410(5)(f), the CPOC concluded that, "[t]he primary focus of this license is water and sewer service to commercial, residential, *and other type facilities*." (Protest Decision at 6.) Again, the CPOC's reasoning is flawed. Other than "swimming pools," nothing in this section supports the CPOC's conclusion that the PB License extends to "other type facilities," and certainly not the work involved in the Project. Rather, the PB License is primarily focused on and limited to work involving buildings and their ancillary structures. As the Department explained in support of its determination of non-responsibility, the PB License expressly covers work "to supply water *to buildings* and to convey sewage or other waste products *from buildings . . .*" S.C. Code Ann. § 40-11-410(5)(f) (emphasis added).

As the CPOC correctly stated in his Protest Decision, "[t]he [P]roject involves work on concrete water storage tanks, water distribution lines to distribute water to fish maturation ponds and drain lines from the ponds." (Protest Decision at 4.) The CPOC's Protest Decision, however,

fails to consider what the PB License does not cover. Notably, the PB License does *not* cover: (1) water storage tanks, but rather only pressure vessels and tanks; (2) excavation, backfilling, and concrete work; and, most importantly, (3) installation and repair of a project involving manholes and the associated utility work. This third category of the Work excluded under Paragon's PB License is expressly required by the Project's drawings and technical specifications. As a matter of law, work on a project broadly involving manholes can only be performed by a contractor with a WL License, such as Haren. Paragon is not licensed to perform such work and, therefore, is a non-responsible bidder under § 11-35-1810.

Contrary to the CPOC's determination, the Project does not involve much, if any, of the work covered by the PB License, such as work relating to the supply of water *to buildings*; venting and sanitary drainage systems for all fluid and semi-fluid and organic wastes; roof leaders; water-conditioning equipment; piping and equipment for swimming pools; or a system to convey sewage or other waste products *from buildings*. Rather, the Work involving manholes, associated utility work, and drain lines from the fish maturation ponds more closely resembles a municipal water system, which is expressly excluded from Paragon's PB License. Accordingly, Paragon cannot demonstrate that the Department's determination of non-responsibility was a clear and prejudicial violation of the licensing statutes tantamount to a lack of reasonable or rational basis. The CPOC's decision must be vacated and reversed.

II. THE DEPARTMENT'S DETERMINATION THAT PARAGON IS NON-RESPONSIBLE IS FURTHER SUPPORTED BY CORRESPONDENCE WITH THE LLR AND THE CITATION ISSUED TO PARAGON.

In determining responsibility, the Department may obtain and rely on any sources of information, including but not limited to the prospective contractor; knowledge of personnel within the using or purchasing agency; commercial sources of supplier information; suppliers,

subcontractors, and customers of the prospective contractor; financial institutions; government agencies; and business and trade associations. S.C. Code Ann. Regs. 19-445.2125(B).

As the CPOC noted in his Protest Decision, the Department took “reasonable steps” to determine the applicable licenses by contacting the LLR for guidance on which license would be required for the Project. (Protest Decision at 7 n.5.) Categorizing the LLR’s response as “indefinite” fails to consider the context of the LLR’s response and the detailed application of the licensing statutes discussed *supra* Section I. The LLR’s response, while informal, definitively stated that the WL License is “more than likely what is required.” (Ex. G to Protest Decision.) Pursuant to S.C. Code Ann. Regs. 19-445.2125(B), the Department was entitled to rely on the guidance of the LLR, the agency charged with interpreting and enforcing the contractor’s licensing laws, *see* S.C. Code Ann. § 40-11-10. Accordingly, the Department’s determination that Paragon is a non-responsible bidder was reasonably and rationally based on Paragon’s license classification.

Under S.C. Code Ann. § 11-35-1810(1), an agency must also consider reliability and record of performance. In exercising this function, the Department correctly considered the citation recently issued to Paragon for engaging in contract work or submitting a bid without proper licensure. Such considerations are even more appropriate where, as here, there is significant doubt by the Department that Paragon possesses the requisite license to legally perform the Work. Accordingly, Paragon cannot demonstrate that the Department’s determination of non-responsibility was a clear and prejudicial violation of the licensing statutes tantamount to a lack of reasonable or rational basis.

CONCLUSION

For the reasons set forth above, Haren respectfully requests that the Panel vacate and reverse the CPOC’s Protest Decision.

Respectfully submitted,

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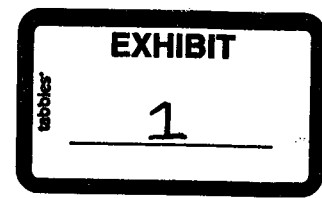
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STATE TREASURER

BRIAN J. GAINES
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BRUCE W. BANNISTER
CHAIRMAN, HOUSE WAYS AND MEANS COMMITTEE

GRANT GILLESPIE
EXECUTIVE DIRECTOR

Protest Decision

Matter of: Paragon Inc. of South Carolina, LLC

File No.: 2026-004

Posting Date: November 19, 2025

Contracting Entity: South Carolina Department of Natural Resources

Project No.: P24-6052-PG

Description: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid

DIGEST

Protest of Intent to Award on the grounds that the South Carolina Department of Natural Resources (Department) erred by finding a contractor with a Mechanical Contractor's-Plumbing License could not legally perform the water supply and discharge line and water supply tank work of the project granted where licensing law provides otherwise.

AUTHORITY

Per S.C. Code Ann. § 11-35-4210, the Chief Procurement Officer for Construction (CPOC) conducted an administrative review of a protest filed by Paragon Inc. of South Carolina, LLC (Paragon) protesting the Department's intention to award a contract to Haren Construction Co., Inc. (Haren) for rehabilitation of the head tower and rearing ponds M-1 through M-4, and replacement of the yard piping and electrical infrastructure at the Beaufort-Waddell Mariculture Center (the Project). Paragon's protest is attached as Exhibit A. This decision is based on materials in the procurement file and applicable law and precedents.

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BACKGROUND

On August 12, 2025, the Department published an advertisement for construction services for the Project. [Exhibit B] By the deadline for receipt of bids, the Department received two bids. [Exhibit C] The solicitation included three add alternates. Paragon was low on the base bid and on any combination of the base bid plus add alternates. [Id.]

On its bid, Paragon provided numbers for its contractor's licenses which are shown on the website of the Department of Labor, Licensing and Regulation as Paragon Builder's licenses. Paragon Builders has South Carolina contractor's license with the classifications of General Contractor-Building (BD License), General Contractor Specialty – Nonstructural Renovations (NR License), Mechanical Contractors – Plumbing (PB License), Electrical (EL License), and Packaged Equipment (PK License). [Exhibit D]

After reviewing the scope of work for the Project in the plans and specifications and the Project Architect-Engineer's (A/E) estimate of probable cost, the Department determined that Paragon lacks an appropriate contractor's license to bid the Project as a sole prime contractor.¹ [Exhibit E] The Department determined that Haren has an appropriate contractor's license to bid the project as a sole prime contractor.

On October 20, 2025, the Department posted a notice of its intent to award a contract to Haren for the base bid work of the Project plus the work of alternate one. [Exhibit F] On October 27, 2025, Paragon filed a notice of intent to protest setting forth the general basis of its protest. [Exhibit A] On October 30, 2025, the Department filed a response with the CPOC. [Exhibit G] On November 4, 2025, Paragon filed its formal protest of the Department's intent to award a contract asserting that it was properly licensed to bid the Project as a sole prime contractor.

¹ A contractor is limited to the scope of his license group and classification both in bidding and performing work. S.C. Code Ann. § 40-11-270; *see also* §§ 40-11-30 and 260(A).

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DISCUSSION

A determination of responsibility is required by S.C. Code Ann. §11-35-1810, which states “[r]esponsibility of the bidder or offeror shall be ascertained for each contract let by the State.” A responsibility determination is a determination that the bidder has the ability to perform. *See* S.C. Code Ann. Regs. 19-445.2125(A)(1). Possession of the proper contractor license is an issue of responsibility. *Protest of Brantley Construction Co., Inc.*, Panel Case No. 1999-3 (where the State is investigating the bidder’s ability to perform it is deciding an issue of responsibility); *Protest of Roofco, Inc.*, Panel Case No. 2000-14(I) (“[T]he lack of a proper license to do the work solicited in a state contract will always render a bidder nonresponsible.”); *see also* S.C. Code Ann. § 40-11-200(B) (“It is a violation of this chapter for an awarding authority ... to consider a bid ... unless the bidder has first obtained the licenses required by this chapter. Bids or contracts submitted by contractors may not be reconsidered or resubmitted to an awarding authority ... if the contractor was not properly licensed at the time the initial bid or contract was submitted.”).

A procurement officer’s determination of nonresponsibility is final and conclusive unless it is “clearly erroneous, arbitrary, capricious, or contrary to law.”² S.C. Code Ann. § 11-35-2410(A). To prevail, the protestant must prove the nonresponsibility determination is clearly erroneous, arbitrary, capricious, or contrary to law. *Protest of Brantley Construction Co., Inc.*, Panel Case No. 1999-3. Where the Department’s decision has a rational basis in law and fact, the CPOC will not, and indeed cannot, substitute his opinion for that of the Department’s.

The Department structured the solicitation and bid documents to seek bids for a sole prime contractor to construct the Project. A prime contractor “is an entity which contracts directly with an owner to perform general or mechanical construction.” S.C. Code Ann. § 40-11-20(20). A sole prime contractor is “the prime contractor for a project on which there is only one prime contractor.” S.C. Code Ann. § 40-11-20(24). A prime contractor may only bid and perform work within the scope of its license(s). S.C. Code Ann. § 40-11-270. However, a sole prime contractor

² The word “clearly” modifies the word “erroneous” but not the words “contrary to law.”

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may offer to perform work outside the scope of its license provided a certain percentage of the work falls within the scope of its license.³ In this regard, S.C. Code Ann. § 40-11-340 states:

An entity licensed under the classifications or subclassifications in Sections 40-11-410(1), (2), or (3) may act as a sole prime contractor on a project if forty percent or more of the work as measured by the total cost of construction falls under one or more of the licensee's license classifications or subclassifications. An entity licensed under the classifications or subclassifications in Section 40-11-410(4) and (5) may act as sole prime contractor if fifty-one percent or more of the work falls under one or more of the licensee's license classifications or subclassifications.

The Contractor's Licensing Laws define the total cost of construction as:

[T]he actual cost incurred by the owner, all contractors, subcontractors, and other parties for labor, material, equipment, profit, and incidental expenses for the entire project. This does not include the cost of design services unless those services are included in a construction contract.

S.C. Code Ann. § 40-11-20(23)

Paragon claims that using its bid, 13% of the work of the Project falls under its BD License, 19% falls under its EL License, and 53% falls under its PB License. While the CPOC does not believe that any of the work of the Project falls under Paragon's BD license since the Project does not involve the construction or renovation of a building, the CPOC need not decide that issue in this case. The controlling issue is whether the Department's determination that more than 51% of the work required a General Contractors-Public Utility license with a Water and Sewer Lines subclassification (WL License) to the exclusion of a PB license, was "clearly erroneous, arbitrary, capricious, or contrary to law."

This Project involves work on concrete water storage tanks, water distribution lines to distribute water to fish maturation ponds and drain lines from the ponds. All the work is on the Department's property and none of the work is to provided water and sewer service to the public.

Section 40-11-410(3)(c) addresses the scope of a WL License stating:

³ A sole prime contractor must subcontract any work outside the scope of its license(s).

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"Water and Sewer Lines" which includes construction work on water mains, water service lines, water storage tanks, sewer mains, sewer lines, lift stations, pumping stations and appurtenances to water storage tanks, lift stations, pumping stations, pavement patching, backfill, and erosion control as a part of construction, and which includes connection at the building of all lines to the appropriate lines contained in commercial structures, installation and repair of a project involving manholes, the laying of pipe for storm drains and sewer mains, all necessary connections, and excavation and backfilling, and concrete work incidental thereto.

Contractors in this license subclassification in license groups three, four, and five may install fire protection sprinkler system underground mains to a flanged outlet 1'-0" above the finished floor in compliance with National Fire Protection Association Standard 24. However, shop drawings must be submitted and approved by the State Fire Marshal with a copy of the approved drawings going to the licensed fire sprinkler contractor. Flushing and testing certificates must be delivered to the authority having jurisdiction and the performing licensed fire sprinkler contractor performing. General contractors in this license subclassification may not engage in water and sewer line work from the right-of-way to a residential structure unless the entity is a subcontractor to a licensee holding a plumbing subclassification.

The primary focus of this license is public utility water and sewer service lines within the utility right-of-way or easement. However, it does not preclude water line work on property that is not within the right-of-way unless it is a service line to a residential structure.⁴ This Project does not involve a residential structure.

Section 40-11-410(5)(f) addresses the scope of a PB License stating:

"Plumbing" which includes the installation, replacement, alteration, and repair of all plumbing including solar water heating when performed solely within property lines and not on public easements or rights-of-way except to make connections to water meters or sewer taps as allowed by the utility owner; and the installation, alteration, and repair of all piping, fixtures, and appliances related to water supply, including pressure vessels and tanks, and excluding municipal or related water supply systems; venting and sanitary drainage systems for all fluid and semi-fluid and organic wastes; roof leaders; water-conditioning equipment; piping and equipment for swimming pools; and installation of a system of pipes, fittings, fixtures, drains, and all necessary component parts upon the premises or in a building to supply water to buildings and to convey sewage or other waste

⁴ It seems odd that the statute singles out residential structures as opposed to other structures such as commercial structures.

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products from buildings. If this equipment is gas-fired, the necessary gas lines may be installed under this subclassification used in connection with this subclassification. Plumbing contractors in license groups three, four, and five are not required to be licensed under Chapter 45, Title 23 to install standpipe systems, including water hose connections, water hose cabinets, and related branch lines if the water hoses do not supply water to automatic fire protection sprinklers.

The primary focus of this license is water and sewer service to commercial, residential, and other type facilities. A licensee with a PB license may not do water and sanitary piping within a utility right-of-way or easement but only “within property lines.” A licensee with a PB license may also work on water supply tanks within property lines.

Neither WL License nor the PB License appears to contemplate water and drainage line work of the type on this project.⁵ Neither expressly excludes such work and both incorporate language that seems to include such work. Therefore, the CPO finds that the language of both allow the licensee to do the water supply tank and line work of this project as well as the drainage line work.

Paragon also protests the Department's determination that Paragon was nonresponsible because it bid in the name of Paragon Inc. of South Carolina, LLC rather than the exact name appearing on its license – Paragon Builders. The Department places its reliance on Section 40-11-370(B) which states:

It is unlawful to engage in construction under a name other than the exact name which appears on the license issued pursuant to this chapter.

However, unlike other provisions in the licensing law, a violation of this Section is not a bar to the contractor performing the work on which they bid. In years past, the Contractors Licensing Board staff have advised the CPOC that this is a minor infraction not affecting a contractor's ability to perform the work. Moreover, Paragon Inc. of South Carolina, LLC, does appear on

⁵ While the scope of both licenses is clear when the work involves traditional utility services and water distribution and sanitary sewage collection for human occupied structures, the scope of each becomes murky where the work is not clearly either. The Department took reasonable steps to determine the applicable licenses when faced with the confusing language of the licensing law – it reached out to the Contractor's Licensing Board which gave an indefinite answer. The process of obtaining a definitive answer from the Board requires submitting the question to the Board at a quarterly meeting, a process that does not accommodate a project construction schedule.

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Paragon's license application as its legal name and Paragon Builders as its trade name. Additionally, Paragon provided its license number with its bid clearly identifying it as Paragon Builders. At the most, Paragon's bidding in its legal name rather than its trade name as it appears on its license is a minor informality per Section 11-35-1520(13).

DECISION

Based on the foregoing, the CPOC grants Paragon's protest and remands this matter back to the Department to proceed in accordance with the Procurement Code.



John St. C. White
Chief Procurement Officer

Columbia, South Carolina

STATEMENT OF RIGHT TO FURTHER ADMINISTRATIVE REVIEW*Protest Appeal Notice (Revised July 2025)*

The South Carolina Procurement Code, in Section 11-35-4210, subsection 6, states:

(6) Finality of Decision. A decision pursuant to subsection (4) is final and conclusive, unless fraudulent or unless a person adversely affected by the decision requests a further administrative review by the Procurement Review Panel pursuant to Section 11-35-4410(1) within ten days of posting of the decision in accordance with subsection (5). The request for review must be directed to the appropriate chief procurement officer, who shall forward the request to the panel or to the Procurement Review Panel, and must be in writing, setting forth the reasons for disagreement with the decision of the appropriate chief procurement officer. The person also may request a hearing before the Procurement Review Panel. The appropriate chief procurement officer and an affected governmental body shall have the opportunity to participate fully in a later review or appeal, administrative or judicial.

Copies of the Panel's decisions and other additional information regarding the protest process is available on the internet at the following web site: <http://procurement.sc.gov>

FILING FEE: Pursuant to Proviso 111.1 of the 2025 General Appropriations Act, "[r]equests for administrative review before the South Carolina Procurement Review Panel shall be accompanied by a filing fee of two hundred and fifty dollars (\$250.00), payable to the SC Procurement Review Panel. The panel is authorized to charge the party requesting an administrative review under the South Carolina Code Sections 11-35-4210(6), 11-35-4220(5), 11-35-4230(6) and/or 11-35-4410...Withdrawal of an appeal will result in the filing fee being forfeited to the panel. If a party desiring to file an appeal is unable to pay the filing fee because of financial hardship, the party shall submit a completed Request for Filing Fee Waiver form at the same time the request for review is filed. *[The Request for Filing Fee Waiver form is attached to this Decision.]* If the filing fee is not waived, the party must pay the filing fee within fifteen days of the date of receipt of the order denying waiver of the filing fee. Requests for administrative review will not be accepted unless accompanied by the filing fee or a completed Request for Filing Fee Waiver form at the time of filing." PLEASE MAKE YOUR CHECK PAYABLE TO THE "SC PROCUREMENT REVIEW PANEL."

LEGAL REPRESENTATION: In order to prosecute an appeal before the Panel, business entities organized and registered as corporations, limited liability companies, and limited partnerships must be represented by a lawyer. Failure to obtain counsel will result in dismissal of your appeal. *Protest of Lighting Services*, Case No. 2002-10 (Proc. Rev. Panel Nov. 6, 2002) and *Protest of The Kardon Corporation*, Case No. 2002-13 (Proc. Rev. Panel Jan. 31, 2003); and *Protest of PC&C J&Hs, LLC*, Case No. 2012-1 (Proc. Rev. Panel April 2, 2012). However, individuals and those operating as an individual doing business under a trade name may proceed without counsel, if desired.

**South Carolina Procurement Review Panel
Request for Filing Fee Waiver
1205 Pendleton Street, Suite 366, Columbia, SC 29201**

Name of Requestor

Address

City

State

Zip

Business Phone

-
1. What is your/your company's monthly income? _____
 2. What are your/your company's monthly expenses? _____
 3. List any other circumstances which you think affect your/your company's ability to pay the filing fee:

To the best of my knowledge, the information above is true and accurate. I have made no attempt to misrepresent my/my company's financial condition. I hereby request that the filing fee for requesting administrative review be waived.

Sworn to before me this

_____ day of _____, 20_____

Notary Public of South Carolina

Requestor/Appellant

My Commission expires: _____

For official use only: _____ Fee Waived _____ Waiver Denied

Chairman or Vice Chairman, SC Procurement Review Panel

This _____ day of _____, 20_____
Columbia, South Carolina

NOTE: If your filing fee request is denied, you will be expected to pay the filing fee within fifteen (15) days of the date of receipt of the order denying the waiver.

Exhibit A

FORMAL PROTEST

Date: November 4, 2025

TO: Chief Procurement Officer Office of State Engineer Construction Office South Carolina
Department of Natural Resources Email: protest-ose@mrnm.sc.gov Physical Address: 1201
Main Street, Suite 600, Columbia, SC 29201

FROM: Paragon Inc. of South Carolina, LLC

2874 Columbia Road NE Orangeburg, SC 29118-1902 Telephone: (803) 534-1900 Email:
eric@paragonbuilderssc.com Attention: Eric Byrd, Vice President

RE: Formal Protest of Award Decision

Project Name: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid Project
Number: P24-6052-PG **Award Notice Posted:** October 20, 2025

I. NOTICE AND TIMELINESS

Pursuant to South Carolina Code Section 11-35-4210, Paragon Inc. of South Carolina, LLC ("Paragon" or "Protester") hereby submits this Formal Protest of the South Carolina Department of Natural Resources' ("SCDNR" or "Agency") decision to deem Paragon's bid non-responsive and to award the above-referenced contract to Haren Construction Co. Inc.

This Formal Protest is timely submitted within fifteen (15) business days of the October 20, 2025, award notice posting, as required by Section 11-35-4210. A Notice of Intent to Protest was timely filed on October 27, 2025.

II. INTERESTED PARTY INFORMATION

Protester: Paragon Inc. of South Carolina, LLC (doing business as "Paragon Builders")

SC Contractor's License Numbers: CLG.100190, CLM.111292

Classification(s) & Limits: Building BD5, Plumbing PB5, Electrical EL5

Contact Person: Eric Byrd, Vice President 2874 Columbia Road NE Orangeburg, SC 29118-1902 Telephone: (803) 534-1900 Email: eric@paragonbuilderssc.com

Legal Counsel: James M. Griffin, Esquire Griffin Humphries LLC PO Box 999 Columbia, SC 29202 Telephone: 803-744-0800 Email: jgriffin@griffinhumphries.com

III. PROCUREMENT INFORMATION

Awarding Agency: South Carolina Department of Natural Resources **Project:** Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid **Project Number:** P24-6052-PG
Bid Opening Date: September 23, 2025 **Award Notice Date:** October 20, 2025 **Intended Awardee:** Haren Construction Co. Inc. **Award Amount:** \$6,207,000.00

IV. PARAGON'S BID INFORMATION

Legal Entity Name: Paragon Inc. of South Carolina, LLC **Trade/DBA Name:** Paragon Builders
Business Address: 2874 Columbia Road, Orangeburg, SC (Orangeburg County) **Federal Tax ID:** 58-2486021

Bid Amounts:

- Base Bid Amount: \$5,323,800.00
- Alternate #1: \$533,600.00
- Alternate #2: \$568,200.00
- Alternate #3: \$573,350.00

Status: Deemed "Non-Responsive" by Agency

V. GROUNDS FOR PROTEST

Paragon protests the Agency's determination that its bid was non-responsive based on alleged violations of South Carolina Code Sections 40-11-270, 40-11-340, and 40-11-370. The Agency's determination is erroneous, arbitrary, and contrary to law. Specifically, Paragon contends:

A. Compliance with Section 40-11-270 (License Requirements)

Issue: The Agency allegedly found Paragon's bid non-responsive due to licensing deficiencies.

Paragon's Position:

Paragon holds all licenses necessary to perform the work as bid:

1. **General Contractor License CLG.100190** - authorizes Building-BD5 and Nonstructural Renovation-NR5 work with the following group limitations:
 - Group #5: Unlimited
 - Expiration: 10/31/2026
2. **Mechanical Contractor License CLM.111292** - authorizes Packaged Equipment-PK5, Plumbing-PB5, and Electrical-EL5 work with the following group limitations:
 - Group #5: Unlimited
 - Expiration: 10/31/2027

The work components of this project include:

- **Building work (BD5)** - covered by General Contractor License CLG.100190 at 13% of Total Project
- **Plumbing work (PB5)** - covered by Mechanical Contractor License CLM.111292 at 53% of total project
- **Electrical work (EL5)** - covered by Mechanical Contractor License CLM.111292 at 19% of total project
- **Pond liner work (15%)** - requires no specific license; Paragon will utilize its Building classification or engage appropriately licensed subcontractors as needed

Paragon's total bid of \$5,857,400 (including alternate #1) falls well within the unlimited group limitations of both licenses.

Supporting Documentation: See Exhibits A (General Contractor License CLG.100190) and B (Mechanical Contractor License CLM.111292).

B. Compliance with Section 40-11-340 (Subcontracting)

Issue: The Agency may have concerns regarding Paragon's ability to properly subcontract portions of the work.

Paragon's Position:

Paragon's licensing structure fully authorizes it to self-perform the major components of this work or to engage licensed subcontractors for specialized portions. Section 40-11-340 permits licensed general contractors to subcontract work to appropriately licensed specialty contractors. Paragon's approach is entirely consistent with this statutory framework and standard industry practice.

For the pond liner work, which represents 15% of the project and requires no specific contractor license under South Carolina law, Paragon may either:

- Perform the work under its Building-BD5 classification, or
- Engage appropriately licensed subcontractors as needed

This flexibility is expressly contemplated by South Carolina's contractor licensing statutes and regulations.

C. Compliance with Section 40-11-370 (Business Name)

Issue: The Agency cited Section 40-11-370(B) regarding engaging in construction under a name other than the exact name on the license.

Paragon's Position:

Paragon's bid was submitted under "Paragon Inc. of South Carolina, LLC," which is the exact legal name of the business entity and matches the Licensee/Legal Name on Paragon's contractor license application to the South Carolina Department of Labor, Licensing and Regulation (LLR).

Critical Distinction: While LLR issued the physical license documents under Paragon's trade name "Paragon Builders," the underlying legal entity holding both licenses is correctly identified as "Paragon Inc. of South Carolina, LLC." This is confirmed by:

1. **License Application (DOC 165)** - submitted in the name of "Paragon Inc. of South Carolina, LLC" with DBA "Paragon Builders" (See Exhibit C)
2. **License Records** - Both licenses (CLG.100190 and CLM.111292) are legally held by and issued to Paragon Inc. of South Carolina, LLC, even though the physical license certificates display the trade name
3. **Bid Submission** - Paragon's bid used the exact legal entity name that holds the licenses

Any alleged discrepancy between the legal entity name and the trade name displayed on the physical license certificates is a secondary, administrative matter that does not warrant bid rejection, particularly when:

- The entity is properly identified in the bid documents
- All license numbers are correctly provided
- The qualifying party is properly designated
- There is no indication of fraud, misrepresentation, or attempt to circumvent licensing requirements

Section 40-11-370(B) is intended to prevent unlicensed entities from fraudulently conducting business under someone else's license or misrepresenting their licensed status. That concern is wholly absent here. Paragon is the properly licensed entity, correctly identified itself, and submitted accurate license information.

The Agency's interpretation would improperly elevate form over substance and penalize a contractor for a ministerial variance between the legal entity name on its application and the trade name on its license certificate—a variance created by LLR's own administrative practices, not by any action or omission of Paragon.

D. Statutory Construction and Legislative Intent

South Carolina's contractor licensing statutes are designed to:

1. Protect the public by ensuring that construction work is performed by qualified, licensed contractors
2. Establish minimum standards for competency and financial responsibility
3. Prevent fraud and misrepresentation in the construction industry

Paragon fully satisfies each of these objectives. The Agency's restrictive interpretation would:

- **Improperly exclude legitimate plumbing work from the statutory scope** - contrary to the plain meaning of Section 40-11-410(5)(f) defining "plumbing" to include water distribution piping
- **Create uncertainty for contractors bidding on projects involving water piping systems on private property** - discouraging competition
- **Penalize contractors for administrative variances** between legal entity names and trade names on license certificates, even when the contractor is properly licensed and identified

VI. PREJUDICE TO PARAGON

Paragon will suffer substantial and irreparable prejudice if this protest is not granted:

1. Financial Harm

Paragon submitted the lowest responsible bid at \$5,857,400 (base bid plus alternate #1). The difference between Paragon's total bid and the intended award amount of \$6,207,000 is **\$349,600 more** than Paragon's total bid. This represents a significant financial loss to both Paragon and the State of South Carolina.

2. Loss of Business Opportunity

Paragon is a qualified, properly licensed contractor capable of performing this work in accordance with all applicable laws and regulations. Denying Paragon this contract opportunity based on erroneous legal interpretations unjustly deprives Paragon of legitimate business.

3. Reputational Harm

A determination of "non-responsiveness" carries significant negative implications for Paragon's professional reputation and may affect future bidding opportunities, despite Paragon's full compliance with all licensing requirements.

4. Competitive Disadvantage

If the Agency's restrictive interpretation of the Plumbing license definition stands, it would create uncertainty for contractors bidding on similar projects involving water piping systems on private property, potentially discouraging competition and increasing costs to public agencies.

VII. RELIEF REQUESTED

Paragon respectfully requests that the Chief Procurement Officer:

1. **Reverse** the determination that Paragon's bid is non-responsive;
2. **Find** that Paragon's Plumbing license (PB5) properly covers the yard piping installation work as defined in Section 40-11-410(5)(f);

3. **Find** that Paragon's bid was submitted in the proper legal name "Paragon Inc. of South Carolina, LLC," which is the legal entity that holds both contractor licenses CLG.100190 and CLM.111292;
4. **Find** that Paragon meets all requirements of Sections 40-11-270, 40-11-340, and 40-11-370;
5. **Determine** that Paragon submitted the lowest responsive and responsible bid; and
6. **Award** the contract to Paragon Inc. of South Carolina, LLC.

VIII. REQUEST FOR DOCUMENTS

Pursuant to Section 11-35-4210 and established protest procedures, Paragon requests access to the following documents within five (5) business days:

1. Complete bid tabulation showing all bids received
2. All documentation related to the responsiveness determination for Paragon's bid, including:
 - o Internal memoranda
 - o Email communications
 - o Evaluation notes
 - o Legal analysis or opinions
3. All documentation related to the responsiveness determination for the two other bidders (Haren Construction and BRW Construction)
4. Any communications within SCDNR or between other South Carolina State Agencies, legal counsel, or personnel regarding license classification interpretation for this project
5. Any legal opinions or guidance sought regarding the plumbing license scope under Section 40-11-410(5)(f)
6. Haren Construction and BRW Construction's license documentation and classifications
7. Any protest or inquiry submitted by any other bidder
8. Complete bid documents submitted by the two other bidders, including copies of sealed bid envelopes
9. All communications between SCDNR and LLR regarding licensing requirements for this project
10. Any determinations, rulings, or guidance from LLR regarding whether plumbing licenses cover yard piping installation work

IX. LEGAL ARGUMENT

A. South Carolina's Competitive Bidding Statutes Favor Acceptance of Low Bids

South Carolina law strongly favors competitive bidding and acceptance of the lowest responsive and responsible bid. The South Carolina Consolidated Procurement Code requires that "[a]n award shall be made with reasonable promptness by written notice to that responsible bidder whose bid will be most advantageous to the State." S.C. Code Ann. § 11-35-1520(5).

A bid should be deemed "non-responsive" only when there is a material deviation from the solicitation requirements that gives the bidder an unfair competitive advantage or otherwise compromises the integrity of the competitive bidding process. Minor irregularities or technicalities that do not affect the substance of the bid should be waived.

B. Paragon's Licenses Authorize All Work Contemplated by the Project

The plain language of Section 40-11-410(5)(f) defines "Plumbing" which includes the installation, replacement, alteration, and repair of all plumbing...when performed solely within property lines...and the installation, alteration, and repair of all piping, fixtures, and appliances, relating to water supply." This definition clearly encompasses the water distribution work in this project, which involves installation of piping systems for mariculture ponds.

The Agency's apparent interpretation—that plumbing licenses do not cover any piping work outside building walls on private property—is:

1. **Contrary to the statute's plain language**, which specifically addresses and includes water distribution piping
2. **Internally inconsistent**, as it would render the phrase "installation...of all piping, fixtures, and appliances relating to water supply" meaningless if all outside piping were categorically excluded
3. **Inconsistent with industry practice** and the reasonable expectations of licensed plumbing contractors
4. **Contrary to legislative intent** to establish clear scope boundaries for licensed trades

Moreover, Paragon's General Contractor license (Building-BD5) provides additional authority to perform this work or to engage appropriately licensed subcontractors.

C. The Business Name Issue Does Not Warrant Bid Rejection

Section 40-11-370(B) states: "No person may engage in the business of contracting in a name other than that shown on the license unless the name is properly registered pursuant to applicable law."

Here, Paragon's bid was submitted in the name "Paragon Inc. of South Carolina, LLC"—the exact legal entity name that:

- Holds both contractor licenses
- Is shown on the license application submitted to LLR
- Is properly registered with the South Carolina Secretary of State

The fact that LLR's physical license certificates display Paragon's trade name "Paragon Builders" rather than the legal entity name is an administrative matter within LLR's control, not Paragon's. Paragon cannot be penalized for LLR's administrative practices.

Section 40-11-370(B) is intended to prevent fraud and misrepresentation—situations where an unlicensed entity attempts to operate under a licensed contractor's name, or where a contractor misrepresents its identity to circumvent licensing requirements. Neither situation exists here.

Courts consistently hold that procurement statutes should be construed to promote competition and achieve the best value for public agencies, not to exclude qualified bidders based on technical irregularities that do not affect the substance of the procurement.

D. Applicable Legal Standards

South Carolina courts have established that:

1. **Procurement regulations should be construed liberally to favor competition** and should not be used to exclude responsible bidders except where necessary to protect the integrity of the procurement process
2. **Substantial compliance is sufficient** where strict compliance would serve no meaningful purpose and the public interest is not compromised
3. **Minor irregularities or immaterial variances** in bids should be waived when they do not provide a competitive advantage or prejudice other bidders
4. **Administrative interpretations that contradict statutory language** or frustrate legislative intent are not entitled to deference

E. Public Policy Considerations

Awarding this contract to Paragon serves important public policy objectives:

1. **Fiscal Responsibility:** Paragon submitted the lowest qualified bid, saving South Carolina taxpayers \$349,600
2. **Competitive Procurement:** Rejecting Paragon's bid based on erroneous legal interpretations discourages competition and increases costs
3. **Fair Treatment of Qualified Contractors:** Paragon holds all necessary licenses and has demonstrated its qualifications; the Agency's interpretation imposes arbitrary barriers to participation
4. **Consistency and Predictability:** Contractors need clear, consistent rules regarding licensing requirements; the Agency's restrictive interpretation creates uncertainty

X. CONCLUSION

Paragon Inc. of South Carolina, LLC is a fully qualified, properly licensed contractor that submitted the lowest responsible bid for this project. The Agency's determination of non-responsiveness is based on erroneous interpretations of South Carolina's contractor licensing statutes that contradict the plain language of those statutes and frustrate their intended purpose.

Paragon respectfully requests that this protest be granted, that Paragon's bid be deemed responsive and responsible, and that the contract be awarded to Paragon as the lowest qualified bidder.

XI. CONSENT TO ELECTRONIC COMMUNICATIONS

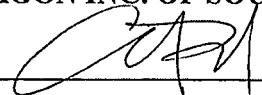
By submitting this Formal Protest to protest-ose@mrnm.sc.gov, Paragon (and any person acting on Paragon's behalf) consents to receive communications regarding this protest (and any related protests) at the email address of Paragon's legal counsel, James M. Griffin at jgriffin@griffinhumphries.com with copies to eric@paragonbuilderssc.com.

XII. CERTIFICATION

The undersigned certifies that the statements contained in this Formal Protest are true and accurate to the best of knowledge and belief.

Respectfully submitted this 4th day of November, 2025.

PARAGON INC. OF SOUTH CAROLINA, LLC

By:  Eric Byrd, Vice President

2874 Columbia Road NE Orangeburg, SC 29118-1902 Telephone: (803) 534-1900 Email: eric@paragonbuilderssc.com

ATTORNEY FOR PROTESTER:

James M. Griffin, Esquire Griffin Humphries LLC PO Box 999 Columbia, SC 29202 Telephone: 803-744-0800 Email: jgriffin@griffinhumphries.com

EXHIBITS

Exhibit A: General Contractor License CLG.100190

Exhibit B: Mechanical Contractor License CLM.111292

Exhibit C: Contractor License Application (DOC 165) showing Paragon Inc. of South Carolina, LLC as Licensee/Legal Name with DBA Paragon Builders

Exhibit D: Notice of Intent to Protest (filed October 27, 2025)

Ex. A

Paragon Builders General Contractor License
Expiration Date 10-31-2026

*** It is at the discretion of this licensee to designate any employee or their company to pull permits and conduct business in their name. ***

*** THIS LICENSE EXPIRES ON 10/31/2026 ***

VERIFY the **QUALIFYING PARTY** ("Qualifier") name(s) on this license is accurate. If a Qualifier ceases to serve this license, you must notify the board in writing (mail or email) within **15 business days** for your license to remain **Active**. Failure to notify the board of a qualifier loss will result in immediate **license cancellation** and disciplinary action.

BOTH PARTS OF THIS POCKETCARD MUST BE PRESENTED TO CONDUCT BUSINESS AT ALL TIMES. DO NOT TEAR CARD IN HALF.

35

PARAGON BUILDERS
PO BOX 2058
ORANGEBURG SC 29116-2058

LICENSE#: CLG.100190

South Carolina Department of Labor, Licensing and Regulation
Contractor's Licensing Board
GENERAL CONTRACTOR

PARAGON BUILDERS
2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

licensed to practice in the 2-letter Classification(s) and Group# listed below:

Building-BD5, Nonstructural Renovation-NR5

INITIAL ISSUE DATE: 01/07/1999

LICENSE EXPIRATION DATE: 10/31/2026

(If above license has "Limited Building-LB", work is limited to 3 stories in height)

GENERAL CONTRACTOR

LICENSE#: CLG.100190

EXPIRATION DATE: 10/31/2026

PARAGON BUILDERS

Qualifier(s): **DEQUINCEY S EDWARDS, STEPHON EDWARDS**

Licensee's Group# Limitation Per Job/Project (i.e., BD2 = Group 2):

Group #1 - \$100,000 Group #2 - \$400,000 Group #3 - \$1,000,000

Group #4 - \$3,000,000 Group #5 - \$Unlimited

M. Monica W. Fulton
Board Executive

WARNING - THIS DOCUMENT CONTAINS SECURITY FEATURES LISTED ON REVERSE SIDE

SOUTH CAROLINA DEPARTMENT OF LABOR, LICENSING AND REGULATION
CONTRACTOR'S LICENSING BOARD

LICENSE#: CLG.100190

PARAGON BUILDERS

2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

Has been qualified by the laws of the State of South Carolina and is duly entitled to practice as a:

GENERAL CONTRACTOR

for each Classification and Group Limitation listed below:

(If this license has a "Limited Building-LB" classification, work is limited to 3 stories in height)

Building-BD5, Nonstructural Renovation-NR5

LICENSE NUMBER: CLG.100190

Initial License Date: 01/07/1999

EXPIRATION DATE: 10/31/2026

Qualifying Party(s): DEQUINCEY S EDWARDS, STEPHON EDWARDS

Group Limitation Per Job (i.e., BD2 = Group 2):

Group #1 - \$100,000 Group #4 - \$3,000,000

Group #2 - \$400,000 Group #5 - \$Unlimited

Group #3 - \$1,000,000

M. Monica W. Fulton
Board Executive

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business on their behalf. ***

Ex. B

Paragon Builders Mechanical Contractor License
Expiration Date 10-31-2025

*** THIS LICENSE EXPIRES ON 10/31/2025 ***

QUALIFYING PARTY ("Qualifier") name(s) on this license is accurate. If a Qualifier ceases to serve this license, you must notify the board in writing (mail or em in **15 business days** for your license to remain **Active**. Failure to notify the board of a qualifier loss will result in immediate **license cancellation** and disciplinary action.

THIS IS A 2-PART POCKETCARD - FOLD CARD IN HALF - DO NOT CUT OR TEAR CARD IN HALF
BOTH PARTS OF THIS POCKETCARD MUST BE PRESENTED TO CONDUCT BUSINESS AT ALL TIMES

LICENSE#: CLM.111292

CCG 1055888

South Carolina Department of Labor, Licensing and Regulation

Contractor's Licensing Board

MECHANICAL CONTRACTOR

PARAGON BUILDERS

2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

licensed to practice in the 2-letter Classification(s) and Group# listed below:

PK5, PB5, EL5, STEPHON EDWARDS, ERIC BYRD, 121268, -74603

LICENSE EXPIRATION DATE: 10/31/2025

(If this license has a "Limited Building-LB", work is limited to 3 stories in height)

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf.***

MECHANICAL CONTRACTOR

LICENSE#: CLM.111292 - EXPIRES: 10/31/2025

PARAGON BUILDERS

Initial Issue Date: 04/28/2010 - Expiration Date: 10/31/2025

Qualifier(s): JONATHAN FERGUSON, PAUL R GILLETTE, RODGERS HAMPTON

Group Limitations Per Job/Project (i.e. AC2 = Group 2):

Group #1 - \$35,000 Group #2 - \$100,000

Group #3 - \$200,000 Group #4 - \$400,000

Group #5 - \$Unlimited

M. Monica W. Fulton
Board Executive

DO NOT PEEL CARD FROM A CORNER

To remove card from backing

- Bend form back from the outside edge
- Pull card off backing

SOUTH CAROLINA DEPARTMENT OF LABOR, LICENSING AND REGULATION
CONTRACTOR'S LICENSING BOARD

CCG 1055888

LICENSE#: CLM.111292

LICENSE#: CLM.111292

PARAGON BUILDERS

2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

Has been qualified by the laws of the State of South Carolina and is duly entitled to practice as a:

MECHANICAL CONTRACTOR

for each Classification and Group Limitation listed below:

PK5, PB5, EL5, STEPHON EDWARDS, ERIC BYRD, 121268, -74603

LICENSE NUMBER:CLM.111292

Initial License Date:04/28/2010

EXPIRATION DATE:10/31/2025

Group Limitations Per Job (i.e. AC2 = Group 2):

Group #1 - \$35,000 Group #3 - \$200,000

Group #2 - \$100,000 Group #4 - \$400,000

Group #5 - \$Unlimited

Qualifying Party(s): JONATHAN FERGUSON, PAUL R GILLETTE, RODGERS HAMPTON

M. Monica W. Fulton
Board Executive

It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf. ***

Paragon Builders Mechanical Contractor License
Expiration Date 10-31-2027

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf.***

*** THIS LICENSE EXPIRES ON 10/31/2027 ***

VERIFY the **QUALIFYING PARTY** ("Qualifier") name(s) on this license is accurate. If a Qualifier ceases to serve this license, you must notify the board in writing (mail or email) within **15 business days** for your license to remain **Active**. Failure to notify the board of a qualifier loss will result in immediate **license cancellation** and disciplinary action.

BOTH PARTS OF THIS POCKETCARD MUST BE PRESENTED TO CONDUCT BUSINESS AT ALL TIMES. DO NOT TEAR CARD IN HALF.

35
PARAGON BUILDERS
PO BOX 2058
ORANGEBURG SC 29116-2058

LICENSE#: CLM.111292

South Carolina Department of Labor, Licensing and Regulation
Contractor's Licensing Board
MECHANICAL CONTRACTOR

PARAGON BUILDERS
2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

licensed to practice in the 2-letter Classification(s) and Group# listed below:
Packaged Equipment-PK5, Plumbing-PB5, Electrical-EL5

INITIAL ISSUE DATE: 04/28/2010
LICENSE EXPIRATION DATE: 10/31/2027

MECHANICAL CONTRACTOR

LICENSE#: CLM.111292

EXPIRATION DATE: 10/31/2027

PARAGON BUILDERS

Qualifier(s): JONATHAN FERGUSON, PAUL R GILLETTE, RODGERS HAMPTON

Licensee's Group# Limitation Per Job/Project (i.e., EL2 = Group 2):

Group #1 - \$35,000 Group #2 - \$100,000 Group #3 - \$200,000
Group #4 - \$400,000 Group #5 - \$Unlimited

Jonathan Ferguson
President

WARNING - THIS DOCUMENT CONTAINS SECURITY FEATURES LISTED ON REVERSE SIDE

SOUTH CAROLINA DEPARTMENT OF LABOR, LICENSING AND REGULATION
CONTRACTOR'S LICENSING BOARD

LICENSE#: CLM.111292

PARAGON BUILDERS

2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

Has been qualified by the laws of the State of South Carolina and is duly entitled to practice as a:

MECHANICAL CONTRACTOR

for each Classification and Group Limitation listed below:

Packaged Equipment-PK5, Plumbing-PB5, Electrical-EL5

LICENSE NUMBER: CLM.111292

Initial License Date: 04/28/2010

EXPIRATION DATE: 10/31/2027

Qualifying Party(s): JONATHAN FERGUSON, PAUL R GILLETTE, RODGERS HAMPTON

Group Limitation Per Job (i.e., EL2 = Group 2):

Group #1 - \$35,000 Group #2 - \$100,000
Group #3 - \$200,000 Group #4 - \$400,000
Group #5 - \$Unlimited

Jonathan Ferguson
President

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business on their behalf. ***

Ex. C

Mechanical Contractor's Application

APPLICATION FOR LICENSURE (DOC 165)

is application form is used for:

- New license, including a business with a new name and Federal ID number, or a new type of business (Corporation, LLC, LLP, etc.)
- Reinstate a lapsed license.

not use this application if you need to revise a license, such as increasing the license group limitation, or name change with the same Federal ID number and type of business you need to complete the General and Mechanical Contractor Revision Application (Doc 180).

submit the following with your application:

- The license fee is \$350. Fees are non-refundable. License fee in the form of a check or money order made payable to SCCLB. A returned check fee of up to \$30, or an amount specified by law, may be assessed on all returned funds. NO CASH IS ACCEPTED.
- Verification to conduct business in SC from the SC Secretary of State (not required for a sole proprietorship).
- Financial Statement or Surety Bond supporting the requested group limitation.
- Completed POP/QP Initial Application(s) (Doc 168) for individuals who are not currently certified by the Board or have a certification that has been inactive for more than four years or completed POP/QP Revision Application (Doc 181) to add an active POP/QP certification or a certification that has been inactive for less than four years.

Completed applications may be submitted to the Board at PO Box 11329, Columbia, SC 29211, by email to act.clb@lr.sc.gov, or delivered in person at 110 Centerview Dr., Columbia, SC 29210.

APPLICANT INFORMATION

Individual or company listed in this section will be designated as the "License Holder." You must sign contracts, for permits, conduct business, and advertise in this name only. (See SC Code of Laws Section 40-11-20, 130-240 and 370(B)).

License/Legal Name: Paragon Inc. of South Carolina, LLC

Doing Business As (DBA) Name: Paragon Builders

Business Phone: 803-534-1900

Email (required): eric@paragonbuilders.com

Business Address: 2874 Columbia Rd, Orangeburg SC, County Orangeburg

Physical street address, City, State and Zip Code

Business Address (if different from above): Same

State Tax ID or SSN: 58-2466023

Website: www.paragonbuilders.com

Is the licensee/entity listed above a current or previous SC Contractor?

☒ YES ☐ NO

If yes, license number:

Is this a reinstatement application?

☐ YES ☒ NO

Is this a name change or form of business change?

☐ YES ☒ NO

Application for Licensure (Rev. 08/02/2023)

Mechanical Contractor's Revision Application



South Carolina Department of Labor, Licensing and Regulation
South Carolina Contractor's Licensing Board

110 Centerview Dr. • Columbia • SC • 29210

P.O. Box 11329 • Columbia • SC • 29211

Phone: 803-896-4686 • Contact: CLB@llr.sc.gov • Fax: 803-896-4814

llr.sc.gov/clb

**GENERAL AND MECHANICAL CONTRACTOR
REVISION APPLICATION (DOC. 180)**

NOTE: Find your specific instructions on the previous page (i.e. "Change of Licensing Group", "Change of Business Name or Address", etc.). The instructions will let you know which sections of the application you need to complete. You may disregard all other sections of the application not mentioned in your instructions. **All applicants must complete sections A, E and F.**

Completed applications may be submitted to the Board at PO Box 11329, Columbia, SC 29211, by email to contact.clb@llr.sc.gov, or delivered in person at 110 Centerview Dr., Columbia, SC 29210.

REQUESTED ACTION

Indicate the reason for your application below. All applicants must complete the applicable sections and attestation at the end of this application.

☐ Name Change ☐ Address Change ☐ Owner/Officer Change ☒ License Group Change

SECTION A

LICENSEE INFORMATION (as it currently appears on your license card)

ALL applicants must complete this section.

Licensee/Legal Name: Paragon Inc. of South Carolina, LLC

Doing Business As (DBA) Name: Paragon Builders License # M.111292

Business Phone: 803-534-1900 Email (required): stephon@paragonbuilderssc.com

Business Address: 2874 Columbia Road, Orangeburg, SC 29118 County: Orangeburg
Physical street address, City, State and Zip Code

Mailing Address (if different from above): POB 2058, Orangeburg, SC 29116

Federal Tax ID or SSN: 58-2466031 Website: www.paragonbuilderssc.com

SECTION B

CHANGE OF BUSINESS NAME OR ADDRESS (physical or mailing)

ONLY complete this section if you need to change your business name, corporate structure, address, or other contact information. Attach amended charter or the Secretary of State Articles of Amendment if this is a corporate name change. If your name, Federal ID No. or corporate structure has changed more than 15 business days ago, do not complete this form; you must submit a new General and Mechanical Contractor Initial Application (Doc 165).

New Business Name: _____

Doing Business As (DBA) Name: _____

Business Phone: _____ Email (required): _____

Business Address: _____ County: _____
Physical street address, City, State and Zip Code

Mailing Address (if different from above): _____

Website: _____

Type of Business:

Corporations, LLCs, LLPs, or LPs must submit a Federal Tax ID number and a SC Secretary of State Certificate of Existence.

- ☐ Sole Proprietorship ☐ Domestic/Foreign Corporation ☐ Partnership
☐ Limited Liability Partnership ☒ Limited Liability Company

State of incorporation or organization: SC

SECTION C

CHANGE OF OWNERS OR OFFICERS

ONLY complete this section if there has been a change in the Licensee's ownership or corporate leadership. Provide the name, title, and date of birth and percent of business ownership of each owner, officer, partner, and/or member of the Licensee. Attach a separate sheet if necessary.

Name: _____ Title: _____

% Ownership: _____ Date of Birth: _____

Name: _____ Title: _____

% Ownership: _____ Date of Birth: _____

Name: _____ Title: _____

% Ownership: _____ Date of Birth: _____

Name: _____ Title: _____

% Ownership: _____ Date of Birth: _____

Name: _____ Title: _____

% Ownership: _____ Date of Birth: _____

SECTION D

CHANGE OF LICENSING GROUP

ONLY complete this section if you wish to change your licensing group limit. Select the group for increase and attach the appropriate financial documentation or surety bond. Please indicate the method for which you are qualifying for the new licensing group limit. Additional information about financial group limits can be found on the Board's website.

Groups 1 and 2 – (submit one)

- Owner Prepared financial statement with an affidavit of accuracy, Document #172; or
- Surety Bond Form for General Contractors / Surety Bond Form for Mechanical Contractors

Groups 3 and 4 – (submit one)

- Financial statement compiled by a licensed CPA in accordance with GAAP, including all disclosures required by GAAP or
- Surety Bond Form for General Contractors / Surety Bond Form for Mechanical Contractors

Group 5 – (submit one)

- An audited balance sheet prepared by a licensed CPA in accordance with GAAP, including all disclosures required by GAAP; or
- Surety Bond Form for General Contractors / Surety Bond Form for Mechanical Contractors

Requested Group Limit:

☐ Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☒ Group 5

Qualifying for Requested Group Limit by:

☐ Net Worth ☐ Working Capital ☒ Surety Bond

What type of financial documentation are you submitting with your application?

☐ Audited Balance Sheet ☐ Reviewed Financial Statement ☐ Compiled Financial Statement
☐ Owner Prepared Financial Statement (Doc 172) ☐ Surety Bond

SECTION E

BACKGROUND QUESTIONS

ALL applicants must complete this section. Answer all questions below. If you answer "Yes" to any of the questions, you are required to complete and submit the Explanatory Statement of Yes Answers - Doc. 142.

1. Since your last renewal or application with the Board, has this entity or any owner, officer, partner, or member been convicted, pled guilty or nolo contendere in the US or foreign country of a felony or the offense of forgery, embezzlement, obtain money under false pretenses, theft, extortion, or conspiracy to defraud or other like offense?

☐ YES ☒ NO

If yes, in addition to Doc 142, a criminal background check must be provided from the state in which the conviction occurred along with the court disposition and any other pertinent documentation. For South Carolina criminal background reports contact SLED at www.sled.sc.gov. Out-of-state applicants may submit a state-issued report, or any report generated by an accredited agency on PBSA's website found here: thepbsa.org/. All criminal background reports must not be older than thirty (30) days from the date of application.

2. Since your last renewal or application with the Board, has this entity or any owner, officer, partner, or member had a professional license or certificate denied, suspended, revoked or otherwise been disciplined in any state or jurisdiction, including South Carolina?

☐ YES ☒ NO

If yes, in addition to Doc 142, official documentation related to the relevant disciplinary action must be provided.

3. Since your last renewal or application with the Board, does this entity or any owner, officer, partner, or member have any unresolved complaints or charges pending before any professional licensing board in South Carolina or any other state or jurisdiction?

☐ YES ☒ NO

If yes, in addition to Doc 142, official documentation related to the relevant disciplinary action must be provided.

4. Since your last renewal or application with the Board, does this entity or any owner, officer, partner, or member have any outstanding monetary judgments related to construction, or have any bankruptcies?

☐ YES ☒ NO

If yes, in addition to Doc 142, official documentation related to the monetary judgments, including the order of judgment or final disposition, and bankruptcies, as well as any payment plans that have been established to satisfy construction related monetary judgments, must be provided.

SECTION F

ATTESTATION

ALL applicants must complete this section.

I certify that the information and statements contained herein are true, accurate, and complete. I understand that the provision of false or inaccurate information may result in the cancellation or denial of a license issued pursuant to this application and may be subject to civil and criminal proceedings. I agree that all information in this application may be verified and investigated. I have read and am familiar with the South Carolina Contractor's Licensing Board Practice Act and hereby agree to abide by such laws.

Owner/Officer/Partner/Member Name (Print): Stephon Edwards

Signature: 

Title Owner

Date 8/28/2024

PRIVACY DISCLOSURE

South Carolina Law requires that every individual who applies for an occupational or professional license provide a social security number for use in the establishment, enforcement and collection of child support obligations and for reporting to certain databanks established by law. Failure to provide your social security number for these mandatory purposes will result in the denial of your licensure application. Social security numbers may also be disclosed to other governmental regulatory agencies and for identification purposes to testing providers and organizations involved in professional regulation. Your social security number will not be released for any other purpose not provided for by law.

Other personal information collected by the Department for the licensing boards it administers is limited to such personal information as is necessary to fulfill a legitimate public purpose. The South Carolina Freedom of Information Act ensures that the public has a right to access appropriate records and information possessed by a government agency. Therefore, some personal information on the application may be subject to public scrutiny or release. The Department collects and disseminates personal information in compliance with The South Carolina Freedom of Information Act, the South Carolina Family Privacy Protection Act, and other applicable privacy laws and regulations. Additionally, the Department shares certain information on the application with other governmental agencies for various governmental purposes, including research and statistical services.



South Carolina Department of Labor, Licensing and Regulation
South Carolina Contractor's Licensing Board

110 Centerview Dr. • Columbia • SC • 29210

P.O. Box 11329 • Columbia • SC • 29211

Phone: 803-896-4686 • Contact: CLB@llr.sc.gov • Fax: 803-896-4814
llr.sc.gov/clb

SURETY BOND FOR MECHANICAL CONTRACTORS

BOND NUMBER: L272743-2227

KNOW ALL MEN BY THESE PRESENTS that we

Paragon Builders, as Principal and

Lexington National Insurance Corporation, a Surety Company authorized to do business in the State of South Carolina, as Surety, its successors, assigns, and legal representatives are held and firmly bound unto the South Carolina Contractor's Licensing Board, State of South Carolina and any person or business sustaining damage within the terms of this bond for payment, as Obligee in the sum of Three Hundred Thousand Dollars (\$300,000.00) lawful money of the United States of America per License Term. We bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents. This bond is in lieu of providing a financial statement showing a minimum net worth or working capital as required in S.C. Code Ann. §40-11-260.

WHEREAS, the above bonded Principal has applied to the South Carolina Contractor's Licensing Board pursuant to Section 40-11-10 *et seq.* of the 1976 Code of Laws of South Carolina, as amended (the Act), to be granted an authorization to engage in the following construction groups with the following bond amounts:

- ☐ Group 1 Mechanical Contractor (\$7,000)
- ☐ Group 2 Mechanical Contractor (\$15,000)
- ☐ Group 3 Mechanical Contractor (\$30,000)
- ☐ Group 4 Mechanical Contractor (\$60,000)
- ☒ Group 5 Mechanical Contractor (\$300,000)

WHEREAS, the above bonded Principal is required in Section 40-11-262 of the Act to furnish the Board with a good and sufficient surety as one method of complying with one of the conditions upon which the authorization is granted.

NOW, THEREFORE, if the Principal, in compliance with 40-11-262, does not engage in an act or omission constituting a breach of construction contract or a contract for the furnishing of labor, materials, or professional services for construction undertaken by the Principal, or does not commit any unlawful act or omission in performing construction, then this obligation shall be void; otherwise it is to remain in full force and effect.

This bond is in full force and effect as to the above statutory, regulatory and procedural obligations of the Principal from 8/22/2024 through 10/31/2025 unless renewed by continuation certificate; however, the Surety or the Principal shall have the right to cancel this bond at any time by filing written notice with the South Carolina Contractor's Licensing Board and the applicable party of its intention to so cancel, giving at least thirty (30) days' notice prior to the effective date of the cancellation. This provision, however, shall not operate to relieve, release or discharge the Surety from any liability already accrued or which shall accrue before the expiration of the thirty (30) day period.

Regardless of the number of years this bond may remain in force or the number of claims against this bond, the aggregate liability of the Surety for any and all claims, suits or actions under this bond shall not exceed the sum of Three Hundred Thousand Dollars (\$ 300 ,000.00) for any License Term. Each License Term is a twenty-four month period beginning on November 1 and ending on October 31.

The Surety shall provide the board with written notice of any payment made in good faith under the Bond within thirty (30) days of such payment. No right of action shall accrue upon or by reason of this bond to or for the use or benefit of anyone whatsoever other than the Board or any person sustaining loss or damage within the terms of this bond for payment.

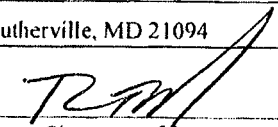
Witness our hands and seal this 22nd day of August, 20 24.

Name and Address of Surety Company (Print)

Lexington National Insurance Corporation

PO Box 6098

Lutherville, MD 21094

By: 

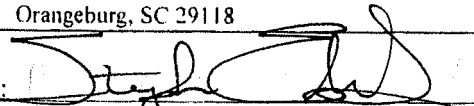
Signature of Surety (Attorney-in-Fact)
Tyler Turnbull

Name and Address of Principal (Print)

Paragon Builders

2874 Columbia Road

Orangeburg, SC 29118

By: 

Signature of Principal

Power of Attorney (attach document)

To report a claim with regard to this bond, submit a claim on the form approved by the Board to the claim address below:

(Print) Lexington National Insurance Corporation

PO Box 6098

Lutherville, MD 21094

IMPORTANT NOTICE – THIS POWER OF ATTORNEY IS VOID IF “LNIC Original” WATERMARK IS NOT PRESENT

POWER OF ATTORNEY

Lexington National Insurance Corporation

Lexington National Insurance Corporation, a corporation duly organized under the laws of the State of Florida and having its principal administrative office in Baltimore County, Maryland, does hereby make, constitute and appoint:

Tyler Turnbull, Beverly Ivey, Della Case, Brett Branton,
Brendan Coale, Matthew Rose, Scott Pelin

as its true and lawful attorney-in-fact, each in their separate capacity, with full power and authority to execute, acknowledge, seal and deliver on its behalf as surety any bond or undertaking of \$6,000,000 or less. This Power of Attorney is void if used for any bond over that amount.

This Power of Attorney is granted under and by authority of the following resolutions adopted by the Board of Directors of the Company on February 15, 2018:

Be it Resolved, that the CEO, President or any Vice-President shall be and is hereby vested with full power and authority to appoint suitable persons as Attorney-in-Fact to represent and act for and on behalf of the Company subject to the following provisions:

Attorney-in-Fact may be given full power and authority for and in the name of and on the behalf of the Company, to execute, acknowledge and deliver any and all bonds, contracts, or indemnity and other conditional or obligatory undertakings, including any and all consents for the release of retained percentages and/or final estimates on engineering and construction contracts, and any all notices and documents cancelling or terminating the Company's liability thereunder and any such instruments so executed by any Attorney-in Fact shall be binding upon the Company as if signed by the CEO, President and sealed by the Corporate Secretary.

RESOLVED further, that the signature of the CEO, President or any Vice-President of LEXINGTON NATIONAL INSURANCE CORPORATION may be affixed by facsimile to any power of attorney, and the signature of the Secretary or any Assistant Secretary and the seal of the Company may be affixed by facsimile to any certificate of such power, or any such power or certificate bearing such facsimile signature or seal shall be valid and binding on the Company. Any such power so executed and sealed and certified by certificate so executed and sealed with respect to any bond to which it is attached continue to be valid and binding upon the Company.

IN WITNESS WHEREOF, the Company have caused this instrument to be signed and their corporate seal to be hereto affixed.



Ronald A. Frank, CEO



State of Maryland
County of Harford County, SS:

Before me, a notary public, personally appeared, Ronald A. Frank, CEO of Lexington National Insurance Corporation, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

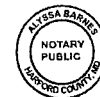
I certify under the PENALTY of PERJURY under the laws of the State of Maryland that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Commission Expires: 05/23/24

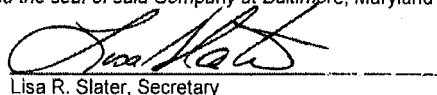


Notary



I, Lisa R. Slater, Secretary of Lexington National Insurance Corporation, do hereby certify that the above and foregoing is true and correct copy of a Power of Attorney, executed by said company, which is still in full force and effect; furthermore, the resolutions of the Boards of Directors, set out in the Power of Attorney are in full force and effect.

In Witness Whereof, I have hereunto set my hand and affixed the seal of said Company at Baltimore, Maryland this 17th day of January, 2024.

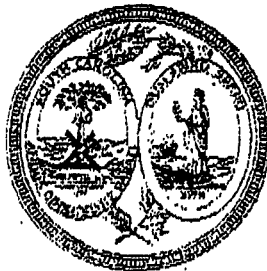


Lisa R. Slater, Secretary

Attached to bond signed this 22nd day of August, 2024

F:\lnic\Power of Attorney form CS 2021 with Watermark Seal

The State of South Carolina



Office of Secretary of State Mark Hammond

Certificate of Existence

I, Mark Hammond, Secretary of State of South Carolina Hereby certify that:

PARAGON, INC. OF SOUTH CAROLINA, LLC, A Limited Liability Company duly organized under the laws of the State of South Carolina on April 30th, 1999, with a duration that is at will, has as of this date filed all reports due this office, paid all fees, taxes and penalties owed to the Secretary of State, that the Secretary of State has not mailed notice to the company that it is subject to being dissolved by administrative action pursuant to section 33-44-809 of the South Carolina Code, and that the company has not filed articles of termination as of the date hereof.

**Given under my Hand and the Great
Seal of the State of South Carolina this
27th day of December, 2007.**

A handwritten signature in cursive script that reads "Mark Hammond".

Mark Hammond, Secretary of State

*** THIS LICENSE EXPIRES ON 10/31/2025 ***

VERIFY the QUALIFYING PARTY ("Qualifier") name(s) on this license is accurate. If a Qualifier ceases to serve this license, you must notify the board in writing (mail or email) within **15 business days** for your license to remain Active. Failure to notify the board of a qualifier loss will result in immediate license cancellation and disciplinary action.

THIS IS A 2-PART POCKETCARD - FOLD CARD IN HALF - DO NOT CUT OR TEAR CARD IN HALF
BOTH PARTS OF THIS POCKETCARD MUST BE PRESENTED TO CONDUCT BUSINESS AT ALL TIMES

CCG 1053518

CCG 1053518

LICENSE#: CLM.111816

South Carolina Department of Labor, Licensing and Regulation
Contractor's Licensing Board

MECHANICAL CONTRACTOR

PAUL R GILLETTE
DBA: GILLETTE PLUMBING

2874 COLUMBIA ROAD
ORANGEBURG SC 29118

licensed to practice in the 2-letter Classification(s) and Group# listed below:

Plumbing-PB2

LICENSE EXPIRATION DATE: 10/31/2025

(If this license has a "Limited Building-LB", work is limited to 3 stories in height)

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf.***

MECHANICAL CONTRACTOR
LICENSE#: CLM.111816 - EXPIRES: 10/31/2025

PAUL R GILLETTE
DBA: GILLETTE PLUMBING

Initial Issue Date: 09/02/2011 - Expiration Date: 10/31/2025

Qualifier(s): PAUL R GILLETTE

Group Limitations Per Job/Project (i.e. AC2 = Group 2):

Group #1 - \$35,000 Group #2 - \$100,000

Group #3 - \$200,000 Group #4 - \$400,000

Group #5 - \$Unlimited

Meronica W. Fulton
Board Executive

DO NOT PEEL CARD FROM A CORNER

To remove card from backing

- Bend form back from the outside edge
- Pull card off backing

Paul R Gillette
Qualifying Party

CCG 1053518

SOUTH CAROLINA DEPARTMENT OF LABOR, LICENSING AND REGULATION
CONTRACTOR'S LICENSING BOARD

LICENSE#: CLM.111816

LICENSE#: CLM.111816

PAUL R GILLETTE
DBA: GILLETTE PLUMBING

2874 COLUMBIA ROAD
ORANGEBURG SC 29118

Has been qualified by the laws of the State of South Carolina and is duly entitled to practice as a:

MECHANICAL CONTRACTOR

for each Classification and Group Limitation listed below:

Plumbing-PB2

LICENSE NUMBER:CLM.111816

Initial License Date:09/02/2011

EXPIRATION DATE:10/31/2025

Qualifying Party(s): PAUL R GILLETTE

Group Limitations Per Job (i.e. AC2 = Group 2):

Group #1 - \$35,000 Group #3 - \$200,000

Group #2 - \$100,000 Group #4 - \$400,000

Group #5 - \$Unlimited

Meronica W. Fulton
Board Executive

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf.***

*** THIS LICENSE EXPIRES ON 10/31/2025 ***

VERIFY the **QUALIFYING PARTY** ("Qualifier") name(s) on this license is accurate. If a Qualifier ceases to serve this license, you must notify the board in writing (mail or email) within **15 business days** for your license to remain **Active**. Failure to notify the board of a qualifier loss will result in immediate **license cancellation** and disciplinary action.

THIS IS A 2-PART POCKETCARD - FOLD CARD IN HALF - DO NOT CUT OR TEAR CARD IN HALF
BOTH PARTS OF THIS POCKETCARD MUST BE PRESENTED TO CONDUCT BUSINESS AT ALL TIMES

LICENSE#: CLM.111292

CCG 1055888

South Carolina Department of Labor, Licensing and Regulation

Contractor's Licensing Board

MECHANICAL CONTRACTOR

PARAGON BUILDERS

2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

licensed to practice in the 2-letter Classification(s) and Group# listed below:

PK5, PB5, EL5, STEPHON EDWARDS, ERIC BYRD, 121268, -74603

LICENSE EXPIRATION DATE: 10/31/2025

(If this license has a "Limited Building-LB", work is limited to 3 stories in height)

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf. ***

MECHANICAL CONTRACTOR 1055888

LICENSE#: CLM.111292 - EXPIRES: 10/31/2025

PARAGON BUILDERS

Initial Issue Date: 04/28/2010 - Expiration Date: 10/31/2025

Qualifier(s): JONATHAN FERGUSON, PAUL R GILLETTE, RODGERS HAMPTON

Group Limitations Per Job/Project (i.e. AC2 = Group 2):

Group #1 - \$35,000	Group #2 - \$100,000
Group #3 - \$200,000	Group #4 - \$400,000
Group #5 - \$Unlimited	

Monica W. Fulton
Board Executive

DO NOT PEEL CARD FROM A CORNER

To remove card from backing

- Bend form back from the outside edge
- Pull card off backing

SOUTH CAROLINA DEPARTMENT OF LABOR, LICENSING AND REGULATION CCG 1055888

CONTRACTOR'S LICENSING BOARD

LICENSE#: CLM.111292

LICENSE#: CLM.111292

PARAGON BUILDERS

2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

Has been qualified by the laws of the State of South Carolina and is duly entitled to practice as a:

MECHANICAL CONTRACTOR

for each Classification and Group Limitation listed below:

PK5, PB5, EL5, STEPHON EDWARDS, ERIC BYRD, 121268, -74603

LICENSE NUMBER:CLM.111292

Initial License Date:04/28/2010

EXPIRATION DATE:10/31/2025

Group Limitations Per Job (i.e. AC2 = Group 2):

Group #1 - \$35,000	Group #3 - \$200,000
Group #2 - \$100,000	Group #4 - \$400,000
Group #5 - \$Unlimited	

Qualifying Party(s): JONATHAN FERGUSON, PAUL R GILLETTE, RODGERS HAMPTON

Monica W. Fulton
Board Executive

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business in their behalf. ***

*** It is at the discretion of this licensee to designate any employee or their company to pull permits and conduct business in their behalf.

*** THIS LICENSE EXPIRES ON 10/31/2026 ***

VERIFY the **QUALIFYING PARTY** ("Qualifier") name(s) on this license is accurate. If a Qualifier ceases to serve this license, you must notify the board in writing (mail or email) within **15 business days** for your license to remain **Active**. Failure to notify the board of a qualifier loss will result in immediate **license cancellation** and disciplinary action.

BOTH PARTS OF THIS POCKETCARD MUST BE PRESENTED TO CONDUCT BUSINESS AT ALL TIMES. DO NOT TEAR CARD IN HALF.

35

PARAGON BUILDERS

PO BOX 2058

ORANGEBURG SC 29116-2058

LICENSE#: CLG.100190South Carolina Department of Labor, Licensing and Regulation
Contractor's Licensing Board**GENERAL CONTRACTOR****PARAGON BUILDERS**2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

licensed to practice in the 2-letter Classification(s) and Group# listed below:

Building-BD5, Nonstructural Renovation-NR5**INITIAL ISSUE DATE: 01/07/1999****LICENSE EXPIRATION DATE: 10/31/2026**

(If above license has "Limited Building-LB", work is limited to 3 stories in height)

GENERAL CONTRACTOR**LICENSE#: CLG.100190****EXPIRATION DATE: 10/31/2026****PARAGON BUILDERS**Qualifier(s): **DEQUINCEY S EDWARDS, STEPHON EDWARDS**

Licensee's Group# Limitation Per Job/Project (i.e., BD2 = Group 2):

Group #1 - \$100,000 Group #2 - \$400,000 Group #3 - \$1,000,000

Group #4 - \$3,000,000 Group #5 - \$Unlimited

Monica W. Filton
Board Executive

WARNING - THIS DOCUMENT CONTAINS SECURITY FEATURES LISTED ON REVERSE SIDE

**SOUTH CAROLINA DEPARTMENT OF LABOR, LICENSING AND REGULATION
CONTRACTOR'S LICENSING BOARD****LICENSE#: CLG.100190****PARAGON BUILDERS**2874 COLUMBIA ROAD
ORANGEBURG SC 29118-1902

Has been qualified by the laws of the State of South Carolina and is duly entitled to practice as a:

GENERAL CONTRACTOR

for each Classification and Group Limitation listed below:

(If this license has a "Limited Building-LB" classification, work is limited to 3 stories in height)

Building-BD5, Nonstructural Renovation-NR5**LICENSE NUMBER: CLG.100190****Initial License Date: 01/07/1999****EXPIRATION DATE: 10/31/2026****Qualifying Party(s): DEQUINCEY S EDWARDS, STEPHON EDWARDS****Group Limitation Per Job (i.e. BD2 = Group 2):**

Group #1 - \$100,000 Group #4 - \$3,000,000

Group #2 - \$400,000 Group #5 - \$Unlimited

Group #3 - \$1,000,000 *Monica W. Filton*
Board Executive

*** It is at the discretion of this licensee to designate any employee of their company to pull permits and conduct business on their behalf. ***

Ex. D

Notice of Intent to Protest
(filed October 27, 2025)



JAMES M. GRIFFIN
ATTORNEY AT LAW

8906 Two Notch Road, Suite 200
Columbia, South Carolina 29223
o. 803.744.0800 f. 803.744.0805
JGriffin@GriffinHumphries.com

October 27, 2025

VIA ELECTRONIC MAIL (protest-ose@mmo.sc.gov)

Office of State Engineer

Attn: Chief Procurement Officer for Construction

South Carolina Department of Natural Resources

1201 Main Street, Suite 600

Columbia, SC 29201

Re: Notice of Intent to Protest by Paragon Inc. of South Carolina LLC
Project Name: Beaufort-Wadell Mariculture
Maturation Ponds Maintenance – Re- Bid
Project Number: P24-6052-PG

Dear Sir:

Please find attached a Notice of Intent to Protest the bid award in the above referenced project number that I am submitting on behalf of my client Paragon Inc. of South Carolina LLC.

If you require any additional information, please feel free to contact me at 803-744-0800.

Sincerely,

A handwritten signature in black ink, appearing to read 'James M. Griffin'. The signature is fluid and cursive, with a large loop at the end. Below the signature, the name 'James M. Griffin' is printed in a small, sans-serif font.

James M. Griffin

cc: Eric Byrd (eric@paragonbuilderssc.com)

NOTICE OF INTENT TO PROTEST****Date:**** October 27, 2025**TO:** Chief Procurement Officer

Office of State Engineer

Construction Office

South Carolina Department of Natural Resources

Email: protest-ose@mmm.sc.gov

Physical Address: 1201 Main Street, Suite 600, Columbia, SC 29201

FROM: Paragon Inc. of South Carolina, LLC

2874 Columbia Road NE

Orangeburg, SC 29118-1902

Telephone: (803) 534-1900

Email: eric@paragonbuilderssc.com

Attention: Eric Byrd, Vice President

RE: Notice of Intent to Protest Award Decision

Project Name: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid

Project Number: P24-6052-PG

Award Notice Posted: October 20, 2025

I. NOTICE OF INTENT TO PROTEST

Pursuant to South Carolina Code Section 11-35-4210, Paragon Inc. of South Carolina, LLC ("Paragon" or "Protester") hereby submits this Notice of Intent to Protest the South Carolina Department of Natural Resources' ("SCDNR" or "Agency") decision to deem Paragon's bid non-responsive and its intent to award the above-referenced contract to Haren Construction Co. Inc.

This Notice of Intent to Protest is timely submitted within seven (7) business days of the October 20, 2025, award notice posting, as required by Section 11-35-4210.

II. INTERESTED PARTY INFORMATION**Protester:**

Paragon Inc. of South Carolina, LLC

SC Contractor's License Numbers: CLG.100190, CLM.111292

Classification(s) & Limits: Building BD5, Plumbing PB5, Electrical EL5

Contact Person:

Eric Byrd, Vice President
2874 Columbia Road NE
Orangeburg, SC 29118-1902
Telephone: (803) 534-1900
Email: eric@paragonbuilderssc.com

Legal Counsel:

James M. Griffin, Esquire
Griffin Humphries LLC
PO Box 999
Columbia, SC 29202
Telephone: 803-744-0800
Email: jgriffin@griffinhumphries.com

III. PROCUREMENT INFORMATION

Awarding Agency: South Carolina Department of Natural Resources
Project: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid
Project Number: P24-6052-PG
Bid Opening Date: September 23, 2025
Award Notice Date: October 20, 2025
Intended Awardee: Haren Construction Co. Inc.
Award Amount: \$6,207,000.00

IV. PARAGON'S BID INFORMATION

Base Bid Amount: \$5,323,800.00
Alternate #1: \$533,600.00
Alternate #2: \$568,200.00
Alternate #3: \$573,350.00
Status: Deemed "Non-Responsive" by Agency

V. GROUNDS FOR PROTEST (SUMMARY)

Paragon protests the Agency's determination that its bid was non-responsive based on alleged violations of South Carolina Code Sections 40-11-270, 40-11-340, and 40-11-370. Specifically, Paragon contends:

A. Paragon's Plumbing License Covers the Yard Piping Work (Section 40-11-340 Compliance)

Issue: The Agency apparently determined that Paragon's Plumbing License (PB5) does not cover the yard piping installation for non-potable water from the head tower to the fishponds, which constitutes 53% of the project scope.

Paragon's Position:

1. Statutory Coverage: The definition of "Plumbing" under Section 40-11-410(5)(f) explicitly includes:

- "installation, alteration, and repair of all piping, fixtures, and appliances related to water supply"
- "installation of a system of pipes, fittings, fixtures, drains, and all necessary component parts **upon the premises or in a building** to supply water to buildings"
- Work performed "***solely within property lines** and not on public easements or rights-of-way"

2. Project Characteristics Support Plumbing Classification:

- All piping is **within the Beaufort-Waddell property lines
- No work is on public easements or rights-of-way
- The work involves piping systems on the premises to supply water (albeit non-potable) to the fishponds
- The statute does not distinguish between potable and non-potable water for piping within private property
- The exclusion for "municipal or related water supply systems" does not apply to this private aquaculture facility

3. Section 40-11-340 Compliance:

Because Paragon's Plumbing license (PB5) covers 53% of the work, Paragon meets the 40% threshold required under Section 40-11-340 to act as sole prime contractor. Combined with Paragon's Electrical license (EL5) (19%) and Building license BD5) (13%), work not covered under a separate License classification (15%), Paragon is licensed to perform 100% of the total project work.

B. Compliance with Section 40-11-270 (License Classification Requirements)

Paragon holds appropriate licenses in all required classifications:

- Building BD5 – for concrete structures and access work (13%)
- Plumbing PB5 – for yard piping from head tower to ponds (53%)

- Electrical EL5 – for electrical panel replacement and pond wiring (19%)

For the pond liner work (15%), which requires no specific license, Paragon will utilize its Building classification or engage appropriately licensed subcontractors as needed.

C. Compliance with Section 40-11-370 (Business Name)

Issue: The Agency cited Section 40-11-370(B) regarding engaging in construction under a name other than the exact name on the license.

Paragon's Position:

Paragon's bid was submitted under "Paragon Inc. of South Carolina, LLC," which matches its legal business name and contractor license. Any alleged discrepancy is a secondary issue that does not warrant bid rejection, particularly when:

- The entity is properly identified
- All license numbers are correctly provided
- The qualifying party is properly designated
- There is no indication of fraud, misrepresentation, or attempt to circumvent licensing requirements

VI. PREJUDICE TO PARAGON

Paragon will suffer substantial prejudice if the protest is not granted:

1. Financial Harm: Paragon submitted the lowest responsible bid. The difference between Paragon's total bid (\$5,857,400) and the intended award (\$6,207,000) is \$349,600 more than Paragon's total bid.
2. Loss of Business Opportunity: Paragon is a qualified, properly licensed contractor capable of performing this work in accordance with all applicable laws and regulations.
3. Improper Interpretation of Law: The Agency's restrictive interpretation of the Plumbing license definition would improperly exclude legitimate plumbing work from the statutory scope, contrary to legislative intent.
4. Competitive Disadvantage: If this interpretation stands, it would create uncertainty for contractors bidding on similar projects involving water piping systems on private property.

VII. RELIEF REQUESTED

Paragon respectfully requests that the Chief Procurement Officer:

1. Reverse the determination that Paragon's bid is non-responsive.
2. Find that Paragon's Plumbing license (PB5) properly covers the yard piping installation work as defined in Section 40-11-410(5)(f);
3. Find that Paragon meets all requirements of Sections 40-11-270, 40-11-340, and 40-11-370;
4. Determine that Paragon submitted the lowest responsive and responsible bid; and
5. Award the contract to Paragon Inc. of South Carolina, LLC.

VIII. REQUEST FOR DOCUMENTS

Pursuant to Section 11-35-410 and protest procedures, Paragon requests access to the following documents within five (5) days:

1. Complete bid tabulation showing all bids received
2. All documentation related to the responsiveness determination for Paragon's bid
3. All documentation related to the responsiveness determination for the two other bidders (Haren Construction and BRW Construction).
4. Any communications within SCDNR or between other South Carolina State Agencies, legal counsel or personnel regarding license classification interpretation for this project
5. Any legal opinions or guidance sought regarding the plumbing license scope
6. Haren Construction and BRW Construction's license documentation and classifications
7. Any protest or inquiry submitted by any other bidder
8. Complete bid documents submitted by the two other bidders including a copy of the sealed bid envelope.

IX. FORMAL PROTEST TO FOLLOW

This Notice of Intent to Protest will be followed by a formal written protest within fifteen (15) days of the date the award notice was posted (October 20, 2025), as required by Section 11-35-4210.

X. CONSENT TO ELECTRONIC COMMUNICATIONS

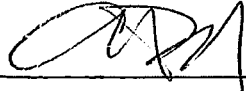
By submitting this Notice of Intent to Protest to protest-ose@mmm.sc.gov, Paragon (and any person acting on Paragon's behalf) consents to receive communications regarding this protest (and any related protests) at the email address of Paragon's legal counsel, James M. Griffin at jgriffin@griffinhumphries.com with copies to eric@paragonbuilderssc.com.

XI. CERTIFICATION

The undersigned certifies that the statements contained in this Notice of Intent to Protest are true and accurate to the best of knowledge and belief.

Respectfully submitted this 27th day of October 2025.

PARAGON INC. OF SOUTH CAROLINA, LLC

By:  _____

Eric Byrd, Vice President

2874 Columbia Road NE
Orangeburg, SC 29118-1902
Telephone: (803) 534-1900
Email: eric@paragonbuilderssc.com

XII. CERTIFICATE OF SERVICE

I hereby certify that a copy of this Notice of Intent to Protest has been served via email on this 27th day of October, 2025, to:

****Chief Procurement Officer****

Office of State Engineer

Email: protest-ose@mmm.sc.gov

****South Carolina Department of Natural Resources****

Attention: Jeff Boyer, Engineer III

Email: boyerj@dnr.sc.gov

****Intended Awardee:****

Haren Construction Co. Inc.

[Address and contact information to be obtained from public records]

****Legal Counsel for Protester: ****

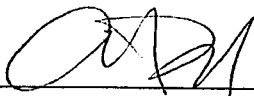
James M. Griffin, Esquire

Griffin Humphries LLC

PO Box 999

Columbia, SC 29202

Email: jgriffin@griffinhumphries.com

By: 

Eric Byrd, Vice President

11/18/25, 5:51 PM

Advertisement Print Page | scbo.sc.gov

Exhibit B

South Carolina Business Opportunities

Published by Division of Procurement Services - Delbert H. Singleton, Jr., Division Director

Ad Category: Construction

Ad Start Date: August 12, 2025

Agency/Owner: Department of Natural Resources

Project Name: Beaufort-Waddell Mariculture Maturation Ponds Maintenance *RE-BID*

Project Number: P24-6052-PG

Construction Cost Range: \$4,500,000 to \$7,000,000

Project Location: Waddell Mariculture Center

Description of Project/Services:

REBID * Revised Scope * - Rehabilitation of rearing ponds, replacement of yard piping and electrical

Bid/Submittal Due Date & Time: September 18, 2025 - 2:00pm

Number of Bid/Submittal Copies: 1

Project Delivery Method: Design-Bid-Build

Agency Project Coordinator: Jeff Boyer

Email: Boyerj@dnr.sc.gov

Telephone: (803) 360-0042

Documents May Be Obtained From: Karen Jones via email: Jonesk@dnr.sc.gov or phone 803-360-0042

Project Details: https://scbo.sc.gov/files/scbo/SE-310_2nd_Rebid_P24-6052-PG.pdf

South Carolina Business Opportunities • SCBO Team • 1333 Main Street, Suite 700 • Columbia, SC 29201
803-737-0600 • scbo@mmo.sc.gov • <https://scbo.sc.gov> • <https://procurement.sc.gov>



Exhibit C

Subcontractor listing - EL

Bid Due Date: 9/23/2025

[illegible]

* South Carolina Code of Laws SECTION 40-11-200, 270, 340, & 370. 40% or more of the work as measured by the total cost of construction does not fall under one or more of the licensee's license classifications or subclassifications.

The above information is certified to be true and correct to the best of my knowledge:

Warren Jones Date: 10/15/23

Exhibit D

[Print this page](#)**Board: Commercial Contractors**

PARAGON BUILDERS
2874 COLUMBIA ROAD
ORANGEBURG, SC 29118-1902
(803) 534-1900

License number: 100190
License type: GENERAL CONTRACTOR
Status: ACTIVE
Expiration: 10/31/2026
First Issuance Date: 01/07/1999
Classification:
Building-BD5
Nonstructural Renovation-NR5

Qualified By: Surety Bond
President / Owner: STEPHON EDWARDS

[Click here for Classification definitions and licensee's contract dollar limit](#)

Supervised By
EDWARDS DEQUINCEY (CQG)
EDWARDS STEPHON (CQG)

[File a Complaint against this licensee](#)

Board Public Action History:

View Orders		View Other License for this Person		
	Order Date	Name	License Type	License Number
View	8/5/2025	PARAGON BUILDERS	CLG	100190

[Print this page](#)**Board: Commercial Contractors**

PARAGON BUILDERS
2874 COLUMBIA ROAD
ORANGEBURG, SC 29118-1902
(803) 534-1900

License number: 111292
License type: MECHANICAL CONTRACTOR
Status: ACTIVE
Expiration: 10/31/2027
First Issuance Date: 04/28/2010
Classification:
Packaged Equipment-PK5
Plumbing-PB5
Electrical-EL5

Qualified By: Surety Bond
President / Owner: STEPHON EDWARDS
Vice President: ERIC BYRD

[Click here for Classification definitions and licensee's contract dollar limit](#)

Supervised By
GILLETTE PAUL (COM)
HAMPTON RODGERS (COM)
FERGUSON JONATHAN (COM)

[File a Complaint against this licensee](#)

Board Public Action History:[View Orders](#)[View Other License for this Person](#)[No Orders Found](#)

Exhibit E

State of South Carolina
Department of Natural Resources



Thomas S. Mullikin, PhD, JD, Director
David Tarrant, Chief Operations Officer

Date 10/17/2025

Re: Beaufort - Waddell Mariculture Maturation Pond Maintenance
P24-6052-PG

Determination of non-responsibility – Paragon Inc. of South Carolina LLC.

The South Carolina Department of Natural Resources opened bids for the Beaufort - Waddell Mariculture Maturation Pond Maintenance project on 9/23/2025. Paragon Inc. of South Carolina LLC appeared to have submitted the lowest bids for the project. After careful review of the submitted bid documents and correspondence with SC LLR and OSE the following was determined:

1. Paragon Inc. of South Carolina LLC. does not have a contractor's license under that name. There is no contractor license in the SCLLR database for Paragon Inc. of South Carolina LLC., however there is a license for Paragon Builders owned by the same owner. *
2. Paragon Builders does not have the proper license classifications or subclassifications to act as a sole prime contractor per SCLLR for this project. Paragon Builders has the following licenses BD5, NR5, PB5 and EL5. Of these licenses only EL is applicable, which comprises 17% of the work requiring a SCLLR license. **

Based on the engineer's opinion, estimated cost and scope of work it is determined that the majority of the work (80%) requires licensure under a (WL) Water and Sewer Line license classification.

According to South Carolina Code of Laws:

***SECTION 40-11-370.** License required to use term "licensed contractor"; engaging in construction under assumed name; enforcement of contract.

(B) It is unlawful to engage in construction under a name other than the exact name which appears on the license issued pursuant to this chapter. "Engaging in construction" includes marketing, advertising, using site signs, and submitting contracts. This requirement does not include advertising on vehicles, which may use an abbreviated version of the license name so long as the advertising is not misleading.

****SECTION 40-11-340.** Qualifications for acting as sole prime contractor.

An entity licensed under the classifications or subclassifications in Sections 40-11-410(1), (2), or (3) may act as a sole prime contractor on a project if forty percent or more of the work as measured by the total cost of construction falls under one or more of the licensee's license classifications or subclassifications. An entity licensed under the classifications or subclassifications in Section 40-11-410(4) and (5) may act as sole prime contractor if fifty-one percent or more of the work falls under one or more of the licensee's license classifications or subclassifications.

See Attachment A - Email corresponded from SC LLR regarding WL classification for this project.

SE-370**Exhibit F****NOTICE OF INTENT TO AWARD - DESIGN-BID-BUILD CONTRACT****AGENCY:** DNR - Department of Natural Resources**PROJECT NAME:** Beaufort-Waddell Mariculture Maturation Ponds Maintenance**PROJECT NUMBER:** P24-6052-CB**POSTING DATE:** 10/20/2025**TO ALL BIDDERS**

Unless stayed by protest or canceled, the Agency intends to enter into a contract as noted below. The successful bid will be accepted and the contract formed by execution of the contract documents. All bid bonds remain in effect for the bid acceptance period as provided in Section 4 of the Bid Form, except as otherwise provided in the Instructions to Bidders.

NAME OF BIDDER: Haren Construction Co. Inc**DATE BIDS WERE OPENED:** 09/23/2025**BID INFORMATION:****BASE BID AMOUNT:** \$5,682,000.00

ALTERNATES:	#1	ACCEPTED	☒	<u>\$525,000.00</u>
	#2	ACCEPTED	☐	<u>\$540,000.00</u>
	#3	ACCEPTED	☐	<u>\$600,000.00</u>

TOTAL BID AMOUNT: \$6,207,000.00**TOTAL CONTRACT AWARD:** \$6,207,000.00*(If the Total Contract Award is different from the Total Bid Amount, explain any negotiations that resulted in the change.)*N/A**REMARKS:** *(If "No Contract to be Awarded" was entered above, indicate the reason.)*N/A

Contractor should not incur any costs associated with the contract prior to receipt of a contract from the Agency for execution. Contractor should not perform any work before receipt of the Agency's written Notice to Proceed.

RIGHT TO PROTEST (SC Code 11-35-4210)

Any actual bidder, offeror, contractor, or subcontractor who is aggrieved in connection with the intended award or award of this contract may be entitled to protest. 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 appropriate Chief Procurement Officer within the time provided.

PROTEST - CPO ADDRESS - OSE: Any protest must be addressed to the Chief Procurement Officer for Construction, Office of State Engineer, and submitted in writing (a) by email to: protest-ose@mmo.sc.gov, or (b) 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 email address from which you sent your protest.

Pursuant to Section 11-35-410, documents directly connected to a procurement activity may be available within five days after request. All document requests should be directed to the procuring agency project coordinator. If a protest is pending, the protestant's lawyer may access otherwise unavailable information by applying to the CPO for the issuance of a protective order. Additional information is available at www.procurement.sc.gov/legal.

BY: Jeff Boyer **TITLE:** Engineer III **DATE:** 10/17/2025**ACKNOWLEDGED BY OSE PROJECT MANAGER:** Perry Derrick **DATE:** 10/20/2025**ROA 1050**

Exhibit G

State of South Carolina
Department of Natural Resources



Thomas S. Mullikin, PhD, JD, Director
David Tarrant, Chief Operations Officer

Date 10/30/2025

Re: Beaufort - Waddell Mariculture Maturation Pond Maintenance
P24-6052-PG

Determination of non-responsibility – Paragon Inc. of South Carolina LLC.

Dear Mr. White,

In response to Paragon Inc. of South Carolina LLC. (herein after referred to as Paragon Inc.) notice of intent to protest the bid award for the Beaufort – Waddell Mariculture Maturation Pond Maintenance – Re-Bid I offer SCDNR's reasoning for our decision to deem Paragon Inc. Non- Responsible.

Just to clarify, SCDNR deemed Paragon Inc. "Non- Responsible" and not Non-Responsive as noted in their notice of intent to protest. A copy of the bid tabulation sent to all bidders is attached.

Background.

The Beaufort – Waddell Mariculture Maturation Pond Maintenance – Re-Bid project involves the renovation of SCDNR's marine fish hatchery in Bluffton, SC. This facility basically works by pumping seawater into an elevated concrete tower where is then released, by a series of valves, to flow by gravity to several in ground ponds via a network of underground pipes and valves ranging from 8" to 12". The seawater is held in the ponds for a period needed for fish production and then drained into a concrete outlet structure where the fish are harvested. The drained seawater is discharged into a drainage ditch and returned to the saltmarsh. Each pond also has electrical components needed to service the ponds.

Scope of Work

Renovation of the hatchery involves the replacement of the main line piping network from the elevated holding tower to the ponds, electrical network, rehabbing the concrete water tower (cleaning, coating and replacement of all piping), replacement of concrete outlet structures in the ponds, replacement of pond liners and associated minor grading. No buildings are being constructed or renovated in this project.

SCDNR determination of non-responsible

SCDNR determined that Paragon Inc. was Non Responsible based on correspondence with South Carolina Department of Labor, Licensing and Regulation (SCLLR) the S.C. Code of Laws Section 40-11-340 and 370 and OSE project manager Clint Burdett.

In accordance with OSE manual policies and guidance for establishment and maintenance of permanent improvement projects, section 6.11 Determination of Bidders Responsibility, SCDNR carefully reviewed the documentation provided by each of the 3 bidders on this project. Investigation of Paragon Inc. licensure with SCLLR found no SCLLR license under the name of Paragon Inc. of South Carolina, LLC. A search on the SC Contractors License Numbers provided in the SE-330 Bid Form, CLG 100190 and CML 111292 did find active General and Mechanical Contractors license for Paragon Builders with classifications of BD5, NR5, EL5, PK5 and PB5. Also noted on the General Contractors license page was a SCLLR Citation and Notification of Penalty for General and/or Mechanical Contracting for engaging in contracting work or submitting a bid when not properly licensed issued 8/4/2025.

Since the name on the bid documents did not have a license according to the SCLLR website, we contacted SCLLR for further clarification. SCLLR responded, citing:

S.C. Code of Laws Title 40 Chapter 11:

SECTION 40-11-370. License required to use term "licensed contractor"; engaging in construction under assumed name; enforcement of contract.

(B) It is unlawful to engage in construction under a name other than the exact name which appears on the license issued pursuant to this chapter. "Engaging in construction" includes marketing, advertising, using site signs, and submitting contracts. This requirement does not include advertising on vehicles, which may use an abbreviated version of the license name so long as the advertising is not misleading.

SECTION 40-11-420. Requirements for obtaining building permit; list of licensed contractors performing work on project.

(A) Building permits, when required by law, must be obtained by the sole prime contractor in the name appearing on that entity's contractor's license.

Subsequent correspondence with SCLLR regarding the proper license required for the major portion of work confirmed that a Water and Sewer Line (WL) classification was appropriate. Based on the EOR opinion of cost, over 40% of the work requires a SCLLR General Contractors license WL classification, see Bold sections below. Paragon Builders does not have a WL license.

SECTION 40-11-410. License classifications and subclassifications.

(c) "Water and Sewer Lines" which **includes construction work on water mains, water service lines, water storage tanks, sewer mains, sewer lines, lift stations, pumping stations and appurtenances to water storage tanks, lift stations, pumping stations, pavement patching, backfill, and erosion control as a part of construction, and which includes connection at the building of all lines to the appropriate lines contained in commercial structures, installation and repair of a project involving manholes, the laying of pipe for storm drains and sewer mains, all necessary connections, and excavation and backfilling, and concrete work incidental thereto.**

Paragon Inc. stance that a Plumbing License (PB) is appropriate for 53% of the work in our determination is not valid. SCDNR's interpretation of the work that can be performed under a PB license is limited to "Supply water to buildings and convey sewage or other waste products from buildings". Please note that in Paragons Inc.'s Notice of Intent page 3 of 7, excerpt below, further supports our determination.

- "installation of a system of pipes, fittings, fixtures, drains, and all necessary component parts **upon the premises or in a building** to supply water to buildings".

There are no buildings being built or renovated in this project, therefore the PB classification is not appropriate for the work.

The bids were submitted on September 23, 2025, and are good for 60 days (November 22, 2025) If at all possible, we would like to have a determination prior to this date so we can proceed with the project. This is our 3rd advertisement, so we very much need to make an award.

Please let me know if you have any questions or need any information.

Jeff Boyer
Engineer III

Attachments. Attachment A - SCDNR & SCLLR email correspondence
EOR opinion of cost with License %

CC Andy Wicker PE SCDNR
Clint Burdett, OSE

Attachement A

From: Rhonda Jackson
To: Jeff Boyer
Subject: RE: Contractor licensing questions
Date: Wednesday, October 15, 2025 10:48:18 AM
Attachments: [image004.png](#)
[image006.png](#)
[image001.png](#)
[image002.png](#)

If the work is over \$10,000, the Water & Sewer Line classification is more than likely what is required. You will need to speak directly with the Building Official at your local city or county Building Department or Permit Office where the work will be performed to assist you with reviewing the plans/contract to determine if a license is required, and if so, the license type and/or license classification(s).

Thank you.

Rhonda T. Jackson

Program Coordinator

S.C. Contractor's Licensing Board

Ph: (803) 896-4627 - Fax (803) 896-4814

[Contractors Website](#) / [Licensing](#) / [Licensee Lookup](#) / [Online Services](#)

Please click the link below or [here](#) to complete a quick survey about the service you received from me today ☺



LABOR
LICENSING
REGULATION



Making South Carolina a Safe Place to Work and Live

Twitter: [@SCDLLR](#), Facebook: [@SCLLR](#), Website: www.llr.sc.gov/clb

110 Centerview Drive, Columbia, SC 29210 (overnight mail)

P.O. Box 11329, Columbia, SC 29211 (regular mail)

From: Jeff Boyer <BoyerJ@dnr.sc.gov>
Sent: Tuesday, October 14, 2025 10:00 AM
To: Rhonda Jackson <rhonda.jackson@llr.sc.gov>
Subject: RE: Contractor licensing questions

----- SCDLLR NOTICE (M365) -----

- This email is from an external email address. Please use caution when deciding whether to open any attachments or when clicking links.
- Personally Identifiable Information (PII) should not be included in e-mail text or attachments. Do not save or transmit PII unencrypted.

Ms. Jackson,

Can you provide some guidance on the licensing requirements.

If we are requesting the installation a main waterline from a water tower to a pond and no occupied building is involved, what license does SCLLR required the contractor to hold?

Thank you for your assistance

Jeff Boyer

S.C. Dept. of Natural Resources

Phone No. (803) 360-0042

boyerj@dnr.sc.gov

From: Rhonda Jackson <rhonda.jackson@llr.sc.gov>

Sent: Tuesday, September 30, 2025 2:11 PM

To: Jeff Boyer <BoyerJ@dnr.sc.gov>

Subject: RE: Contractor licensing questions

You don't often get email from rhonda.jackson@llr.sc.gov. [Learn why this is important](#)

We/staff is not qualified to review plans to determine the appropriate licensing needed. The local building official can assist with that. The statute does state:

<https://www.scstatehouse.gov/code/t40c011.php>

SECTION 40-11-370.License required to use term "licensed contractor"; engaging in construction under assumed name; enforcement of contract.

(B) It is unlawful to engage in construction under a name other than the exact name which appears on the license issued pursuant to this chapter. "Engaging in construction" includes marketing, advertising, using site signs, and submitting contracts. This requirement does not include advertising on vehicles, which may use an abbreviated version of the license name so long as the advertising is not misleading.

SECTION 40-11-420.Requirements for obtaining building permit; list of licensed contractors performing work on project.

(A) Building permits, when required by law, must be obtained by the sole prime contractor in the name appearing on that entity's contractor's license.

If they are awarded the job, you can submit a protest to the building official.

Thank you.

Rhonda T. Jackson

Program Coordinator

S.C. Contractor's Licensing Board

Ph: (803) 896-4627 - Fax (803) 896-4814

[Contractors Website](#) / [Licensing](#) / [Licensee Lookup](#) / [Online Services](#)

Please click the link below or [here](#) to complete a quick survey about the service you received from me today ☺



Making South Carolina a Safe Place to Work and Live

Twitter: [@SCDLLR](#), Facebook: [@SCLLR](#), Website: www.llr.sc.gov/clb

110 Centerview Drive, Columbia, SC 29210 (overnight mail)

P.O. Box 11329, Columbia, SC 29211 (regular mail)

From: Jeff Boyer <BoyerJ@dnr.sc.gov>

Sent: Wednesday, September 24, 2025 10:57 AM

To: Contact.CLB <Contact.CLB@llr.sc.gov>

Subject: Contractor licensing questions

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I have a couple of questions regarding a recent solicitation by SCDNR. Below is the information regarding my questions.

SCDNR has a saltwater fish hatchery in Beaufort South Carolina. This facility basically works by pumping seawater into a concrete tower where is then released, by a series of valves, to flow by gravity to several in ground ponds via a network of underground pipes and valves ranging from 8" to 12". The seawater flows into the ponds and is discharged through a concrete outlet structure. Each pond also has electrical components needed to service the ponds.

SCDNR recently solicited bids to rehab this hatchery which included replacement of the piping network, electrical network, rehabbing the concrete water tower (cleaning, coating and replacement of all piping), replacement of concrete outlet structures, replacement of pond liners and associated minor grading. All work takes place withing the boundary of SCDNR property. A copy of the bid drawings is attached.

On 9/23/2025 SCDNR received bids from 3 contractors. Paragon Inc. of South Carolina, LLC is the apparent low bid. Below is Paragons information that was provided in the bid documents.

A copy of the last page of the bid form that shows the information submitted from Paragon is attached along with copies of Paragon Builders Licenses obtained from

the SCLLR website.

Paragon Inc. of South Carolina, LLC

SC Contractors License: CLG 100190 & CML111292

License Classification: BD5, PB5, EL5

When I go to the License Look up on the SCLLR website I am unable to find a SC Contractors License for "Paragon Inc. of South Carolina LLC". When I look up the contractor's License numbers provided, it shows a "Paragon Builders".

Questions

1. Is the bid valid since Paragon Builders bid the job under a business name other than the exact name which appears on the license issued?
2. Is a PB (Plumbing) License appropriate for the scope of work?

Please let me know if you have any questions or need additional information.

Thanks

Jeff Boyer

S.C. Dept. of Natural Resources

Phone No. (803) 360-0042

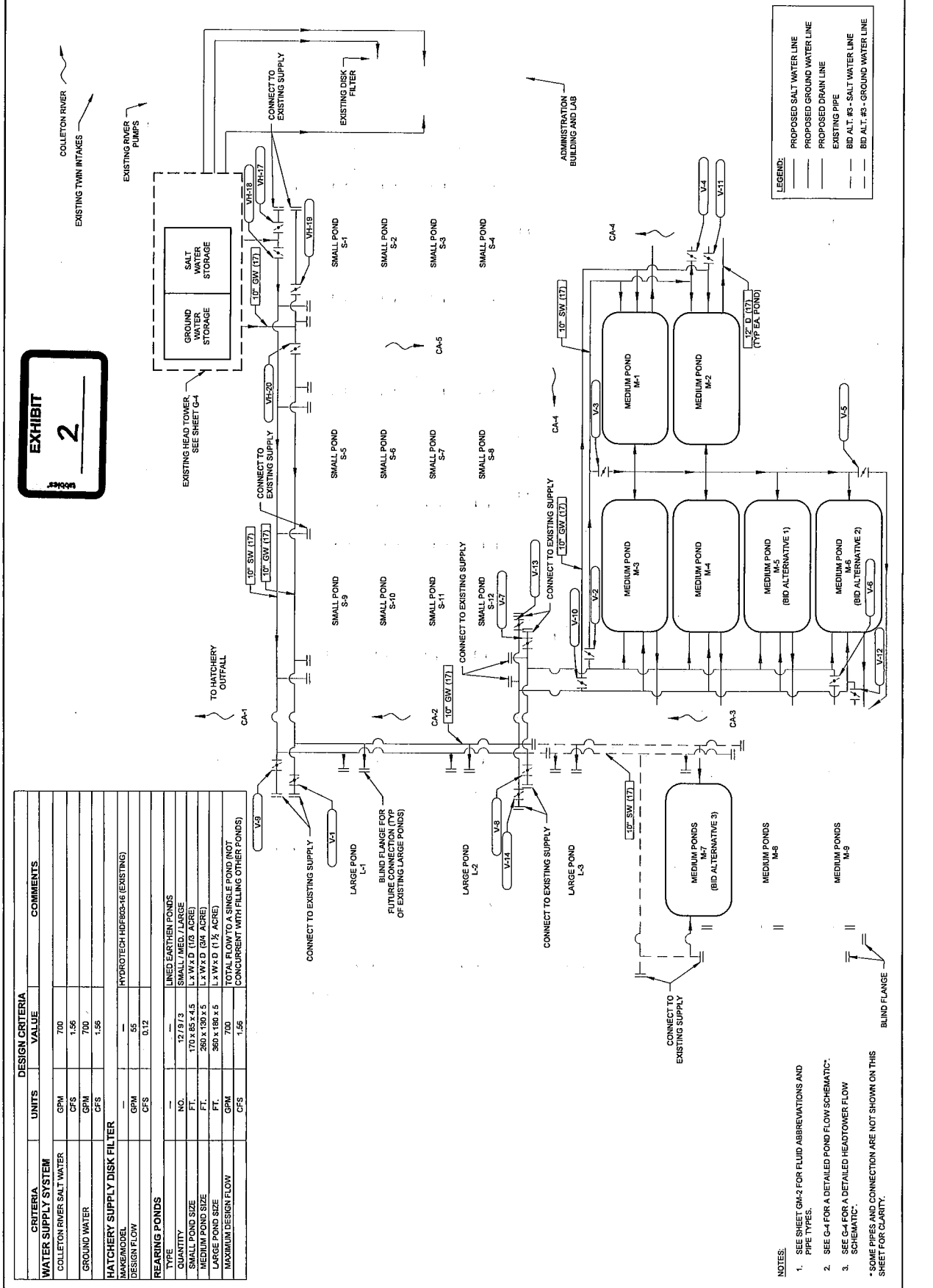
boyerj@dnr.sc.gov

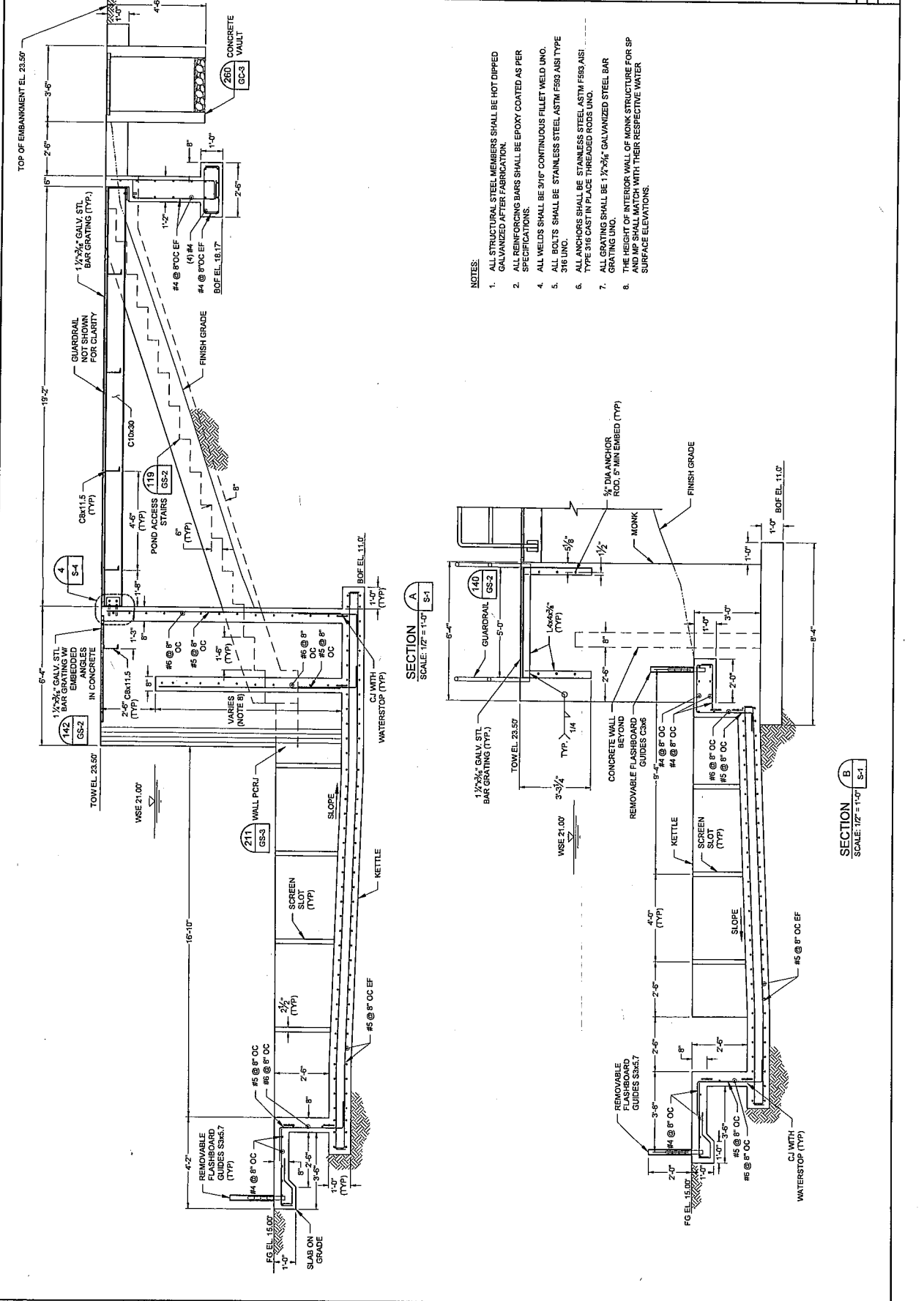
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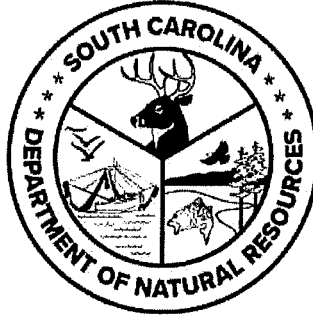
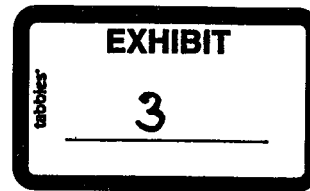
EXTERNAL EMAIL: Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Waddell Mariculture Center
100% Design Cost Estimate (Design Reduction)
Rev. 2

Construction Item	Quantity	Unit	Cost	Extension	totals
1 Mobilization/Demobilization	1	LS	\$ 125,000	\$ 125,000	\$ 125,000
2 General Conditions					
Supervision (Assuming 8 month Duration)					
Superintendent (\$90/hr)	8	mo	\$ 15,500	\$ 124,000	no license
Field Engineer (\$60/hr)	8	mo	\$ 10,300	\$ 82,400	no license
Home Office Support (\$90/hr; 3/4 time for project duration)	6	mo	\$ 13,700	\$ 82,200	no license
Subsistence (\$500/wk/person for 6 person crew)	32	wk	\$ 3,000	\$ 96,000	no license
Communications & Field Office Expense	8	mo	\$ 300	\$ 2,400	no license
Trailer (1 Trailer)	8	mo	\$ 300	\$ 2,400	no license
Pickup Rental & Fuel (Two Pickups)	16	mo	\$ 1,800	\$ 28,800	no license
Excavator	8	mo	\$ 6,600	\$ 52,800	no license
Dump Truck	8	mo	\$ 1,500	\$ 12,000	no license
			Subtotal	\$	483,000
3 Site					
Demolition					
Buried Piping (Labor for Operator & Labor)	60	HR	\$ 75	\$ 6,000	no license
Disposal (Tipping Fee)	3,000	CY	\$ 6	\$ 18,000	no license
Hauling (Buried Pipe)	4,000	CY	\$ 15	\$ 60,000	no license
Yard Piping					
10" DR17 HDPE	6,000	LF	\$ 108	\$ 648,000	
8" DR17 HDPE	256	LF	\$ 90	\$ 23,040	
6" DR17 HDPE	512	LF	\$ 72	\$ 36,864	
10" Butterfly Valve	12	EA	\$ 7,500	\$ 90,000	787,904 WL
Electrical and Controls					
Material	1	LS	\$ 204,000	\$ 204,000	
Labor	1	LS	\$ 289,500	\$ 289,500	533,500 EL
Tools & Equipment	1	LS	\$ 40,000	\$ 40,000	
			Subtotal	\$	1,415,404
4 Medium Pond	Number of Ponds =	4			
Demolition					
Labor for Operator & Labor	40	HR	\$ 75	\$ 3,000	no license
Disposal (Tipping Fee)	100	CY	\$ 6	\$ 600	no license
Hauling	100	CY	\$ 15	\$ 1,500	no license
Liner & Outlet					
Subgrade Preparation & Excavation	72	CY	\$ 25	\$ 1,800	
Concrete (Slabs)	10	CY	\$ 1,800	\$ 18,000	
Concrete (Kerls)	20	CY	\$ 1,800	\$ 36,000	
Concrete (Mort)	7	CY	\$ 1,800	\$ 12,600	68,400 CC
HDPE Liner (34,000sf surface area + 10% for side slopes)	38,000	SF	\$ 4	\$ 152,000	
Handrail	76	LF	\$ 40	\$ 3,040	
Gutting	100	SF	\$ 60	\$ 6,000	
L 4x4x8	27	LF	\$ 50	\$ 1,350	
HSS 3x2x1/4	18	LF	\$ 50	\$ 900	
HSS 1.5x1.5x1/4	18	LF	\$ 50	\$ 900	
S 3x5.7	69	LF	\$ 55	\$ 3,795	15,945 MM
2x4 Treated Pine Board	318	LF	\$ 10	\$ 3,180	
Piping and Valves					
8" PVC Pipe	125	LF	\$ 80	\$ 10,000	
4" PVC Pipe	50	LF	\$ 40	\$ 2,000	
8" HDPE 45 Elbow	2	EA	\$ 200	\$ 400	
8" Tee	2	EA	\$ 800	\$ 1,600	
8" 90 elbow	2	EA	\$ 550	\$ 1,100	
8" 45 elbow	2	EA	\$ 550	\$ 1,100	
8" butterfly valve	3	EA	\$ 5,000	\$ 15,000	
8" Pinch Valve	1	EA	\$ 5,000	\$ 5,000	
8" to 4" reducer	1	EA	\$ 500	\$ 500	
4" 90 elbow	6	EA	\$ 100	\$ 600	
4" Tee	1	EA	\$ 140	\$ 140	
4" Pinch Valve	2	EA	\$ 1,500	\$ 3,000	
10" Dia Knife Gate	2	EA	\$ 15,000	\$ 30,000	1,260,260 WL
			Subtotal	\$	
5 Head Tower Rehab					
Recoat Tower Interior	2,000	SF	\$ 50	\$ 100,000	
Recoat Tower Exterior	2,000	SF	\$ 20	\$ 40,000	
Replace/Enlarge Overflows (24" Dia)	100	LF	\$ 240	\$ 24,000	
Misc. Pipe Supports and Link Seals	1	LS	\$ 25,000	\$ 25,000	
Modify Drain - New Piping (8" dia), and deaerout	75	LF	\$ 80	\$ 6,000	
8" DIA BFV	4	EA	\$ 5,000	\$ 20,000	
Reroute inflow piping to allow backflushing (8" dia PVC)	75	LF	\$ 60	\$ 4,500	
8" dia BFV	6	EA	\$ 4,000	\$ 24,000	
Misc. Concrete Coring and Repair	1	LS	\$ 40,000	\$ 40,000	
10" GW Piping	50	LF	\$ 200	\$ 10,000	
8" GW Piping	50	LF	\$ 160	\$ 8,000	
12" SW Piping	75	LF	\$ 240	\$ 18,000	
10" DIA Valve	5	EA	\$ 7,500	\$ 37,500	
			Subtotal	\$	405,000 WL
12" DIA Valve	4	EA	\$ 12,000	\$ 48,000	
			Subtotal	\$	405,000 WL
Percentage of each license based on cost					
total cost of work requiring license					
			WL	EL	CC
			\$ 2,463,164	\$ 533,500	\$ 68,400
			80%	17%	2%
					1%
Subtotal			\$	5,104,413	no license
Contractors Overhead & Profit (25%)			\$	1,276,103	no license
Insurance & Bonds (3%)			\$	191,415	no license
Unrelated Items (8%)			\$	408,353	no license
Engineering During Construction			\$	143,520	no license
3rd Party Inspections (1%)			\$	51,044	no license
Subtotal			\$	7,174,849	no license
Expected Range of Cost (-10% to +15%)	6,457,354	to	\$	8,251,076	
Items Not Included in Estimate: Sales Tax, Permits					







**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID
P24-6052-PG**

BID-READY

AUGUST 8, 2025



Schnabel Engineering
348 W Parkcenter Blvd, Suite 200
Boise, ID 83706
Phone: (208) 331-9736

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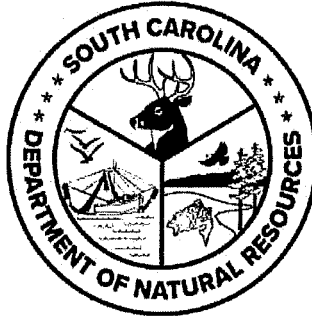
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2023 Edition

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**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

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

SE-310**INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES****AGENCY:** DNR - Department of Natural Resources**PROJECT NAME:** Beaufort-Waddell Mariculture Maturation Ponds Maintenance**PROJECT NUMBER:** P24-6052-PG **CONSTRUCTION COST RANGE:** \$4,500,000 to \$7,000,000**PROJECT LOCATION:** Waddell Mariculture Center**DESCRIPTION OF PROJECT/SERVICES:** (450 character limit)

REBID * Revised Scope * - Rehabilitation of rearing ponds, replacement of yard piping and electrical

BID/SUBMITTAL DUE DATE: 09/18/2025 **TIME:** 02:00 PM **NUMBER OF COPIES:** 1**PROJECT DELIVERY METHOD:** Design-Bid-Build**AGENCY PROJECT COORDINATOR:** Jeff Boyer**EMAIL:** Boyerj@dnr.sc.gov**TELEPHONE:** (803) 360-0042**DOCUMENTS OBTAINED FROM:** Karen Jones via email: Jonesk@dnr.sc.gov or phone 803-360-0042**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 sources(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: Schnabel Engineering**A/E CONTACT:** Bryant Charlo, PE**EMAIL:** bcharlo@schnabel-eng.com**TELEPHONE:** (208) 331-9736**PRE-BID CONFERENCE:** ☒ Yes ☐ No **MANDATORY ATTENDANCE:** ☐ Yes ☒ No**PRE-BID DATE:** 08/28/2025 **TIME:** 10:30 AM**PRE-BID PLACE:** Waddell Mariculture 211 Sawmill Creek Road, Bluffton, SC 29910**BID OPENING PLACE:** SCDNR Headquarters, 260 D. Epting Lane, Room 248 West Columbia, SC 29172**BID DELIVERY ADDRESSES:****HAND-DELIVERY:**

Attn: Jeff Boyer

260 D. Epting Lane, Room 248

West Columbia, SC 29172

MAIL SERVICE:

Attn: Jeff Boyer

260 D. Epting Lane, Room 248

West Columbia, SC 29172

IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? ☐ Yes ☒ No**APPROVED BY:**

(OSE PROJECT MANAGER)

DATE: 08/11/2025



BEAUFORT-WADDELL MARICULTURE MATURATION PONDS MAINTENANCE – RE-BID

AIA A701 INSTRUCTIONS TO BIDDERS

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

Instructions to Bidders

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

Cite this document as "AIA Document A701™– 2018, Instructions to Bidders — SCOSE Version," or "AIA Document A701™–2018 — SCOSE Version."

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)

Beaufort - Waddell Mariculture Maturation Pond Maintenance Re-Bid
P24-6052-MJ
211 Sawmill Creek Road, Bluffton, SC 29910

THE OWNER:

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

South Carolina Department of Natural Resources
P.O. Box 167
Columbia, SC 29202

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)

Schnabel Engineering
250 S 5th Street, Suite 510
Boise, ID 83702

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

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ROA 1070

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.

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§ 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.

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§ 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.

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§ 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.sceind.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 All requested Alternates shall be bid. The failure of the Bidder to indicate a price for an Alternate shall 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.

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§ 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 Bid an Alternate, except as expressly allowed by law;
- .6 Failure to list qualified subcontractors as required by law;
- .7 Showing any material modification(s) or exception(s) qualifying the Bid;
- .8 Faxing a Bid directly to the Owner or Owner's representative; or
- .9 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

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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-responsive.

§ 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: Lobby

Building Where Posted: SCDNR Headquarters

Address of Building: 260 D. Epting Lane, West Columbia, SC 29172

WEB site address (if applicable):

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
See Attachment 1		

- .5 Specifications

Section	Title	Date	Pages
See Attachment 2			

Init.

.6 Addenda:

Number	Date	Pages
--------	------	-------

.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.)

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.sclax.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 Tax Credit For Subcontracting With Minority Firms

§ 9.5.1 Pursuant to S.C. Code Ann. §12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return.

§ 9.5.2 Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888.

§ 9.5.3 The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: S.C. Code Ann. §11-35-5010 – Definition for Minority Subcontractor & S.C. Code Ann. §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

§ 9.6 Other Special Conditions Of The Work

Init.



**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

AIA A301 BID BOND

Beaufort – Waddell Mariculture Maturation Pond Maintenance – Re-Bid
State Project No. P24-6052-MJ

BID BOND

The Bid Bond must be in the form of the AIA Document A310 - 2010.

BID BOND



**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

SE-330 LUMP SUM BID FORM

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: South Carolina Department of Natural Resources
(Agency's Name)

FOR: PROJECT NAME: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid
PROJECT NUMBER: P24-0652-PG

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): Replacement of yard piping and electrical infrastructure throughout, and rehabilitation of head tower and rearing ponds M-1 through M-6.

\$ _____, which sum is hereafter called the Base Bid.
(Bidder to insert Base Bid Amount on line above)

SE-330

LUMP SUM BID FORM

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

§ 6.2 **BID ALTERNATES** as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): Renovation of Pond M-5

☐ ADD TO or ☐ DEDUCT FROM BASE BID: \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 2 (Brief Description): Renovation of Pond M-6

☐ ADD TO or ☐ DEDUCT FROM BASE BID: \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 3 (Brief Description): Renovation of Pond M-7 an associated yard piping

☐ ADD TO or ☐ DEDUCT FROM BASE BID: \$ _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

§ 6.3 UNIT PRICES:

BIDDER offers for the Agency's consideration and use, the following UNIT PRICES. The UNIT PRICES offered by BIDDER indicate the amount to be added to or deducted from the CONTRACT SUM for each item-unit combination. UNIT PRICES include all costs to the Agency, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Agency reserves the right to include or not to include any of the following UNIT PRICES in the Contract and to negotiate the UNIT PRICES with BIDDER prior to including in the Contract.

No.	ITEM	UNIT OF MEASURE	ADD	DEDUCT
1.	_____	_____	\$ _____	\$ _____
2.	_____	_____	\$ _____	\$ _____
3.	_____	_____	\$ _____	\$ _____
4.	_____	_____	\$ _____	\$ _____
5.	_____	_____	\$ _____	\$ _____
6.	_____	_____	\$ _____	\$ _____

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 the following page BF-2A)

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

(A) SUBCONTRACTOR LICENSE CLASSIFICATION or SUBCLASSIFICATION NAME (Completed by Agency)	(B) LICENSE CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION (Completed by Agency)	(C) SUBCONTRACTOR and/or PRIME CONTRACTOR (Required - must be completed by Bidder)	(D) SUBCONTRACTOR'S and/or PRIME CONTRACTOR'S SC LICENSE NUMBER (Requested, but not Required)
BASE BID			
Electrical	EL		
ALTERNATE #1			
ALTERNATE #2			
ALTERNATE #3			

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

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 himself) Bidder will use to perform this work.
 - a. **Columns A & B:** The Agency fills out these columns to identify the subcontractor license classification / subclassification and related license abbreviation for which the Bidder must list either a subcontractor or himself as the entity that will perform this work. In Column A, the subcontractor license classification/subclassification is identified by name and in Column B, the related contractor license abbreviation (per Title 40 of the SC Code of Laws) is listed. 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 C and D:** In these columns, the Bidder identifies the subcontractors it will use for the work of each license listed by the Agency in Columns A & B. 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. Likewise, 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 Columns A & B. The subcontractor license must also be within the appropriate license group for the work. If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsive.
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 must, except with the approval of the Agency for good cause shown, use the listed entities to perform the work for which they are listed.
7. 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.
8. Bidder's failure to identify an entity (subcontractor or himself) to perform the work of a subcontractor listed in Columns A & B 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 300 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 \$ 500.00 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:** _____



**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

**AIA A101 STANDARD FORM BETWEEN OWNER
AND CONTRACTOR**

**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***

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

Cite this document as "AIA Document A101®–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum — SCOSE Version," or "AIA Document A101®–2017 — SCOSE Version."

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)

South Carolina Department of Natural Resources
P.O. Box 167
Columbia, SC 29202

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)

Beaufort - Waddell Mariculture Maturation Pond Maintenance Re-Bid
P24-6052-MJ
211 Sawmill Creek Road, Bluffton, SC 29910

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

Schnabel Engineering
250 S 5th Street, Suite 510
Boise, ID 83702

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.

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- 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.

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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.)

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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: Andy Wicker, PE
 Title: Chief Engineer
 Address: P.O. Box 167, Columbia, SC 29202
 Telephone: 803-542-2729
 Email: wickera@dnr.sc.gov

§ 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: Jeff Boyer
 Title: Engineer III
 Address: P.O. Box 167, Columbia, SC 29202
 Telephone: 803-360-0042
 Email: boyerj@dnr.sc.gov

§ 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: Bryant Charlo, PE
Title: Associate
Address: 348 W Parkcenter Blvd, Suite 200
Telephone: (208) 331-9736
Email: bcharlo@schnabel-eng.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.

- .2 The Contractor 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
See Attachment 1		

- .6 Specifications

Section	Title	Date	Pages
See Attachment 2			

- .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

☐

Supplementary and other Conditions of the Contract:

Document

Title

Date

Pages

- .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

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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 words, indicate day, month and year.)

for the following **PROJECT**:

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

Beaufort - Waddell Mariculture Maturation Pond Maintenance Re-Bid

P24-6052-MJ

211 Sawmill Creek Road, Bluffton, SC 29910

THE OWNER:

(Name, legal status and address)

South Carolina Department of Natural Resources

P.O. Box 167

Columbia, SC 29202

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.

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)

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.

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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.

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§ 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

§ 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.)

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Causes of Loss**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

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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%
Performance Bond	100%

§ 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.

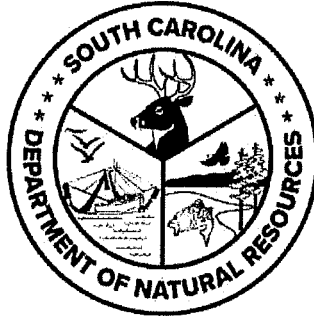
§ A.3.5.2 The Performance and Labor and Material Payment Bonds shall:

- .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:



**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

**AIA A201 GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION**

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

General Conditions of the Contract for Construction

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

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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)

Beaufort - Waddell Mariculture Maturation Pond Maintenance Re-Bid
P24-6052-MJ
211 Sawmill Creek Road, Bluffton, SC 29910

THE OWNER:

(Name, legal status, and address)

South Carolina Department of Natural Resources
P.O. Box 167
Columbia, SC 29202

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)

Schnabel Engineering
250 S 5th Street, Suite 510
Boise, ID 83702

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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

- 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.

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§ 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.

§ 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.

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§ 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 prior to submitting them for review and approval.
- .2 The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record (EOR) prior to submittal to the Office of State Fire Marshal (OSFM).
- .3 The EOR shall submit to OSFM in accordance with the OSFM process.
- .4 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

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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

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.

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§ 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.

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§ 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.

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§ 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

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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

- .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

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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

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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.

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§ 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 Minority Business Enterprises

Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

§ 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.

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§ 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 waived 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 waived 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

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**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

SE-335 PERFORMANCE BOND

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: South Carolina Department of Natural ResourcesAddress: P.O. Box 167Columbia, SC 29202

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 constructState Project Name: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Rc-BidState Project Number: P24-6052-PGBrief Description of Awarded Work: Replacement yard piping, electrical, and rehabilitation of rearing ponds.in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*Name: Schnabel EngineeringAddress: 348 W Parkcenter BlvdBoise, ID 83706

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**

By: _____
(Seal)

Print Name: _____**Print Title:** _____**Witness:** _____**SURETY**

By: _____
(Seal)

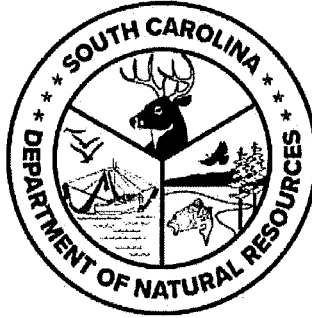
Print Name: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____*(Additional Signatures, if any, appear on attached page)*

SE-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 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.



**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

SE-357 LABOR & MATERIAL PAYMENT BOND

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: South Carolina Department of Natural ResourcesAddress: P.O. Box 167Columbia, SC 29202

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 constructState Project Name: Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-BidState Project Number: P24-60520-PGBrief Description of Awarded Work: Replacement yard piping, electrical, and rehabilitation of rearing pondsin accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*Name: Schnabel EngineeringAddress: 348 W Parkcenter BlvdBoise, ID 83706

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** _____
(shall be no earlier than Date of Contract)

BOND NUMBER _____**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.



**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID**

**SE-380 CHANGE ORDER TO DESIGN-BID-BUILD
CONTRACT**

SE-380

CHANGE ORDER NO.: _____

CHANGE ORDER TO DESIGN-BID-BUILD CONTRACT**AGENCY:** South Carolina Department of Natural Resources**PROJECT NAME:** Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid**PROJECT NUMBER:** P24-6052-PG**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**

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

SE-380, Page 2

CHANGE ORDER REQUEST NO.: _____

CHANGE ORDER REQUEST SUMMARY – DESIGN-BID-BUILD**AGENCY:** South Carolina Department of Natural Resources**PROJECT NAME:** Beaufort-Waddell Mariculture Maturation Ponds Maintenance - Re-Bid**PROJECT NUMBER:** P24-6052-PG**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
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
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
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)

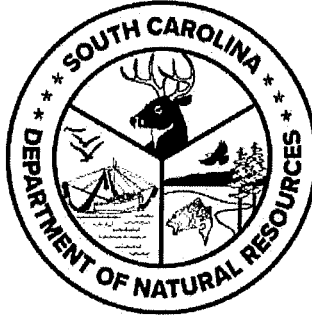
Print Name of Representative: _____

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.

TECHNICAL SPECIFICATIONS FOR CONSTRUCTION OF THE



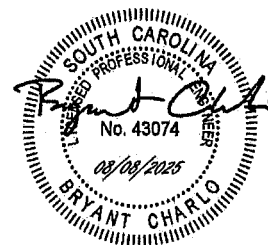
**BEAUFORT-WADDELL MARICULTURE
MATURATION PONDS MAINTENANCE – RE-BID
P24-6052-PG**

BID-READY

AUGUST 8, 2025



Schnabel Engineering
348 W Parkcenter Blvd, Suite 200
Boise, ID 83706
Phone: (208) 331-9736



Attachment 1 - Drawing List

Number	Title	Date
G-0	COVER SHEET	7/28/2025
G-1	DRAWING LIST AND LOCATION MAPS	7/28/2025
G-2	SYMBOLS AND ABBREVIATIONS	7/28/2025
G-3	DESIGN CRITERIA AND FLOW SCHEMATIC	7/28/2025
G-4	POND & HEAD TOWER FLOW SCHEMATICS	7/28/2025
G-5	HYDRAULIC PROFILE	7/28/2025
GC-1	GENERAL CIVIL NOTES	7/28/2025
GC-2	CIVIL DETAILS - I	7/28/2025
GC-3	CIVIL DETAILS - II	7/28/2025
GS-1	GENERAL STRUCTURAL NOTES	7/28/2025
GS-2	STRUCTURAL DETAILS - I	7/28/2025
GS-3	STRUCTURAL DETAILS - II	7/28/2025
GS-4	STRUCTURAL DETAILS - III	7/28/2025
GM-1	GENERAL MECHANICAL NOTES	7/28/2025
GM-2	MECHANICAL SCHEDULES	7/28/2025
GM-3	MECHANICAL DETAILS - I	7/28/2025
D-1	SITE DEMOLITION PLAN	7/28/2025
D-2	HEAD TOWER DEMOLITION PLAN	7/28/2025
D-3	SITE PHOTOS - I	7/28/2025
C-1	OVERALL SITE PLAN	7/28/2025
C-2	YARD PIPING PLAN - I	7/28/2025
C-3	YARD PIPING PLAN - II	7/28/2025
C-4	YARD PIPING PLAN - III	7/28/2025
C-5	YARD PIPING PLAN - IV	7/28/2025
C-6	COORDINATE TABLE	7/28/2025
C-7	NOT USED	7/28/2025
C-8	M-POND REHABILITATION PLAN & PROFILE	7/28/2025
S-1	POND OUTLET KETTLE PLANS	7/28/2025
S-2	POND OUTLET KETTLE SECTIONS - I	7/28/2025
S-3	POND OUTLET KETTLE SECTIONS - II	7/28/2025
S-4	POND OUTLET KETTLE DETAILS	7/28/2025
M-1	OUTLET STRUCTURE PIPING PLAN & SECTIONS	7/28/2025
M-2	KETTLE AND MONK SCREEN DETAILS	7/28/2025
M-3	HEAD TOWER MECHANICAL LAYOUT	7/28/2025
E-001	ELECTRICAL NOTES, DETAILS AND LEGEND	7/28/2025
E-002	M-POND AREA ELECTRICAL DEMOLITION RISER	7/28/2025
E-003	WELL PUMP ELECTRICAL DEMOLITION RISER	7/28/2025
E-004	M-POND GRASS FIELD AREA DEMOLITION	7/28/2025
E-005	M-POND PANELS EXISTING CONDITIONS PICTURES	7/28/2025
E-006	RISER DIAGRAMS, FEEDER SCHEDULES & MOUNTING DETAILS	7/28/2025
E-007	PANEL SCHEDULES	7/28/2025
E-101	ELECTRICAL SITE DEMOLITION PLAN II	7/28/2025

E-102	ELECTRICAL SITE DEMOLITION PLAN III	7/28/2025
E-103	ELECTRICAL SITE DEMOLITION PLAN IV	7/28/2025
E-200	ELECTRICAL SITE INSTALLATION PLAN I	7/28/2025
E-201	ELECTRICAL SITE INSTALLATION PLAN II	7/28/2025
E-202	ELECTRICAL SITE INSTALLATION PLAN III	7/28/2025
E-203	ELECTRICAL SITE INSTALLATION PLAN IV	7/28/2025

Attachment 2 - Specification List

Number	Title	Date	Pages
011000	Summary	7/28/2025	4
012900	Payment Procedures	7/28/2025	4
012910	Schedule of Values	7/28/2025	2
013119	Project Management and Coordination	7/28/2025	3
013216	Progress Schedule	7/28/2025	4
013300	Submittal Procedures	7/28/2025	7
014000	Quality Requirements	7/28/2025	7
014150	Special Inspections and Testing	7/28/2025	4
015000	Temporary Facilities and Controls	7/28/2025	6
016500	Products Delivery and Handling	7/28/2025	2
017200	Project Layout and Field Engineering	7/28/2025	3
017329	Cutting and Patching	7/28/2025	4
017700	Contract Close Out Procedures	7/28/2025	3
017823	Operation and Maintenance Data	7/28/2025	7
017836	Warranties	7/28/2025	4
019100	Equipment Testing and Facility Startup	7/28/2025	4
024116	Structure Demolition	7/28/2025	3
030100	Maintenance of Concrete	7/28/2025	15
031000	Concrete Forming and Accessories	7/28/2025	14
032000	Concrete Reinforcing	7/28/2025	10
033000	Cast-In-Place Concrete	7/28/2025	28
051200	Structural Steel Framing	7/28/2025	11
055000	Miscellaneous Metalwork	7/28/2025	12
055250	Steel Railing	7/28/2025	6
099600	Protective Coatings	7/28/2025	16
260500	Common Work Results for Electrical	7/28/2025	7
260501	Excavation and Backfill for Electrical Work	7/28/2025	2
260503	Electrical Demolition	7/28/2025	3
260519	Low Voltage Electrical Power Conductors and Cables	7/28/2025	4
260526	Grounding and Bonding for Electrical Systems	7/28/2025	3
260529	Hangers and Supports for Electrical Systems	7/28/2025	3
260534	Conduit	7/28/2025	4
260537	Boxes	7/28/2025	3
260553	Identification for Electrical Systems	7/28/2025	3
262416	Panelboards	7/28/2025	3
262818	Enclosed Switches	7/28/2025	2
312316	Excavation	7/28/2025	4
312323	Soils and Aggregates	7/28/2025	7
317700	Geomembrane Liner	7/28/2025	9
400507	Pipe Supports - General	7/28/2025	5
400510	General Piping Provisions	7/28/2025	11
400515	Pipe and Fitting Materials	7/28/2025	7

400551	Valves and Appurtenances	7/28/2025	7
400597	Identifications, Stenciling and Tagging Systems	7/28/2025	9

BEAUFORT-WADDELL MARICULTURE MATURATION PONDS MAINTENANCE – RE-BID

TECHNICAL SPECIFICATIONS TABLE OF CONTENTS

DIVISION 01 – GENERAL REQUIREMENTS

011000	Summary
012900	Payment Procedures
012910	Schedule of Values
013119	Project Management and Coordination
013216	Project Schedule
013300	Submittal Procedures
014000	Quality Requirements
014150	Special Inspections and Structural Testing
015000	Temporary Facilities and Controls
016500	Product Delivery and Handling
017200	Project Layout and Field Engineering
017329	Cutting and Patching
017700	Contract Close Out Procedures
017823	Operation and Maintenance Data
017836	Warranties
019100	Equipment Testing and Facility Startup

DIVISION 02 – EXISTING CONDITIONS

024116	Structure Demolition
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DIVISION 03 – CONCRETE

030100	Maintenance of Concrete
031000	Concrete Forming and Accessories
032000	Concrete Reinforcing
033000	Cast-In-Place Concrete

DIVISION 04 – MASONRY

Not Applicable

DIVISION 05 – METALS

051200 Structural Steel Framing
055000 Miscellaneous Metalwork
055250 Steel Railing

DIVISION 06 THRU 08

Not Applicable

DIVISION 09 – FINISHES

099600 Protective Coatings

DIVISION 10 THRU 25

Not Applicable

DIVISION 26 – ELECTRICAL

260500 Common Work Results for Electrical
260501 Excavation and Backfill for Electrical Work
260503 Electrical Demolition
260519 Low Voltage Electrical Power Conductors and Cables
260526 Grounding and Bonding for Electrical Systems
260529 Hangers and Supports for Electrical Systems
260534 Conduit
260537 Boxes
260553 Identification for Electrical Systems
262416 Panelboards
262818 Enclosed Switches

DIVISION 27 THRU 30

Not Applicable

DIVISION 31 – EARTHWORK

312316 Excavation
312323 Soils and Aggregates
317700 Geomembrane Liner

DIVISION 32 THRU 39

Not Applicable

DIVISION 40 – PROCESS INTEGRATION

400507	Pipe Supports - General
400510	General Piping Provisions
400515	Pipe and Fitting Materials
400551	Valves and Appurtenances
400597	Identification, Stenciling and Tagging Systems

DIVISION 41 THRU 48

Not Applicable

SECTION 011000**SUMMARY****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
1. Project information.
 2. Contract description.
 3. Contractor's use of Site.
 4. Work sequence.
 5. Work restrictions.
 6. Permits.

1.2 PROJECT INFORMATION

- A. Name: Beaufort-Waddell Mariculture Maturation Ponds Maintenance.
1. The Work is located at 211 Sawmill Creek Rd, Bluffton, SC 29910 in Beaufort County, SC.
 2. The site elevation is nominally 20.00 ft (NAVD 1988)
 3. Extreme design temperatures are -30 to +110 degrees Fahrenheit.
- B. Owner: South Carolina Department of Natural Resources.
- C. Project Engineer: Schnabel Engineering, LLC.
1. Where "Architect" is called for within the specifications, it shall be substituted for "Engineer".
- D. Engineer's Consultants: Engineer retains the following design professionals, who prepare designated portions of the Contract Documents:
1. CDDC, LLC: Electrical Design.
- E. Web-Based Project Software: Contractor-furnished software will be used for purposes of managing communication and documents during the construction stage.
1. See Section 013300 - Submittal Procedures for requirements for using web-based Project software.

1.3 CONTRACT DESCRIPTION

- A. The Work to be performed under this Contract shall consist of furnishing all tools, equipment, materials, supplies, and manufactured articles and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the Work in good faith shall be provided by the Contractor as though originally so indicated, at no increase in cost to the Owner.
- B. The Work of this Contract comprises renovation of the Waddell Mariculture Center.
- C. The Work of this Contract includes, but is not limited to, construction of the following items:
 - 1. Renovation of Ponds M-1 through M-4 including new liners, outlet structures and piping.
 - 2. Modifications to the existing Head Tower including concrete repair, new coatings, and piping modifications.
 - 3. New yard piping and site electrical systems.
- D. As alternates, this Contract includes the following:
 - 1. Alternate 1 – Renovation of Pond M-5
 - 2. Alternate 2 – Renovation of Pond M-6
 - 3. Alternate 3 – Renovation of Pond M-7
- E. The Contractor shall provide all demolition, civil, landscaping, architectural, structural, mechanical, electrical, and instrumentation and control work in accordance with the Contract Documents.
- F. Contractor shall be responsible for all dewatering efforts required during construction. The Contractor must dewater and compact subgrades for all pipe, conduit, building foundations, and other underground features in the dry and in accordance with the specifications.
- G. Contractor shall be responsible for negotiations of any waivers or alternate arrangements required for transportation of materials to the site.
- H. Maintain conditions of access road (Sawmill Creek Rd) to site and the on-site pond access roads such that access is not hindered as the result of construction related deterioration.
 - 1. Any undue damage to the roadway as determined by the Owner shall be immediately repaired by the Contractor to the satisfaction of the Owner.

1.4 CONTRACTOR'S USE OF SITE

- A. The Contractor's use of the project site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices. The Contractor is instructed to remain within the limits of construction indicated on the Drawings.
- B. See Work Sequence and Work Restrictions below.

1.5 WORK SEQUENCE

- A. Construction Sequencing Plan: Before start of construction, submit a construction sequencing plan for review and acceptance by Owner and Engineer. The plan shall detail the timelines and scope of each phase of the work, including the details of any temporary utility routing or facility construction, needed to provide meet the work restrictions below. After acceptance of the plan, comply with accepted plan when coordinating construction sequencing unless deviations are accepted by Owner in writing.

1.6 WORK RESTRICTIONS

- A. The Waddell Mariculture Center is an operating facility that will be temporarily shut down during construction in order to minimize conflicts with hatchery operations and construction activities. The Contractor shall fully cooperate with the Owner and operators of the facility to ensure construction does not impact operations.
- B. Domestic water, sanitary sewer, and electrical services to existing residences and office spaces must be maintained throughout construction. Coordinate necessary outage periods with the Owner. Outages shall not be longer than 4 hours.
- C. Work shall be performed during normal working hours Monday – Friday, 0830 – 1700 hours. Any work or deliveries outside of normal working hours shall be approved by the Owner 48 hours in advance.

1.7 PERMITS

- A. Contractor shall secure and pay for all permits necessary for construction, government fees, clearances and licenses, including but not limited to:
 - 1. South Carolina Department of Environmental Quality Permits
 - a. Construction Dewatering Permit
 - b. Construction Stormwater General Permit and Stormwater Management Plan
 - c. Construction Air Activity Permit and Air Emission Notice
 - 2. Building Permit to be issued by the South Carolina Office of State Engineer

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 012900
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Engineer at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Contractor's name and address.
 - d. Date of submittal.
 - 2. Schedule of values shall be in the format of and on the AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the

Contract Sum.

4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
6. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. P Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

- c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule.
 - 4. Submittal schedule.
 - 5. Copies of building permits.
 - 6. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
- H. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. Affidavit of Payment of Debts and Claims, AIA Document G706.
 - 5. Consent of Surety, AIA Document G707.
 - 6. Supplemental Attachment for ACORD Certificate of Insurance 25, AIA Document G715
 - 7. A statement that the Contractor knows of no reason that the completed project insurance will not be renewable to cover the period required by the Contract Documents.
 - 8. Evidence that claims have been settled.
 - 9. Final liquidated damages settlement statement.
 - 10. Completion of items specified for completion after Substantial Completion.
 - 11. Removal of surplus materials, rubbish, and similar elements.
 - 12. Removal of temporary facilities and services.
 - 13. Warranties, Operation and Maintenance manuals.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 012910
SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Schedule of Values is required to be compatible with the continuation sheet and accompanying applications for payment, as described in Section 01290.

1.2 QUALITY ASSURANCE

- A. Use required means to assure arithmetical accuracy of the sums described.
- B. When so required by the Construction Manager and/or Architect, provide copies of the subcontractor's Schedule of Values or other data acceptable to the Construction Manager and/or Architect, substantiating the sums described.

1.3 SUBMITTALS

- A. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the Schedule of Values.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
 - 3. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
 - 4. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the

materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

5. Schedule Updating: Update the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

B. Prior to first application for payment, submit a proposed schedule of values to the Construction Manager.

1. Meet with the Construction Manager and determine additional data, if any required to be submitted.
2. Secure the Construction Manager's approval of the schedule of values prior to submitting first application for payment. **NO APPLICATIONS FOR PAYMENT WILL BE PROCESSED PRIOR TO APPROVAL OF THE SCHEDULE OF VALUES.**
3. AIA Form G703 and "Form A" shall be submitted with all columns and spaces completed.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 013119**PROJECT MANAGEMENT AND COORDINATION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General project coordination procedures.
 2. Coordination.
 3. Administrative and supervisory personnel.
 4. Project meetings.
 5. Weekly Reports

1.02 RELATED DOCUMENTS

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

1.03 COORDINATION

- A. Coordinate construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. The Contractor shall coordinate its operations with those included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Contact Progress Reporting: The scheduling and sequence of all operations shall be carefully co-ordinated with the Owner and Engineer.
- C. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Pre-Construction conference.
 7. Pre-installation conferences.
 8. Project closeout activities

1.04**PROJECT MEETINGS****A. Pre-Construction Meeting**

1. A Pre-Construction Meeting will be scheduled as soon as possible after the award of the contract. The Engineer's Representative will compile minutes of the meeting and will furnish a copy of the minutes to the Contractor and each person present. The Contractor may make and distribute such other copies as he wishes.
2. Attendance: Contractor Project Manager, Job Superintendent and Job Foreman, Owner, Engineer's Representative, manufacturer's representatives, installers of related work and all other persons concerned with the installation and performance. The Contractor shall also provide three (3) local telephone numbers, which may be used to contact the Contractor or his authorized representative in the event of an emergency after normal business hours.
3. Minimum Agenda: Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, and the Project Manager; channels and procedures for communication; construction schedule, including sequence of critical work; contract documents, including distribution of required copies of Drawings and revisions; processing of Shop Drawings and other data submitted to the Project Manager for review; rules and regulations governing performance of the work and procedures for safety, first aid, security, quality control, housekeeping and related matters.

B. Progress Meetings

1. The Contractor shall attend monthly progress meetings for the purpose of informing the Owner and the Engineer regarding the status of the project. The Engineer will compile minutes of the meeting, and will furnish a copy of the minutes to the Contractor and each person present. The Contractor may make and distribute such other copies as he wishes.
2. Attendance: Owner, Engineer, Contractor, Job Superintendent, material Supplier, and Subcontractors, as appropriate. Each representative shall be thoroughly familiar with the status of the project and shall be prepared to discuss and act upon any situations, which may arise. The time, date and location of these meetings will be established during pre- construction conference. The Contractor shall provide an updated job progress schedule at each weekly meeting.
3. Minimum Agenda: Review of work progress; field observations, problems, and decisions; identification of problems which impede planned progress; maintenance of progress schedule; corrective measures to regain projected schedules; planned progress during succeeding work period; coordination of projected progress; maintenance of quality and work standards; processing of field decisions and Change Orders; effect of proposed changes on progress, schedule, and coordination; other business relating to work.

C. Substantial Completion Inspection Meeting

1. Scheduled by Owner and Engineer upon written notification of substantial completion of work from the Contractor.
2. Attendance: Owner, Engineer, Contractor, material manufacturer.
3. Minimum Agenda: Walkover inspection; verification of substantial completion; identification of punch list items; identification of problems, which may impede issuance of warranties.
4. Refer to Section 01 7700 for other requirements.

D. Final Inspection Meeting

1. Scheduled by Owner and Engineer upon written notification of final completion of work from the Contractor.
2. Attendance: Owner, Engineer, Contractor.
3. Minimum Agenda: Verification of final completion including the completion of the punch list items.
4. Refer to Section 01 7700 for other requirements.

1.05 REPORTS**A. Weekly Construction Reports: Prepare a weekly construction report recording the following information concerning events at Project site and Fax or email a copy to the Engineer by noon on the following Monday:**

1. Approximate daily count of personnel at Project Site.
2. Daily material deliveries.
3. Daily High and low temperatures and general weather conditions.
4. Accidents.
5. Unusual events.
6. Stoppages, delays, shortages, and losses.
7. Orders and requests of authorities having jurisdiction.
8. Change Orders received and implemented.
9. Change Directives received and implemented.
10. Daily Allowance and Unit Cost usage.

PART 2 PRODUCTS (NOT USED)**PART 3 EXECUTION (NOT USED)****END OF SECTION 01311**

SECTION 013216
PROJECT SCHEDULE

PART 1- GENERAL

1.1 WORK INCLUDED

- A. To assure adequate planning and execution of the Work so that the Work is completed within the number of calendar days allowed in the Contract, and to assist the Architect in evaluating progress of the Work, prepare and maintain the schedules and reports described in this Section.
- B. It should be noted by all Contractors and material suppliers the extremely critical nature of this project and time being allowed for its completion.
- C. Work shall be performed in accordance with the Pre-Bid Construction Schedule.

1.2 RELATED WORK

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.
- B. Requirements for progress schedule: General Conditions.
- C. Construction period: Form of Agreement

1.3 DEFINITIONS

- A. "Day", as used throughout the Contract unless otherwise stated, means "calendar day".

1.4 QUALITY ASSURANCE

- A. Employ a scheduler who is thoroughly trained and experienced in compiling construction schedule, and in preparing and issuing periodic updates and reports as required.
- B. Perform data preparation, analysis, charting and updating in accordance with standards approved by the Architect.

1.5 SUBMITTALS

- A. Comply with pertinent provisions of Section 013300, Submittal Procedures.

- B. Construction schedule: After the Contractor has received the Owner's Notice to Proceed, the Contractor shall provide the Construction Manager with sufficient information on his plan for completing all work under this Contract. The Contractor shall provide a detailed bar chart (CPM Method) of this work clearly showing how his schedule integrates with the total construction duration. This bar chart schedule must include subcontract awards, material purchase dates and delivery dates, manpower levels broken down by trades and plant and equipment to be used. All interface activities and tasks which must be completed by other trades prior to proceeding with the work must be shown on the bar chart schedule. Submit one (1) reproducible copy and four (4) prints of a construction schedule for review.
- C. Periodic revisions and reports: Submit four (4) prints of the construction schedule updated along with the monthly payment request.

PART 2- PRODUCTS

2.1 CONSTRUCTION ANALYSIS

- A. Graphically show by bar-chart the order and interdependence of all activities necessary to complete the work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors.

PART 3- EXECUTION

3.1 CONSTRUCTION SCHEDULE

- A. Immediately after receipt of Notice to Proceed meet with the Construction Manager, review contents of the proposed construction schedule, and make all revisions agreed upon.
- B. The information on the Contractor's plan of action for performing the work under this Contract shall be based on the allotted construction duration for this work. The Construction Schedule shall indicate the key points of interface between the work under this contract and the other work of the project and the major project milestones. Sequencing and coordinating of miscellaneous activities will be discussed and agreed upon in the weekly meetings. It is agreed and understood that the schedule dates shown in the Construction Schedule for the indicated interface points and project milestones may change during the course of the Contract and such changes, in and of themselves, will not entitle the Contractor to any additional compensation or be deemed to constitute an extension of time or to constitute a change under Article 7 of the General Conditions for the Contract for Construction.
- C. Every effort will be made to make progress on the work as expeditiously as possible and if critical path activities can be improved during the course of the work, the Construction Schedule shall be revised to reflect improved dates on all work activities.

- D. The Contractor shall award all subcontracts, purchase materials, arrange for deliveries, furnish sufficient forces, plant and equipment and work such hours as necessary to insure execution of the work in conformity with the project duration.
- E. In the event of material procurement delays, the Contractor shall immediately notify the Construction Manager. However, it will be assumed that the Contractor has checked material deliveries as specified prior to the Bid, as submission of a Bid for work will be assumed to be an agreement to the time frame allocated for that work as noted per the total project duration.
- F. If the Contractor falls behind the Construction Schedule, or current approved revision of the Construction Schedule, and is not entitled to any time extension as determined by the Construction Manager, he shall, upon request of the Construction Manager, submit within forty-eight (48) hours his plan for bringing his work back up to schedule. This plan shall include a commitment for immediate implementation, unless otherwise approved by the Construction Manager, and must include a time commitment, acceptable to the Construction Manager, for bringing the work up to schedule. If the Contractor fails to provide an acceptable plan within the requested time, he will be given a mandatory plan by the Construction Manager.
- G. The Contractor's plan shall illustrate his proposed methods for bringing his work back up to schedule, whether by a normal 40 hour work week, or by working 24 hours a day if necessary. If other measures will not be sufficient to make up the lag, the Contractor's plans and implementation thereof shall include increasing the number of shifts, days of work and/or instituting or increasing overtime, all at his own expense.
- H. If a Contractor fails or refuses to implement such measures as will bring his work back up to conformity with the approved Schedule, his right to proceed with any or all portions of the Contract requirements may be terminated pursuant to Article 14 of the General Conditions for the Contract for Construction.

3.2 PERIODIC REVISIONS AND REPORTS

- A. The approved construction schedule shall be updated monthly and submitted along with each monthly payment application.
 - 1. Indicate "actual" progress in percent completion for each activity.
 - 2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.3 REVISIONS

- A. The Contractor will be given ample notice on any schedule changes that may affect the starting dates of his work. Periodic schedule review and revision meetings will be held with the Contractors who will be expected to provide input to the scheduling activities. The latest approved revision of the Construction Schedule shall be part of the Contract Documents and shall be complied with by the Contractor at no extra cost to the Owner. Activity duration period shown on the Construction Schedule will not be reduced without the approval of the Contractor nor will they be increased without the approval of the Construction Manager.

- B. Make only those revisions to approved construction schedule as are approved in advance by the Construction Manager.

3.4 REQUEST FOR EXTENSION DUE TO DELAYS

- A. It is understood that the Owner, Construction Manager or Engineer shall not in any event be liable to the Contractor for delays of any kind whatsoever and the Contractor shall be fully responsible for making up lost time of all delays except to the extent that extensions of time are granted. If completion of the work is delayed by any act of neglect of the Owner, or by the Construction Manager or the acts of the Construction Manager or Engineer, by strikes or by other exceptional conditions over which the Contractor has no reasonable control, the time of completion shall upon receipt of the Contractor's written request, be extended by such period as the Construction Manager may consider reasonable. No extension shall be allowed unless a claim is presented in writing to the Construction Manager within seven (7) days after the commencement of such delay. In case of continued cause of delay, only one claim is necessary. Nothing in this clause shall be construed to release the Contractor from the obligation to perform at his own expense all overtime necessary to maintain the Contract completion date where delays have occurred which are not excused. If the Contractor, delayed by any acts of the Owner, Construction Manager, Engineer, and is granted an extension of time by the Construction Manager, the Contractor shall comply with the extended schedule with no additional compensation from the Owner.

END OF SECTION

SECTION 013300
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. General Instructions
- B. Web-Based Project Management Software Package
- C. Submittal Procedure
- D. Other Submittals
- E. Product Substitutions

1.2 GENERAL INSTRUCTIONS

- A. Contractor is responsible to determine and verify field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and check and coordinate each item with other applicable approved shop drawings and Contract Document requirements.
- B. Provide submittals:
 - 1. That are specified or reasonably required for construction, operation, and maintenance of the Work.
 - 2. That demonstrate compliance with the Contract Documents
- C. Prepare submittals in the English language. Do not include information in other languages. Present measurements in customary American units (feet, inches, pounds, etc).
- D. Provide submittal information from only one manufacturer for a specified product. Submittals with multiple manufacturers for one product will be rejected without review.
- E. Edit all submittals so that the submittal specifically applies to only the item furnished. Neatly cross out all extraneous text, options, models, etc. that do not apply to the equipment being furnished, so that the only information remaining is applicable to the equipment being furnished. Highlight technical data that is applicable to the item being furnished.
- F. For submittals that cover multiple devices used in different areas under the same specification section, the submittal for the individual devices must list the area where the device is used.

- G. Contractor will provide the Owner and Engineer with an electronic copy of the expected submittal register for review.
1. Where applicable (i.e., except for drawings, figures, etc.) submittal content shall use bookmarks for each section and be electronically searchable using the PDF file as submitted.
- H. Transmit each submittal with a transmittal form. Sequentially number transmittals. Required submittal numbering format shall adhere to the following:
1. Example: 01340-002-1
 - a. "01340" indicates the affected specification is Section 01340.
 - b. "002" indicates the second submittal under this section.
 - c. "1" indicates the first resubmittal of the Submittal 01340-002-1. Note that this number would not be included in the initial Submittal 01340-002.
 2. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.
 3. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.
 4. Include a list of numbered deviations from Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work. Listed deviations shall be accompanied by a clear explanation and reason for each deviation.
- I. For each submittal for review, allow 21 calendar days for Engineer review.
1. When a submittal cannot be returned within the specified period, Engineer will, within a reasonable time after receipt of the submittal, give notice of the date by which that submittal will be returned.
 2. Engineer's acceptance of progress schedules containing submittal review times less than those specified or agreed to in writing by Engineer will not constitute Engineer's acceptance of review times.
 3. Contractor shall notify Engineer in writing that timely review of a submittal is critical to the progress of the Work.

1.3 WEB-BASED PROJECT MANAGEMENT SOFTWARE PACKAGE

- A. Web-Based Project Management Software Package: Contractor-furnished web-based Project management software package for purposes of hosting and managing Project communication and documentation until final completion.
1. Web-based Project management software includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, Subcontractors, Architect/Engineer, Architect's/Engineer's consultants, Owner, and other entities involved in Project.

- b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow among Project entities.
 - d. Create, log, track, and notify Project members of Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, minor changes in the Work, Construction Change Directives, and Change Orders.
 - e. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - f. Management of construction progress photographs.
2. Contractor shall provide three software user licenses for use by the Owner and Engineer's Project Manager and other key personnel (a minimum of 6 total licenses).

1.4 SUBMITTAL PROCEDURE

A. Contractor: prepare submittal information in sufficient detail to show compliance with specified requirements.

- 1. Determine, verify and list quantities, field dimensions, product dimensions, specified design and performance criteria, materials, catalog numbers, and similar data.
- 2. Coordinate submittal with other submittals and with the requirements of the Contract Documents
- 3. Check, verify, and revise submittals as necessary to bring them to conformance with Contract Documents and actual field conditions.
- 4. Resubmittals
 - a. Include a response in writing to each of the Engineer's comments or questions in the order that the comments or questions were presented throughout the submittal. Responses shall indicate if the comment was incorporated or explain why the comment is not accepted or a requested change is not made. Explain how requirement will be satisfied in lieu of comment or change requested by Engineer.
 - b. Submittal review comments not addressed by the Contractor in resubmittals shall continue to apply whether restated or not in subsequent reviews until adequately addressed by the Contractor to the satisfaction of the reviewing and approving authority.

B. Engineer: Review and provide response.

- 1. Review description:
 - a. Engineer shall be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a particular submittal whether or not a stamp or seal is required by Contract Documents or Laws and Regulations.

- b. Engineer review of submittals shall not release Contractor from Contractor's responsibility of requirements of Contract Documents. Neither shall Engineer's review release Contractor from fulfilling purpose of installation nor from Contractor's liability to replace defective work.
- c. Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents.
- d. Deficient submittals will be returned along with the transmittal form which will be marked to indicate deficient areas.
- e. Engineer's submittals does not extend to:
 - 1) Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.
 - 2) Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents.
 - 3) Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.
- f. Engineer can accept or reject any exception at their sole discretion.
- g. Review response will be returned to Contractor with one of the following dispositions:
 - 1) No Exceptions Taken
 - a) There are no notations or comments on the submittal and the Contractor may release the equipment for production.
 - 2) Make Corrections Noted
 - a) The Contractor may proceed with the Work; however, all notations and comments must be incorporated into the final product.
 - 3) Revise & Resubmit
 - a) Contractor may not proceed with the Work described in the submittal.
 - b) Contractor assumes responsibility for proceeding without approval.
 - c) Resubmittal of complete submittal package is required.
 - 4) Rejected
 - a) Contractor may not proceed with the Work described in the submittal.
 - b) The submittal does not meet the intent of the Contract Documents. Resubmittal of complete submittal package is required with materials, equipment, methods, etc. that meet the requirements of the contract documents.

5) Receipt Acknowledged

- a) This is used in acknowledging receipt of informational submittals that address means and methods of construction such as schedules and work plans, conformance test reports, health and safety plans, etc.

1.5 OTHER SUBMITTALS

- A. In addition to required submittals called for in other Sections, Contractor shall prepare and submit the following:

- 1. Owner's Manuals and Installation Instruction Manuals for all manufactured equipment or manufactured items. Include the following information:
 - a. Description of function, normal operating conditions and limitations, performance curves, engineering data and test and complete nomenclature and commercial numbers of replacement parts.
 - b. Manufacturer's printed operating procedures to include start-up, break-in and routine and normal operating instructions, regulation, control, stopping, shutdown and emergency instructions and summer and winter operating instructions.
 - c. Maintenance procedures for routine preventative maintenance and troubleshooting, disassembly, repair and reassembly, aligning and adjusting instructions.
 - d. Servicing instructions and lubrication charts and schedules.
 - e. Manufacturer's contact information.
- 2. Job Hazard Analysis and Site-Specific Safety Plan

1.6 PRODUCT SUBSTITUTIONS

- A. Base all bids on materials, equipment and procedures specified.
- B. Certain types of equipment and materials are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers. When this method of specifying is used, it is not intended to exclude from consideration of other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provide said products are of equal quality and proven capable of accomplishing the same tasks as the products specifically indicated.
- C. Other types of equipment and types of materials may be acceptable at the sole discretion of the Engineer.
- D. In making request for substitution or in using an approved product, Contractor shall do the following:

1. Investigate the proposed product and determine that it is equal to or superior in all respects to that specified, and that it will perform the function for which it is intended.
2. Provide standard submittal requirements.
 - a. In addition, provide in sufficient detail to show reason for variance from specified products and that the substitution does not change the design intent.
3. Provide reason the specified product is not being provided.
4. Explain the benefits to the Owner for accepting the substitution.
5. Itemized comparison of the proposed substitution with product specified including a list of significant variations:
 - a. Design features
 - b. Design dimensions
 - c. Installation requirements
 - d. Operations and maintenance requirements
 - e. Availability of maintenance services and sources of replacement materials
6. Reference projects where the product has been successfully used
7. Define Impacts:
 - a. Impacts to Contract Price
 - b. Impacts to Contract Time
 - c. Impacts to Contract Scope
 - d. Impacts to other work or products
8. Contractor represents the following:
 - a. Contractor shall pay associated costs for Engineer to evaluate the substitution.
 - b. Contractor bears the burden of proof of the equivalency of the proposed substitution.
 - c. Proposed substitution does not change the design intent and will have equal performance to the specified product.
 - d. Proposed substitution is equal or superior to the specified product.
 - e. Contractor will provide same guarantee for substitute item as for product specified.
 - f. Contractor will coordinate installation of accepted substitution into work, to include building modifications if necessary, making such changes as may be required for work to be completed in all respects.
 - g. Contractor waives all claims for additional costs related to substitution which subsequently arise.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 014000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality control.
- B. References.
- C. Mockup requirements.
- D. Shop Inspection requirements.
- E. Sampling and testing.
- F. Testing and inspection services.
- G. Surveying.
- H. As-built drawings.

1.2 QUALITY CONTROL

- A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Comply with manufacturer's instruction, including performing each step in sequence. when manufacturer's instructions conflict with the Contract Documents, request clarification from Engineer before proceeding.
- D. Perform Work using persons qualified to produce required and specified quality.
- E. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- F. When specified, products will be tested and inspected either at point of origin or at Work site. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.:
 - 1. Notify Engineer in writing a minimum of 2 weeks in advance of when products will be ready for testing and inspection at point of origin.

2. Satisfactory test and inspections at point of origin do not serve as final acceptance of products, nor do they preclude retesting or re-inspection of products at Work site.
 3. Do not ship products which require testing and inspection at point of origin prior to testing and inspection.
- G. All costs of retesting or reworking required because of non-conformance to the Contract Documents shall be borne by the Contractor.
- H. Protection, storage and handling of delivered product:
1. Inspect all products or equipment delivered to the site prior to unloading. Reject all products or equipment that are damaged, used, or in any other way unsatisfactory for use on the project.
 2. Handle and protect all products or equipment in accordance with manufacturer's written directions.
 3. Store products or equipment in accordance with manufacturer's written directions.
 4. Protect equipment from exposure to elements and keep thoroughly dry.

1.3 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current as of date of Contract Documents, except where specific date is established by code.
- C. Obtain copies of standards and maintain on Site when required by product Specification Sections.
- D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

1.4 MOCK-UP REQUIREMENTS

- A. Mock-ups shall not be provided until corresponding product data, shop drawings, samples and other preparatory submittals are approved.
- B. Mock-ups shall be delivered to the project site unless specifically stated otherwise, or approved by Owner.
- C. When a mock-up is required for a piece of equipment that will have multiple identical copies in the finished construction, a prototype shall be fabricated, delivered to the site, tested, and approved by the Engineer before any work on the remaining units begins. Once onsite testing and inspection are complete, the Contractor shall return the prototype to the place of manufacture for modification, after which it will serve as the standard for constructing the remaining identical units.

- D. Mock-ups shall be rebuilt as necessary until approved by Owner.
- E. After approval, mock-up shall remain intact and serve as the standard for judging the acceptance or rejection of workmanship in the corresponding construction.
- F. After completion and acceptance of the corresponding construction, mock-ups shall be removed when directed by the Owner unless approved mock-ups have been located as part of the permanent construction.
- G. Mock-up construction, testing, and acceptance procedures:
 - 1. Fabricate one complete mock-up as required in the contract documents. After fabrication, each mock-up shall be shipped to the site and fully assembled by the Contractor to undergo functional testing.
 - 2. The mock-up shall be installed with all systems necessary for functional testing, including structural, mechanical, plumbing, electrical, and controls equipment to create a fully functioning system that is representative of the final installation. If necessary, the Contractor shall provide temporary utilities (water, power, or other) so that the functional testing represents the true final operating condition for the mock-up.
 - a. Materials used in the initial mockup construction shall meet the specifications for the work and be approved by submittal reviews. Materials may be modified only to the extent required for mock-up approval by the Owner.
 - 3. Once onsite testing and inspection are complete, the Contractor shall return the prototype to the place of manufacture for modification, after which it will serve as the standard for constructing the remaining identical units. If no modifications are required, mock-ups may be used as the first unit for final installation.
- H. Tests will be performed under provisions identified in this Section and identified in individual product Specification Sections.

1.5 SHOP INSPECTION REQUIREMENTS

- A. Shop inspections shall be scheduled for each major piece of equipment and as indicated in the Contract Documents.
- B. The Contractor shall notify the Engineer a minimum of 2 weeks in advance of each shop inspection.
- C. Shop inspections for mechanical equipment shall include all temporary utilities necessary for testing and inspecting the item to confirm that it meets the requirements and will perform adequately when in service.

1.6 SAMPLING AND TESTING

- A. General:

1. Prior to deliver and incorporation in the Work, submit listing of sources of materials.
2. When products are specified:
 - a. Submit sufficient quantities of representative samples of materials to be used in the Work for testing or examination.
 - b. Test materials in accordance with standards of national testing organizations.

B. Sampling:

1. Furnish specimens of materials when requested.
2. Do not use materials which are required to be tested until testing indicates satisfactory compliance with specified requirements.
3. Specimens of materials will be taken for testing whenever necessary to determine quality of material.

C. Test Standards:

1. Perform sampling, specimen preparation, and testing of materials in accordance with specified standards, and when no standard is specified, in accordance with standard of nationally recognized technical organization.
2. Physical characteristics of materials not particularly specified shall conform to standards published by ASTM, where applicable.

1.7 TESTING AND INSPECTION SERVICES

- A. Owner will employ and pay for specified services of an independent firm to perform testing and inspection. The Inspector employed or retained by Owner is authorized to inspect the Work.
- B. Inspections may extend to entire or part of the Work and to preparation, fabrication, and manufacture of products for the Work.
- C. Deficiencies or defects in the Work which have been observed will be called to Contractor's attention.
- D. Inspector will not:
 1. Alter or waive provisions of Contract Documents.
 2. Accept portions of the Work, issue instructions contrary to the intent of Contract Documents, or act as foreman for Contractor.
 3. Supervise, control, or direct Contractor's safety precautions program.
 4. Inspect for safety conditions on the work site, or persons thereon, whether Contractor's employees or others.
- E. Inspector will:

1. Conduct onsite observations of the Work in progress to assist Engineer in determining when the Work is, in general, proceeding in accordance with Contract Documents.
 2. Inspect construction to ensure compliance with the requirements of the Contract Documents.
 3. Report to Engineer and Owner whenever Inspector believes that Work is faulty, defective, does not conform to Contract Documents, or has been damaged; or whenever there is defective material or equipment; or whenever Inspector believes the Work should be uncovered for observation or requires special procedures.
- F. Contractor shall provide a running 21 day schedule of activities requiring inspections.
- G. The Contractor shall notify the Inspector 72 hours prior to inspections.
- H. Contractor shall furnish incidental labor and facilities to provide access to construction to be tested, to obtain and handle samples at Work site or at source of product to be tested, and to otherwise facilitate inspections and tests.

1.8 SURVEYING

- A. Contractor shall provide the services of a registered licensed surveyor for the establishment line and grade control for all facilities constructed as part of the work. The surveyor shall be responsible for using the horizontal and vertical control established in the design drawings and ensuring that it is carried out during construction. At a minimum, this work shall include:
1. Establishing finished floor elevation and corners of all structures.
 2. Establishing inverts and center lines of all pipe penetrations and buried piping.
 3. Establish line and grade of the gravel paving and concrete surfaces.
 4. Establish all hydraulic control grades provided on the hydraulic profile including, but not limited to, elevation of the upstream distribution boxes, incubation overflow weirs, raceway and pond walls and inverts, and pollution abatement elevations.
- B. Prior to burying any below grade structures, such as piping, valves and gates, the surveyor shall establish and record as-built elevations which shall be transferred to the As-built Drawings for the work.
- C. Prior to Substantial Completion and in preparation of the As-built Drawings, all structure corners and slab elevations shall be surveyed and transferred to the As-built Drawings. Survey shall illustrate locations, dimensions, angles and elevations of buildings and Site Work that have resulted from construction indicating their relationship to permanent bench marks and property lines.
- D. All as-built surveys shall be signed and sealed by the surveyor and transferred to the Owner and Engineer electronically and in hard copy.
- E. All surveyed grade control and hydraulic controls noted on the Hydraulic Profile for the facility shall be at the elevations noted on the drawings +/- 1/32-inches.

1.9 AS-BUILT DRAWINGS

- A. Contractor shall maintain a complete and accurate set of full-sized As-built Drawings throughout the project on the job site.
- B. Legibly mark each item to record actual construction as follows:
 - 1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
 - 2. Include locations of concealed elements of the Work.
 - 3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
 - 4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
 - 5. Identify and locate existing buried or concealed items encountered during Project.
 - 6. Measured depths of foundations in relation to finish floor datum.
 - 7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 9. Field changes of dimension and detail.
 - 10. Details not on original Drawings.
- C. Contractor shall electronically markup drawings weekly and send updates to the Owner and Engineer.
- D. As-built Drawings shall show the installed locations and conditions for all constructed work that vary in location, material or equipment from the Contract Documents. Any variations from the design shall be approved by the Engineer in advance of performing the work.
- E. Contractor's As-built Drawings shall be available to the Engineer for inspection at the job site.
- F. As-built Drawings shall be uploaded to the electronic document management system prior to Substantial Completion of the work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION**3.1 REQUIRED MOCK-UP ASSEMBLIES**

- A. The Contractor shall furnish mock-ups of the following and any other items called for in the Contract Documents.
 - 1. Kettle Screens

2. Monk Screens
3. Kettle Flashboard System
4. Rehabilitated Pond Piping
 - a. After construction of the new outlet works, complete installation of a single pond's supply piping for inspection, testing and modification by the Owner and Engineer. Mock-up shall include all piping, supports, access grating, handrails, valves, and actuators as necessary to provide a fully functional system.

3.2 REQUIRED SHOP INSPECTIONS

- A. The Contractor shall coordinate shop inspection for the following items called for in the Contract Documents.

1. Monk Work Platform

END OF SECTION

SECTION 014150**SPECIAL INSPECTIONS AND STRUCTURAL TESTING****PART 1 GENERAL****1.1 SCOPE**

- A. This section includes a listing of special inspections as required by Chapter 17 of the 2021 International Building Code (IBC) to be performed during the progress of this project. A Certificate of Occupancy cannot be issued without documentation that these inspections have been performed and the work is in conformance with the Contract Documents and the 2021 International Building Code.

- B. Related Work:

Section 01400 Quality Control

1.2 RESPONSIBILITY

- A. It shall be the Owner's responsibility to contract and pay for special inspections; however, the Contractor shall be responsible for proper notification when inspection is required in the progress of the work, providing access to facilitate the inspection and making corrections necessary when work is not in compliance with the Contract Documents. The Contractor shall give the Inspector 24 hours notice minimum when an inspection for a portion of the work is required.

1.3 REPORTS

- A. Copies of inspection reports signed by person performing the inspection or test shall be submitted to Construction Manager, Project Manager, and Contractor. A copy shall also be kept in the job trailer.

1.4 GENERAL REQUIREMENTS

- A. Special Inspections and Materials Testing shall be in accordance with Chapter 17 of the 2021 International Building Code.
- B. Special Inspections and Materials Testing shall be in accordance with the 2001 edition of the "National Practice Guidelines for Special Inspections," by the Council of American Structural Engineers (CASE).
- C. The program of Special Inspections and Structural Testing is a Quality Assurance Program intended to ensure that the work is performed in accordance with the Contract Documents.
- D. This specification section is intended to inform the Contractor of the Owner's quality assurance program and the extent of the Contractor's responsibilities. This specification section is also intended to notify the Special Inspector, Testing Laboratory, and other Agents of the Special Inspector of their requirements and responsibilities.

1.5 SPECIAL INSPECTIONS

- A. Shall be performed by a qualified inspector and/or approved testing agency hired by SCDNR.
- B. Contractor shall be responsible to notify inspector in a timely manner (24 hours prior notice minimum) when required inspections need to be performed.

- C. The inspection / testing firm shall be responsible to notify the Contractor, the Construction Manager, and Project Manager immediately of all failed inspections and/or tests in writing. If discrepancies are not corrected, the Special Inspector shall notify the Owner.

1.6 SCHEDULE OF INSPECTIONS AND TESTS

- A. Required inspections and tests are described in the "Statement of Special Inspections" attached at the end of this section, and in the individual specification Sections for the items to be inspected or tested.

1.7 PAYMENT

- A. The Owner shall engage and pay for the services of the Special Inspector, Agents of the Special Inspector, and the Testing Laboratory.
- B. If any materials which require Special Inspections are fabricated in a plant which is not located within 100 miles of the project, the **Contractor shall be responsible for the travel expenses of the Special Inspector or Testing Laboratory.**
 - 1. Expenses shall be adequate to provide same-day round-trip transportation to remote plant.
 - 2. Expenses shall include travel, lodging and meals.
- C. **Cost for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be withheld from the Contractor's final pay application.**

1.8 CONTRACTOR RESPONSIBILITIES

- A. Contractor's Statement of Responsibility: Each Contractor responsible for the construction of a seismic-force-resisting system, designated seismic system, or component listed in the Seismic Quality Assurance Plan shall submit a "Contractor's Statement of Responsibility" to the Building Official and/or the Project Manager prior to the commencement of work. The Contractor's statement of responsibility contains the following:
 - 1. Acknowledgement of awareness of the project's special inspection requirements.
 - 2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the Building Official.
 - 3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting, and the distribution of the reports
 - 4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.
- B. The Contractor shall cooperate with the Special Inspector and his agents so that the Special Inspections and testing may be performed without hindrance.
- C. The Contractor shall review the "Statement of Special Inspections" and shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Special Inspector or Testing Laboratory at least 24 hours in advance of a required inspection or test. Un-inspected work that required inspection may be rejected solely on that basis.
- D. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at the source of products to be tested, and to facilitate tests and inspection, storage and curing of test samples.
- E. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved and field use shop and erection drawings, and specifications for use by the inspectors and testing technicians.

- F. The Special Inspection program shall in no way relieve the Contractor of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program. All work that is to be subjected to Special Inspections shall first be reviewed by the Contractor's quality control personnel.
- G. The Contractor shall be solely responsible for construction site safety.

1.9 LIMITS ON AUTHORITY

- A. The Special Inspector or Testing Laboratory may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.
- B. The Special Inspector or Testing Laboratory will not have control over the Contractor's means and methods of construction.
- C. The Special Inspector or Testing Laboratory shall not be responsible for construction site safety.
- D. The Special Inspector or Testing Laboratory has no authority to stop the work except with prior written consent of the Owner.

1.10 RECORDS AND REPORTS

- A. Detailed daily reports shall be prepared of each inspection and test and submitted to the Special Inspector. Reports shall include:
 - 1. Name of Project
 - 2. Date of test or inspection
 - 3. Name of inspector or technician
 - 4. Location of specific areas tested or inspected
 - 5. Description of test or inspection and results and interpretation of results
 - 6. Applicable ASTM standard or test method
 - 7. Weather conditions
 - 8. Engineer's seal and signature
 - 9. Corrective actions, if any
 - 10. Recommendation for re-inspection (if applicable)
- B. The Special Inspector shall submit interim reports at the end of each week which includes all inspections and test reports received that week. Copies shall be sent to the Construction Manager, Project Manager, Contractor, and SER and a copy shall be kept on site.
- C. Any discrepancies from the Contract Documents found during a Special Inspection shall be immediately reported to the Contractor, Construction Manager, and Project Manager. If the discrepancies are not corrected, the Special Inspector shall notify the Owner. Reports shall document all discrepancies identified and the corrective action taken.
- D. The Testing Laboratory shall immediately notify the Special Inspector, Contractor, Construction Manager, and Project Manager by telephone, fax or email of any test results which fail to comply with the requirements of the Contract Documents. If conditions are not corrected, the testing laboratory shall notify the Owner.
- E. Reports shall be submitted to the Special Inspector within 7 days of the inspection or test. Hand written reports may be submitted if final typed copies are not available. See Inspection Report Form in Section 01400 – Quality Control.

- F. At the completion of the work requiring Special Inspections, each inspection agency and testing laboratory shall provide a statement to the Owner, Construction Manager, Architect and Building Official that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed.

1.11 FINAL REPORT OF SPECIAL INSPECTIONS

- A. The "Final Report of Special Inspections" shall be completed by the Special Inspector and submitted to the Owner, Construction Manager, and Project Manager prior to the issuance of a Certificate of Use and Occupancy.
- B. The "Final Report of Special Inspections" will certify that all required inspections have been performed and will itemize any discrepancies that were not corrected or resolved.

END OF SECTION

SECTION 015000**TEMPORARY FACILITIES AND CONTROLS****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, access roads, temporary controls, project sign, field offices and sheds, and removal after construction.
- B. Temporary Utilities
- C. Field Offices
- D. Project Identification Sign
- E. Barriers
- F. Security
- G. Temporary Controls:
- H. Removal of utilities, facilities, and controls.

1.2 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
 - 3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Occupational Safety and Health Administration (OSHA)

1.3 TEMPORARY UTILITIES

- A. Temporary electrical power
 - 1. The Contractor shall arrange adequate temporary electrical service or provide onsite power generation suitable for the Work.

2. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.
- B. Temporary electrical lighting
1. In work areas, provide lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by OSHA and state agency which administers OSHA regulations where Project is located.
- C. Temporary water
1. Coordinate with Owner to furnish potable water for human consumption in limited quantities, provided it does not affect the Owner's operation. The Owner reserves the right to discontinue water service at any time. Non-potable water for use during construction shall be the responsibility of the Contractor.
- D. Temporary sanitary facilities
1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.
 2. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.
- E. Temporary fire protection
1. Provide sufficient number of fire extinguishers of type and capacity required to protect the Work and ancillary facilities.
- F. First aid
1. Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.
 2. Provide a minimum of one eyewash station and shower as required by onsite materials.
- 1.4 FIELD OFFICES
- A. Contractor's Field Office
1. Maintain on Project Site weathertight space in which to keep copies of Contract Documents, progress schedule, shop drawings, and other relevant documents.
 2. Facility should include
 - a. Telephone
 - b. Computers with power and Wifi internet access
 - c. Sanitary facilities
 - d. Project site-wide cell phone booster that enables clear and reliable cell phone service at any location on the Project Site.
- B. Owner's Field Office (Contractor Furnished)

1. Maintain on the Project Site a separate, weathertight, secure, furnished office space for the Owner and Engineer. Office shall be approved by the Owner and established prior to the start of construction.
2. Facility should include:
 - a. Telephone
 - b. Power and Wifi internet access
 - c. Sanitary facilities
 - d. A minimum of two wastebaskets, one desk, desk chair and three additional visitor chairs, storage/filing cabinet, and additional meeting table.
- C. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.
- D. Maintenance and Cleaning:
 1. Weekly janitorial services for field offices; periodic cleaning and maintenance for sheds and storage areas.
 2. Maintain walks free of mud, water, snow, and the like.
- E. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.5 PROJECT IDENTIFICATION SIGN

- A. Provide and maintain Project identification sign consisting of painted 8-ft wide by 4-ft high exterior grade plywood and minimum 10-ft. long, 4 by 4 lumber posts, set in ground at least 3 feet, which exhibit lettering by professional sign painter using no more than 5 colors.
 1. List at least the title of the Project, the Owner, Engineer and Contractor.
 2. Contractor's and Engineer's name shall be identified in upper right-hand corner underneath the bid number. Construction and type of Project signage may require description by Drawing detail.
- B. Installation:
 1. Install Project identification sign within 15 days after date established by Notice to Proceed.
 2. Erect at location of high public visibility adjacent to main entrance to Site.
 3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
 4. Install sign surface plumb and level, with butt joints. Anchor securely.
 5. Paint exposed surfaces of sign, supports, and framing.
- C. Maintenance: Maintain clean signs and supports; repair deterioration and damage.
- D. Removal: remove signs, framing, supports, and foundations at completion of Project and restore area to pre-project conditions.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas , to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Place barriers at ends of excavations and along excavations to warn pedestrians and vehicular traffic of excavations. Barricade excavations to prevent persons from entering excavated areas in roadways, parking lots, or other public or private areas.
 - 1. Provide barriers with flashing lights after dark.
 - 2. Keep barriers in place until excavations are entirely backfilled and compacted.
- C. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage, or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.
- D. Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Devices shall conform to minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located.

1.7 SECURITY

- A. Make adequate provision for protection of the work area against fire, theft, and vandalism, and for protection of public against exposure to injury.

1.8 TEMPORARY CONTROLS

- A. Dust Control
 - 1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
 - 2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.
- B. Erosion and Sediment Control
 - 1. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 2. Minimize surface area of bare soil exposed at one time.
 - 3. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.
 - 4. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.
 - 5. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

C. Stormwater Management and Pollution Prevention

1. The Contractor shall prepare, submit and carryout all requirements to obtain the necessary Stormwater Management Plan (SWMP) permit.
2. Prior to commencement of any excavation, the Contractor shall be in possession of a SWMP, and also ensure that an application for a Stormwater Construction Permit has been submitted to the appropriate agency at least 10 days prior to the start of construction activities.
3. The SWMP contains the Best Management Practices (BMPs) that shall be implemented to comply with the Stormwater Construction Permit. The SWMP will be subject to review by the Owner and the Engineer. The Contractor shall ensure all parties are in agreement with the stormwater management practices. The following shall be specifically addressed in the SWMP:
 - a. Define type, location and scheduled placement of stabilization practices that will be implemented to prevent soil erosion.
 - b. Describe stormwater management techniques and schedule of implementation.
 - c. Define practices to be employed to prevent off-site movement of sediment.
 - d. Characterize construction, sanitary and any hazardous waste disposal practices.
 - e. Define record keeping practices.

D. Noise Control

1. Provide methods, means, and facilities to minimize noise produced by construction operations.
2. Work will not be permitted onsite between the hours of 8pm and 7am without prior written notice by the Owner.
3. Take special measures to suppress noise during night hours.

E. Pollution Control

1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

1.9 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.
- B. Remove underground installations to minimum depth of 2 feet. Grade Site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary Work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 016500**PRODUCT DELIVERY AND HANDLING****PART 1- GENERAL****1.1 DESCRIPTION**

- A. Work included: Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Sections in Division 1 of these specifications.
 - 2. Additional procedures also may be prescribed in other Sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Engineer, determine, and comply with manufacturer's recommendations on product handling, storage and protection.

1.4 PRODUCT DELIVERY

- A. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
- B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

1.5 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

- B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality and other pertinent information.

1.6 PROTECTION OF MATERIAL AND WORK

- A. General
 - 1. Carefully and properly protect all materials of every description, both before and after installation.
 - 2. Provide any enclosing or special protection from weather as deemed necessary by the Engineer at no additional cost to the Owner.
- B. Partial payments under the Contract will not relieve the Contractor from responsibility.
 - 1. When materials and work at the site which have been partially paid for are not adequately protected by the Contractor, such materials will be protected by the Owner at the expense of the Contractor and no further partial payment thereon will be made.
- C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.7 STORAGE

- A. Store all items of equipment, component parts, etc. in accordance with the manufacturers' recommendations or as may otherwise be necessary to prevent damage or deterioration of any sort.

1.8 REPAIRS AND REPLACEMENTS

- A. In the event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the contract time of completion.

PART 2- PRODUCTS

Not Used

PART 3- EXECUTION

Not Used

END OF SECTION

Technical Specifications

016500-2

PRODUCT DELIVERY
AND HANDLING

SECTION 017200**PROJECT LAYOUT AND FIELD
ENGINEERING****PART 1- GENERAL****1.1 DESCRIPTION**

- A. Work included: Provide such field engineering services, including survey and civil engineering, as are required for proper completion of the Work including, but not necessarily limited to:
 - 1. Establish and maintain all horizontal and vertical reference points, grades, lines and planes as required to construct project as indicated, specified, or both.
 - 2. Structural design of shores, forms and similar items provided by the Contractor as part of his means and methods of Construction.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Additional requirements for field engineering also may be described in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary craft and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of the Section.
 - 1. Surveyor: Engage a Registered Land Surveyor registered in the State where the project is located, to perform land surveying services required.
 - 2. Engineer: Engage a Professional Engineer of the discipline required, registered in the State in which the project is located, to perform required engineering services.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01330 - Submittal Procedures.
- B. Upon request of the Construction Manager and/or Architect, submit:
 - 1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
 - 2. Documentation verifying accuracy of field engineering work.
 - 3. Certification, signed by a registered land surveyor, certifying that elevations and locations of improvements are in conformance with requirements of the Contract Documents. The cost for registered land surveyors shall be included in the Contractors bid.

- C. Final Property Survey: Prior to Substantial Completion, prepare a final property survey showing significant features that have resulted from construction of the project. Include a certification signed by the surveyor that lines and levels of the project are accurately positioned as shown on the survey and in accordance with the contract documents.

PART 2- PRODUCTS

2.1 ENGINEERING EQUIPMENT

- A. Transit and measuring devices shall be calibrated to layout site and building work indicated.

2.2 OTHER LAYOUT EQUIPMENT

- A. Provide stakes and batter boards of size and quality to execute the work indicated, Use wire and non-stretching cord to establish lines for site, paving and building work.

PART 3- EXECUTION

3.1 BENCHMARKS

- A. The contractor shall maintain carefully all benchmarks, monuments and other reference points throughout execution of this work. If these are disturbed or destroyed, same shall be replaced and rest as directed by the Architect at Contractor's expense.

3.2 LAYOUT

- A. Stake building and site improvements relative to reference lines indicated on plan.
- B. Locate storage sheds, temporary office and topsoil stockpile so as to best advance progress of work and as approved by architect.

3.3 SITE CONDITIONS

- A. Before commencing work, verify benchmarks, reference points, and conditions where new work ties into existing work.

3.4 ADDITIONAL PROCEDURES

- A. In addition to procedures necessary for proper performance of the Contractor's responsibilities:
 - 1. Locate and protect control points before starting work on the site.
 - 2. Preserve a minimum of two permanent reference points during progress of the

- Work and through completion of the Work. Locate permanent reference points on as-built documents.
3. Do not change or relocate reference points or items of the Work without specific approval from the Architect.
 4. Promptly advise the Construction Manager when a reference point is lost or destroyed, or required relocation because of other changes in the Work.
 - a Upon direction of the Construction Manager, require the field engineer to replace reference stakes or markers. Locate such replacements according to the original survey control.
 5. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning any work, investigate and verify the existence and location of underground utilities and other construction.
 - a Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping.

END OF SECTION

SECTION 017329**CUTTING AND PATCHING****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Work included: This Section establishes general requirements pertaining to cutting (including excavating), fitting and patching of the work required to:
 - 1. Make the several parts fit properly;
 - 2. Uncover work to provide for installing, inspection, both, of ill-timed work;
 - 3. Remove and replace work not conforming to requirements of the Contract Documents; and
 - 4. Remove and replace defective work.
- B. Related Work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, NCLC, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. In addition to other requirements specified, upon the Construction Managers and/or Engineer's request to uncover work to provide for inspection by the Construction Manager and/or Engineer of covered work, and remove samples of installed materials for testing.
 - 3. Do not cut or alter work performed under separate contracts without the Construction Manager's and Engineer's written permission.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

1.3 SUBMITTALS

- A. Request for Construction Manager's and/or Engineer's consent:
 - 1. Prior to cutting which effects structural safety, submit written request to the Construction Manager and/or Engineer for permission to proceed with cutting.
 - 2. Should conditions of the Work, or schedule indicate a required change of materials or methods for cutting and patching, so notify the Construction Manager and/or Engineer and secure his written permission and the required Change Order prior to proceeding.
- B. Notices to the Construction Manager and/or Engineer:
 - 1. Prior to cutting and patching performed pursuant to the Construction Manager's

- and/or Engineer's instructions, submit cost estimate to the Construction Manager and Engineer. Secure the Construction Manager's and the Engineer's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
2. Submit written notice to the Construction Manager and/or Engineer designating the time the Work will be uncovered, to provide for the Construction Manager's and/or Engineer's observation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT FOR COSTS

- A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to the written Change Order, after claim for such reimbursement is submitted by the Contractor and approved by the Construction Manager and Engineer. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching and backfilling.
 2. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies:
 1. If uncovered conditions are not as anticipated, immediately notify the Construction Manager and/or Engineer and secure needed directions.
 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the Work.
- B. Provide required fire protection including, but not necessarily limited to, fire blankets, fire extinguishing equipment, prior to consent from Construction Manager.

3.3 PERFORMANCE

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
1. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.
 2. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.
 3. All penetrations made by the Contractor through walls, ceilings, and/or floors shall be sealed by the Contractor to meet the requirements of all building codes, fire codes, applicable to this project.
 4. Extent of Cutting and Patching: Cut areas in new or existing work only to the extent required to perform the work. Cutting shall be in a manner that will not disturb adjoining work as much as possible and will facilitate patching in a sound and durable manner with invisible seams between the patched areas and the existing adjoining work. Patching shall restore area to match original finish to the satisfaction of the Engineer. All rejected patched areas shall be removed and replaced to provide visually acceptable and durable work as directed by the Engineer.
- B. General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.
- C. Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.
- a. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.
 - b. Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.
 - c. Generally, unless other specified, work that requires cutting shall be performed by the tradesman performing the work.
- D. Patching: Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.
1. Where feasible, inspect and test patched areas to demonstrate integrity of work.
 2. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.
 3. Responsibility For Patching: The subcontractor will pay the masons on site to patch masonry walls that have to be cut for ductwork and any other larger opening. Holes in walls for pipe and conduit shall be drilled and grouted as required. Any damage to the fire rated construction will be the responsibility of the

subcontractor to have properly repaired to meet the UL rating and meet approval of the Engineer. The ultimate responsibility for all patching shall be on the General Contractor to provide an acceptable patch as determined by the Engineer. All patching determined by the Engineer to be unacceptable shall be corrected by personnel skilled and qualified in installing the material to be patched.

- a. All patching shall be performed by personnel skilled in patching the substrate that has been disturbed. The subcontractor who performed the cutting shall be responsible to pay the appropriate personnel to install the patching material.
- E. Cleaning: Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 017700
CONTRACT CLOSE-OUT PROCEDURES

PART 1 - GENERAL

1.1 Deficiency Lists

- A. During the construction of the work, the Construction Manager and/or Engineer shall inspect the work for conformance to the Contract Documents.
- B. Should an inspection reveal work that is not in conformance with the Contract Documents, and if the nature of the non-conformance warrants, at the sole discretion of the Construction Manager and/or Engineer, a written list of deficiencies will be issued.
- C. The "deficiency list" as hereinafter called, shall stipulate the item or items of work that are in non-conformance and shall specify a reasonable time for the deficient work to be brought into conformance with the Contract Documents.
 - 1. Upon receipt of the deficiency list the Contractor shall by any and all means at his disposal, endeavor to correct the work within the time stipulated. The Contractor shall notify the Construction Manager in writing when the work has been corrected and request an inspection.
- D. If the inspection reveals the deficiency has been corrected, then the deficiency list shall be rescinded.
- E. During the period that the deficiency list is in effect, the Construction Manager may, at his option, not authorize the payment of progress billings until the deficiency list is rescinded or, in the opinion of the Construction Manager, the Contractor is making a good faith effort to correct the deficiency.

1.2 Punch Lists/Final Inspection

- A. When the Contractor determines that his work or portions of his work are sufficiently near completion to warrant a preliminary inspection, he shall request in writing to the Construction Manager a preliminary inspection.
- B. At a mutually agreeable time, the Construction Manager and Contractor shall conduct a preliminary inspection of the work for completeness and conformance of work. Any items noted as incomplete shall be listed on a preliminary punch list, a copy of which shall be forwarded to the Contractor for completion and correction.
- C. The Construction Manager shall establish a reasonable time period for the completion or correction of all items on the preliminary inspection punch list. At the end of this time period a pre-final inspection shall be conducted.
- D. The substantial completion inspection shall include the Engineer, Owner, Construction

Manager and Contractor. The Contractor shall present to the Engineer a written list of all work incomplete, a reason why the item of work is incomplete and give a date when the work will be complete. The substantial completion inspection shall not be conducted unless the Contractor presents the list of incomplete items.

- E. Should the Engineer find any item of work to be unacceptable he shall prepare a punch list of those items. The Contractor shall complete all items on the list within fourteen (14) days of the inspection.
- F. At the conclusion of the substantial completion inspection and if the completeness of the work allows, the Engineer shall issue a Certificate of Substantial Completion. OSE issues the certificate of occupancy. Should the amount of incomplete work be such that a Certificate of Substantial Completion cannot be issued, another substantial completion inspection shall be scheduled.
- G. Upon completion of the substantial completion punch list and provided a Certificate of Substantial Completion has been issued, a final inspection shall be held with the Owner, Engineer, Construction Manager and Contractor. Provided the inspection reveals work to be complete and all punchlist items are corrected, the Engineer shall establish the date of substantial completion.

1.3 Project Close-Out

A. Final Close-Out and Payment

- 1. The Contractor may make Application for Final Payment after the Certificate of Substantial Completion has been issued. The following items must be submitted to the Construction Manager prior to processing of the Final Application for Payment:
 - a. Evidence of completion of Project closeout requirements.
 - b. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - c. Updated final statement, accounting for final changes to the Contract Sum.
 - d. Affidavit of Payment of Debts and Claims, (AIA-G706);
 - e. Consent of Surety, (AIA-G707);
 - f. Release of Liens, (AIA-G706) from: Contractors, Sub- Contractors, and Material Suppliers;
 - g. Supplemental Attachment for ACORD Certificate of Insurance 25 (AIA-G715)
 - h. Completion of items specified for completion after Substantial Completion.
 - i. A statement that the Contractor knows of no reason that the completed project insurance will not be renewable to cover the period required by the Contract Documents.
 - j. Removal of all temporary facilities, services, debris and surplus materials;
 - k. Final "Project Record Documents" as specified in Section 01780, Project Record Documents;
 - l. Final liquidated damages settlement statement.
 - m. Operations & Maintenance Manuals as specified in Section 01780, Project Record Documents;
 - n. Final "As Built" surveyor's drawings verifying dimensions noted on stake-

- out plan sheet;
 - o. Guarantees, Warranties, and Bonds as specified in Section 01780, Project Record Documents;
 - p. Spare parts and replacement items as required by the Specifications;
 - q. Certificate of Final Occupancy;
 - r. Demonstration and testing of equipment has been scheduled or is completed.
 - s. Property survey as required in Section 01720.
2. No final payment application will be processed for payment until final inspection and final acceptance.
 3. Close-out time encompasses a large amount of work during a short period of time. Therefore, the Contractor is encouraged to begin to submit close-out items as soon as possible so that the Contract may be completed, thus allowing the Engineer to recommend approval of the final payment to the Owner.
 4. The Construction Manager may continue to withhold 3.5% retainage from the Contractor until all outstanding close-out materials are submitted to the Construction Manager. It shall be at the discretion of the Construction Manager, upon consultation with the Engineer, to reduce the amount of retainage on a project by project basis, upon a favorable
 5. review of the status of completion of the final punch list, the status of close-out submittals, and above all, the total amount listed on the Release of Liens submitted by the Contractor for all Sub-Contractors and Material Suppliers contracted with by the General Contractor. At no time shall the retainage be reduced to an amount less than the total of the Release of Liens submitted by the Contractor. Final payment may then be made once all remaining outstanding close-out requirements are met.

1.4 Responsibility

- A. It shall be the Contractor's responsibility to see that all requirements of this Section of the Specifications are executed and complete in a timely manner.
- B. No provisions of this section of the Specifications shall in any way relieve the Contractor of completing his work on time and in accordance with the Project Schedule.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 017823**OPERATION AND MAINTENANCE DATA****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes: Preparation and submittal of Operation and Maintenance Manuals.

1.2 GENERAL

- A. Submit Operation and Maintenance Manuals as specified in technical sections.
- B. Make approved manuals available at project site for use by construction personnel and Owner.

1.3 SUBMITTALS

- A. Draft Operation and Maintenance Manuals:
1. Submit prior to shipment of equipment or system to site.
 2. Shipment will be considered incomplete without the draft Operation and Maintenance Manuals.
- B. Final Operation and Maintenance Manuals:
1. Make additions and revisions in accordance with Owner's and Engineer's review comments on draft manuals.
 2. Submit approved Operation and Maintenance Manuals at least 30 days prior to Functional Testing and at least 60 days prior to Owner Training.
 3. Quantity:
 - a. Hard copy: 5 sets.
 - b. Electronic: 5 USB Drives.
 - 1) Label USB drive with submittal number and submit in envelope with paper cover sheet.
 - c. Web-Based Project Management System: 1 submittal.
- C. Electronic Operation and Maintenance manuals shall be provided in native file formats whenever possible and searchable PDF with appropriate bookmarks.
- D. Make additions and revisions to the Manuals in accordance with Owner and Engineer's review comments.

- E. Make final approved manuals available at project site for use by construction personnel and Engineer.

1.4 PREPARATION

A. General requirements:

1. Provide dimensions in English units.
2. Assemble material, where possible, in the same order within each volume.
3. Reduce drawings and diagrams to no larger than 11 by 17-inch size, if possible unless otherwise specified.
4. Complete forms on computer, handwriting not acceptable.
5. Delete items or options not provided in the supplied equipment or system.
6. Provide package control system completely annotated ladder logic for PLC.

B. Hard copy requirements:

1. Binders: 3-ring with rigid covers.
 - a. Break into separate binders as needed to accommodate large size.
 - b. Utilize numbered tab sheets to organize information.
2. Provide original and clear text on reproducible non-colored paper, 8 1/2 by 11-inch size, 24-pound paper.
 - a. All text shall be in English. Do not include any other languages.
3. 11 by 17 inch Drawings:
 - a. Zee-fold drawings separately and place in binder

C. Electronic requirements:

1. File Format: Entire manual in PDF format.
 - a. Include text and drawing information.
 - b. Provide a single PDF file for each volume if the hard copy version is broken into separate binders due to being too large. No single PDF should exceed 200 megabytes in size.
 - c. Create PDF from the native format of the document (Microsoft Word, graphics programs, drawing programs, etc.).
 - 1) If material is not available in native format and only available in paper format, remove smudges, fingerprints, and other extraneous marks before scanning to PDF format.
 - 2) Hard copy record drawing requirements:
 - a) Provide a single multipage PDF file of each set of the scanned drawings.
 - b) Page 1 shall be the cover of the drawing set.

- 3) At file opening, display the entire cover.
 - a) Scan drawings at 300 or higher dots per inch (DPI), black and white, Group IV Compression, unless otherwise specified.
 - b) Scan drawings with photos in the background at 400 dots per inch (DPI), black and white, Group IV Compression.
 - d. Pagination and appearance to match hard copy.
 - e. Searchable.
 - 1) To create searchable PDFs with any scanner, use Optical Character Recognition Software OCR software applications like FineReader, ReadIRIS or OmniPage. These programs can also be used to convert images to MS Word, Excel and other editable formats.
 - 2) To scan original documents into searchable PDF files, the CONTRACTOR or SUPPLIER shall utilize a scanner with the following capabilities:
 - a) Resolution: 600 x 600.
 - b) Autocrop: yes.
 - c) Imprinter: yes.
 - d) 300 dpi color scanning at 30 ppm.
 - e) Visual enhancement software: Kofax VRS Professional - Full Version.
 - f) Color depth: 24-bit RGB.
 - g) Grayscale: 8 bit.
 - h) Ability to scan 11 by 17 documents.
 - f. Scanned images are not acceptable.
 - g. Bookmarks:
 - 1) Bookmarks shall match the table of contents.
 - 2) Bookmark each section (tab) and heading.
 - 3) Drawings: Bookmark at a minimum, each discipline, area designation, or appropriate division.
 - 4) At file opening, display all levels of bookmarks as expanded.
 - h. Thumbnails optimized for fast web viewing.
2. Drawing requirements.
 - 1) Drawings shall have a white background.
 - 2) Drawing shapes shall not degrade when closely zoomed.
 - 3) Screening effects intended to de-emphasize detail in a drawing must be preserved.
 - 4) Delete items or options not provided in the supplied equipment or system.
 3. Media:
 - a. USB drive.

- b. Web-Based Project Management System
- 4. Label media with the following information:
 - a. Operation and Maintenance Manual.
 - b. Equipment name.
 - c. Specification Section Number
 - d. Equipment tag number.
 - e. Owner's name.
 - f. Project number and name.
 - g. Date.
- 5. If multiple submittals are made together, each submittal must have its own subdirectory that is named and numbered based on the submittal number.

1.5 CONTENTS

- A. Label the spines:
 - 1. Equipment name.
 - 2. Tag number.
 - 3. Project name.
 - 4. Owner name.
- B. Cover page:
 - 1. Operation and Maintenance Manual.
 - 2. Equipment name.
 - 3. Specification Section Number
 - 4. Equipment tag number.
 - 5. Owner's name.
 - 6. Project number and name.
 - 7. Date.
- C. Table of Contents: General description of information provided within each tab section.
- D. Equipment Summary Form: Completed form as specified in Appendix A of this Section.
- E. Equipment Maintenance Summary Form: Completed form as specified in Appendix B of this Section.
- F. Electric Motor Technical Data Form: Completed form as specified in Appendix C of this Section.
- G. Description of equipment function, normal operating characteristics, and limiting conditions.
- H. Manufacturer's product data sheets:

1. Where printed material covers more than 1 specific model, indicate the model number, calibrated range, and other special features.
- I. Assembly, installation, alignment, adjustment, and checking instructions.
- J. Storage instructions: Control diagrams:
 1. Internal and connection wiring, including logic diagrams, wiring diagrams for control panels, ladder logic for computer-based systems, and connections between existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings.
 2. Complete set of 11-inch by 17-inch drawings of the control system.
 3. Complete set of control schematics.
- K. Programming: Copies of Contractor furnished programming.
- L. Start-up procedures: Recommendations for installation, adjustment, calibration, and troubleshooting.
- M. Operating procedures:
 1. Step-by-step instructions including but not limited to the following:
 - a. Safety precautions.
 - b. Guidelines.
 - c. Manual keyboard entries.
 - d. Entry codes.
 - e. System responses.
 - f. Other information as needed for safe system operation and maintenance.
 2. Modes:
 - a. Startup.
 - b. Routine and normal operation.
 - c. Regulation and control.
 - d. Shutdown under specified modes of operation.
 - e. Emergency operating shutdown.
- N. Preventative maintenance procedures:
 1. Recommended steps and schedules for maintaining equipment.
 2. Troubleshooting.
- O. Lubrication information: Required lubricants and lubrication schedules.
- P. Overhaul instructions: Directions for disassembly, inspection, repair and reassembly of the equipment; safety precautions; and recommended tolerances, critical bolt torques, and special tools that are required.
- Q. Parts list:

1. Complete parts list for equipment including but not limited to the following information:
 2. Catalog data: Generic title and identification number of each component part of equipment.
 3. Include bearing manufacturer, model and ball or roller pass frequencies for every bearing.
 4. Availability.
 5. Service locations.
- R. Spare parts list: Recommended number of parts to be stored at the site and special storage precautions.
- S. Engineering data:
1. Drawings: Complete set of 11-inch by 17-inch equipment drawings.
 2. Exploded view or plan and section views with detailed callouts.
 3. Outline, cross-section, and assembly drawings.
 4. System drawings: Provide interconnection and wiring diagrams, plan views, panel layouts, bill of materials, etc.
 5. Packaged equipment system drawings: Provide instrumentation loop drawing, control schematic diagrams, interconnection and wiring diagrams, plan views, panel layouts, bill of materials, etc.
 6. System drawings and data sheets: Include drawings and data furnished by the Engineer and the Supplier; provide "as installed" version.
 7. Provide electrical and instrumentation schematic record drawings.
- T. Test data and performance curves, when applicable.
- U. Manufacturer's technical reference manuals.
- V. Source (factory) Test results: Provide copies of Source Tests reports as specified in technical sections.
- W. Functional Test results: After Functional Tests are completed, insert Functional Test reports as specified in technical sections.

1.6 ARCHIVAL DOCUMENTATION

- A. Types of archival documents include the following:
1. Record drawings.
 2. Reports.
 3. Specifications.
 4. Shop drawings.
 5. Vendor Equipment O & M Manuals.
 6. Photos.
 7. Demonstration and training videos.
 8. Other.

- B. All file formats that are not static (i.e. DWG, DXF, DWF) shall be converted to a digital format intended for archival purposes, namely Searchable Portable Document Format (PDF).
- C. Construction Photos:
 - 1. Provide original images in native format (i.e. JPG).
 - 2. Convert images to PDF file showing no more than two photos per page with description of photo below image.
 - 3. Provide construction photos on external hard drives, two for Owner and one for Engineer.
- D. Demonstration and training videos:
 - 1. All demonstration and training videos shall be converted to a digital video format suitable for use on a multitude of computing platforms and devices.
 - 2. An HTML 5 compatible file version of each video shall be provided.
 - 3. HTML 5 compatible file Video:
 - a. Shall be 640x480 pixels video size.
 - b. Compression shall be set to preserve quality over file size.
 - c. 20 frames per second minimum. 30 frames per second is recommended.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 017836**WARRANTIES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes: Warranty requirements.

1.2 SUBMITTALS

- A. For each item of material or equipment furnished under the Contract:
1. Submit form of manufacturer's warranty prior to fabrication and shipment of the item from the manufacturer's facility.
 2. Submit form of manufacturer's special warranty when specified.
- B. Provide consolidated warranties and bonds within 15 calendar days of Substantial Completion.
1. Contents
 - a. Organize warranty documents:
 - 1) Include Table of Contents organized by specification Section number and the name of the product or work item.
 - b. Include each required warranty and bond in proper form, with full information, are certified manufacturer as required, and are properly executed by Contractor, or subcontractor, supplier, or manufacturer.
 - c. Provide name, address, phone number, and point of contact of manufacturer, supplier, and installer, as applicable.
 2. Hardcopy format:
 - a. Submit 2 copies.
 - b. Assemble in 3 D-side ring binders with durable cover.
 - c. Identify each binder on the front and spine with typed or printed title "Warranties"; Project Name or Title, and the Name Address and Telephone Number of the Contractor.
 3. Electronic copy in PDF format.
 - a. Submit 1 copy.

1.3 OWNER'S RIGHTS

- A. Owner reserves the right to reject warranties.
- B. Owner reserves the right to refuse to accept Work for the project if the required warranties have not been provided.

1.4 RELATIONSHIP TO GENERAL WARRANTY AND CORRECTION PERIOD

- A. Warranties specified for materials and equipment shall be in addition to, and run concurrent with, both Contractor's general warranty and the correction period requirements.
- B. Disclaimers and limitations in specific materials and equipment warranties do not limit Contractor's general warranty, nor does such affect or limit Contractor's performance obligations under the correction period.

1.5 MANUFACTURER'S WARRANTY MINIMUM REQUIREMENTS

- A. Written warranty issued by item's manufacturer.
- B. Project-specific information, properly executed by product manufacturer, and expressly states that its provisions are for the benefit of the Owner.
- C. Covers all costs associated with the correction of the defect, including but not limited to removal of defective parts, new parts, labor, and shipping.
 - 1. When correcting warranted Work that has failed, remove and replace other Work that had been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- D. Provides a timely response to correct the defect.
 - 1. Manufacturer shall provide, in a timely fashion, temporary equipment as necessary to replace warranted items requiring repair or replacement, when warranted items are in use and are critical to the treatment process, as defined by Owner.
 - 2. In the case that Owner has to provide temporary equipment to replace function of warranted item requiring repair or replacement, manufacturer shall reimburse Owner for such costs associated with the temporary equipment.
- E. Warranty shall commence running on the date of substantial completion.
 - 1. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit warranty within 10 calendar days after acceptance, listing date of acceptance as beginning of warranty period.
- F. Duration of Warranty: 2 years unless noted otherwise.

1.6 MANUFACTURER'S SPECIAL WARRANTY

- A. Manufacturer's special warranty is a written warranty published by the manufacturer which includes the requirements specified in the Section where the item is specified.
 - 1. Includes Project-specific information and requirements, properly executed by product manufacturer, and expressly states that its provisions are for the benefit of the Owner. Technical sections indicate Project-specific requirements that differ from the minimum warranty requirements for that item.
 - a. Examples include extending the duration of manufacturer's warranty or to provide increased rights to Owner.
 - 2. Manufacturer's warranties commence on the date that the associated item is certified by Engineer as substantially complete.

1.7 WARRANTY WORK

- A. Contractor's responsibilities:
 - 1. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the product, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with Contractor.
- B. Replacement cost:
 - 1. Upon determination that work covered by warranty has failed, replace or rebuild the work to an acceptable condition complying with requirement of the Contract Documents.
 - a. Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether Owner has benefited from the use of the work through a portion of its anticipated useful service life.
- C. Related damages and losses:
 - 1. When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- D. Owner's recourse:
 - 1. Written warranties are in addition to implied warranties, and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitation on time in which Owner can enforce such other duties, obligations, rights, or remedies.
- E. Reinstatement of warranty:

1. When work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.
 - a. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

1.8 IMPLIED WARRANTIES

- A. Warranty of title and intellectual rights:
 1. Except as may be otherwise indicated in the Contract Documents, implied warranty of title required by Laws and Regulations is applicable to the Work and to materials and equipment incorporated therein.
 2. Provisions on intellectual rights, including patent fees and royalties, are in the General Conditions, as may be modified by the Supplementary Conditions.
- B. Implied warranties: Duration in accordance with Laws and Regulations.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 019100**EQUIPMENT TESTING AND FACILITY STARTUP****PART 1 - GENERAL****1.1 GENERAL**

- A. Equipment testing and facility startup are prerequisites to satisfactory completion of the contract requirements and shall be completed within the Contract Times.
- B. The Contractor shall be responsible for scheduling and performing all operational testing.
- C. Startup of a fish hatchery is a complex operation requiring the combined expertise of the Contractor, manufacturers' representatives, subcontractors, the Engineer, and the Owner. The Contractor shall be responsible for coordinating all parties for a successful startup. The Engineer and Owner will be available for technical and operational advice prior to and during startup.
- D. Contractor shall perform a 7-day facility acceptance test as specified in Part 3 of this Section. The test shall start prior to midday on a Monday, Tuesday, or Wednesday. Testing periods shall not include holidays, based on the Owner's calendar.
- E. During system testing and startup, water used for disinfecting must be neutralized before discharge.

1.2 SUBMITTALS

- A. Schedule:
 - 1. The schedule for testing and startup shall be submitted under Section 011000 - Summary.
- B. Testing and Startup Plan:
 - 1. Not less than 60 Days prior to startup, submit for review a detailed Testing and Startup Plan. The Plan shall include schedules for manufacturers' equipment certifications, schedules for submitting final Owner's Manuals, schedule for training the Owner's personnel, list of Owner and Contractor-furnished supplies, electrical testing, instrumentation and controls testing, and detailed schedule of operations to achieve successful system testing, startup, and performance and acceptance testing. The Plan shall include test checklists and data forms for each item of equipment and shall address coordination with the Owner's staff. The Contractor shall revise the Plan as necessary based on review comments.
- C. Records and Documentation:

1. Equipment Installation Certification: Where required by the specifications, submit documentation from manufacturer's representative that the equipment has been properly installed and lubricated, is in accurate alignment, is free from undue stresses from connecting piping and anchoring, and has operated satisfactorily under full load conditions.
2. Records of testing and startup as indicated below.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 EXECUTION

A. Prerequisites:

1. The following shall be completed before testing and startup begins:
 - a. Furnish all Technical Manual information required by the Contract Documents.
 - b. Provide all safety equipment, emergency shower and eyewash units, fire extinguishers, gas detectors, protective guards and shields, emergency repair kits, safety chains, handrails, gratings, safety signs, and valve and piping identification required by the Contract Documents. Devices and equipment shall be fully functional, adjusted, and tested.
 - c. Manufacturer's certifications of proper installation have been accepted.
 - d. Leakage tests, electrical tests, and adjustments have been completed.
 - e. The Owner has approved the Contractor's Testing and Startup Plan.
 - f. Functional verification of the individual instrumentation loops (analog, status, alarm, and control) from the field devices to the HMI.
 - g. Adjustment of the pressure switches, flow switches, timing relays, level switches, vibration switches, temperature switches, RTD monitors, pressure regulating valves, and other control devices to the settings determined by the Engineer or the equipment manufacturer.
 - h. Functional verification of the individual interlocks between the field-mounted control devices and the motor control circuits, control circuits of variable-speed controllers, and packaged system controls.

B. Supplies:

1. The Contractor shall furnish:
 - a. All necessary materials not listed for the Owner to furnish.
2. The Owner will furnish:
 - a. Water.
 - b. Power.

C. Records of Testing and Startup:

1. The Contractor shall maintain the following during testing and startup and submit originals to Owner prior to acceptance:
 - a. Lubrication and service records for each mechanical and electrical equipment item.
 - b. Hours of daily operation for each mechanical and electrical equipment item.
 - c. Equipment alignment and vibration measurement records.
 - d. Logs of electrical measurements and tests.
 - e. Instrumentation calibration and testing logs.
 - f. Testing and validation of SCADA inputs, outputs, logic functions, status indications and alarms.
 - g. Factory and field equipment settings.
 - h. Log of problems encountered and adjustments made.
 - i. Other records, logs, and checklists as required by the Contract Documents.

3.2 SYSTEM TESTING

- A. After individual equipment items have been tested and certified as required by the Technical Specifications, tests of systems comprised of single or multiple equipment items with appurtenant equipment and instruments and controls shall be conducted. Items of equipment shall be tested as part of a system to the maximum extent possible.
- B. The Contractor shall demonstrate the manual and automatic modes of operation to verify proper control sequences, software interlocks, proper operation of software logic and controllers, etc. System testing shall include the use of water or other process media, as applicable, to simulate the actual conditions of operation.
- C. Systems testing activities shall follow the detailed test procedures and checklists in Contractor-furnished Testing and Startup Plan. Completion of systems testing shall be documented by a report.
- D. The Contractor shall system test the utility, chemical feed, safety equipment, and other support systems before testing the process system.
- E. Furnish the Owner at least 10 Days written notice confirming the start of system testing. The Owner's and Engineer's staff will observe systems testing.
- F. The Contractor shall arrange for manufacturer's representative to revisit the Site as often as necessary to correct malfunctions to the Owner's satisfaction.

3.3 STARTUP AND ACCEPTANCE TESTING

- A. The Contractor shall start up the water supply systems, head tower, piping systems, all process systems, and operate them at rates directed by the Engineer without malfunction for a continuous 7 Day, 24 hour/day acceptance test period. If any equipment item, subsystem, or system malfunctions during the test period, the item shall be repaired and the test restarted at time zero with no credit given for the elapsed time before the malfunction.
- B. Defects in material or workmanship that appear shall be promptly corrected. Time lost for wiring corrections, control point settings, or other reasons that interrupt the test may, at the judgment of the Owner, be cause for extending the test period an equal amount of time.
- C. Acceptance testing shall not begin until leakage tests, instrumentation tests and adjustments, electrical tests and adjustments, equipment field tests, disinfection, and system tests have been completed to the satisfaction of the Owner and Engineer.
- D. The Contractor shall furnish the services of manufacturer's representatives, if necessary, to correct equipment malfunctions.
- E. The Owner will furnish hatchery operators during the test period. The Contractor shall furnish continuous, 24-hour staffing at the facility.
- F. During acceptance testing, the Contractor shall:
 - 1. Maintain and operate equipment and systems in accordance with the manufacturers' recommendations and normal facility operation as determined by the Owner.

END OF SECTION

SECTION 024116**STRUCTURE DEMOLITION****PART 1 - GENERAL**

- 1.1 The Contractor shall demolish and reconstruct all existing construction, as shown, and install all new structures, concrete, pipe, utilities, backfill, and pavement, as indicated, in accordance with the Contract Document.
- 1.2 **COORDINATION**
- A. The Contractor shall carefully coordinate the Work in areas where existing facilities shall remain operational. See Section 011000 - Summary for work restrictions and phasing/sequencing requirements.
 - B. The Work indicated in the Contract Documents is not all-inclusive and the Contractor shall be responsible to perform the reconstruction indicated plus that which can be reasonably inferred from the Contract Documents as necessary to complete the Project. The Contract Documents identify the major facilities that shall be demolished and reconstructed, but auxiliary utilities such as water, drainage, fencing, electrical wiring, controls, and instrumentation are not necessarily shown.
 - C. The Contractor shall note that the Drawings used to indicate demolition and reconstruction are based on record drawings of the existing facilities which have been reproduced to show existing conditions and to clarify the Scope of Work as much as possible. Prior to bidding the Contractor shall conduct a comprehensive survey at the Site to verify the correctness and exactness of the Drawings, the Scope of Work, and the extent of auxiliary utilities.
 - D. While demolition and reconstruction are being performed, the Contractor shall provide adequate access for the continued operation and maintenance of the facilities. The Contractor shall erect and maintain fences, warning signs, barricades, and other devices around the reconstruction as required for the protection of the Contractor's employees and the Owner's personnel at the sites. The Contractor shall remove all such protection when reconstruction activities are complete, or as Work progresses, or when directed by the Owner.
- 1.3 **DEMOLITION**
- A. Items to be removed at the site are summarized on the Drawings. Coordinate with Specifications.
 - B. Existing structures and related appurtenances shown or required to be demolished as part of the Work shall be removed and disposed of unless otherwise indicated. Removed items shall be disposed of offsite by the Contractor.

1.4 REHABILITATION

- A. Existing civil, landscaping, structural, and electrical Work disturbed or damaged by reconstruction activities shall be repaired and rehabilitated as indicated.
- B. Damaged items shall be repaired or replaced with new items to restore damaged items or surfaces to a condition equal to and matching that existing prior to damage.

1.5 DISPOSAL

- A. The Contractor shall be responsible for the offsite disposal of debris resulting from reconstruction in compliance with local, state, and federal codes and requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Except as otherwise indicated, the Contractor shall provide materials which will result in equal-or-better Work than the Work being reconstructed, in terms of performance characteristics and including visual effects where applicable. The Contractor shall use material identical with the original materials where feasible.
- B. Materials shall comply with the requirements of the technical specifications wherever applicable.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall coordinate demolition and reconstruction Work with the Owner and Engineer. Unless otherwise indicated, the Contractor shall be responsible for the sequence of activities. Work shall be performed in accordance with applicable safety rules and regulations.
- B. The Contractor shall ensure that any utilities connected to structures, equipment, and facilities to be removed, relocated, salvaged, replaced, or abandoned are rendered inoperable, replaced with new utilities, or adequately bypassed with temporary utilities before proceeding with demolition and reconstruction.
- C. The Contractor shall take precautions to avoid damage to adjacent facilities and to limit the Work activities to the extent indicated. If reconstruction beyond the Scope indicated is required, the Contractor shall obtain approval from the Owner prior to commencing Work.

3.2 PROTECTION OF EXISTING FACILITIES

- A. Before beginning any reconstruction Work, the Contractor shall carefully survey the existing facilities and examine the Specifications and Drawings to determine the extent of reconstruction and coordination with the Work. Existing facilities not subject to reconstruction shall be protected and maintained. Damaged existing facilities shall be repaired to the previous condition or replaced.
- B. The Contract Documents indicate existing items to be demolished, and/or relocated. Auxiliary utilities including such services as water, air, drainage, and electrical wiring are not necessarily indicated. The Contractor shall verify the Scope of the Work to remove the items indicated. The removal of existing items for demolition, and relocation shall be completed at no additional cost to the Owner.

3.3 REHABILITATION

- A. Certain areas of existing structures, piping, conduits, and the like will be affected by Work necessary to complete modifications under this Contract. The Contractor shall be responsible to rehabilitate those areas affected by its construction activities.

3.4 DISPOSAL

- A. Demolition and removal of debris shall minimize interference with roads, walks, and other adjacent occupied or used facilities which shall not be closed or obstructed without permission from the Owner. Alternate routes shall be provided around closed or obstructed traffic ways.

3.5 CLEANING

- A. During and upon completion of Work, the Contractor shall promptly remove tools and equipment, surplus materials, rubbish, debris, and dust and shall leave areas affected by Work in a clean, approved condition.
- B. Adjacent structures shall be cleaned of dust, dirt, and debris caused by reconstruction, as directed by the Engineer or governing authorities, and adjacent areas shall be returned to condition existing prior to start of Work.

END OF SECTION

SECTION 030100
MAINTENANCE OF CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Epoxy adhesive injection materials.
2. Epoxy mortar materials and mixing.
3. Cementitious mortar materials and mixing.
4. Repair of damaged and spalled concrete.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories
2. Section 032000 - Concrete Reinforcing
3. Section 033000 - Cast-in-Place Concrete

1.2 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 318 Building Code Requirements for Structural Concrete.
2. ACI 364.3R Guide for Cementitious Repair Material Data Sheet.

B. American Welding Society:

1. AWS D1.1/D1.1M - Structural Welding Code - Steel.
2. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel.

C. ASTM International:

1. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
2. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
3. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
4. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).
5. ASTM C150/C150M - Standard Specification for Portland Cement.
6. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
7. ASTM C293/C293M - Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading).

8. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
9. ASTM C882/C882M - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
10. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.

D. International Concrete Repair Institute:

1. ICRI 310.2R Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair
2. ICRI 320.3R Guideline for Inorganic Repair Material Data Sheet Protocol

E. Bureau of Reclamation:

1. USBR M-47 Standard Specifications for Repair of Concrete, 2nd Edition

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

C. Concrete Repair/Removal Plan: Submit a plan detailing approach and schedule for concrete repair. Plan shall include:

1. Methods and equipment used to locate embedded metalwork and reinforcement within concrete to be removed.
2. Methods, equipment, and sequence used to cut and remove concrete and prepare the surface for repair.
3. Cleanup operations, equipment, and equipment locations.
4. Plans to prevent damage to remaining concrete.
5. Temporary barriers and enclosures to be provided for workers and to contain dust during work.
6. Describe method to be used to place repair material. Include type and placement of formwork and sequence of installation.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit mixing instructions.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of structural reinforcement repairs and type of repair.

1.5 QUALIFICATIONS

- A. Employ persons trained for application of repair materials. Minimum of 3 years of experience on similar repair projects within past 5 years.
- B. Welders: AWS qualified within previous 12 months for employed weld types.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.7 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.
- B. Information drawings provide general locations of spall. Actual locations may vary.
- C. Ambient and Surface Temperatures: 50 to 80 degrees F at time of application.
- D. Exterior Applications: If rain, snow, or excessive moisture is expected during application or within 24 hours after application, protect repairs from freezing and moisture.

PART 2 - PRODUCTS

2.1 EPOXY ADHESIVE

- A. Manufacturers:
 - 1. Dayton Superior.
 - 2. Euclid Chemical Company (The); an RPM company.
 - 3. Master Builders Solutions.
 - 4. Sika Corporation.
 - 5. Unitex by Dayton Superior.
 - 6. W.R. Meadows, Inc.

B. Description:

1. Type: Two-part.
2. Solids Content: 100 percent.

C. Minimum Characteristics:

1. Bond Strength:
 - a. 2,700 psi.
 - b. Comply with ASTM C882/C882M.
2. Tensile Strength:
 - a. 3,300 psi.
 - b. Comply with ASTM D638.
3. Elongation:
 - a. 2 percent at seven days at 70 deg.
 - b. Comply with ASTM D638.
4. Flexural Strength:
 - a. 8,000 psi

2.2 EPOXY MORTAR**A. Manufacturers:**

1. Euclid Chemical Company (The); an RPM company.
2. Sika Corporation.

B. Description:

1. Type: Three-part binding resin and aggregate mortar mixture.

C. Binding Resin:

1. Two-part epoxy resin.
2. Solids Content: 100 percent.
3. Minimum Characteristics:
 - a. Bond Strength:
 - 1) 2,700 psi.
 - 2) Comply with ASTM C881.
 - b. Tensile Strength:
 - 1) 6,600 psi.

- 2) Comply with ASTM D638.
 - c. Elongation:
 - 1) 2 percent at seven days at 70 deg. F.
 - 2) Comply with ASTM D638.
 - d. Flexural Strength:
 - 1) 8,000 psi.
 - 2) Comply with ASTM D790.
 - e. Compressive Strength:
 - 1) 6,500 psi.
 - 2) Comply with ASTM D695.
 - D. Aggregate Type: As recommended by mortar manufacturer.
- 2.3 CEMENTITIOUS MORTAR
- A. Manufacturers:
 - 1. Dayton Superior.
 - 2. Euclid Chemical Company (The); an RPM company.
 - 3. Master Builders Solutions.
 - 4. Sika Corporation.
 - 5. Unitex by Dayton Superior.
 - 6. W.R. Meadows, Inc.
 - B. Description: Packaged portland-cement patching mortar.
 - C. Consistency:
 - 1. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.
 - 2. The slump for topping grout and concrete fill shall be adjusted to match placement and finishing conditions but shall not exceed 4-inches.
 - D. Minimum Characteristics:
 - 1. Compressive Strength:
 - a. 2,000 psi after one day and 5,000 psi after 28 days.
 - b. Comply with ASTM C109/C109M.
 - 2. Bond Strength:

- a. 2,500 psi after 28 days.
- b. Comply with ASTM C882/C882M.

3. Flexural Strength:

- a. 1,500 psi after 28 days.
- b. Comply with ASTM C293/C293M.

E. Portland Cement:

- 1. Type: I/II or IL.
- 2. Comply with ASTM C150/C150M.
- 3. Color: Gray.

F. Sand:

- 1. Description: Uniformly graded and clean.
- 2. Comply with ASTM C33/C33M.

G. Water: Clean and potable.

H. Air Entrainment Admixture: Comply with ASTM C260/C260M.

I. Calcium Chloride: Not permitted.

J. Bonding Agent:

- 1. Description:
 - a. Dispersed in water while mixing and non-coagulant in mix.
 - b. Water resistant when cured.
- 2. Emulsion: Polyvinyl acetate.

K. Cleaning Agent:

- 1. Commercial muriatic acid.
- 2. Strength: Suitable for intended application.

2.4 REINFORCEMENT CORROSION PROTECTION

A. Manufacturers:

- 1. Sika Armatec 110 Epcom by Sika Corporation
- 2. Masterprotect P 8100AP by Sika Corporation

B. Prime exposed reinforcing according to manufacturers recommendations.

2.5 CURING MATERIALS

- A. Curing materials shall be per manufacturer's recommendations for the specific products used.

PART 3 - EXECUTION

3.1 GENERAL

- A. Prior to starting removal work, obtain written permission from Engineer.
- B. Location of concrete removal on drawings is approximate. Verify and adjust concrete removal areas with Engineer in the field.
- C. Do not place repair material until approved by Engineer.
- D. Cease operations and notify Engineer if concrete repair operations damage concrete to remain in place.
- E. Repair concrete and reinforcement outside of prescribed removal lines damaged or loosened during cutting and removal operations, in accordance with this Section. Repair or replace as directed by Engineer at no additional cost to Owner.

3.2 EXAMINATION

- A. Verify that surfaces are ready to receive Work.

3.3 PREPARATION

- A. Locate and mark embedded reinforcement and metalwork within concrete removal areas before beginning concrete removal.
- B. Cleaning:
 - 1. Primary Cleaning - Remove dust and debris resulting from concrete removal.
 - a. Use contained shotblasting, wet sandblasting, or water blasting to remove weakened or damaged concrete micro fractured surfaces.
 - b. If water blasting, use pressure sufficiently high to prepare surface. Pressures up to 15,000 psi may be necessary.
 - c. Remove materials that weaken the bond between remaining concrete and repair material.
 - d. Include saw cut or ground faces.
 - e. After primary cleaning, protect surface from contaminants.
 - 2. Secondary Cleaning - Within 48 hours prior to placement of repair material, use low pressure water jetting to remove materials that may impair bond.

3. Concrete substrate surface roughness: Equivalent to or larger than CSP 5 in accordance with ICRI 310.2R.
4. Clean and allow surfaces to create a saturated surface dry condition.
5. Do not use acids for cleaning or preparing concrete surfaces for repair.

C. Surface Preparation:

1. Remove abrupt protrusions (i.e., form fins) flush with the concrete surface.
2. Remove surface contaminants by pressure washing, or by other methods as approved by the Engineer. Adjust pressure to remove contaminants and limit concrete excavation unless excavation is required.
3. Do not interrupt curing of adjacent concrete. Keep concrete surfaces moist until repairs are completed.

D. Ports:

1. Provide temporary entry ports spaced to facilitate movement of fluids between ports.
2. Size: Not deeper than depth of crack to be filled, or diameter not greater than thickness of crack. Stagger above and below the crack at 45 degree angle. The holes shall be spaced 8 inches maximum center to center along the crack length unless closer spacings are recommended by the grout manufacturer.

E. Provide temporary seal at concrete surface to prevent leakage of adhesive.

F. Remove broken and soft concrete 1/2 inch deep minim and remove corrosion from steel.

G. Reinforcement:

1. Remove concrete shadows around circumferences of reinforcing bars.
2. When corroded reinforcement steel bars are exposed, remove additional concrete along corroded bars until a continuous length of 2 inches of bar free from corrosion is exposed.
 - a. Assess limit of active corrosion on a visual basis.
 - b. Edges of additional areas removed shall be cut square as specified below.
 - c. Remove additional concrete along bar to accommodate couplers or lap splices for replacement reinforcement.
 - d. Obtain approval from Engineer prior to additional concrete removal.
3. Where more than 1/3 of the diameter of a reinforcing bar is exposed by removal of concrete to required depth, remove additional concrete to minimum depth of 3/4 inch below the bar.
4. When removing concrete in and around reinforcing steel to remain in place, use 15-pound or smaller chipping hammers, high or ultra-high pressure water jetting.
 - a. For removal away from saw cut edges, cleanly break concrete with pointed jackhammer bits. Replace or sharpen jackhammer bits that are not pointed.
 - b. Complete removal near repair boundaries with hammers fitted with spade bits.

H. Grinding:

1. To correct surface bulges, offsets, and other irregularities.
2. Concrete surfaces exposed to public view - Limit grinding depth so that no more than 1/2 inch cross-section of aggregate particle is exposed.
3. All other concrete surfaces - Limit grinding depth so that no more than 1/2 the diameter of the largest aggregate particle is exposed.
4. If limits cannot be met, remove and replace concrete.

3.4 CONCRETE REMOVAL

- A. Initially remove damaged, deteriorated, loosened, or unbonded portions of existing concrete by high and ultra-high pressure water jetting, jack hammering, or other approved method. Follow with approved mechanical means if necessary. The minimum repair thickness is 1/2 inch.
- B. Produce rounded 1 inch radius corners.
- C. Produce surfaces and edges suitable for required construction.
- D. Use methods which will not damage concrete or reinforcement to remain in place.
- E. Do not use jackhammers in excess of 30 pounds, or dry sandblasting, without Engineer approval.
 1. Points on jackhammer bits shall cleanly break the concrete.
 2. Replace or sharpen jackhammer bits without points.
- F. Do not line drill perimeters of large openings.
- G. Do not pry on concrete to be removed or existing reinforcement.
- H. Blasting not permitted.
- I. Do not use bush hammers or scabblers.
- J. Saw cutting:
 1. Fully encompass removal area.
 2. Produce clean, sharp edges.
 3. Saw cut depth: Minimum 1 inch.
 - a. Do not damage reinforcing steel.
 - b. If embedment or other conditions prevent a minimum 1 inch saw cut depth, use a grinder to create a minimum 1/4 inch perpendicular face.
 4. Limit number of corners.
 5. Use acute angles greater than approximately 70 degrees. Do not produce sharp corners.
 6. Use diamond blade or diamond wire saws.
 7. Make cuts normal to exposed concrete surface.

8. Prevent kerfs from crossing each other.
9. Do not extend saw kerfs beyond specified limits of removal.

3.5 MIXES

A. Epoxy Mortar:

1. Mix to consistency for intended purpose.
2. Mix components in clean equipment or containers.
3. Comply with pot life and workability limits.

B. Cementitious Mortar:

1. Mix to consistency required for intended purpose.
2. Include bonding agent as additive to mix as appropriate.

3.6 APPLICATION

A. Repairs:

1. Remove standing water.
2. Apply the bonding agent and prime the reinforcing steel with recommended repair materials.
3. Reinforcement: Join new bar reinforcement to existing reinforcement with sleeve splices where required.
4. Strength of Splices and Reinforcement: Exceed original stress values.
5. Exposed Structural, Shrinkage, and Settlement Cracks in Concrete: by one of the following methods as appropriate: epoxy injection, epoxy application, bonding agent and cementitious paste method.
6. Mix and apply the recommended mortar in strict accordance with written recommendation from the manufacturer.
7. For overhead repair (stiff) material, apply repair material with sufficient pressure to ensure intimate contact with substrate.
8. Fill voids flush with surface.
9. Apply surface finish.
10. Shallow Repairs:
 - a. For defects where less than 1/3 circumference of reinforcing steel is exposed.
 - b. Where needed, shape repair area to prevent trapping air in placement.
 - c. Use materials suitable for thickness of repair and as approved.
 - d. Contain materials with formwork as needed.
 - e. For stiff repair materials, thoroughly pack material into void and rub over area with a sponge rubber float or steel trowel to fill defects.

B. Epoxy Resin Injection:

1. Remove any dust, laitance, grease, foreign particles and disintegrated materials from the surface.

2. Inject epoxy-resin adhesive into prepared ports under pressure, using equipment appropriate for particular application. Injection pressure shall be in accordance with grout manufacturer's recommendations and in accordance with the following general procedure.
 - a. Slowly increase the pressure as needed to fill the hole. Use minimum pressure necessary to fill the crack.
 - b. Repeat process on the next injection port.
 - c. After completing 10-12 injection ports, return to the first injection port and repeat the process with a second pass. Continue grouting until the crack is filled.
3. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port, continuing from port to port until entire crack is filled.
4. After curing of epoxy resin, remove temporary seal and excess adhesive.
5. Clean surfaces adjacent to repair and blend finish.

C. Epoxy Mortar:

1. Trowel-apply mortar mix and tamp into place, filling voids at spalled areas.
2. Patching of Honeycombed Areas:
 - a. Trowel mortar onto surface, and work mortar into honeycomb to bring surface flush with surrounding area.
 - b. Finish trowel surface to match surrounding area.
3. Cover exposed steel reinforcement with epoxy mortar and feather edges to flush surface.

D. Cementitious Mortar:

1. Bonding Agent:
 - a. Apply coating to concrete surfaces per manufacturer's requirements.
 - b. Provide full surface coverage.
2. Steel trowel and tamp into place, filling voids at spalled areas.
3. Work mix into honeycombed areas.

E. Cure cementitious mortar per manufacturer's requirements.

3.7 CONCRETE REPAIR METHODS

A. Concrete sections or surfaces with honeycombing and voids:

1. Provide repairs having surface appearance and finish consistent with that of the surrounding work and acceptable to the Engineer.
2. Do not patch, repair, or cover defective Work without prior inspection by the Engineer.
3. Preparation of concrete for repair:

- a. Make no repair until Engineer has accepted methods for preparing surfaces and for making and curing repairs.
- b. Chip out and key-in imperfections in the Work to make them ready for repair.
- c. Coat bonding surfaces and edges of repair area with bonding agents as accepted by the Engineer.

4. Methods of repair:

- a. Dry pack mortar method:
 - 1) Use for holes having depth nearly equal to or greater than least surface dimension of hole, for cone-bolt holes, and for narrow slots cut for repair.
 - 2) Smooth Holes: Clean and roughen by heavy sandblasting before repair.
 - 3) Install dry-pack mortar as specified.
- b. Cement mortar method:
 - 1) Use for holes too wide to dry pack and too shallow for concrete replacement; and for comparatively shallow depressions, large or small, that extend no deeper than nearest surface reinforcement.
 - 2) Install cement mortar as specified.
- c. Concrete replacement:
 - 1) Use when holes extend entirely through the concrete section or when holes are more than 1 square foot in area and extend halfway or more through the section.
 - 2) Form, place, consolidate, and cure concrete of same mix as the surrounding work.

B. Leaking cracks in concrete walls and slabs:

1. Repair cracks that develop in walls or slabs, and repair cracks that show any signs of leakage until all leakage is stopped.
2. Pressure inject visible cracks in the following areas, other than hairline cracks and crazing, with epoxy or polyurethane grout using products and methods acceptable to the Engineer.
 - a. Floors and walls of water bearing structures.
 - b. Walls and overhead slabs of passageways and occupied spaces where the opposite face of the member is exposed to weather or may be washed down and where the opposite face does not receive a separate waterproofing membrane.
 - c. Other items not specified to receive separate waterproofing membrane including slabs over water channels, wet wells, reservoirs, and other similar surfaces.

3. Continue pressure injection of cracks as specified until structure is watertight and remains watertight for not less than 1 year after date of Substantial Completion or date of final repair, whichever occurs later in time.
- C. Leaking construction joints and expansion joints in concrete walls or slabs that include waterstops:
1. Repair any signs of leakage until all leakage is stopped.
 2. Pressure inject visible leaks with hydrophilic polyurethane foam resin.
 3. Continue pressure injection along joints lines as specified until structure is watertight and remains watertight for not less than 1 year after date of Substantial Completion or date of final repair, whichever occurs later in time.
- D. Walls and slabs at overhead channels that leak or sweat because of porosity or cracks too small for successful pressure injection with epoxy.
1. Seal on water or weather side by coating using surface-applied sealing system, specified in this Section.
 2. Apply as recommended by manufacturer published instructions. Where concrete continues to sweat or leak, apply additional coats of surface-applied sealing system until the sweating or leaks stop.
 3. Continue application of surface-applied sealing system as specified until structure is watertight and remains watertight for not less than 1 year after date of Substantial Completion or date of final repair, whichever occurs later in time.
- E. Horizontal Spall Repair
1. Field mark the area of concrete surface that needs to be repaired by visual inspection. Remove all the loose and deteriorated concrete by mechanical chipping to expose sound concrete surface. The area to be patched shall not be less than 1/8 inch in depth and shall be nearly square or rectangular in shape. Avoid making irregular shapes for repairs.
 2. If reinforcing steel is exposed, remove concrete according to this Section.
 3. Before the application of a bonding agent, dampen all the exposed surface so that the pores are completely filled with water. Remove any ponding or glistening water on the concrete surface to create a saturated surface dry (SSD) condition.
 4. Apply a concrete bonding agent to the repair surface. Bonding agent shall have adequate working time to permit final placement of repair mortar.
 5. Use two component, polymer-modified, cementitious, trowel-grade repair mortar Sikatop 122 plus or acceptable alternate for horizontal repair. Mortar depth shall not exceed 1 inch. For the depths exceeding 1 inch to 4 inches, use 3/8 inch dia. Pea gravel to the repair mortar as per the manufacturer's recommendation.
 6. Mix and apply the mortar in strict accordance with the written recommendations from the manufacturer.
 7. Allow the mortar to set to desired stiffness and finish the surface with wood float, sponge float, broom or burlap-drag, depending on the desired surface texture. The finished surface shall be free of bulges or ripples.

8. Cure all the repaired surface using wet burlap and polyethylene or by a fine mist of water. Begin curing immediately after finishing and continue for a minimum of 48 hours. Protect freshly applied mortar from direct sunlight, wind, rain and frost. Curing shall be based on ACI recommendations for portland cement concrete.
9. All the waste shall be promptly removed from the site and properly disposed of by the Contractor.

F. Concrete Topping Replacement

1. Remove existing concrete topping if present. Clean the concrete surface thoroughly by pressure washing using clean water.
2. For the installation of dowels, drill holes in the existing concrete with hole diameter and depth as recommended by the epoxy manufacturer. The hole shall not be larger than 1/4 inch greater than the diameter of outer surface of reinforcing bar with hole depth not less than 12 times bar diameter, unless indicated otherwise.
3. Blow dry compressed air to clean the hole from dust and debris. Follow manufacturer's recommendation for the injection of epoxy adhesive into the prepared hole and insert the recommended dowels.
4. Before placing the new concrete topping, coat the concrete surface with epoxy bonding agent.
5. Before pouring the concrete, place the welded wire fabric (WWF). Use 4x4-w2.9xw2.9 WWF confirming to ASTM A185. WWF shall be in flat sheets or in rolls with a core diameter not less than 10 inches. Use slab bolters continuously across the entire width of reinforcement mat at spacing not more than 30 inches on center to support the reinforcement mat.
6. Finish concrete in accordance with Section 033500 - Concrete Finishing.

G. Vertical And Overhead Spall Repair

1. Field mark the area of concrete surface that needs to be repaired by visual inspection. Remove all the loose and deteriorated concrete by mechanical chipping to expose sound concrete surface. The area to be patched shall not be less than 1/8 inch in depth and shall be nearly square or rectangular in shape. Avoid making irregular shapes for repairs.
2. If reinforcing steel is exposed, remove concrete according to this Section.
3. Before the application of a bonding agent, dampen all the exposed surface so that the pores are completely filled with water. Remove any ponding or glistening water on the concrete surface to create a saturated surface dry (SSD) condition.
4. Apply a concrete bonding agent to the repair surface and prime reinforcement. Bonding agent shall have adequate working time to permit final placement of repair mortar.
5. Mortar depth shall not exceed 3 inches for vertical repair and 2 inches for overhead repair.
 - a. For spall depth greater than 3 inches and 2 inches, Apply mortar in lifts of 1/4 inch to 2 inches. Thoroughly score each lift and allow initial set before next layer is applied.

6. Mix and apply the mortar in strict accordance with the written recommendations from the manufacturer.
7. Allow the mortar to set to desired stiffness and finish the surface in accordance with Section 033500 - Concrete Finishing.
8. Cure all the repaired surface using wet burlap and polyethylene or by a fine mist of water. Begin curing immediately after finishing and continue for a minimum of 48 hours. Protect freshly applied mortar from direct sunlight, wind, rain and frost. Curing shall be based on ACI recommendations for portland cement concrete.
9. All the waste shall be promptly removed from the site and properly disposed of by the contractor.

3.8 FORMING

- A. Use formwork to protect and prevent movement and leakage of repair material. Construct formwork in accordance with Section 031000 - Concrete Forming and Accessories for specified finish.

3.9 FINISHING

- A. Finish repair surfaces in accordance with Section 033500 - Concrete Finishing.
- B. Tooled Edges: Tool exposed edges to a radius of 1/4 inch or as otherwise approved by Engineer.
- C. Finish concrete in presence of Engineer unless inspection is waived.
- D. Meet requirements of Section 031000 - Concrete Forming and Accessories for surface tolerances.

3.10 PROTECTION

- A. Protect from direct sunlight, wind, and other conditions that could cause rapid drying.
- B. Protect from damage or deterioration during project.

3.11 FIELD QUALITY CONTROL

- A. Test concrete for calcium chloride content during execution of the Work.

END OF SECTION

SECTION 031000**CONCRETE FORMING AND ACCESSORIES****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Formwork for cast-in-place concrete.
2. Shoring, bracing, and anchorage.
3. Architectural form liners.
4. Form accessories.
5. Form stripping.

B. Related Requirements:

1. Section 032000 - Concrete Reinforcing: Reinforcing steel and required supports for cast-in-place concrete.
2. Section 033000 - Cast-in-Place Concrete: Cast-in-place or in-situ concrete for structural building frame, slabs-on-grade, and other concrete components associated with building.
3. Section 042000 - Unit Masonry:
 - a. Positioning of recessed reglets for brick veneer masonry anchors.
 - b. Product requirements for masonry accessories for placement by this Section.
4. Section 055000 - Metal Fabrications: Product requirements for metal fabrications for placement by this Section.

1.2 REFERENCE STANDARDS**A. American Concrete Institute:**

1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 318 - Building Code Requirements for Structural Concrete.
4. ACI 347 - Guide to Formwork for Concrete.
5. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures

B. American Forest & Paper Association:

1. AF&PA - National Design Specification (NDS) for Wood Construction.

C. American Society of Mechanical Engineers:

1. ASME A17.1 - Safety Code for Elevators and Escalators.
- D. APA - The Engineered Wood Association:
 1. APA/EWA PS 1 - Voluntary Product Standard - Structural Plywood.
- E. ASTM International:
 1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- F. West Coast Lumber Inspection Bureau:
 1. WCLIB - Standard No. 17 Grading Rules for West Coast Lumber.

1.3 COORDINATION

- A. Coordinate Work of this Section with other Sections of Work in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit manufacturer information on void form materials and installation requirements.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
 1. Form materials
 2. Form ties and related accessories
 3. Form gaskets
 4. Form release agent
 5. List of form materials and locations of use
- D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.5 QUALITY ASSURANCE

- A. Perform Work according to ACI 347, 301, 350, and 318.
- B. Design formwork shall be performed under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Idaho.

- C. The Contractor shall be solely responsible for design and engineering of formwork, as well as its construction.

1.6 QUALIFICATIONS

- A. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of Idaho.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept void forms on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. Design, engineer, and construct formwork, shoring, and bracing according to ACI 318, 350, and 347 to conform to design and applicable code requirements to achieve concrete shape, line, and dimension as indicated on Drawings.
- B. Design of forms and falsework to include values for live load, dead load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety during construction.
 - 1. Forms and falsework to support roof and floor slabs shall be designed for a minimum form dead load of 10 psf plus a 50 psf minimum live load. Live load shall be increased when motorized carts are used to a minimum of 75 psf. These loads shall be in addition to concrete dead load.
 - 2. The maximum height of newly placed concrete shall not exceed 12 feet during any one placement, unless approved by the Engineer.
 - 3. Design formwork to be readily removable without impact, shock or damage to concrete surfaces and adjacent materials.
 - 4. Design formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.
- C. Vapor Retarder Permeance: Maximum 1 perm when tested according to ASTM E96, water method.

2.2 WOOD FORM MATERIALS

- A. Form Materials: Except as otherwise expressly accepted by the Engineer, lumber brought on the Site for use as forms, shoring, or bracing shall be new material. Materials for concrete forms, formwork, and falsework shall conform to the following requirements:
 - 1. Lumber shall be Douglas Fir or Southern Yellow Pine, construction grade or better, in conformance with U.S. Product Standard PS 20.
 - 2. Form materials shall be metal, wood, plywood, or other material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line, and grade required. Metal forms shall be an approved type that will accomplish such results. Wood forms for surfaces to be painted shall be Medium Density Overlaid plywood, MDO Ext. Grade.
- B. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be mortar tight.
- C. Rust stained steel formwork is not acceptable.
- D. Plywood Forms:
 - 1. Application: Exposed finish concrete.
 - 2. Description:
 - a. Comply with APA/EWA PS 1.
 - b. Panels: Full size, 4 by 8 feet.
 - c. Label each panel with grade trademark of APA/EWA.
 - 3. Plywood for Surfaces to Receive Membrane Waterproofing:
 - a. Minimum Thickness: 5/8 inch.
 - b. Grade: APA/EWA "B-B Plyform Structural I Exterior."
 - 4. Plywood with "Smooth Finish" Indicated on Drawings:
 - a. Minimum Thickness: 3/4 inch.
 - b. Grade: APA/EWA "HD Overlay Plyform Structural I Exterior."

2.3 PREFABRICATED FORMS

- A. Manufacturers:
 - 1. EFCO - Economy Forms Corp.
 - 2. Molded Fiber Glass Construction Products.
 - 3. Sonoco Products Co.
 - 4. Symons by Dayton Superior.
 - 5. Wall-Ties & Forms, Inc.
 - 6. Western Forms.
- B. Preformed Steel Forms:

1. Description: Matched, tightly fitted, and stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
 2. Minimum Thickness: 16 gage.
- C. FRP Forms: Matched, tightly fitted, and stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
- D. Pan:
1. Material: Steel.
 2. Configuration: Size and profile as required.
- E. Steel Forms:
1. Description: Sheet steel, suitably reinforced.
 2. Design: For particular use as indicated on Drawings.
- F. Form Liners: Smooth, durable, grainless, and non-staining hardboard unless otherwise indicated on Drawings.
- G. Framing, Studding, and Bracing: Stud.

2.4 ARCHITECTURAL FORM LINERS

- A. Manufacturers:
1. Sika Greenstreak.
 2. Symons by Dayton Superior.
 3. Approved equal.
- B. Architectural Form Liners:
1. Material: Polyurethane.
 2. Type: Reusable.
 3. Pattern: As indicated on Drawings or as selected by Engineer.

2.5 FORMWORK ACCESSORIES

- A. Form Ties:
1. Type: Removable or Snap off with; cone suitable for intended application, ACI 350 and 347.
 2. Material: Galvanized.
 3. Length: Fixed or Adjustable suitable for intended application.
 4. Furnish waterproofing washer.
 5. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to ensure that the form tie may be broken off back of the face of the concrete.
 6. Free of defects capable of leaving holes larger than 1 inch in concrete surface.
 7. No metal or other material shall be left within 1½ inch from formed surface.

8. Form ties manufacturers:
 - a. Hex head snap tie by meadowBurke
 - b. Snap ties by Dayton Superior
 - c. Or equal.
9. Taper tie manufacturers:
 - a. HD-9 taper tie by meadowBurke
 - b. D9 taper ties by Dayton Superior
 - c. Or equal.

B. Spreaders:

1. Description: Standard, non-corrosive metal-form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face.
2. Wire ties, wood spreaders, or through bolts are not permitted.

C. Form Release Agent:

1. Description: Colorless mineral oil that will not stain concrete or absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete.
2. Manufacturers:
 - a. Architectural Concrete Chemicals, LLC.
 - b. Nox-Crete Products Group.
 - c. Or equal.

D. Corners:

1. Type: Chamfer made of rigid plastic or wood strip as appropriate.
2. Size: 3/4 by 3/4 inches.
3. Lengths: Maximum possible.
4. Re-entrant corners in concrete members shall not have fillets unless otherwise indicated.

E. Dovetail Anchor Slot:

1. Material: Galvanized steel.
2. Thickness: 22 gage.
3. Filling: Foam.
4. Fasten slot to concrete formwork according to manufacturer instructions, and insert foam filler to prevent concrete from entering slot during pour.

F. Vapor Retarder:

1. Description: Polyethylene sheet.
2. Thickness: 15 mils.

- G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength, and character to maintain formwork in place while placing concrete.
- H. PVC Waterstops
 - 1. In accordance with Section 033100 - Joints in Concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and centers before proceeding with formwork.
- B. Verify that dimensions agree with Drawings.
- C. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Engineer before proceeding.

3.2 INSTALLATION

- A. Earth Forms: Not permitted.
- B. Formwork:
 - 1. Forms to confine and shape the concrete to the required lines shall be used wherever necessary. The Contractor shall assume full responsibility for the adequate design of forms, and any forms that are unsafe or inadequate in any respect shall promptly be removed from the Work and replaced. A sufficient number of forms of each kind shall be available to permit the required rate of progress to be maintained. The design and inspection of concrete forms, falsework, and shoring shall comply with applicable local, state and federal regulations. Design, construction, maintenance, preparation, and removal of forms shall be in accordance with ACI 347.
 - 2. Forms shall be true in every respect to the required shape and size, shall conform to the established alignment and grade, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete.
 - 3. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
 - 4. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
 - 5. Camber forms where necessary to produce level finished soffits unless indicated otherwise on Drawings.
 - 6. Positioning:
 - a. Carefully verify horizontal and vertical positions of forms.

- b. Correct misaligned or misplaced forms before placing concrete.
7. Complete wedging and bracing before placing concrete.
8. Erect formwork, shoring, and bracing to achieve design requirements according to ACI 301 & 318.
9. Stripping:
 - a. Arrange and assemble formwork to permit dismantling and stripping.
 - b. Do not damage concrete during stripping.
 - c. Permit removal of remaining principal shores.
10. Obtain approval of Engineer before framing openings in structural members not indicated on Drawings.
11. Install void forms according to manufacturer instructions.
12. Coordinate this section with other sections of Work that require attachment of components to formwork.
13. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture on exposed concrete surfaces. Exposed concrete surfaces are defined as surfaces which are permanently exposed to view.
14. Do not patch formwork.
15. Leave forms in place for minimum number of days according to ACI 347.

C. Form Removal:

1. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads, and removal has been approved by Engineer.
2. Loosen forms carefully; do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
3. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
4. Careful procedures for the removal of forms shall be strictly followed, and this Work shall be done with care so as to avoid damage to the concrete. No heavy loading on green concrete will be permitted. Members which must support their own weight shall not have their forms removed until they have attained at least 75 percent of the 28-Day strength of the concrete. Forms for vertical walls and columns shall remain in place at least 48 hours after the concrete has been placed. Forms for parts of the Work not specifically mentioned herein shall remain in place for periods of time as recommended in ACI 347
5. Forms shall not be removed sooner than the following minimum times after concrete is placed. These periods represent cumulative number of days and fractions of days, not necessarily consecutive, during which the temperature of the air adjacent to the concrete is above 50 degrees Fahrenheit.

Element	Time
Beams and arches - supporting forms and shoring	14 days
Deck slabs - supporting forms and shoring	7 days
Sides of beams, slabs and small structures	24 hours

Columns, walls - <u>with</u> side or vertical load	7 days
Columns, walls - <u>with no</u> side or vertical loading:	3 days
Concrete supporting 20 to 30 feet of wall in place above it	7 days
Concrete supporting not more than 20 feet of wall in place above it	3 days

6. Form Release Agent:

- a. Apply according to manufacturer instructions.
- b. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- c. Do not apply form release agent if concrete surfaces are indicated to receive special finishes or applied coverings that may be affected by agent.
- d. Soak inside surfaces of untreated forms with clean water, and keep surfaces coated prior to placement of concrete.

7. Form Cleaning:

- a. Clean forms as erection proceeds to remove foreign matter within forms.
- b. Clean formed cavities of debris prior to placing concrete.
- c. Flush with water or use compressed air to remove remaining foreign matter.
- d. Ensure that water and debris drain to exterior through cleanout ports.
- e. Cold Weather:
 - 1) During cold weather, remove ice and snow from within forms.
 - 2) Do not use de-icing salts.
 - 3) Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure; use compressed air or other dry method to remove foreign matter.

8. Reuse and Coating of Forms:

- a. Thoroughly clean and repair surfaces of forms to be re-used in the work. Apply new form coating compound to concrete contact surfaces as specified for new formwork before each reuse.
- b. For exposed work, split, frayed, delaminated, patched, or otherwise damaged form facing material which would impair the quality of the resulting concrete surface will not be acceptable.
- c. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets.

D. Forms for Smooth Finish Concrete:

1. Use steel, plywood, or lined-board forms.
2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.

3. Install form lining with close-fitting square joints between separate sheets without springing into place.
4. Use full-sized sheets of form liners and plywood wherever possible.
5. Tape joints to prevent protrusions in concrete.
6. Apply forming and strip wood forms in a manner to protect corners and edges.
7. Level and continue horizontal joints.
8. Keep wood forms wet until stripped.

E. Architectural Form Liners:

1. Erect architectural side of formwork first.
2. Attach form liner to forms before installing form ties.
3. Install form liners square, with joints and pattern aligned.
4. Seal form liner joints to prevent grout leaks.
5. Dress joints and edges to match form liner pattern and texture.

F. Forms for Surfaces to Receive Membrane Waterproofing:

1. Use plywood or steel forms.
2. After erection of forms, tape form joints to prevent protrusions in concrete.

G. Framing, Studding, and Bracing:

1. Maximum Spacing of Studs:
 - a. Boards: Maximum 16 inches o.c.
 - b. Plywood: 12 inches o.c.
2. Size framing, bracing, centering, and supporting members for sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Construct beam soffits of material minimum 2 inchesthick.
4. Distribute bracing loads over base area on which bracing is erected.
5. When placed on ground, protect against undermining, settlement, and accidental impact.

H. Form Anchors and Hangers:

1. Do not use anchors and hangers leaving exposed metal at concrete surface.
2. Symmetrically arrange hangers supporting forms from structural-steel members to minimize twisting or rotation of member.
3. Penetration of structural-steel members is not permitted.

I. Inserts, Embedded Parts, and Openings:

1. Install formed openings for items to be embedded in or passing through concrete Work.
2. Locate and set in place items required to be cast directly into concrete.
3. Position recessed reglets for brick veneer masonry anchors according to spacing and intervals as specified in Section 042000 - Unit Masonry or as indicated on Drawings.

4. Install accessories straight, level, and plumb, and ensure that items are not disturbed during concrete placement.
5. Joints:
 - a. Install waterstops continuous without displacing reinforcement.
 - b. Heat-seal joints watertight.
6. Openings:
 - a. Provide temporary ports or openings in formwork as required to facilitate cleaning and inspection.
 - b. Locate openings at bottom of forms to allow flushing water to drain.
7. Close temporary openings with tight-fitting panels, flush with inside face of forms, and neatly fitted such that joints will not be apparent in exposed concrete surfaces.

J. Form Ties:

1. Provide sufficient strength and quantity to prevent spreading of forms.
2. Place ties at least 1 inch away from finished surface of concrete.
3. Leave inner rods in concrete when forms are stripped.
4. Space form ties equidistant, symmetrical, and aligned vertically and horizontally unless indicated otherwise on Drawings.

K. Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

L. Construction Joints:

1. Install surfaced pouring strip where construction joints intersect on exposed surfaces to provide straight line at joints.
2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
3. Appearance:
 - a. Show no overlapping of construction joints.
 - b. Construct joints to present same appearance as butted plywood joints.
4. Arrange joints in continuous line straight, true, and sharp. Provide snap ties or bolt inserts greased for easy removal 3" to 4" below horizontal construction joints at same spacing as regular ties to tighten forms against hardened concrete. Other methods of achieving a leak proof joint may be used with approval of the Engineer.
5. Obtain approval of the Engineer if it becomes necessary to eliminate or relocate construction joints to facilitate use of ganged forms.
6. Locate control, contraction, and expansion joints were shown and in accordance with Section 033000 - Cast-in-Place Concrete.

M. Embedded Items:

1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, waterstops, and other features.
2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
5. Ensure that conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318 regarding size and location limitations.

N. Openings for Items Passing through Concrete:

1. Frame openings in concrete where indicated on Drawings.
2. Establish exact locations, sizes, and other conditions required for openings and attachment of Work specified under other Sections.
3. Coordinate Work to avoid cutting and patching of concrete after placement.
4. Perform cutting and repairing of concrete required as result of failure to provide required openings.

O. Screeds:

1. Set screeds and establish levels for tops of and finish on concrete slabs.
2. Slope slabs to drain where required or as indicated on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms; remove freestanding water.

P. Scream Supports:

1. For concrete over waterproof membranes and vapor retarder membranes, use cradle-, pad-, or base-type screed supports that will not puncture membrane.
2. Staking through membrane is not permitted.

Q. Cleanouts and Access Panels:

1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris, and waste material.
2. Clean forms and surfaces against which concrete is to be placed.
3. Remove chips, sawdust, and other debris.
4. Thoroughly blow out forms with compressed air just before concrete is placed.

3.3 TOLERANCES

- A. Tolerances are defined as allowable variations from specified lines, grades, and dimensions, and as the allowable magnitude of surface irregularities. Tolerances for concrete formwork shall be in accordance with 4.1 - Variations From Specified Lines, Grades, and Dimensions.

- B. Deviations from established lines, grades, and dimensions will be permitted to the extent set forth herein, provided, that the Engineer reserves right to diminish tolerances set forth herein if such tolerances impair structural action or operational function of a structure.
- C. Where tolerances are not stated in Specifications or Drawings for any individual structure or feature, permissible deviations will be interpreted within construction tolerances as specified in ACI 117.
- D. The Contractor shall be responsible for setting and maintaining concrete forms sufficiently within tolerance limits so as to insure completed work within tolerances specified.
- E. When concrete placements result in hardened concrete which does not meet specified tolerances, submit to the Engineer an outline of preventive actions such as modifications to forms, modified procedure for setting screeds, and different finishing techniques to be implemented to avoid repeated failures. Submit when requested by the Engineer.
- F. The Engineer reserves the right to delay concrete placements until preventive actions which have been approved by the Engineer are implemented.

3.4 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Inspection:
 - 1. Inspect erected formwork, shoring, and bracing to ensure that Work complies with formwork design and that supports, fastenings, wedges, ties, and items are secure.
 - 2. Coordinate with Owner, Engineer, and on site inspector to inspect forms and embedded items in sufficient time prior to each concrete placement to certify to the Engineer that formwork is ready to receive concrete.
 - 3. Schedule concrete placement to permit formwork inspection before placing concrete.
- C. Continuously monitor alignment and stability of forms during all phases to assure the finished product will meet required surface class and tolerances specified herein.
- D. Failure of any supporting surface either due to surface texture, unsatisfactory surfaces, deflection, or form collapse shall be responsibility of the Contractor. Replacement or correction shall be at the discretion of the Engineer and at no additional cost to the Owner.
- E. When forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar.

PART 4 - TOLERANCES**4.1 VARIATIONS FROM SPECIFIED LINES, GRADES, AND DIMENSIONS**

- A. Unless otherwise noted, tolerances shall be in accordance with ACI 117. Surface offsets, surface irregularities and spillway floor finish shall be in accordance with Section 4.2 below.
- B. Variation of controlling dimensions for each structure from specified position in plan from reference line:
 - 1. Overall dimensions: ± 1 inch
- C. Variation in cross-sectional dimensions from those specified for columns, beams, buttresses, piers, and similar members: $-1/4$ inch, $+1/2$ inch
- D. Variation from plumb, specified batter, or specified curved profile for lines and surfaces of columns, walls, piers, buttresses, arch sections, vertical joint grooves, and arises for exposed construction:
 - 1. When overall height of line or surface is:
 - a. 10 feet or less: $\pm 1/2$ inch
 - b. More than 10 feet: $\pm 3/4$ inch
 - 2. For any two successive intermediate points on the line or surface separated by:
 - a. 10 feet or less: $\pm 1/2$ inch
 - b. More than 10 feet: $\pm 3/4$ inch
- E. Variation in thickness of slabs, walls, arc sections, and similar members from that specified:
 - 1. $-1/4$ inch, $+1/2$ inch
- F. Variation in top of wall elevations from that specified: -0 , $+ 1/2$ inch
- G. Variation in location from specified position in plan of sleeves, floor openings, and walls openings: $\pm 1/2$ inch

END OF SECTION

SECTION 032000
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Reinforcing bars.
2. Welded wire fabric.
3. Tie wires.
4. Reinforcement accessories.

B. Related Requirements:

1. Section 031000 - Concrete Forming and Accessories: Form materials, waterstops, and accessories required to form cast-in-place concrete.
2. Section 033000 - Cast-in-Place Concrete: Cast-in-place or in-situ concrete for structural building frame, slabs on grade, and other concrete components associated with building.

1.2 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures
4. ACI 530/530.1 - Building Code Requirements and Specification for Masonry Structures.
5. ACI SP-66 - ACI Detailing Manual.

B. American Welding Society:

1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

C. ASTM International:

1. ASTM A184 - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.
2. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
3. ASTM A704 - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

4. ASTM A706 - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
5. ASTM A767 - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
6. ASTM A775 - Standard Specifications for Epoxy Coated Steel Reinforcing Bars
7. ASTM A934 - Standard Specifications for Epoxy Coated Prefabricated Steel Reinforcing Bars
8. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

D. Concrete Reinforcing Steel Institute:

1. CRSI 10-MSP - Manual of Standard Practice.
2. CRSI 10PLACE - Placing Reinforcing Bars.

1.3 COORDINATION

- A. Coordinate Work of this Section with placement of formwork, formed openings, and other Work.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:

1. Indicate bar sizes, spacings, locations, splice locations, and quantities of reinforcing steel and welded wire fabric.
2. Indicate reinforcement with coatings (e.g. epoxy).
3. Indicate bending and cutting schedules.
4. Indicate supporting and spacing devices.
5. Indicate locations of water stops, anchor bolts, joints, and other items embedded in concrete the influence the placement of reinforcement.
6. Conform to ACI 315 and ACI SP-66.

- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- D. Submit certified copies of mill test report of reinforcement materials analysis.

- E. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.

- F. Source Quality-Control Submittals: Indicate results of tests and inspections.

- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Qualifications Statement:

1. Welders: Qualify procedures and personnel according to AWS D1.1.

1.5 QUALITY ASSURANCE

- A. Meet the applicable requirements of Section 014000 - Quality Requirements.
- B. Perform Work according to CRSI 10-MSP, ACI 301, ACI 318.
- C. Prepare Shop Drawings according to ACI SP-66.
- D. In the case of contradictory requirements, identify on Shop Drawings the standard applied.
- E. Shop Drawings shall be reviewed and approved by the Engineer prior to commencement of reinforcing work.
- F. Make completed reinforcement available for inspection at manufacturer's factory prior to packaging for shipment. Notify the Engineer at least seven days before inspection is allowed.

1.6 QUALIFICATIONS

- A. Welders: AWS qualified within previous 12 months for employed weld types.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. All reinforcing bars shall be delivered to the job site cut to exact length, bent, securely bundled, and tagged with metal tags corresponding to the bar schedules and diagrams.
- B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- C. Store materials according to manufacturer instructions.
- D. Protection:
 - 1. Protect materials from moisture by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.8 EXISTING CONDITIONS

- A. Field Measurements:
 - 1. Verify field measurements prior to fabrication.
 - 2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel:

1. Comply with ASTM A615.
2. Yield Strength: 60 ksi
3. Billet Bars: Deformed.
4. Finish: Epoxy Coated.
5. Welded wire fabric will not be considered as a substitute.

B. Plain Dowels:

1. Comply with ASTM A615.
2. Yield Strength: 60 ksi.
3. Round, smooth surface.

C. Reinforcement Dowels:

1. Comply with ASTM A615.
2. Yield Strength: 60 ksi.
3. New billet steel: Deformed.

D. Welded Wire Fabric:

1. Comply with ASTM A1064.
2. Configuration: W4 size wire or smaller shall be in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than size W4 shall be in flat sheets only.
3. Finish: Uncoated.

2.2 FABRICATION

- A. Fabricate concrete reinforcement according to CRSI 10-MSP & ACI 318 code.
- B. Form standard hooks for 180-degree bends, 90-degree bends, stirrups and tie hooks, and seismic hooks as indicated on Drawings.
- C. Form reinforcement bends with minimum diameters according to ACI 318.
- D. Fabricate column reinforcement with offset bends at reinforcement splices.
- E. Form spiral column reinforcement from minimum 3/8-inch diameter continuous deformed bar.
- F. Form ties and stirrups from following:
 1. Bars No. 10 and Smaller: No. 3 deformed bars.
 2. Bars No. 11 and Larger: No. 4 deformed bars.

G. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken material. Reinforcement with the following defects will not be permitted:

1. Bar exceeding specified fabrication tolerances.
2. Bend or kinks not indicated on Drawings or approved shop drawings.
3. Bars with reduced cross-section due to excessive rusting or other cause.

H. Weld reinforcement according to AWS D1.4.

I. Splicing:

1. If not indicated on Drawings, locate reinforcement splices at point of minimum stress.
2. Obtain approval of splice locations from Engineer.

2.3 ACCESSORY MATERIALS

A. Tie Wire:

1. Minimum 16 gage, annealed type.
2. Epoxy coated wires shall be used for epoxy coated rebars.
3. Ozone contactors: Type 304 stainless steel wire, 16 gage or heavier.

B. Chairs, Bolsters, Bar Supports, Spacers, and other devices to position and secure reinforcement during concrete placement:

1. Comply with requirements of ACI 315.
2. Size and Shape: To strengthen and support reinforcement during concrete placement conditions.
3. Furnish load-bearing pad on bottom to prevent vapor retarder puncture.

C. Special Chairs, Bolsters, Bar Supports, and Spacers Adjacent to Weather-Exposed Concrete Surfaces:

1. Size and Shape: To meet Project conditions.

D. Reinforcing Splicing Devices:

1. Type: Exothermic welding type; full tension and compression.
2. Size: To fit joined reinforcing.

2.4 SHOP FINISHING

A. Epoxy-Coated Finish for Steel Bars: Comply with ASTM A775.

B. Epoxy-Coated Finish for Steel Wire: Comply with ASTM A884, Class A.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Unless otherwise called out on the Drawings deliver reinforcing bars to job site cut to exact length, bent, securely bundled and tagged with metal tags corresponding to the bar schedules and diagrams.
- B. Store bars and bar mats off the ground a minimum height of six inches and protect from mechanical injury, surface deterioration, and moisture.
- C. If concrete placement is delayed for a considerable number of days after reinforcement is placed in position such that reinforcement is corroding, protect reinforcement by covering with canvas or other satisfactory covering. Any bars or fabric having loose scaly rust shall be cleaned before concrete is placed.
- D. Ensure that transport, storage and assembly of concrete reinforcing does not damage prepared foundations, adjacent concrete or formworks, or allow contamination of adjacent stream, reservoir or wetlands with materials or chemicals.

3.2 INSTALLATION

- A. Place reinforcement where indicated on the Drawings within specified tolerances and adequately supported during concrete placement. Comply with specified codes and standards, and CRSI recommendations as listed in Paragraph 1.2 References of this Section.
- B. Placement details of reinforcement and accessories not specified or shown on the Drawings shall be in accordance with ACI 301 or as directed by the Engineer.
- C. Before reinforcement is placed, the surfaces of the bars and fabric and any metal supports shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease, or other coatings or foreign substances. After placement, the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete.
- D. Position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing with chairs, runners, bolsters, spacers, and hangers, as required to carry reinforcement.
- E. Securely tie bars and bar supports together with tie wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that ends are directed away from exposed concrete surfaces. Do not place reinforcing bars more than 2 inches beyond last leg of any continuous bar support.
- F. Do not deviate from required position beyond specified tolerance.
- G. Do not weld crossing reinforcement bars for assembly except as permitted by Engineer.
- H. Do not displace or damage vapor retarder.

- I. Accommodate placement of formed openings.
- J. No steel bars shall be bent after being partially embedded in concrete unless indicated on the Drawings, approved Shop Drawings or authorized by the Engineer.
- K. Spacing:
 - 1. Space reinforcement bars with minimum clear spacing according to ACI 350 for water retaining structures and ACI 318 for all other structures.
 - 2. If bars are indicated in multiple layers, place upper bars directly above lower bars.
- L. Maintain minimum concrete cover around reinforcement according to ACI 318, ACI 350, and as indicated on drawings.

3.3 SPLICES AND TERMINATIONS

- A. Splices and terminations shall comply with requirements of ACI 350, ACI 318, and as shown on the Drawings.
- B. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tightly wire tying or space transversely apart to permit embedment of entire surface of each bar in concrete.
- C. Do not place lapped bars farther apart than 1/5 the required length of lap or 6 inches.
- D. Provide splices and laps with lengths shown and as located on the Drawings or as indicated in standard Drawing details.
- E. Splices in reinforcement bars shall be made only as required. Locate splices not shown on the Drawings or shop drawings, at point of minimum stress in reinforcement. Bars may be spliced at alternate or additional locations subject to approval by the Engineer and at no additional cost to the Owner.
- F. Tension splices of No. 14 or smaller bars shall be staggered longitudinally a minimum of 5 feet or otherwise indicated so that no more than half of the bars are spliced at any one section.
- G. Terminate horizontal reinforcement in beams, elevated slabs and walls with a standard hook, unless otherwise shown.

3.4 CONCRETE COVER

- A. Provide the following minimum concrete cover over steel reinforcement, unless otherwise shown on the Drawings:
 - 1. Walls and other formed surfaces exposed to weather, intermittent water, or backfill: 2 inches.
 - 2. Walls continually exposed to water: 2-1/2 inches.
 - 3. Walls continually exposed to salt water: 3 inches.

- 4.
5. Bottom face of footings and concrete formed against earth/rock: 3 inches.
6. Top face of concrete slabs: 3-1/2 inches.

- B. The allowable variation for minimum cover shall be as follows:

Minimum Cover	Allowable Variation
2 inch / 2-1/2 inch	plus 1/4 inch
3 inch / 3-1/2 inch	plus 3/8 inch

3.5 WELDING

- A. Welding of reinforcement bars will be permitted only where indicated on approved Shop Drawings or as authorized by the Engineer.
- B. Welding shall be performed in accordance with AWS D1.4 except where otherwise specified or indicated.
- C. Welded crossing reinforcement bars installed to aid assembly shall not be permitted, except as specifically authorized by the Engineer.
- D. Tack welding of bars shall not be permitted.

3.6 INSTALLATION OF PLAIN DOWELS

- A. Place plain dowels across contraction joints in accordance with the Drawings, approved Shop Drawings or as directed by the Engineer.
- B. Place and embed one-half length of dowel in initial concrete placement across contraction joint.
- C. Prior to placing adjoining concrete, coat remaining one-half length of dowel with heavy grease or provide a commercial dowel cover to prevent dowel from bonding to concrete.
- D. Keep dowels in straight alignment as shown on the Drawings, during and subsequent to concrete placement. Rigidly support dowels during concrete placement.

3.7 INSTALLATION OF REINFORCEMENT DOWELS

- A. Place reinforcement dowels and threaded rods in accordance with the Drawings, approved Shop Drawings or as directed by the Engineer.
- B. Locate existing reinforcement in vicinity of proposed holes prior to drilling. Adjust location of holes to avoid drilling through or nicking existing reinforcement.
- C. Hole diameter shall be as recommended by epoxy manufacturer but shall be no larger than 0.25 inches greater than diameter of outer surface of reinforcing bar deformations.

- D. Depth of hole shall be as recommended by epoxy manufacturer to fully develop bar, but shall not be less than 12 bar diameters, unless noted otherwise on the Drawings.
- E. Drill holes for reinforcement dowels by methods that do not interfere with proper bonding of epoxy grout.
- F. Blow clean the hole with clean, dry compressed air to remove dust and loose particles.
- G. Inject epoxy grout into hole through a tube placed to bottom of hole. Withdraw tube as epoxy grout is placed but kept immersed to prevent formation of air pockets. Fill hole to a depth that ensures excess material will be expelled from hole during dowel placement.
- H. Twist dowels during insertion into the partially filled hole to ensure full wetting of bar surface with epoxy. Insert bar slowly enough to avoid developing air pockets.
- I. Remove excess epoxy grout from concrete and reinforcement dowel to provide adequate bond to new concrete.

3.8 TOLERANCES

- A. Section 014000 - Quality Requirements: Requirements for tolerances.
- B. Install reinforcement within following tolerances for flexural members, walls, and compression members:
 - 1. Reinforcement Depth Greater Than 8 Inches:
 - a. Depth Tolerance: Plus or Minus 3/8 inch
 - b. Minus 3/8 inch
 - 2. Reinforcement Depth Less Than or Equal to 8 Inches:
 - a. Depth Tolerance: Plus or Minus 1/2 inch
 - b. Minus 1/2 inch
- C. Foundation Walls: Install reinforcement within tolerances according to ACI 530/530.1.

3.9 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Field inspection and testing will be performed by Contractor's testing laboratory according to applicable standards.
- C. Provide unrestricted access to Work and cooperate with appointed inspection and testing firm.
- D. Reinforcement Inspection:

1. Placement Acceptance: Inspect specified material requirements and specified placement tolerances.
2. Welding: Inspect welds according to AWS D1.1.
3. Periodic Placement Inspection: Inspect for correct materials, fabrication, sizes, locations, spacing, concrete cover, and splicing.
4. Weldability Inspection: Inspect for reinforcement weldability if formed from steel other than ASTM A706.

3.10 ATTACHMENTS

- A. Reinforcement for Superstructure Framing Members: Deformed bars.
- B. Reinforcement for Foundation Wall Framing Members and Slabs on Grade: Deformed bars.

END OF SECTION

SECTION 033000**CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Provide all materials and labor necessary to complete all concrete, plain and reinforced, as indicated or as specified in these specifications and as required to complete the Project. Work, without limiting the generality thereof, includes:
1. Installation of concrete to provide footings, foundations, retaining walls, slabs on grade, and other incidental concrete Work.
 2. Setting of utility structures to grade, setting of granite curb, setting of precast concrete curb, grouting around pipe at manholes, manhole bases, and general repairs caused by utility Work.
 3. Concrete pads for mechanical equipment.
 4. Furnishing and installation of admixtures.
 5. Work of other trades required to be built into concrete, such as inserts for connections to steel members, waterstops, flashing reglets, anchors, embedded plates, and reinforcing dowels.
 6. Providing vapor retarder below slabs on grade.
 7. Finishing of concrete as specified herein or as indicated.
- B. Related Requirements:
1. Section 031000 - Concrete Forming and Accessories
 2. Section 032000 - Concrete Reinforcing

1.2 DEFINITIONS

- A. Cementitious Materials: The materials that are subject to compliance with requirements, such as Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume.
- B. Conventional Concrete: A type of concrete that has a specified compressive strength of less than 8,000 psi.
- C. Strain Hardening: The ability to carry increasing tensile load beyond the point of first crack.
- D. Strain Softening: The ability to carry a reduced (but nonzero) tensile load beyond the point of first crack.
- E. Water-Cementitious Materials Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 Types of joints

- A. **Construction Joints:** A construction joint is defined as a planned joint where two placements of concrete meet, across which development and maintenance of bond are required, through which any reinforcement that may be present is not interrupted. Unless otherwise indicated on Drawings, construction joints in water bearing members shall be provided with a waterstop and/or sealant groove of the shape indicated.
- B. **Control Joints:** The function of the control joint is to provide a weaker plane in the concrete, where shrinkage cracks will probably occur. A groove, of the shape and dimensions shown, is formed or saw-cut in the concrete. This groove is afterward filled with a joint sealant material as specified in the Paragraph in Part 2 entitled "Joint Sealant".
- C. **Contraction Joints:** Contraction joints are similar to construction joints except that the fresh concrete shall not bond to the hardened surface of the first pour, which shall be coated with a bond breaker. The slab reinforcement shall be stopped 4-1/2 inches from the joint; which is provided with a sleeve-type dowel, to allow shrinkage of the concrete of the second pour. Waterstop and/or sealant groove shall also be provided when specified or shown.
- D. **Expansion Joints:** To allow the concrete to expand freely, a space is provided between the two pours, the joint shall be formed as shown. This space is obtained by placing a filler joint material against the first pour, which acts as a form for the second pour. Unless otherwise specified, all expansion joints in water bearing members shall be provided with a center-bulb type waterstop as shown.
- E. Premolded expansion joint material shall be installed with the edge at the indicated distance below or back from finished concrete surface, and shall have a slightly tapered, dressed, and oiled wood strip secured to or placed at the edge thereof during concrete placement, which shall later be removed to form space for sealing material.
- F. The space so formed shall be filled with a joint sealant material as specified in the Paragraph in Part 2.3, "Joint Sealant". In order to keep the two wall or slab elements in line the joint shall also be provided with a sleeve-type dowel as shown.

1.4 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M182 - Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats.
 - 2. AASHTO T206 - Standard Method of Test for Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials
 - 3. AASHTO T303 - Standard Method of Testing for Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction
- B. American Concrete Institute:
 - 1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials.

2. ACI 214 - Recommended Practice for Evaluation of Strength Test Results of Concrete.
3. ACI 224.3 - Joints in Concrete Construction.
4. ACI 228.1R - Report on Methods for Estimating In-Place Concrete Strength.
5. ACI 232.3R - Report on High-Volume Fly Ash Concrete for Structural Applications.
6. ACI 239R - Ultra-High-Performance Concrete: An Emerging Technology Report.
7. ACI 301 - Specifications for Structural Concrete.
8. ACI 302.1 - Guide to Concrete Floor and Slab Construction.
9. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
10. ACI 304 - Measuring, Mixing, Transporting, and Placing Concrete
11. ACI 305R - Guide to Hot Weather Concreting.
12. ACI 305.1 - Specification for Hot Weather Concreting.
13. ACI 306.1 - Standard Specification for Cold Weather Concreting.
14. ACI 306R - Guide to Cold Weather Concreting.
15. ACI 308.1 - Specification for Curing Concrete.
16. ACI 315 - Details of Concrete Reinforcement.
17. ACI 318 - Building Code Requirements for Structural Concrete.
18. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures.
19. ACI 350.5 - Specifications for Environmental Concrete Structures.
20. ACI 363.2R - Guide to Quality Control and Assurance of High-Strength Concrete.

C. ASTM International:

1. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
3. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. ASTM C42/C42M - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
5. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
6. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
7. ASTM C150/C150M - Standard Specification for Portland Cement.
8. ASTM C156 - Standard Test Method for Water Retention by Liquid Membrane-Forming Curing Compounds for Concrete
9. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
10. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
11. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
12. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
13. ASTM C192 - Method for Making and Curing Test Specimens
14. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
15. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

16. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
17. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
18. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements.
19. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
20. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
21. ASTM C845/C845M - Standard Specification for Expansive Hydraulic Cement.
22. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
23. ASTM C920 - Specification for Elastomeric Joint Sealants.
24. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete.
25. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars.
26. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
27. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
28. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
29. ASTM C1074 - Standard Practice for Estimating Concrete Strength by the Maturity Method.
30. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.
31. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
32. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete.
33. ASTM C1157/C1157M - Standard Performance Specification for Hydraulic Cement.
34. ASTM C1218/C1218M - Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
35. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
36. ASTM C1260 - Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method).
37. ASTM C1293 - Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction.
38. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
39. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).
40. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
41. ASTM C1611/C1611M - Standard Test Method for Slump Flow of Self-Consolidating Concrete.
42. ASTM C1778 - Standard Guide for Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete.

43. ASTM C494 - Standard Specification for Chemical Admixture for Concrete
44. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
45. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
46. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
47. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
48. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
49. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
50. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
51. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
52. ASTM E1993/E1993M - Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

D. International Building Code (IBC):

1. IBC 1704 - Special Inspections

E. National Ready Mixed Concrete Association (NRMCA):

1. NRMCA - Certification of Ready Mixed Concrete Production Facilities.

F. National Sanitation Foundation (NSF):

1. NSF/ANSI Standard 61 - Drinking Water System Components - Health Effects.

G. South Coast Air Quality Management District:

1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

H. U.S. Army Corps of Engineers:

1. CRD-C 48 - Standard Test Method for Water Permeability of Concrete.
2. CRD-C572 - PVC Waterstop.
3. CRD-C621 - Non-Shrink Grout.

I. Federal Specifications:

1. TT-S-0227E(3) - Sealing Compound, elastomeric type, Multi-component for Calking, Sealing, and Glazing Buildings and Other Structures.

1.5 COORDINATION

- A. Coordinate placement of construction joint devices with erection of concrete formwork and placement of form accessories.
- B. Coordinate concrete finishing with concrete placement and concrete floor curing.

1.6 SUBMITTALS

- A. Finish submittals in accordance with Section 013300 - Submittal Procedures.
- B. Product Data: Submit data on the following:
 - 1. Portland cement.
 - 2. Fly ash.
 - 3. Slag cement.
 - 4. Blended hydraulic cement.
 - 5. Silica fume.
 - 6. Performance-based hydraulic cement.
 - 7. Aggregates - including gradation and certification.
 - 8. Admixtures:
 - a. Include limitations of use, such as restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
 - b. Admixture certification (Chloride ion content shall be included).
 - 9. Color pigments.
 - 10. Vapor retarders.
 - 11. Curing materials, including methods of curing.
 - 12. Concrete finish materials, including curing compound compatibilities and limitations.
 - 13. Waterstops.
 - 14. Joint sealant.
 - 15. Joint fillers.
 - 16. Grout.
 - 17. Repair materials.
- C. Design Mixtures: For each concrete mixture, include the following:
 - 1. Concrete supplier proposed and location of plant or plants at which the concrete will be batched.
 - 2. Proportions and gradations of materials proposed for each class and type of concrete.
 - 3. Mixture identification.
 - 4. Minimum 28-day compressive strength.
 - 5. Durability exposure class.
 - 6. Maximum water-cementitious materials ratio.
 - 7. Slump limit - design and actual.

8. Air content - design and actual.
 9. Nominal maximum aggregate size.
 10. Submit intended placement method.
 11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 12. When a water reducing admixture is to be used, the Contactor shall furnish mix designs for concrete both with and without the admixture.
 13. Admixture source and dosage.
 14. Admixture certification (Chloride ion content shall be included).
 15. Submit separate mix designs if admixtures are required for the following:
 - a. Hot and cold weather concrete Work.
 - b. Air entrained concrete Work.
- D. Qualification Data: Submit data for the following:
1. Installer: Include copies of applicable ACI certificates.
 2. Ready-mixed concrete manufacturer.
- E. Shop Drawings:
1. Construction Joint Layout:
 - a. Indicate proposed joints required to construct structure.
 - b. Location of joints is subject to approval of Engineer.
- F. Samples:
1. For vapor retarder minimum 12 by 12 inches, in size.
 2. Working floor surface coatings.
- G. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- H. Manufacturer Instructions: Submit installation procedures and interfacing required for adjacent Work.
- I. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- J. Delivery Tickets: Where ready-mix concrete is used, the Contractor shall furnish certified delivery tickets at the time of delivery of each load of concrete. Each ticket shall show the state certified equipment used for measuring, and the total quantities, by weight, of cement, sand, each class of aggregate, admixtures, the amounts of water in the aggregate, added at the batching plant, and the amount allowed to be added at the Site for the specific design mix. In addition, each certificate shall state the mix number, total yield in cubic yards, and the time of day to the nearest minute, corresponding to the time when the batch was dispatched, when it left the plant, when it arrived at the Site, when unloading began, and when unloading was finished.

1.7 CLOSEOUT SUBMITTALS

- A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of embedded utilities and components concealed from view in finished construction.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer employing Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor certified as ACI Flatwork Concrete Finisher/Technician, or an ACI Concrete Flatwork Technician with experience installing and finishing concrete.
 - 1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced manufacturing ready-mixed concrete products that complies with ASTM C94/C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Concrete Testing Service: Employ and pay an independent testing laboratory, acceptable to the Owner and Engineer to perform material evaluation tests and to review concrete mix designs proposed by Contractor to conform to this Specification. Contractor shall be responsible for the cost related to such testing.
- D. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
 - 1. Personnel performing laboratory tests are required to be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisors are required to be ACI-certified Concrete Laboratory Testing Technician, Grade II.
- E. Field Quality-Control Testing Agency Qualifications: An independent agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - 1. Personnel conducting field tests are required to be qualified as ACI Concrete Field-Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.
- F. Alkali-Silica Reactivity Testing: Aggregates used in the concrete shall be tested by an independent testing agency for alkali-silica reactivity in accordance with ASTM C1260 and ASTM C1567. Agencies approved for this testing are as follows:
- G. Additional Testing and Inspection Services:

1. Tests on component materials and for compressive strength and shrinkage of concrete will be performed as indicated herein. Tests for determining slump will be in accordance with the requirements of ASTM C143.
2. Testing for aggregate shall include sand equivalence, reactivity, organic impurities, abrasion resistance, and soundness in accordance with ASTM C33 and AASHTO T260.
3. The cost of laboratory tests on cement, aggregates, and concrete, will be borne by the Contractor and the Contractor shall pay the cost of any additional tests and investigations on Work that does not meet the Specifications. The laboratory will meet or exceed the requirements of ASTM C1077.
4. Concrete for testing shall be furnished by the Contractor at no cost to the Owner, and the Contractor shall assist the Engineer in obtaining samples and disposal and cleanup of excess material.
5. Special inspections shall be provided in conformance with the International Building Code (IBC).
6. Inspect concrete batching, mixing, and delivery operations.
7. Inspect forms, foundation preparation, reinforcement, embedded items, reinforcement placement, and concrete placing, finishing, and curing operations.
8. Review manufacturer's report for shipment of cement, reinforcement, and prestressing tendons, and conduct laboratory tests or spot checks of materials received for compliance with specifications.
9. Other testing or inspection services as required by Engineer.

1.9 COORDINATION AND SEQUENCE

- A. Concrete shall not be placed in adjacent blocks of slabs or in adjacent lifts of walls until abutting concrete has been in place at least five days without prior approval from the Owner or Engineer.
- B. Locate and construct joints as shown on Drawings. Relocation, addition or elimination of any joint shall be subject to written approval of the Engineer.
- C. Coordinate placement of joint devices, such as waterstops, and reinforcing steel with erection of concrete formwork and placement of form accessories.

1.10 AMBIENT CONDITIONS

- A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.
- B. Cold-Weather Placement: Comply with ACI 301, ACI 306.1, and as follows:
 1. Protect concrete Work from physical damage or reduced strength caused by frost, freezing actions, or low temperatures.
 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- C. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1

PART 2 - PRODUCTS**2.1 CONCRETE, GENERAL**

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Concrete Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
3. Obtain aggregate from single source.
4. Obtain each type of admixture from single source from single manufacturer.

B. Concrete Components:

1. Cement:
 - a. Comply with ASTM C150/C150M, Type II - Moderate Sulfate Resistant or Type V - High Sulfate Resistant.
 - b. Type: Portland.
2. Blended Cement:
 - a. Comply with ASTM C595/C595M.
 - b. Type: Portland Limestone Cement Type 1L.
 - c. Color: Gray.
3. Fly Ash: Comply with ASTM C618, Class F, non-staining.
 - a. Loss on ignition limited to a maximum of 2.5 percent.
 - b. Contain less than 4 percent sulfur trioxide by weight.
4. Silica Fume: Comply with ASTM C1240, amorphous silica.
5. Slag:
 - a. Description: Ground granulated, blast furnace.
 - b. Comply with ASTM C989/C989M.
 - c. Grade 100.
6. Normal Weight Aggregates:
 - a. Comply with ASTM C33. Provide aggregates from a single source.
 - 1) Alkali-Silica Reaction:

- a) Expansion Result of Aggregate: Not more than 0.04 percent at one year when tested in accordance with ASTM C1293.
 - b) Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - b. Coarse Aggregate Maximum Size: 1 inch nominal.
 - 1) Clean, uncoated, processed aggregate free from clay, mud, loam, and other foreign material. Aggregate may be crushed natural rock, crushed stone, or washed natural or crushed gravel. Use of pit run gravel is not permitted.
 - 2) Gradation shall conform to ASTM C33 Grades 57 or 67
 - c. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
 - 1) Hard, dense durable particles of either sand or crushed stone regularly graded from coarse to fine, free from loam, clay, lumps, and foreign material.
 - 2) Gradation shall conform to ASTM C33.
 - 3) Fine aggregate shall not exceed 40 percent by weight of the combined aggregate total.
7. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
- a. Air-Entraining Admixture: ASTM C260/C260M.
 - 1) The air-entraining agent shall be added to the batch in a portion of the mixing water.
 - 2) The solution shall be batched by means of a mechanical batcher capable of accurate measurement.
 - 3) Air content shall be tested at the point of placement.
 - 4) Acceptable Manufacturers:
 - a) Master-Air AE 200 by Master Builders
 - b) Daravair By W.R. Grace
 - c) Sika AEA-14 by Sika Corporation
 - d) Or approved equal.
 - b. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 1) Concrete shall not contain more than one water reducing admixture.
 - 2) Acceptable Manufacturers:
 - a) WRDA 82 by Grace Construction Products
 - b) Plastocrete 161 by Sika Corporation
 - c) Or approved equal.

- c. Retarding Admixture: ASTM C494/C494M, Type B.
 - 1) Where the air temperature at the time of placement is expected to be consistently over 80 degrees F, a set retarding admixture such as Plastocrete 161 by Sika Corporation; Daratard 17 by Grace Construction Products; or equal shall be used.
 - 2) Where the air temperature at the time of placement is expected to be consistently under 40 degrees F, a non-corrosive set accelerating admixture such as Plastocrete 161FL by Sika Corporation, Master Builder MasterSet FP 20, Polarset by Grace Construction Products, or equal may be used.
- d. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
- e. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type F or G.
 - 1) High range water reducer shall be added to the concrete after all other ingredients have been mixed and initial slump has been verified. No more than 14 ounces of water reducer per sack of cement shall be used. Water reducer shall be considered as part of the mixing water when calculating water cement ratio.
 - 2) If the high range water reducer is added to the concrete at the job site, it may be used in conjunction with the same water reducer added at the batch plant. Concrete shall have a slump of 3-inches $\pm$ 1/2-inch prior to adding the high range water reducing admixture at the job site. The high range water reducing admixture shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested prior to each day's operation of the job site system.
 - 3) Acceptable Manufacturers:
 - a) Plastol 500 by Euclid Chemical Company
 - b) Or equal.
- f. Permeability-Reducing Admixture: ASTM C494/C494M, Type S, hydrophilic, permeability-reducing crystalline admixture, capable of reducing water absorption of concrete exposed to hydrostatic pressure (PRAH).
 - 1) Manufacturers:
 - a) AQUAFIN, Inc.
 - b) Kryton International.
 - c) Xypex Chemical Corporation.

8. Water and Water Used to Make Ice: ASTM C94/C94M, potable clean, and free from objectionable quantities of silty organic matter, alkali, salts, and other impurities. The water shall be considered potable, for the purposes of this Section only, if it meets the requirements of the local governmental agencies. Agricultural water with high total dissolved solids (over 1000 mg/l TDS) shall not be used.

2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, not less than 15 milsthick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Water vapor permeance: 0.03 maximum per ASTM E96
- C. Puncture resistance: ASTM D1709, Method B, 2200 grams.
- D. Minimum tensile strength: 45lbs/in, ASTM D882.
- E. Vapor retarder tape: as recommended by vapor retarder manufacturer.

2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 1. Manufacturers:
 - a. Euclid Chemical Company (The); an RPM company
 - b. L&M Construction Chemicals, Inc.
 - c. Or approved equal.
- B. Concrete Curing Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Concrete Curing Reusable Moisture-Retaining Covers, ASTM C171:
 1. Burlap-polyethylene sheet.
 - a. 10 oz. burlap laminated onto 5 mil white coated polyethylene.
 - b. Reusable, natural burlap provides moisture absorption.
 - c. Coated white poly reflects sunlight and intense heat rays.
 - d. Quality lamination between the two fabrics.
 - e. Size: 10-by-100-foot roll.
- D. Membrane Curing Compound:
 1. ASTM C309, Type II, Class A or B: Sodium silicate compounds shall not be allowed.
 - a. Kurze VOX White Pigmented by Euclid Chemical Company

- b. Cure R-2 by L&M Construction Chemicals
 - c. 1200-White by W.R. Meadows
 - d. Or equal.
- 2. ASTM C309, Type 1, Class A or B: When curing compound must be removed for finishes or grouting.
 - a. Kurez DR VOX by Euclid Chemical Company
 - b. L&M Cure R by L&M Construction Chemicals
 - c. 1100-Clear by WR Meadows
 - d. Or equal.

2.5 RELATED MATERIALS

A. Joint Devices and Filler:

- 1. Joint Filler, Type A
 - a. Description: Asphalt-impregnated fiberboard or felt.
 - b. Comply with ASTM D1751.
- 2. Sealant and Primer: As specified in Section 079000 - Joint Protection.

B. Nonshrink Grout:

- 1. Manufacturers:
 - a. CGM, Incorporated.
 - b. Euclid Chemical Company (The); an RPM company.
 - c. Laticrete International, Inc.
 - d. QUIKRETE.
 - e. Sika Corporation.
 - f. Or approved equal.
- 2. Description: Premixed compound consisting of non-metallic aggregate, cement, and water-reducing and plasticizing agents.
- 3. Comply with ASTM C1107/C1107M.
- 4. Minimum Compressive Strength: 5000psi in 28 days.

C. Epoxy Grout:

- 1. Epoxy grout shall be used to embed anchor bolts designed for use with epoxy grouts, dowels, and reinforcing steel where specified, and other applications as indicated on Drawings.

D. Manufacturers:

- 1. Hilti HY 200 or RE 500
- 2. ITW Ramset/Redhead Epcon C-6
- 3. Powers Fasteners Power-Fast+
- 4. Or approved equal.

E. Bonding Agent:

1. Manufacturers:

- a. Euclid Chemical Company (The); an RPM company.
- b. Metalcrete Industries.
- c. QUIKRETE.
- d. Sika Corporation.
- e. W.R. Meadows, Inc.
- f. Or approved equal.

F. Backing Rod

1. Backing rod shall be an extruded closed-cell, polyethylene foam rod. The material shall be compatible with the joint sealant material used and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at 8 psi. The rod shall be 1/8-inch larger in diameter than the joint width except that a one-inch diameter rod shall be used for a 3/4-inch wide joint.

G. Bond Breaker

1. Bond breaker shall be Sure-Lift J-6WB by Dayton Superior, or equal. It shall contain a fugitive dye so that areas of application will be readily distinguishable.

2.6 CONCRETE MIXTURES, GENERAL

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

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

B. Concrete shall be composed of cement, admixtures, aggregates, and water of the qualities indicated. In general, the mix shall be designed to produce a concrete capable of being deposited so as to obtain maximum density and minimum shrinkage, and where deposited in forms, to have good consolidation properties and maximum smoothness of surface. The proportions shall be changed whenever necessary or desirable to meet the required results at no additional cost to the Owner. Mix changes shall be subject to review by the Engineer.

C. The Contractor is cautioned that the limiting parameters below are **NOT** a mix design. Admixtures may be required to achieve workability required by the Contractor's construction methods and aggregates. The Contractor is responsible for providing concrete with the required workability.

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

1. Fly Ash or Other Pozzolans: 25 percent by mass.
2. Slag Cement: 50 percent by mass.
3. Silica Fume: 10 percent by mass.

4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass, and silica fume not exceeding 10 percent by mass.
 5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass, and silica fume not exceeding 10 percent by mass.
- E. Admixtures: Use in accordance with manufacturer's written instructions.
1. Use water-reducing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.7 CONCRETE MIXTURES

- A. Select proportions for concrete ACI 318 trial mixtures and field test data.
- B. Performance and Design Criteria: Structural Concrete
1. Compressive Strength: 4000 psi at 28 days.
 2. Cement Type: ASTM C150/C595.
 3. Minimum Cement Content: 564 to 600 lb./cu. Yd
 4. Aggregate Type: Normal weight.
 5. Maximum Water-Cementitious Materials Ratio: 0.45 by weight.
 6. Aggregate Size: 1 inch maximum.
 7. Air Content: 6 percent +/- 1.5 percent.
 8. Maximum Fly Ash Content: 25 percent of cementitious materials by weight.
 9. Maximum Silica Fume Content: 10 percent of cementitious materials by weight.
 10. Maximum Slag Content: 50 percent of cementitious materials by weight.
 11. Slump: ASTM C 144, 3 inches, plus or minus 1 inch.
- C. Performance and Design Criteria: Site Concrete
1. Compressive Strength: 3000 psi at 28 days.
 2. Cement Type: ASTM C150/C595.
 3. Minimum Cement Content: 490 lb./cu. Yd
 4. Aggregate Type: Normal weight.
 5. Maximum Water-Cementitious Materials Ratio: 0.50 by weight.
 6. Aggregate Size: 1 inch maximum.
 7. Air Content: 6 percent +/- 1.5 percent.
 8. Maximum Fly Ash Content: 25 percent of cementitious materials by weight.
 9. Maximum Silica Fume Content: 10 percent of cementitious materials by weight.
 10. Maximum Slag Content: 50 percent of cementitious materials by weight.
 11. Slump: ASTM C 144, 3 inches, plus or minus 1 inch.
- D. Ready-Mixed Concrete: Mix and deliver concrete according to ASTM C94/C94M.
- E. Mass Concrete: Comply with requirements of ACI 301 Section 8 - Mass Concrete.

2.8 CONCRETE MIXING

- A. Ready-Mix Concrete: Comply with requirements of ASTM C94/C94M and as herein specified.
1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94/C94M may be required. When air temperature is between 85 deg. F and 90 deg. F, reduce mixing and delivery time from 90 minutes to 75 minutes, and when air temperature is above 90 deg. F, reduce mixing and delivery time to 60 minutes. The time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.
 2. During cold weather, concrete shall not be mixed while the ambient temperature is below 40 degrees without the permission of the Engineer. If permission is granted for mixing under such conditions, aggregates or water, or both, shall be heated and the concrete shall be placed at a temperature between 50 deg. F and 80 deg. F. Maintain the concrete temperature above 50 deg. F for at least 72-hours after placement.
 3. Retempering of concrete by adding water or any other material is not permitted.
 4. Truck mixers shall be equipped with electrically actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counter shall be actuated at the time of starting the mixer at mixing speed.
 5. Each batch of concrete shall be mixed in a truck mixer for not less than 70 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. Materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.
 6. Each batch of ready-mixed concrete delivered to the Work shall be accompanied by a delivery ticket furnished to the Engineer in accordance with the requirements above.

PART 3 - EXECUTION

3.1 EVALUATION OF CONCRETE, GROUT OR MORTAR TEST RESULTS

- A. Strength Test Samples:
1. Sampling Procedures: Comply with ASTM C172.
 2. Cylinder Molding and Curing Procedures:
 - a. Comply with ASTM C31/C31M.
 - b. Cylinder Specimens: Field cured.
 3. Sample concrete and make one set of six cylinders for every 75-cu. yd. or less of each class of concrete placed each day, and for every 5,000 sq. ft. of surface area for slabs and walls.

- a. The Owner reserves the right to sample and test concrete regardless of quantity of concrete being placed.
 4. If volume of concrete for a class of concrete would provide less than five sets of cylinders, take samples from five randomly selected batches, or from every batch if less than five batches are used.
 5. Make one additional cylinder during cold weather concreting and field cure.
 6. Specimens will be 6-inches diameter by 12-inches high cylinders.
 7. Drying shrinkage testing shall be made in advance of submission at the time of the first placement of each class of concrete, and during construction to ensure continued compliance with these Specifications.
- B. Cylinder Compressive Strength Testing:
1. Test Method: Comply with ASTM C39/C39M.
 2. Test Acceptance: According to ACI 318.
 3. Test two cylinder at seven days.
 4. Test two cylinder at 28 days.
 5. Retain remaining cylinders for testing when requested by Engineer.
 6. Dispose of remaining cylinders if testing is not required.
 7. If any concrete fails to meet these requirements, immediate corrective action shall be taken to increase the compressive strength for subsequent batches of the type of concrete affected.
 8. Concrete that fails to meet the ACI requirements and these Specifications is subject to removal and replacement as part of the Work.
- C. Cylinder Compressive Strength Acceptance:
1. Strength of concrete will be considered acceptable if following conditions are satisfied.
 - a. Averages of all sets of 3 consecutive strength test results is greater than or equal to the specified compressive strength f_c .
 - b. No individual strength test (average of 2 cylinders) falls below specified compressive strength f_c by more than 500 pounds per square inch.
 - c. Where relationships between 7-day and 28-day compressive strength, or between 28-day and 56-day compressive strength, have been provided as part of the mix design submittals:
 - 1) 7-day strength may be considered as an indication of 28-day strength provided effects of temperature and humidity between 7 days and 28 days are taken into account.
 - 2) 28-day strength may be considered as indication of 56-day strength provided effects of temperature and humidity between 28 days and 56 days are taken into account.
- D. Shrinkage Limitation:

1. The maximum concrete shrinkage, as measured at 21-day drying age or at 28-day drying age, shall be 0.036 percent or 0.042 percent, respectively. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirements.
2. The maximum concrete shrinkage for specimens cast in the field shall not exceed average maximum shrinkage requirement by more than 25 percent.
3. If the required shrinkage limitation is not met during construction, the Contractor shall take any or all of the following actions, at no additional cost to the Owner, for securing the specified shrinkage requirements. These actions may include changing the source or aggregates, cement, and/or admixtures; reducing water content; washing of aggregate to reduce fines; modifying the curing requirements; or other actions designed to minimize shrinkage or the effects of shrinkage.

3.2 EXAMINATION

- A. Verify installation of concrete forms, accessories, reinforcement and embedded items before placing concrete. Confirm the required inspections have been performed.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.3 PREPARATION

- A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.
- B. Clean, roughen, and dry surfaces of construction joints, previously placed concrete, and existing concrete that are to be covered with fresh concrete:
 1. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent if required.
 2. Remove laitance, loose or defective concrete, coatings, sand, curing compound, and other foreign material.
 3. Sandblast, steel shotblast, or high-pressure water jet surfaces, or use other method approved by the Engineer to create a surface equivalent to or larger than CSP 8 in accordance with ACI 318.
 4. If new concrete is to be placed against existing concrete that is over 7 days old, the existing concrete shall be in a saturated surface-dry (SSD) condition immediately prior to placement of the new concrete.
- C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels, and pack solid with non-shrink grout.
- D. Remove oil, grease, debris, and ice from formwork, reinforcement, and concrete substrates prior to concrete placement.

- E. Thoroughly wet wood forms immediately before placing concrete, as required, where form coatings are not used. Thoroughly saturate existing concrete one hour before placing new concrete against existing concrete. Maintain surface of existing concrete in a moist condition until new concrete is placed.
- F. Remove water from areas receiving concrete before concrete is placed. Earth surfaces shall be thoroughly wetted by sprinkling prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon. The surface shall be free from standing water, mud, and debris at the time of placing concrete.
- G. No concrete shall be placed in any structure until water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the Work. No concrete shall be deposited underwater, nor shall the Contractor allow still water to rise on any concrete until the concrete has attained its initial set. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, shall be subject to the review of the Engineer.
- H. Reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and secured in the forms at locations indicated or by Shop Drawings and shall be acceptable to the Engineer before any concrete is placed. Accuracy of placement is the responsibility of the Contractor.
- I. Corrosion Protection: Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of 2-inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.
- J. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
 - 1. Daily access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project Site during Site curing period for test samples.
 - 4. Security and protection for test samples and for testing and inspection equipment at Project Site.

3.4 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 - 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 - 2. Face laps away from exposed direction of concrete pour.

3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
4. Lap joints 6 inches and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

- B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 INSTALLATION

A. Placing Concrete:

1. Place concrete according to ACI 301318
2. Notify testing laboratory and Engineer minimum 24 hours prior to commencement of operations.
3. Ensure that reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
4. Joint Filler:
 - a. Separate slabs on grade from vertical surfaces with joint filler.
 - b. Place joint filler in floor slab pattern placement sequence; set top to required elevations; secure to resist movement by wet concrete.
 - c. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface.
5. Joint Devices:
 - a. Coordination: Install construction joint devices in coordination with floor slab pattern placement sequence; set top to required elevations; secure to resist movement by wet concrete.
 - b. Install joint device anchors, maintaining correct position to allow joint cover to be flush with floor and wall finish.
 - c. Install joint covers in longest practical length when adjacent construction activity is complete.
6. Deposit concrete at final position, preventing segregation of mix.
7. Place concrete in continuous operation for each panel or section as determined by predetermined joints.
8. Consolidate concrete.
9. Maintain records of concrete placement, including date, location, quantity, air temperature, and test samples taken.
10. Place concrete continuously between predetermined construction joints.

11. Place floor slabs in indicated checkerboard or saw-cut pattern.
12. Saw-Cut Joints:
 - a. Saw-cut joints within 12 hours after placing.
 - b. Use 3/16 inch thick blade.
 - c. Cut 1/4 depth of slab thickness.

B. Proportioning and Mixing:

1. Proportioning: The concrete mix proportioning shall conform to the requirements of ACI 301.
2. Mixing: Mixing of concrete shall conform to the requirements of ACI 301.
3. Slump: Slump shall be as indicated in Part 2 of this specification.
4. Retempering: Retempering of concrete or mortar which has partially hardened shall not be permitted.

C. Pumping of Concrete:

1. General: If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.
2. Pumping Equipment:
 - a. The pumping equipment shall have 2 cylinders and be designed to operate with one cylinder only in case the other one is not functioning. In lieu of this requirement, the Contractor may have a standby pump on the Site during pumping.
 - b. The minimum diameter of the hose conduits shall be in accordance with ACI 304.
 - c. Pumping equipment and hose conduits that are not functioning properly shall be replaced.
 - d. Aluminum conduits for conveying the concrete shall not be permitted.

D. Tamping and Vibrating:

1. Consolidate concrete per the approved Concrete Placement Plan.
2. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer, which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete. Vibrators shall be high speed power vibrators (8000 to 12,000 rpm) of an immersion type in sufficient number and with at least one standby unit as required.

3. Concrete in walls shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the required results within 15 minutes after concrete of the prescribed consistency is placed in the forms. The vibrating head shall not contact the surfaces of the forms. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.
4. Vibration shall not be applied directly to reinforcement steel or forms, or to concrete that has hardened to the degree that it does not become plastic when vibrated.

E. Concrete Finishing:

1. Provide formed concrete surface such as walls, columns, elevated slabs, beams and other items indicated on the Drawings with smooth, rubbed, rough and form finish.
2. Provide unformed concrete surface such as top surface of footing, floor and roof slabs, top of walls that do not have slab cast above and other items indicated on the Drawings with scratch, floated, steel trowel, broomed and ground concrete finish.
3. Finish concrete floor surfaces according to ACI 301.
4. In areas with floor drains, maintain floor elevation at walls and pitch surfaces uniformly to drains as indicated.

F. Curing and Protection:

1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
2. Maintain concrete with minimal moisture loss at relatively constant temperature for period as necessary for hydration of cement and hardening of concrete.
3. Cure concrete according to ACI 308.1.
4. Ponding: Maintain 100 percent coverage of water over floor slab areas continuously for four days.
5. Spray water over floor slab areas and maintain wetness for seven days.
6. Membrane-Forming Curing Compound: Apply membrane curing compound to vertical formed concrete surface in accordance with manufacturer's recommendation. Apply uniformly in two-coats continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - a. Recoat areas subject to heavy rainfall within three hours after initial application.
 - b. Maintain continuity of coating and repair damage during curing period

3.6 REMOVAL OF FORMS

- A. Forms shall be removed in accordance with the requirements of Section 031000 - Concrete Forming and Accessories.

3.7 PROTECTION

- A. Maintain standard concrete temperature after installation at minimum 50 degrees F for minimum seven days.
- B. The Contractor shall protect concrete against damage until final acceptance.
- C. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow. The Contractor shall provide such protection while the concrete is still plastic and whenever precipitation is imminent or occurring.

3.8 GROUTING OF BASES

- A. All equipment and structural base plates shall be firmly and solidly grouted in place, with non-shrink grout by methods that will ensure complete, uniform, and permanent filling of all space beneath the base without disturbing or displacing the alignment or level of the base in its correct position.
- B. Surface Preparation:
 - 1. The surfaces of hardened concrete upon which grout will be placed shall be chipped to remove laitance and surface mortar and to expose the aggregate.
 - 2. The surface of the hardened concrete shall be cleaned of all oil, grease, laitance, curing compound, and other foreign loose materials and shall be saturated with water for not less than 24 hours immediately before the grout is placed.
 - 3. All excess water shall be removed.
- C. Alignment and Leveling:
 - 1. Each base shall be set in place over its anchor bolts and shall be carefully aligned in proper position and then brought to accurate level using shims.
 - 2. Small structural bases may be leveled by means of an extra nut below the base on each anchor bolt.
- D. Mixing:
 - 1. Non-shrinking grout shall be furnished factory premixed so only water is added at the job site.
 - 2. Grout shall be mixed in a mechanical mixer for a minimum of three (3) minutes.
 - 3. No more water shall be used than is recommended by the Manufacturer.
- E. Placement:
 - 1. Non-shrinking grout shall be placed immediately after mixing and before stiffening sets in.
 - 2. Grout shall be placed in strict accordance with the directions of the Manufacturer so that all grout space is completely filled without voids.
 - 3. Non-shrinking grout shall be finished smooth in all locations where the grout will be exposed to view after it has reached its initial set.

F. Finishing Edges:

1. When the placing of the grout has been completed, it shall be allowed to stand undisturbed until set stiff.
2. Then immediately the form or dam, if any, shall be taken off, and the portions of the grout which extend beyond the edges of the base shall be cut off flush and removed, except where a sloping surface is indicated on the drawings.
3. Sloping surfaces shall be finished to a one-to-one slope.
4. All grouting shall be completed in a proper and workmanlike manner with the exposed edges of the foundation and the surfaces adjacent thereto left clean and free from cement and grout.
5. Grout shall be finished to the bottom of the baseplates and will not be permitted to project up onto the vertical edges of baseplates.

3.9 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Inspection and Testing: Performed by Owner's testing laboratory according to ACI 318
- C. Provide unrestricted access to Work and cooperate with appointed testing and inspection firm.
- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- E. Concrete Inspections:
1. Continuous Placement Inspection: Inspect for proper installation procedures.
 2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.
- F. Concrete Maturity Testing Using Sensors:
1. Non-destructive Test: Gather information from wireless embedded sensors recording temperature and strength.
 2. Data is logged and/or retrieved by external device in real-time.
 3. Comply with sensor manufacturer's written instructions and ASTM C1074, CSA A23.1/A23.2, ACI 318ACI 228.1R, and ACI 306R.
- G. Field Testing:
1. Slump Test Method: Comply with ASTM C143/C143M.
 2. Air Content Test Method: Comply with ASTM C173/C173M.
 3. Temperature Test Method: Comply with ASTM C1064/C1064M.
 4. Compressive Strength Concrete:
 - a. Measure slump and temperature for each sample.
 - b. Measure air content in air-entrained concrete for each sample.

H. Core Compressive Strength Testing:

1. Sampling and Testing Procedures: Comply with ASTM C42/C42M.
2. Test Acceptance: According to ACI 318
3. Drill three cores for each failed strength test from failed concrete.

I. Water-Soluble Chloride Ion Concentration Test Method:

1. Comply with ASTM C1218/C1218M.
2. Test at 28 days.
3. Maximum Chloride Ion Concentration: As permitted by ACI 318 and ACI 350 code.

J. Patching:

1. Allow Engineer to inspect concrete surfaces immediately upon removal of forms.
2. Honeycombing or Embedded Debris in Concrete:
 - a. Not acceptable.
 - b. Notify Engineer upon discovery.
3. Patch imperfections as directed by Engineer according to ACI 301

3.10 NON-CONFORMING WORK:

- A. Description: Concrete which during or before placing is found not to conform to the requirements of the Contract Documents, such as concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements, shall be rejected and immediately removed from the Work.
- B. Concrete which is not placed in accordance with the Contract Documents, or which is of inferior quality shall be removed and replaced at the expense of the Contractor.
- C. Repair or replacement of defective concrete will be determined by Engineer or Owner.
- D. Do not patch, fill, touch up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.
- E. Remove and replace or repair non-conforming and defective work.
 1. Provide repairs having strength equal to or greater than specified concrete for areas involved.
 2. Provide replacement or repair of non-conforming work by means acceptable to the Engineer and at no additional cost to the Owner.
 3. Project schedule will not be extended based on work to address non-conforming concrete.
- F. Concrete not conforming to the specified requirements for properties of plastic concrete: Remove from the site and replace with conforming materials at no additional cost to the Owner.

1. Temperature: Do not use concrete having a temperature above or below the limits specified herein.
2. Slump: Do not place concrete that does not conform to Specification requirements for slump.
3. Air entrainment: Do not use concrete that does not conform to Specification requirements for percentage of entrained air.

G. Concrete not conforming to the specified requirements for compressive strength:

1. Concrete is expected to reach a compressive strength equal to or greater than the minimum specified compressive strength f_c as specified in this Section.
2. Non-compliant strength tests.
 - a. Mark non-compliant strength test reports to highlight the non-complying results, and immediately forward copies to all parties on the test report distribution list.
 - b. Initial treatment may consist of additional curing of affected portion followed by not less than 3 cores at each affected area, taken in accordance with ASTM C 42 and ACI 318. Obtain Engineer's acceptance of proposed coring locations before proceeding with that work.
 - c. Submit report of compressive strength testing for Engineer's review.
 - d. If requested by the Engineer, provide additional cores and obtain petrographic testing in accordance with ASTM C 856. Submit results for Engineer's review.
 - e. If additional curing does not bring average of 3 cores taken in affected area to at least specified compressive strength f_c , designate such concrete in affected area will be considered defective.
 - f. The Engineer may require the Contractor to strengthen defective concrete by means of additional concrete, additional reinforcing steel, or replacement of defective concrete, all of the Contractor's expense.

3.11 TOLERANCES AND ACCEPTANCE

- A. Acceptance of the concrete work will be a cumulative acceptance process based upon progressively meeting the requirements of the Contract Documents for: (1) fresh concrete; (2) concrete strength and durability; (3) structure dimensions; and (4) appearance.
- B. Fresh Concrete: Fresh concrete conforming to the mix and quality requirements, and handled and placed in accordance with this Specification, will be considered satisfactory.
- C. Structure Dimensions: The dimensions of formed members, unless otherwise specified, will be satisfactory if they conform to the requirements of the Contract Documents, and are within the following acceptable tolerances:

Variation	Tolerance
Variation from plumb (walls and columns)	0.2% of wall height
Variation from specified elevation	0.25 inch

Variation	Tolerance
Variation in cross-sectional dimension (columns, beams, walls, above-grade slabs)	-0.25-inch, +0.5 inch
Variation in alignment in plane	1 inch in 100 ft

END OF SECTION

SECTION 051200
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural shapes.
2. Channels and angles.
3. Hollow structural sections.
4. Structural pipe.
5. Structural plates and bars.
6. Bolts, connectors, and anchors.
7. Grout.

B. Related Requirements:

1. Section 033000 – Cast-In-Place Concrete: Grouting and supply of anchors for casting into concrete.
2. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.2 REFERENCE STANDARDS

A. American Institute of Steel Construction:

1. AISC 303 - Code of Standard Practice for Structural Steel Buildings and Bridges.
2. AISC 341 - Seismic Provisions for Structural Steel Buildings.
3. AISC 360 - Specification for Structural Steel Buildings.

B. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.

C. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
4. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

6. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
7. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
8. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use.
9. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
10. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
11. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
12. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
13. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
14. ASTM A582 - Standard Specification for Free-Machining Stainless Steel Bars.
15. ASTM A588 - Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi Minimum Yield Point, with Atmospheric Corrosion Resistance.
16. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
17. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
18. ASTM A847 - Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
19. ASTM A913 - Standard Specification for High-Strength Low-Alloy Steel Shapes of Structural Quality, Produced by Quenching and Self-Tempering Process.
20. ASTM A992 - Standard Specification for Structural Steel Shapes.
21. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
22. ASTM E94 - Standard Guide for Radiographic Examination.
23. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
24. ASTM E709 - Standard Guide for Magnetic Particle Testing.
25. ASTM F436 - Standard Specification for Hardened Steel Washers.
26. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners.
27. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
28. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
29. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

D. Building Code:

1. IBC 2021 – International Building Code and Associated Standards, 2021 Edition, including all State of South Carolina amendments, referred herein as Building Code.

E. Research Council on Structural Connections:

1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts.

F. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
3. SSPC Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic).
4. SSPC SP 3 - Power Tool Cleaning.
5. SSPC SP 6 - Commercial Blast Cleaning.
6. SSPC SP 10 - Near-White Blast Cleaning.

1.3 COORDINATION

- A. Section 013000 - Administrative Requirements: Requirements for coordination.
- B. Coordinate Work of this Section with following:
1. Section 055000 - Metal Fabrications for miscellaneous steel supports other than structural steel.

1.4 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings:
1. Indicate profiles, sizes, spacing, dimensions, locations of structural members, openings, attachments, bolts, connection materials, and shop coatings.
 2. Connections. Indicate all shop and field bolts.
 3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths and all shop and field welds.
 4. Be reviewed and sealed by a professional engineer retained by Contractor to verify conformance with design criteria stipulated in the Contract.
 5. Correct any incorrect or unacceptable material or fabrication due to incorrect detailing, shop work, or erection, without additional charge.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.
- E. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.
- F. Source Quality-Control Submittals: Indicate results of manufacturers tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- H. Qualifications Statements:

1. Submit qualifications for fabricator, erector, shop painter, and welders.

1.5 QUALITY ASSURANCE

- A. Perform Work according to following:
 1. Structural Steel: AISC 303, ASIC 341 and AISC 360.
 2. High-Strength Bolted Connections: RCSC - Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.
- B. Maintain a copy of each standard affecting the Work of this Section on-Site.

1.6 QUALIFICATIONS

- A. Fabricator: Minimum of 5 years experience in fabrication of structural steel and shall be certified under AISC Quality Certification.
- B. Erector: Minimum of 5 years of experience in erection of structural steel following current AISC Certification.
- C. Welders and Welding Procedures: AWS D1.1 qualified within previous 12 months.

1.7 DEFINITIONS

- A. Code: AISC Code of Standard Practice for Steel Buildings and Bridges
- B. Owner: May meant the Owner's representative for construction as defined by the Code.
- C. Galvanizing: Hot-dipped galvanizing per ASTM A123 with minimum coating of 2.0 OZ of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by standard.

PRODUCTS

1.8 STRUCTURAL STEEL

- A. Structural W-Shapes: ASTM A572; Grade 50 with special requirements per AISC Technical Bulletin #3, New Shape Material, dated March 3, 1997.
 1. ASTM A992; Grade 50 may be used in lieu of ASTM A572; Grade 50.
- B. Structural T-Shapes: Cut from structural W-shapes.
- C. Channels and Angles: ASTM A36.
- D. Round, Hollow Structural Sections: ASTM A500, Grade B, $F_y = 42\text{ksi}$.
- E. Rectangular, Hollow Structural Sections: ASTM A500 Grade B, $F_y = 46\text{ksi}$

F. Structural Pipe: ASTM A53, Grade B, Type E or S, $F_y = 35\text{ksi}$.

G. Structural Plates and Bars: ASTM A36.

1.9 BOLTS, CONNECTORS, AND ANCHORS

A. Bolts: Heavy-hex, structural type.

1. ASTM A325; Type 1, hot-dip galvanized, or Type 3, plain.
2. ASTM A490; Type 1 or 3, galvanized.
3. ASTM F593 type 304 or 316 stainless steel with matching nut and washer.

B. Nuts: ASTM A563; heavy-hex type.

1. Finish: Hot-dip galvanized.

C. Washers:

1. ASTM F436.
2. Type 1, circular.
3. Finish: Plain.

D. Anchor Rods:

1. ASTM F1554; Grade 55.
2. Shape: Hooked or Straight.
3. Plate Washers: ASTM A36.
4. Epoxy Adhesive Anchors:
 - a. Manufacturers:
 - 1) HIT RE 500 V3 Adhesive Anchor by Hilti, Inc.
 - 2) Submit requests for substitution.
5. Grout: As specified in Section 033000 – Cast-In-Place Concrete.
6. Expansion Anchors:
 - a. The use of expansion anchors requires approval by Engineer.
 - b. Manufacturers:
 - 1) Kwik Bolts by Hilti, Inc.
 - 2) Trubolt by ITW Ramset/Red Head

E. Threaded Rods:

1. ASTM A36 or ASTM F593 AISI Type 316.
2. Finish: Hot-dip galvanized for ASTM A36.

F. Headed Studs and Deformed Bar Anchors

1. Studs: ASTM A108, complying with AWS Code Section 7, Type B; minimum yield strength 50,000 psi, minimum tensile strength 60,000 psi.
 - a. Uniform diameter.
 - b. Heads: Concentric and normal to shaft.
 - c. Weld end: Chamfered and solid flux.

2. Deformed anchor bars: ASTM A496, complying with AWS Code. Minimum yield strength 70,000 psi. Minimum tensile strength 80,000 psi.
 - a. Straight, unless indicated otherwise.
 - b. Solid flux.
3. After welding, remove ceramic ferrules and maintain free from any substance which would interfere with function, or prevent bonding to concrete.

G. Forged Structural Steel Hardware:

1. Clevises and Turnbuckles: ASTM A108; Grade 1085.
2. Eye Nuts and Eye Bolts: ASTM A108; Grade 1030.
3. Sleeve Nuts: ASTM A108; Grade 1018.
4. Rod Ends, Yoke Ends and Pins, Cotter Pins, and Coupling Nuts: Carbon steel.

1.10 WELDING

1. AWS D1.1.
 2. Type required for materials being welded.
 3. Welding Electrodes (AWS):
 - a. Shielded metal arc: AWS A5.1 or AWS A5.5, E70XX or E801X-X.
 - b. Submerged arc: AWS A5.17 or A5.23, F7XX-EXXX or F8XX-EXXX-XX.
 - c. Gas metal arc: AWS A5.18, E70S-X or E70U-1 or AWS A5.28, ER805-XX, E80C-XXX.
 - d. Flux cored arc: AWS A5.20, E7XT-X (except 2, 3, 10, GS), AWS A5.29, E7XT-X or E8XTX-X, E8XTX-XM.
- B. Comply with AWS Code, and other requirements indicated herein, for all welding, techniques of welding employed, appearance and quality of welds, and methods used to correct defective work.
1. Qualify joint welding procedures or test in accordance with AWS qualification procedures.
- C. Test and qualify welders, welding operators and tackers in compliance with AWS Code for position and type of welding to which they will be assigned.
1. Conduct tests in presence of approved testing agency.
 2. Certification within previous 12 months will be acceptable, provided samples of the welder's work are satisfactory.

1.11 FABRICATION

- A. Space shear stud connectors at 12 inches o.c., unless indicated otherwise on Drawings.
- A. Comply with requirements of applicable building codes and AISC Specification with modifications and additional requirements specified herein.
1. Identify high-strength steel material in fabricated members in accordance with ASTM A6.
- B. Minimize the amount of field welding. Shop assemble components into largest size possible commensurate with transportation and handling limitations.

1. Shop connections: Bolted with high-strength bolts or welded.
- C. Cut, drill, or punch holes at right angles to surface of metal.
 1. Do not make or enlarge holes by burning.
 2. Make holes clean cut, without torn or ragged edges.
 3. Remove outside burrs resulting from drilling or reaming operations with tool making 1/16 IN bevel.
 4. Provide holes in members to permit connection of work of other trades or contractors.
- D. Make splices only where indicated or where approved.
- E. Tolerances (unless noted otherwise on Drawings):
 1. ASTM A6: When material received from the mill does not satisfy ASTM A6 tolerances for camber, profile, flatness or sweep, the Contractor is permitted to perform corrective work using controlled heating, and mechanical straightening, subject to the limitations of the AISC specification.

1.12 FINISHES

- A. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.
- B. Galvanizing for Bolts, Connectors, and Anchors:
 1. Hot-Dip Galvanizing:
 - a. Bolts, Nuts, and Washers: ASTM F2329.
 - b. Connectors and Anchors: ASTM A153.

1.13 SHOP COATING

- A. Refer to Section 099600 and coordinate shop primer, surface preparation and coating with field applied primers where specified.
- B. Provide suitable methods of handling and transporting painted steel to avoid damage to coating.
- C. Do not coat following surfaces:
 1. Machined surfaces, surfaces adjacent to field welds, and surfaces fully embedded in concrete.
 2. All other members for which no coating is specified.
- D. Clean thoroughly all surfaces not coated before shipping. Remove loose mill scale, rust, dirt, oil and grease. Protect machined surfaces.

1.14 SOURCE QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Testing: Test bolted and welded connections as specified in PART 3 for field quality control tests.

- C. Certificate of Compliance: When fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.

1. Specified shop tests are not required for Work performed by approved fabricator.

EXECUTION

1.15 GENERAL

- A. Contractor is responsible for safety. Construction means and methods and sequencing of work is the prerogative of the Contractor. Take into consideration that full structural capacity of many structural members is not realized until structural assembly is complete, e.g., until slabs, decks, bracing or rigid connections are installed.
1. Partially complete structural members shall not be loaded without an investigation by the Contractor and Engineer.
 2. Until all elements of the permanent structure and lateral bracing system are complete, provide temporary bracing that shall be designed, furnished, and installed by the Contractor for the partially complete structure. The Owner and Engineer shall review the submitted information for approval.

1.16 EXAMINATION

- A. Examine work-in-place on which specified work is in any way dependent to ensure that conditions are satisfactory for the installation of the work. Report defects in work-in-place which may influence satisfactory completion of the work. Absence of such notification will be construed as acceptance of work-in-place.
- B. Verify that bearing surfaces are at correct elevation.
- C. Verify that anchor rods are set in correct locations and arrangements, with correct exposure for steel attachment.

1.17 PREPARATION

- A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.
- B. Prior to making field connections to existing structural steel, remove completely all paint from existing steel which will be in contact with new steel and new welds.
- C. Adequate temporary bracing to provide safety, stability and to resist all loads to which the partially complete structure may be subjected, including wind, construction activities, and operation of equipment is the responsibility of the Contractor.
1. Use temporary guys, braces, shoring, connections, etc., necessary to maintain the structural framing plumb and in proper alignment until permanent connections are made, the succeeding work is in place, and temporary work is no longer necessary.

2. Use temporary guys, bracing, shoring, and other work to prevent injury or damage to adjacent work or construction from stresses due to erection procedures and operation of erection equipment, construction loads, and wind.
3. Contractor shall be responsible for the design of the temporary bracing system and must consider the sequence and schedule of placement of such elements and effects of loads imposed on the structural steel members by partially or completely installed work, including work of all other trades. If not obvious from experience or from the Drawings, the Contractor shall confer with the Engineer to identify those structural steel elements that must be complete before the temporary bracing system is removed.
4. Remove and dispose of all temporary work and facilities off-site.

1.18 ERECTION

- A. Allow for erection loads and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field-weld components and shear connectors as indicated on Drawings.
- C. Field-connect members with threaded fasteners; torque to required resistance and snug-tighten for bearing-type connections.
- D. Do not field-cut or alter structural members without approval of Architect/Engineer.
- E. Clean stored material of all foreign matter accumulated during erection period.
- F. Clean bearing and contact surfaces before assembly.
- G. After erection, touch up welds and abrasions to match shop finishes.
- H. Tighten and leave in place erection bolts used in welded construction.
- I. Provide beveled washers to give full bearing to bolt head or nut where bolts are to be used on surfaces having slopes greater than 1 in 20 with a plane normal to bolt axis.
- J. After bolts are tightened, upset threads of A307 unfinished bolts and anchor bolts to prevent nuts from backing off.
- K. Do not use gas cutting to correct fabrication errors. In case members do not fit or holes do not match, ream out the holes and insert the next larger size bolt. If the connections require new holes, then drill new holes. Make no such corrections without prior approval of the Engineer.
 1. Burning of holes: Not permitted.
- L. After erection, grind smooth all sharp surface irregularities resulting from field cutting or welding; power tool clean welds, bolts, washers and abrasions to shop coat removing all rust and foreign matter.
- M. Expansion anchor bolts and adhesive anchor bolts:
 1. Minimum embedment as recommended by manufacturer or specified herein, whichever is larger.

2. Notify Engineer if required depth of embedment cannot be achieved at a particular bolt location.
3. Follow manufacturer's recommendations for installation and torque.

1.19 GROUT INSTALLATION

- A. Grout under base plates specified in Section 033000 – Cast-In-Place Concrete.
- B. Shim bearing plates and equipment supports to proper elevation, and snug-tighten anchor bolts.
- C. Fill void under bearing surface with grout; install and pack grout to remove air pockets.
- D. Moist-cure grout.
- E. Remove forms after grout is set; trim grout edges to form smooth surface, splayed 45 degrees.
- F. Tighten anchor bolts after grout has cured for a minimum of three days.

1.20 TOLERANCES

- A. Section 014000 - Quality Requirements: Requirements for tolerances.
- B. Maximum Variation from Plumb: 1/4 inch per story, noncumulative.
- C. Maximum Offset from Alignment: 1/4 inch.

1.21 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Bolted Connections: Inspect according to AISC 303.
 1. Visually inspect all bolted connections.
 2. Direct Tension Indicators: Comply with requirements of ASTM F959 and verify that gaps are less than gaps specified in Table 2.
- C. Welding: Inspect welds according to AWS D1.1
 1. Use certified welders, and conduct inspections and tests as required. Record types and locations of defects found in Work. Record work required and performed to correct deficiencies.
 2. Visually inspect all welds.
 3. Ultrasonic Inspection: ASTM E164; perform on each full-penetration weld.
 4. Liquid Penetrant Inspection: ASTM E165.
 5. Magnetic Particle Inspection: ASTM E709.
 6. Radiographic Inspection: ASTM E94.
- D. Correct defective bolted connections and welds.

END OF SECTION 051200

SECTION 055000
MISCELLANEOUS METALWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Shop-fabricated metal items.
2. Ledge and shelf angles.
3. Bollards.
4. Fixed Ladder, ship ladder, and ladder accessories.
5. Metal grating.
6. Structural supports for miscellaneous attachments.
7. Miscellaneous metals.
8. Associated accessories to the above items.

B. Related Requirements:

1. Section 033000 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this Section in concrete.
2. Section 051200 - Structural Steel: Structural steel column and anchor bolts.
3. Section 099600 - Protective Coatings: Field-applied paint finish.

1.2 REFERENCE STANDARDS

A. American National Standards Institute:

1. ANSI A14.3 - American National Standard (ASC) for Ladders - Fixed - Safety Requirements.

B. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.
3. AWS D1.6 - Structural Welding Code - Stainless Steel.

C. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
6. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
7. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
8. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
9. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
10. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
11. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
12. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
13. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
14. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
15. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
16. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
17. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
18. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
19. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
20. ASTM A992 - Standard Specification for Structural Steel Shapes.
21. ASTM F436 - Standard Specification for Hardened Steel Washers.
22. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.

D. Builders Hardware Manufacturers Association (BHMA):

1. ANSI/BHMA A156.20 - American National Standard for Strap and Tee Hinges and Hasps.

E. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
3. SSPC Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic).
4. SSPC SP 1 - Solvent Cleaning.
5. SSPC SP 10 - Near-White Blast Cleaning.

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.
- D. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept metal fabrications on-Site in labeled shipments. Inspect for damage.
- B. Protect metal fabrications from damage by exposure to weather or by ground contact.

1.5 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to fabrication. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel:
 - 1. Structural W Shapes: ASTM A992, Grade 50.
 - 2. Structural Shapes: ASTM A36
 - 3. Channels and Angles: ASTM A36.
 - 4. Steel Plate: ASTM A36.
 - 5. Hollow Structural Sections: ASTM A500, Grade B.
 - 6. Steel Pipe: ASTM A53, Types E or S, Grade B, or ASTM A501.
 - 7. Sheet Steel: ASTM A653, Grade 33 Structural Quality.
 - 8. Standards Bolts: ASTM A307; Grade A or B.
 - 9. High Strength Bolts: ASTM A325.
 - 10. Nuts: ASTM A563; heavy-hex type.
 - 11. Washers: ASTM F436; Type 1.
 - 12. Welding Materials: AWS D1.1; type required for materials being welded.
- B. Stainless Steel:

1. Bars and Shapes: ASTM A276; Type 304 or Type 304L for materials to be welded.
2. Tubing: ASTM A269 or ASTM A554; Type 304 or Type 304L for materials to be welded.
3. Pipe: ASTM A312, welded; Type 304.
4. Plate, Sheet, and Strip: ASTM A240; Type 304 or Type 304L for materials to be welded.
5. Bolts and Anchors: ASTM F593; Type 304; Minimum yield stress of 30 ksi.
6. Nuts and Washers: ASTM F594; Type 304
7. Welding Materials: AWS D1.6; type required for materials being welded.

C. Aluminum:

1. Sheet Aluminum: ASTM B209 Alloy 5052, Temper H32.
2. Aluminum-Alloy-Drawn Seamless Tubes: ASTM B209 Alloy 5052, Temper H32.
3. Aluminum-Alloy Bars: ASTM B209; Alloy 5052, Temper H32.
4. Aluminum-Alloy Sand Castings: ASTM B26
5. Aluminum-Alloy Die Castings: ASTM B85 as required to suit application.
6. Bolts, Nuts, and Washers: Stainless steel.
7. Welding Materials: AWS D1.2; type required for materials being welded.

D. Bolts, Nuts, and Washers:

1. Carbon Steel:
 - a. Structural Connections: ASTM A307, Grade A, hot-dip galvanized.
 - b. Anchor Bolts: Smaller than 1" diameter shall be ASTM A36 or ASTM F1554 Grade 36; hot-dip galvanized. 1" diameter and larger shall be ASTM F1554 Grade 55; hot-dip galvanized.
2. Stainless Steel: Type 316 stainless steel, Class 2; ASTM A193 for bolts; ASTM A194 for nuts.
3. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.
4. The length of all bolts shall be such that after joints are made up, each bolt shall extend through the entire nut, but in no case more than 1/2-inch beyond the nut.

2.2 ANCHORS

A. Anchor:

1. ASTM F1554 Gr 55 with weldability or ASTM F593 Type 304 or 316 stainless steel with matching nut and washer.
2. Shape: Straight.
3. Furnish with nut and washer.
4. Finish: Galvanized after fabrication.

B. Epoxy Adhesive Anchors:

1. Manufacturers:
 - a. HIT RE 500 V3 Adhesive Anchor by Hilti, Inc.
 - b. Submit requests for substitution.
2. Grout: As specified in Section 033000 - Cast-In-Place Concrete.

C. Expansion Anchors:

1. The use of expansion anchors requires approval by Engineer.
2. Manufacturers:
 - a. Kwik Bolts by Hilti, Inc.
 - b. Trubolt by ITW Ramset/Red Head

2.3 LEDGE AND SHELF ANGLES

A. Ledge and Shelf Angles, Channels, and Plates Not Attached to Structural Framing:

1. For support of metal decking or metal grating.
2. Finish: Galvanized.

2.4 BOLLARDS

A. Removable Bollard:

1. Steel pipe Sch 80.
2. Crowned cap.
3. Size: 6.625 inch outside diameter, length as indicated on Drawings.
4. Finish: Galvanized, painted yellow

B. Concrete Encasement and Embedment:

1. Minimum Compressive Strength: 3,000 psi
2. As specified in Section 033000 - Cast-in-Place Concrete.
3. Steel pipe Sch 80
4. Size: 7.625 inch outside diameter, length as indicated on Drawings.
5. Provide a 1" diameter PVC drain and 12" drain rock in locations where groundwater is not present as indicated on Drawings.

2.5 LADDERS

A. Fixed Ladder:

1. IBC and OSHA.
2. Steel - welded construction.

- a. Ladders which may be partially or wholly submerged, or which are located inside a hydraulic structure, shall be entirely of Type 316 stainless steel.
3. Siderails:
 - a. Size: As specified on the drawings
4. Rungs:
 - a. Deformed rod.
 - b. Size: 1-inch diameter.
 - c. Spacing: 12 inches o.c.
5. Mounting:
 - a. Space rungs 7 inches from wall surface.
 - b. Provide steel mounting brackets and attachments.
6. Finish: Galvanized.

2.6 METAL GRATING

A. General:

1. Fabricate grating to cover areas indicated on the Drawings.
2. Unless otherwise specified or indicated on the Drawings:
 - a. Grating over an opening shall cover entire opening.
 - b. Grating shall be galvanized.
3. Make cutouts in grating where required for equipment access or protrusion, including valve operators or stems, and gate frames.
4. Band ends of grating and edges of cutouts in grating:
 - a. End banding: 1/4 inch less than height of grating, with top of grating and top edge of banding flush.
 - b. Cutout banding: Full-height of grating.
 - c. Use banding of same material as grating.
5. Panel layout: Enable installation and subsequent removal of grating around protrusions or piping.
 - a. Openings 6 inches and larger: Lay out grating panels with edges of 2 adjacent panels located on centerline of opening.
 - b. Openings smaller than 6 inches: Locate opening at edge of single panel.
6. Where an area requires more than 1 grating section to cover area, clamp adjacent grating sections together at 1/4-points with fasteners acceptable to Engineer.
7. Maximum weight of grating panels:

- a. Fabricate steel grating sections in units weighing not more than 80 pounds each.
- 8. Gaps between adjacent grating sections shall not be more than the clear spacing between bearing bars.
- 9. When requested by Engineer, test 1 section of each size grating for each span length involved on the job under full load:
 - a. Furnish a suitable dial gauge for measuring deflections.
- 10. Grating stair treads:
 - a. Tread width: Equal to tread spacing, plus 1-inch minimum for nosing.
 - b. Tread length: To suit stringer-to-stringer dimension indicated on the Drawings.
- B. Galvanized steel grating:
 - 1. Material for gratings, shelf angles, and rebates: Carbon steel.
 - 2. Bar size and spacing: As determined by manufacturer to enable grating to satisfy design loading and deflection limit criteria.
 - a. Design live load: A minimum of 100 pounds per square foot uniform live load on entire grating area, but not less than the live load indicated on the Drawings for the area where grating is located, and not less than any specific requirements indicated for grating within those areas.
 - b. Maximum deflection due to design load: 1/240 of grating clear span.
 - c. Maximum spacing of main grating bars:
 - 1) Unless otherwise indicated or otherwise required to resist design live loads: 1-3/16 inches on center, providing maximum 1-1/8 inches clear between bars.
 - 2) Where "close mesh" or "ADA grating" is indicated on the Drawings: 7/16 inch on center, providing maximum 5/16-inch clear between bars.
 - d. Bar height: As required to limit deflections under design loads specified.
Minimum grating height: 3/4 inch.
 - 3. Fabrication:
 - a. Swaged carbon steel construction with cross bars recessed below top of bearing bars.
 - b. Finish: Hot dip galvanized in accordance with ASTM A123 after fabrication.

2.7 FABRICATION

- A. Fit and shop-assemble items in largest practical sections for delivery to Site.

- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small, uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- F. Fabrication Tolerances:
 - 1. Maximum deviation from overall width, height, and depth measurements: 1/16 inch.
 - 2. Diagonal dimensions for symmetric fabrications: 1/16 inch.
 - 3. Squareness: 1/8-inch maximum difference in diagonal measurements.
 - 4. Maximum Offset between Faces: 1/16 inch.
 - 5. Maximum Misalignment of Adjacent Members: 1/16 inch
 - 6. Maximum Bow: 1/8 inch in 48 inches
 - 7. Maximum Deviation from Plane: 1/16 inch in 5 feet or 1/8 inch over the entire face.

2.8 FINISHES

A. Steel:

- 1. Prepare surfaces to be primed according to SSPC SP 6.
- 2. Do not prime surfaces in direct contact with concrete or where field welding is required.
- 3. Prime-paint items per Specification 099600 except where galvanizing is specified.
- 4. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.
- 5. Galvanizing for Fasteners, Connectors, and Anchors:
 - a. Hot-Dip Galvanizing: ASTM A153.
 - b. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
- 6. Touchup Primer for Galvanized Surfaces:
 - a. SSPC Paint 20, Type I or Type II
 - b. ASTM A780.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive Work.
- B. If unsatisfactory conditions exist, do not begin this work until such conditions have been corrected.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal and aluminum where Site welding is required.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, and free from distortion or defects.
- B. Fabrication and erection of structural steel shall conform to the requirements of the American Institute of Steel Construction "Manual of Steel Construction."
- C. Make provisions for erection stresses. Install temporary bracing to maintain alignment until permanent bracing and attachments are installed.
- D. Interface between materials:
 - 1. Dissimilar metals: Where steel comes in contact with dissimilar metals (aluminum, stainless steel, etc.), separate or isolate the dissimilar metals.
 - 2. Make application so that the isolating or protective barrier is not visible in the completed construction.
- E. Field-weld components indicated on Drawings or Shop Drawings.
- F. Perform field welding according to AWS D1.1.
- G. Obtain approval of Engineer prior to Site cutting or making adjustments not scheduled.
- H. Drilled anchors and reinforcing bars shall be installed in strict accordance with the manufacturer's instructions. Holes shall be roughened with a brush on a power drill, cleaned and dry. Drilled anchors shall not be installed until the concrete has reached the specified 28-day compressive strength. Adhesive anchors shall not be loaded until the adhesive has reached its specified strength in accordance with the Manufacturer's instructions.
- I. Ladders:

1. Secure to supporting surface with bent plate clips providing minimum 8 inches between supporting surface and center of rungs.
2. Where exit from ladder is forward over top rung, extend side rails 3 feet 6 inches minimum above landing, and return the rails with a radius bend to the landing.
3. Where exit from ladder is to side, extend ladder 5 feet 6 inches minimum above landing and rigidly secure at top.
4. Erect rail straight, level, plumb, and true to position indicated on the Drawings:
 - a. Correct deviations from true line or grade which are visible to the eye.

J. Metal Grating:

1. Allow 1/8-inch maximum clearance between ends of grating and inside face of vertical leg of shelf angles.
2. Horizontal bearing leg of shelf angles shall be 2 inches minimum.
3. Install galvanized plate or angles where necessary to fill openings at changes in elevation and at openings between equipment and grating.
4. Install angle stops at ends of grating.
5. Installed grating shall not slide out of rebate or off support.
6. Weld stops in place, unless otherwise specified or indicated on the Drawings.
7. Top surfaces of grating sections adjacent to each other shall lie in same plane.

3.4 TOLERANCES

- A. Section 014000 - Quality Requirements: Requirements for tolerances.
- B. Overall width, height, and depth measurements shall not vary from design dimensions by more than +/- 1/16-inch.
- C. Diagonal dimensions for symmetric fabrications shall not vary by more than +/- 1/16-inch.
- D. Flat fabrication faces (such as screens or gates) shall not vary from a true plane by more than 1/16-inch. in 5 feet. or 1/8-inch. over the entire face.

3.5 WELDING

- A. All welding shall be by the metal-arc method or gas shielded arch method as described in the American Welding Society's "Welding Handbook".
- B. Qualification of welders shall be in accordance with the AWS Standards governing same.
- C. In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions.
- D. Weld reinforcement shall be as specified by the AWS Code.

- E. Upon completion of welding, all weld splatter, flux, slag, and burrs left by attachments shall be removed. Welds shall be repaired to produce a workmanlike appearance, with uniform weld contours and dimensions.
- F. All sharp corners of material which is to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.
- G. All welds shall be inspected following criteria outlined in the applicable AWS standard by a certified inspector. When the applicable AWS standard does not explicitly state minimum weld testing requirements, coordinate with the Engineer for the required level of testing for each fabricated item. Submit all NDT results to the Engineer for review and approval.

3.6 GALVANIZING

- A. All structural steel plates shapes, bars and fabricated assemblies required to be galvanized shall, after the steel has been thoroughly cleaned of rust and scale, be galvanized in accordance with the requirements of ASTM A123.
- B. Any galvanized part that becomes warped during the galvanizing operation shall be straightened.
- C. Bolts, anchor bolts, nuts and similar threaded fasteners, after being properly cleaned, shall be galvanized in accordance with the requirements of ASTM A153.
- D. Field repairs to galvanizing shall be made using "Galvinox," "Galvo-Weld," or equal.

3.7 FIELD QUALITY CONTROL

- A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.
- B. Welding: Inspect welds according to AWS D1.1.
- C. When the applicable AWS standard does not explicitly state minimum weld testing requirements, coordinate with the Engineer for the required level of testing for each fabricated item.
- D. Submit all NDT results to the Engineer for review and approval.
- E. Replace damaged or improperly functioning hardware.
- F. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.
- G. Touch up factory-applied finishes according to manufacturer-recommended procedures.

3.8 ADJUSTING

- A. Adjust operating hardware and lubricate as necessary for smooth operation.

END OF SECTION

**SECTION 055250
STEEL RAILINGS**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel handrail, stair rail and guardrail.
Specifier: Used to indicate if portions or all of the work in the section are an alternate bid item, and to cross-reference to other sections containing alternates to the work in the section. This paragraph has limited applicability for most projects.

1.2 REFERENCE STANDARDS

A. ASTM International (ASTM):

1. A36, Specification for Carbon Structural Steel.
2. A53, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. A123, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. A276, Specification for Stainless Steel Bars and Shapes. A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
6. A312, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
7. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
8. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
9. A780, Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
10. A924, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

B. American Welding Society (AWS):

1. D1.1, Structural Welding Code Steel.

C. National Association of Architectural Metal Manufacturers (NAAMM):

1. ANSI/NAAMM AMP 521, Pipe Railing Manual.

D. U.S. Department of Justice, Architectural and Transportation Barriers Compliance Board (Access Board):

1. Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).

- E. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):
 - 1. 29 CFR 1910, OSHA Safety and Health Standards for General Industry (referred to herein as OSHA standards).
- F. Building code:
 - 1. International Code Conference (ICC):
 - a. International Building Code and associated standards, latest Edition including all State of Idaho amendments, referred to herein as Building Code.

1.3 QUALITY ASSURANCE

- A. Qualify welding procedures and welding operators in accordance with AWS.

1.4 DEFINITIONS

- A. Hardware: As defined in ASTM A153.
- B. Galvanizing: Hot-dip galvanizing per ASTM A123 or A153 with minimum coating of 2.0 OZ of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by standard.
- C. Guardrail: A system of building components located near the open sides of elevated walking surfaces for the purpose of minimizing the possibility of an accidental fall from the walking surface to the lower level.
- D. Handrail: A railing provided for grasping with the hand for support.
- E. Railing: A generic term referring to guardrail, handrail and/or stair rails.
- F. Stair Rail: A guardrail, installed at the open side of stairways with either a handrail mounted to the inside face of the guardrail, or where allowed by applicable codes, with the top rail mounted at handrail height and serving the function of a handrail.

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. See Section 013300.
 - 2. Fabrication and/or layout drawings.
 - a. Plan showing profile, location, section and details of each railing, and type and details of anchorage system.
 - b. Location and type of expansion joints.
 - c. Materials of construction including shop-applied coatings.
- B. Miscellaneous Submittals:

1. See Section 013300.
2. Certification of welders and welding procedures indicating compliance with AWS.
3. Certification that railings have been designed and fabricated to meet the loading requirements specified.
4. Acknowledgement that products submitted meet requirements of standards referenced.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and handle railings to preclude damage.
- B. Store railings on skids, keep free of dirt and other foreign matter which will damage railings or finish and protect from corrosion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Welded railing systems:
 - a. Any manufacturer meeting this specification.
 2. Galvanizing repair paint:
 - a. TNEMEC.
 - b. ZRC Products.

2.2 MATERIALS

- A. Pipe: ASTM A53, Types E or S, Grade B, or ASTM A501.
- B. Steel Sheet, Bar (Pickets) and Plate: ASTM A36.
- C. Fasteners: See Section 055000.
- D. Expansion and Adhesive Anchors: See Section 055000.
- E. Welding Electrodes: AWS D1.1, E70 Series.

2.3 FABRICATION

- A. General:

1. Verify field conditions and dimensions prior to fabrication.
2. For fabrication of items which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
 - a. Remove blemishes by grinding and buffing or by welding and grinding, prior to cleaning, treating and application of surface finishes.
3. Form exposed work with smooth, short radius bends, accurate angles and straight edges.
 - a. Ease exposed edges to a radius of approximately 1/32 IN.
 - b. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
4. Form exposed connections with flush, smooth, hairline joints, using galvanized steel splice locks to splice sections together or by welding. Top rail splices and expansion joints shall be located within 8 IN of post or other support.
5. Provide for anchorage of type indicated on the Drawings or as required by field conditions.
 - a. Drill or punch holes with smooth edges.
6. Design railing and anchorage system to withstand:
 - a. 200 LB concentrated load applied at any point in any direction to top of rail system.
 - b. 100 PLF vertical and 50 PLF horizontal uniform load applied simultaneously to the top rail of the guardrail.
 - c. A load of 25 psf applied horizontally at right angles over the entire tributary area including openings and spaces between rails.
 - d. Concentrated load need not be assumed to act concurrently with uniform load.
7. Custom fabricate pipe railings to dimensions and profiles indicated.
 - a. Fabricate handrails mounted to walls or guardrail vertical posts using 1-1/4 IN nominal DIA Schedule 40 pipe.
 - b. Fabricate all guardrail top rails using 1-1/2 IN nominal DIA Schedule 40 pipe. Fabricate all guardrail vertical posts using 1-1/2 IN nominal DIA Schedule 80 pipe.
 - c. All intermediate rails shall be fabricated using minimum 1-1/2 IN nominal DIA Schedule 40 pipe.
 - 1) Where details are not indicated, set horizontal rails to requirements of the Building Code or OSHA, whichever requires the more restrictive design.
 - d. Provide 1/4 x 4 IN high toe boards at elevated walkways and platforms, where indicated on the Drawings or required by OSHA Standards.

- 1) Clearance between bottom of toe board and walking surface shall not exceed 1/4 IN.
8. Fit exposed ends of guardrails and handrails with solid terminations.
 - a. Return ends of handrails to wall but do not attach to wall.
9. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly of units at project site.
- B. Finish:
 1. Galvanized after fabrication. Provide air expansion vent holes for all closed sections.
- C. Welded Railing Fabrication:
 1. All welding to be continuous in accordance with AWS D1.1 for steel and ASW D1.2 for aluminum.
 - a. All welded railing joints shall have full penetration welds.
 2. All exposed welds to be ground and buffed smooth and flush to match and blend with adjoining surfaces.
 3. No ragged edges, surface defects, or undercutting of adjoining surfaces will be accepted.
- D. Expansion Joints:
 1. Allow thermal expansion and contraction of railing while still meeting design load requirements as required.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to installation, inspect and verify condition of substrate.
 1. Installation of product constitutes installer's acceptance of substrate condition for product compatibility.
- B. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation.

3.2 INSTALLATION

- A. Set work accurately in location, alignment and elevation; plumb, level and true. Measure from established lines and items which are to be built into concrete, masonry or similar construction.

- B. Provide removable railing sections where indicated on Drawings.
- C. Anchor railings to concrete with minimum 1/2 IN stainless steel adhesive anchors with stainless steel bolts, nuts and washers unless noted otherwise in the Contract documents.
 - 1. Where exposed, bolts shall extend minimum 1/2 IN and maximum 3/4 IN above the top nut.
- D. Repair damaged galvanized surfaces in accordance with ASTM A780.
 - 1. Properly prepare surface in accordance with galvanizing repair paint manufacturer's recommendations.
 - 2. Apply minimum 6 mils DFT of galvanizing repair paint in accordance with manufacturer's recommendations.
- E. Prepare and paint railings in accordance with Section 099000.
- F. Provide railings as required for stair construction identified in Section 055000.

END OF SECTION

SECTION 099600
PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 THE REQUIREMENTS

- A. The Work of this Section shall include the protective coating of all specified surfaces including all surface preparation, pretreatment, priming, coating application, touch-up of factory-coated surfaces, protection of surfaces not to be coated, cleanup, and appurtenant work, all in accordance with the requirements of the Contract Documents.
- B. The following surfaces shall not be coated:
 - 1. Concrete, unless indicated elsewhere in the Specifications or Drawings.
 - 2. Stainless Steel
 - 3. Electrical Conduit
 - 4. Machined Surfaces
 - 5. Grease Fittings
 - 6. Glass
 - 7. Equipment Nameplates
 - 8. Platform gratings, stair treads, door thresholds, and other walking surfaces, unless specifically indicated to be coated.
 - 9. PVC piping indoors not subject to UV exposure.
- C. The coating system schedules summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the drawings are used to show exceptions to the schedules, to show or extend the limits of coating systems, or to clarify or show details for application of the coating systems.
- D. Coating materials shall be formulated for environments encountered in water and wastewater treatment processes.
- E. Coating materials that come in contact with water distributed as potable water shall be certified in accordance with NSF 61.
- F. Extra Materials: Deliver to Owner 1 gal. of each color and type of finish coat paint used on Project, in containers, properly labeled and sealed.
- G. Interior paint shall be low VOC.
- H. Submit color chart to Owner along with the submittal for each coating system. The Owner shall select the color of all protective coatings.
- I. Paint all exposed surfaces unless otherwise indicated.
- J. Definitions of terms used in this Section are in accordance with definitions referenced in ASTM D16, ASTM D3960, and SSPC Glossary of Definitions.

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. References herein to "SSPC Specifications" or "SSPC" shall mean the published standards of the Steel Structures Painting Council
- B. References herein to "NACE" shall mean the published standards of the National Association of Corrosion Engineers
- C. ASTM International (ASTM):
 - 1. D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - 2. D2200 - Standard Practice for Use of Pictorial Surface Preparation Standards and Guides for Painting Steel Surfaces.
 - 3. D3359 - Standard Test Methods for Rating Adhesion by Tape Test.
 - 4. D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 - 5. D4285 - Standard Test Method for Indicating Oil or Water in Compressed Air.
 - 6. D4414 - Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
 - 7. D4417 - Standard Test Methods for Field Measurement of Surface Profile of Blast-Cleaned Steel.
 - 8. D4541 - Standard Test Methods for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - 9. D4787 - Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates.
 - 10. D5162 - Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates.
 - 11. D7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
 - 12. E337 - Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures).
 - 13. F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - 14. F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes.
- D. Commercial Standards:
 - 1. ANSI A 13.1- Scheme for Identification of Piping Systems.
 - 2. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
 - 3. ANSI/AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape-Hot-Applied.
 - 4. ANSI/AWWA C222, Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings.
 - 5. ANSI/AWWA C602 - Standard for Cement-Mortar Lining of Water Pipelines in Place- 4 inches and Larger.
 - 6. ANSI/AWWA D102 - Painting Steel Water-Storage Tanks
 - 7. NSF International (NSF):61 - Drinking Water System Components - Health Effects.

E. Federal Specifications:

1. DOD-P-23236A(SH) - Military Specification, Paint Coating Systems, Steel Ship Tank, Fuel and Salt Water Ballast.

1.3 CONTRACTOR SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Samples

1. Submit samples of all paint, finishes and other coating materials specified herein. Paint or coating samples shall be submitted on 8-1/2-in. by 11-in. sheet metal. Each sample shall be completely coated over its entire surface with one protective coating material, type and color.
2. Two sets of color samples to match each color selected by the Owner from the manufacturer's standard color sheets. If custom mixed colors are required by this Section, the color samples shall be made using color formulations prepared to match the color samples furnished by the Owner. The color formula shall be shown on the back of each color sample.

C. Product data:

1. Physical properties of coatings, including the following:
 - a. Solids content.
 - b. Ingredient analysis.
 - c. VOC content.
 - d. Temperature resistance.
 - e. Typical exposures and limitations.
 - f. NSF certification of coatings for potable water supply systems.
 - g. Manufacturer's standard color chips.
2. Coating System Manufacturer's current printed recommendations and product data sheets for coating systems, including:
 - a. Surface preparation recommendations.
 - b. Method of application.
 - c. Compatible primer type and thickness.
 - d. Maximum dry and wet-mil thickness per coat and number of coats.
 - e. Minimum and maximum curing time between coats, including atmospheric conditions for each.
 - f. Curing time before submergence in liquid.
 - g. Approved thinner to be used for each coating.
 - h. Ventilation requirements for field coating.
 - i. Minimum and maximum atmospheric conditions during which the paint may be applied.
 - j. Required protection from sun, wind, and other conditions.
 - k. Maximum allowable substrate moisture content.
 - l. Requirements for transportation and storage.

- m. Mixing instructions.
- n. Storage requirements and shelf life.
- o. Material Pot life.
- p. Touch-up requirements and limitations.
- q. Minimum adhesion of each system submitted in accordance with ASTM D4541 and ASTM D7234.
- r. Material safety data sheets for each product.

D. Test Reports:

1. Results of testing on coating systems recommended by manufacturer and required by this section, including at least the following:
 - a. Visual inspection reports
 - b. Film thickness testing reports.
 - c. Holiday detection reports
 - d. Adhesion testing reports
2. Manufacturer certifications that coating passed tests.

1.4 QUALITY ASSURANCE

- A. General: The Contractor shall give the Engineer a minimum of 3 days advance notice of the start of any field surface preparation work of coating application work, and a minimum of 7 days advance notice of the start of any shop surface preparation work.
- B. Inspection by the Engineer, or the waiver of inspection of any particular portion of the work, shall not relieve the Contractor of its responsibility to perform the work in accordance with these Specifications.
- C. Scaffolding shall be erected and moved to locations where requested by the Engineer to facilitate inspection. Additional illumination shall be provided to cover all areas to be inspected.
- D. Surface Preparation: Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the standard samples available from the NACE, using NACE standard TM-01-70.
- E. Film Thickness Testing:
 1. On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No.2" using a magnetic-type dry film thickness gauge such as Mikrotest model FM, Elcometer model 111/1 EZ, or equal.
 2. Each coat shall be tested for the correct thickness and reported to the Engineer. No measurements shall be made until at least 8 hours after application of the coating.
 3. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using a wet film gauge.

- F. Store materials in well-ventilated, enclosed structures, and protect from weather and excessive heat or cold in accordance with the manufacturer's recommendations.
1. Store flammable materials in accordance with federal, state, and local requirements.
 2. Store rags and cleanup materials appropriately to prevent fire and spontaneous combustion.
 3. Store and dispose of hazardous waste in accordance with federal, state, and local requirements. This requirement specifically applies to waste solvents and coatings
- G. Do not use contaminated, outdated, diluted materials, and/or materials from previously opened containers and immediately remove these items from the project site once discovered.
- H. Inspection at Hold Points:
1. Conduct inspections at Hold Points during the coating system application and record the results.
 2. Coordinate Hold Points with the Engineer so the Engineer can observe Contractor's inspections on a scheduled basis.
 3. Provide the Engineer a minimum of 24 hours of notice before conducting Hold Point Inspections.
 4. Hold Points shall be as follows:
 - a. Conditions before surface preparation: Before starting surface preparation, observe, record, and confirm that oil, grease, and/or soluble salts are gone from the surface.
 - b. Post surface preparation: After completing surface preparation, measure and inspect for cleanliness and proper surface profile as specified in this Section and in the manufacturer's written instructions.
 - c. Coatings application: At the beginning of any coating system application, measure, record, and confirm acceptability of surface and ambient air temperature and humidity. Inspect applicator's equipment for serviceability and suitability for coatings application.
 - d. Post application inspection: Identify defects in application work on all surfaces, including pinholes, holidays, excessive runs or sags, inadequate or excessive film thickness, and other problems.
 - e. Follow-up corrective actions and final inspection: Measure and re-inspect corrective coating work performed to repair defects at prior Hold Points, and repeat until the surface condition is acceptable. Conduct final visual inspection with follow-up tests, such as holiday detection, adhesion tests, and DFT surveys.

- I. **Warranty Inspection:** A warranty inspection may be conducted during the eleventh month following completion of all coating and painting work. The Contractor and a representative of the coating material manufacturer shall attend this inspection. All defective work shall be repaired in accordance with these specifications and to the satisfaction of the Owner. The Owner may, by written notice to the Contractor, reschedule the warranty inspection to another date within the one-year correction period, or may cancel the warranty inspection altogether. If a warranty inspection is not held the Contractor is not relieved of its responsibilities under the Contract Documents.

PART 2 - PRODUCTS

2.1 GENERAL

- A. The term "paint," "coatings," or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.
- B. The term "DFT" means minimum dry film thickness, with no negative tolerance.
- C. Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use.
- D. The Contractor shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.
- E. In any coating system, only compatible materials from a single manufacturer shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the Engineer, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.
- F. All colors and shades of colors of all coats of paint shall be as selected or specified by the Owner. Each coat shall be of a slightly different shade, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples by the Owner.
- G. Products shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. Where requested, the Contractor shall provide the Engineer with the names of not less than 10 successful applications of the proposed manufacturer's products demonstrating compliance with this specification requirement.

2.2 SYSTEM MANUFACTURERS

- A. Each of the following manufacturers is capable of supplying many of the industrial coating materials specified herein. Where manufacturers and paint numbers are listed, it is to show the type and quality of coatings that are required as a minimum.

1. Sherwin-Williams
2. Carboline Coatings Company
3. Tnemec

2.3 COATING SYSTEM SCHEDULE

- A. Concrete Head Tower, Interior (Exposed, Saltwater Immersion Service)

1. Products:
 - a. 1st Coat: Polyamidoamine Epoxy applied at 3-5 mils
 - 1) Tnemec Series N140 Pota-Pox Plus or approved equal
 - b. 2nd Coat: Phenalkamine Epoxy applied at 10-14 mils
 - 1) Tnemec Series 21 Epoxoline or approved equal
2. Surface Preparation
 - a. SSPC-SP13/NACE 6 surface preparation of concrete, CSP ICRI 5.
 - b. The surface shall be clean, dry and free of contaminants before painting.

- B. Concrete Head Tower, Exterior (Exposed, Non-Immersion Service)

1. Products:
 - a. 1st Coat: Waterborn Modified Polyamine Epoxy applied at 0.7-1.5 dry mils
 - 1) Tnemec Series 151 Elasto-Grip or approved equal
 - b. 2nd Coat: Modified Waterborn Acrylate applied at 6-8 dry mils via a brush and rolled application
 - 1) Tnemec Series 156 Enviro-Crete or approved equal
 - c. 3rd Coat: Modified Waterborne Arcylate applied at 6-8 dry mils via a brush and rolled application
 - 1) Tnemec Series 156 Enviro-Crete or approved equal
2. Surface Preparation
 - a. SSPC-SP13/NACE 6 surface preparation of concrete.
 - b. Remove all loose paint, dirt, dust, mildew and other foreign matter prior to coating.
 - c. Fill any voids and repair concrete as directed by Engineer.
 - d. The surface shall be clean, dry and free of contaminants before painting.

- C. Exterior or UV-exposed PVC Piping

1. System - Acrylic
 - a. Single component, water-based, acrylic coating with fungicide.
 - b. Product shall be demonstrated suitable for PVC & CPVC piping, weather and mild chemical resistance, excellent color and gloss retention

2. Products:

Manufacturer	Primer	Intermediate Coat	Finish Coat
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Tnemec	Series 1028 or 1029	N/A	Series 1028 or 1029
Sherwin Williams	Bond-Plex	N/A	Pro Industrial Acrolon 100 WB
Carboline	Carbocrylic 120	N/A	Carbocrylic 3359

3. Coating System Details:

a. Surface Preparation

- 1) Lightly sand to establish abraded surface
- 2) Vacuum to remove loose materials
- 3) SSPC-SP1 - Solvent cleaning

b. Primer DFT: 2-4 mils

c. Intermediate Coat DFT: N/A

d. Finish Coat DFT: 2-3 mils per coat

e. Total System DFT: 4-7 mils

D. Non-skid surfaces of steel or galvanized steel:

1. Where non-skid surface is required, add grit or silica sand to the protective coating for slip protection. Texture shall be 30-50 mesh grit or silica sand incorporated into the coating system. The Contractor shall submit and follow the manufacturer's recommended materials, number and thickness of coats, and methods.

PART 3 - EXECUTION

3.1 STORAGE, MIXING, AND THINNING OF MATERIALS

- A. **Manufacturer's Recommendations:** Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed. The Contractor shall supply the Engineer with copies of each manufacturer's instructions in accordance with the requirements of Section 01340 - Submittal Procedures and this section.
- B. All protective coating materials shall be used within the manufacturer's recommended shelf life.
- C. **Storage and Mixing:** Coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together.

3.2 PREPARATION FOR COATING

- A. General: All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The Contractor shall examine all surfaces to be coated and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application.
- B. Protection of Surfaces Not to be Coated: Surfaces which are not to receive protective coatings, or adjacent work, shall be protected during surface preparation, cleaning, and coating operations.
- C. All hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be painted shall be removed, masked or otherwise protected.
- D. Drop cloths shall be provided to prevent coating materials from falling on or marring adjacent surfaces. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.
- E. Spray painting shall be conducted under carefully controlled conditions. The Contractor shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.
- F. Erect and maintain protective enclosures in accordance with SSPC- Guide 6.
- G. Protection of Painted Surfaces: Cleaning and coating shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.
 - 1. Whenever possible, coordinate with other trades and complete surface preparation and coating work before installing hardware, hardware accessories, nameplates, data tags, electrical fixtures, and similar uncoated items that will be in contact with coated surfaces. Reinstall removed items after coating.
- H. Prepare and coat exposed conduit and appurtenances occurring in finished areas with color and texture to match adjacent surfaces.
- I. Replace identification markings on mechanical or electrical equipment when coated over or spattered.
- J. Remove grilles, covers, and access panels for mechanical and electrical system and coat separately.

3.3 GENERAL SURFACE PREPARATION

- A. Prepare surfaces in accordance with coating manufacturer's instructions unless more stringent requirements are specified in this Section.

- B. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification:
1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil, salts, and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.
 2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by hand chipping, scraping, sanding, and wire brushing.
 3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by power tool chipping, descaling, sanding, wire brushing, and grinding.
 4. White Metal Blast Cleaning (SSPC-SP5): Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.
 5. Commercial Blast Cleaning (SSPC-SP6): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.
 6. Brush-Off Blast Cleaning (SSPC-SP7): Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust, and loose paint.
 7. Near-White Blast Cleaning (SSPC-SP10): Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.

3.4 METAL SURFACE PREPARATION (UNGALVANIZED)

- A. The minimum abrasive blasting surface preparation shall be as specified in the coating system schedules included in this Section. Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.
- B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers, NACE Standard TM-01-70.
- C. All oil, grease, welding fluxes and other surface contaminants shall be removed by solvent cleaning per SSPC-SP1 prior to blast cleaning.
- D. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.
- E. Unless otherwise specified, the requirements for blast cleaning steel, ductile iron, and stainless steel substrates are as follows:
1. Ferrous metal surfaces not to be submerged: Abrasive blast in accordance with SSPC-SP 10 unless blasting may damage adjacent surfaces, is prohibited, or is specified otherwise. Where abrasive blasting is not possible, clean surfaces to bare metal with power tools in accordance with SSPC-SP 11.

2. Ferrous metal surfaces to be submerged: Abrasive blast in accordance with SSPC-SP 5, unless specified otherwise, to clean and provide roughened surface profile with a depth between 2 and 4 mils.
- F. The type and size of abrasive shall be selected to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. Abrasives for submerged and severe service coating systems shall be clean, hard, sharp cutting crushed slag.
- G. The abrasive shall not be reused unless otherwise approved by the Engineer. For automated shop blasting systems, clean oil-free abrasives shall be maintained.
- H. The Contractor shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.
- I. Compressed air for air blast cleaning shall be supplied at adequate pressure from well-maintained compressors equipped with oil/moisture separators which remove at least 95 percent of the contaminants.
- J. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or another approved method prior to painting.
- K. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.
- L. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.
- M. Shop applied coatings of unknown composition shall be completely removed before the specified coatings are applied. Valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by solvent cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.
- N. Shop primed equipment shall be solvent cleaned before finish coats are applied.

3.5 SURFACE PREPARATION OF OTHER SURFACES

- A. Galvanized steel and non-ferrous metal surfaces:
 1. Degrease or solvent clean (SSPC-SP 1) to remove oily residue.
 2. Abrasive blast clean in accordance with SSPC-SP 16.
 - a. If abrasive blast cannot be performed, abrade in accordance with SSPC-SP 3 (Power Tool Cleaning).
 3. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded, such as bolts, nuts, or preformed channels.
 4. Test surface for contaminants using copper sulfate solution.
- B. PVC and FRP surfaces:

1. Lightly sand surfaces to be coated.
 - a. Sand to remove gloss and establish uniform surface profile.
 2. Vacuum to remove loose dust, dirt, and other materials.
 3. Solvent clean with clean white rags and allow solvent to evaporate completely before applying coating materials.
- C. Field preparation of shop-primed surfaces:
1. Smooth welds and prominences with power tools before applying field-applied coatings.
 2. Clean and dry shop-primed ferrous metal surfaces and fabricated assemblies before applying field coats.
 3. Prepare shop epoxy primed surfaces with light abrasive blasting or abrading and then vacuum before applying finish coats.
 - a. Follow coating manufacturer instructions for surface preparation when the primer recoat limit has been exceeded.
 4. Non-immersion service: Clean in accordance with SSPC-SP 2 (Hand Tool Cleaning) or SSPC-SP 3 (Power Tool Cleaning) and uniformly roughen.
- D. Immersion, and chemical service: Remove shop primer in accordance with SSPC-SP 5 (Near-White Blast Cleaning).

3.6 WORKMANSHIP

- A. Skilled craftsmen and experienced supervision shall be used on all work.
- B. Clean drop cloths shall be used. All damage to surfaces resulting from the work hereunder shall be cleaned, repaired, and refinished to their original condition.
- C. All coatings shall be applied under dry and dust-free conditions. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness.
- D. Edges, corners, crevices, and joints shall receive special attention to ensure that they have been thoroughly cleaned and that they receive an adequate thickness of coating material.
- E. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat would not increase the hiding.
- F. Installations shall be protected by the use of drop cloths or other approved precautionary measures.

3.7 SHOP COATING REQUIREMENTS

- A. Unless otherwise indicated, all items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the specified or approved color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires top coating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.
- B. For certain small pieces of equipment, the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.
- C. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before top coated, or less time if recommended by the coating manufacturer.
- D. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturers printed instructions.
- E. The Contractor shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted with equipment shop drawings.

3.8 APPLICATION OF COATINGS

- A. The application of protective coatings to steel substrates shall be in accordance with "Paint Application Specification No.1, (SSPC-PA 1)," Steel Structures Painting Council.
- B. Cleaned surfaces and all coats shall be inspected prior to each succeeding coat. The Contractor shall schedule such inspection with the Engineer in advance.
- C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.
- D. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations, and this Section, whichever has the most stringent requirements.
- E. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe painting for these areas.
- F. Special attention shall be given to materials which will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.

- G. Finish coats, including touch-up and damage repair coats shall be applied in a manner which will present a uniform texture and color matched appearance.
- H. Coatings shall not be applied under the following conditions:
 - 1. Temperature exceeding the manufacturer's recommended maximum and minimum allowable.
 - 2. Dust or smoke laden atmosphere.
 - 3. Damp or humid weather.
 - 4. When the substrate or air temperature is less than 5 degrees F above dewpoint.
 - 5. When air temperature is expected to drop below 40 degrees F or less than 5 degrees F above the dewpoint within 8 hours after application of coating.
- I. Dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Dept. of Commerce, Weather Bureau psychrometric tables.
- J. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
- K. Steel piping shall be abrasive blast cleaned and primed before installation.
- L. Spray application:
 - 1. With a brush, stripe coat edges, welds, corners, nuts, bolts, and difficult-to-reach areas, as necessary, before spray application to ensure specified coating thickness along edges.
 - 2. When using spray application, apply each coat to thickness no greater than recommended in coating manufacturer's instructions.
 - 3. Use airless spray method unless air spray method is required by the coating manufacturer's instructions or these Specifications.
 - 4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist, fumes, or overspray.
- M. Leave no holidays. Repair all holidays in accordance with the requirements on pertinent Coating Detail Sheets or as recommended by the manufacturer.
- N. Sand and feather into a smooth transition and recoat scratched, contaminated, or otherwise damaged coating surfaces so repairs are invisible to the naked eye.

3.9 CURING OF COATINGS

- A. The Contractor shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the highest requirement, prior to placing the completed coating system into service.
- B. Adhesion confirmation: Perform adhesion tests after proper coating cure in accordance with ASTM D3359. Demonstrate that:
 - 1. Prime coat adheres to the substrate.
 - 2. Coatings adhere to the prime and intermediate coats.

- a. Coating 5 mils or more DFT: Achieve adhesion test result of 5A on immersed surfaces and 4A or better on other surfaces.
- b. Coating less than 5 mils DFT: Achieve adhesion test results of 5B on immersed surfaces and 4B or better on other surfaces.

3.10 CORRECTION OF DEFECTIVE WORK

- A. Recoat areas not meeting the required system DFT. Follow manufacturer recommendations for applying additional coats, including additional surface preparation if the manufacturer's recoat window is passed. Recheck parts to ensure the specified minimum DFT is achieved.
- B. Repair pinholes or holidays identified by Holiday Testing as follows:
 1. Remove the coating system with a grinder or other suitable power tool.
 2. Remove coating system at all pinholes and holidays at least 2 inches diameter around the defect back to expose substrate.
 3. Concrete voids: chip back to expose entire cavity in all directions.
 - a. Completely fill void with approved filler/surfacer material using a putty knife or other suitable tool, and strike off. Cure per coating manufacturer's recommendations.
 4. Aggressively abrade or sand the intact coating system surface at least 3 inches beyond the removal area in all directions to produce a uniform 6- to 8-mil profile in the intact coating system.
 5. Vacuum the prepared area to remove all dust, dirt, etc., leaving clean, sound surfaces.
 6. Tape to mask the periphery of the prepared intact coating area to prevent coating repair application onto the prepared area.
 7. Apply the coating system with enough coats to achieve the specified finish coat thickness over the defect and coating removal area. Feather the coating onto the abraded coated surfaces around the removal area to avoid a lip and to achieve a neat repair outline.
 8. Follow curing time between coats as specified by coating manufacturer for the site conditions. Solvent wash and abrasive blast per coating manufacturer instructions, if the maximum recoat time is exceeded.
 9. Apply coating at specified dry film thickness.

3.11 FINAL INSPECTION

- A. Conduct final inspection with Engineer to ensure work conforms to contract documents requirements and the requirements of this section.
 1. Mark any rework required.
 - a. Re-clean and repair, as specified, at no additional cost to the Owner.

END OF SECTION

SECTION 260500**COMMON WORK RESULTS FOR ELETRICAL****PART 1- GENERAL****1.1 GENERAL**

- A. Refer to the Division 26 specifications as well as General Conditions, Supplementary Conditions and Special Conditions of the Construction Contract for provisions which may apply to the work under this section.
- B. The work under this section includes all electrical systems, as shown on the plans and as indicated herein.
- C. These specifications include all labor, materials, equipment and related items required to complete work within the intent of the drawing and specifications, whether or not specifically mentioned. For this reason, visit the site before submitting bid and familiarize yourself with the areas in which work is to be done.
 - 1. Feeders, panelboards, and distribution equipment.
 - 2. Branch circuit wiring system for motors, receptacles, equipment, etc..
- D. Contractor shall coordinate inspections with the general contractor when work is completed and ready for inspection. Contractor shall be responsible for providing all necessary licenses, associated documentation, etc. as required for obtaining permits with respect to their trade.

1.2 PLANS AND SPECIFICATIONS

- A. Plans and specifications are to be considered as mutually complimentary, and requirements of one shall be considered as requirements of both. If conflicting requirements are shown, the most restrictive requirement shall apply as ascertained by the Architect/Engineer.
- B. The intention of the drawings and specifications is to provide complete functioning systems in every respect. Furnish all material and equipment and perform all labor to achieve this intent, whether or not such material or equipment is indicated herein.
- C. All Electrical Plans shall be examined prior to submission of quotations to determine systems interface and conditions which could cause interference or deviations in equipment locations and routing. Conflicts or discrepancies on plans or in specifications shall be referred to the Engineer prior to submittal of bids to the Owner.
- D. Routing of conduit, circuits and location of equipment, apparatus, fixtures and other devices are shown on plans for general guidance. Coordinate work with existing conditions and other Contractors and provide any necessary deviations in routing (as

far as 10' from those shown) to provide systems as specified or implied, without interference, pursuant to these requirements and at no additional cost to the Owner.

1.3 COORDINATION

- A. Carefully examine all contract documents and include in the cost of this bid all work normally claimed by the trades under your contract. Coordinate work with the work of other contractors and determine that the work installed will not interfere with the work of other Contractors. If work is installed which does interfere, it shall be corrected at no cost to the Owner. Occupation of space by any Contractor does not give right of priority to the space.
- B. All work shall be performed in compliance with governing codes, utility standards, local practices and manufacturer's published standards. If any portion of the work specified or shown on the drawings is contrary to the above, the Contractor shall be required to bring the matter to the attention of the Architect/ Engineer (Owner's representative) prior to rough-in for clarification or revision.
- C. Provisions and requirements of the Occupational Safety and Health Act (OSHA) and the Construction Safety Act, all other applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for safety of persons or property shall be fully complied with by Contractors and subcontractors employed on this project.
- D. Contractor shall provide electrical power specifically required for each item of equipment whether specifically required by the contract documents or not.

1.4 TRADE AND LOCAL PRACTICES

- A. In order to achieve a greater degree of coordination as well as for a single source of ability, the work of several trades is occasionally included under one Contractor's contract. Comply with local customs and labor trade agreements which determine the particular trade or trades that shall be employed for the installation of any part of the work specified under your contract.

1.5 PERMITS, LICENSES, INSPECTIONS AND TAXES

- A. The Electrical Contractor shall comply with all codes, laws, ordinances, etc. If the plans and/or specifications are at a variance therewith, notify the Engineer in writing before the work is performed. If the Contractor, without notice, performs any work contrary to any law, ordinance, rule or regulation, he shall be held responsible for any such violation, and all costs arising there from shall be borne by him.
- B. Include any local, federal and states taxes in bid.
- C. Contractor shall be responsible for obtaining any licenses required to perform work (local business license, state license, etc.) and all associated fees.

1.6 BID AND SUBSTITUTES

- A. All bids shall be based on the drawings and specifications. Any requests for substitutions shall be submitted in writing, 10 business days in advance of bid, to the Engineer of Record for approval.
- B. Meet the responsibility of coordination with other trades for any changes incurred in pumps, equipment, general contracts, etc., which result from equipment substitution. Any additional costs involved, due to substitutions, will be paid by the Contractor proposing the substitution.

1.7 SHOP DRAWINGS

- A. Show drawings shall comply with the requirements of Section 0133300 Submittal Procedures.
- B. Submit for review electronic copies of the shop drawings and descriptive literature of equipment to be furnished under this contract. Drawings shall state capacities, sizes and all information shown in schedules on plans as a minimum of all equipment.
 - 1. Drawings shall be submitted with a list of items included, blank sheet for shop drawing stamps and be bound.
- C. All shop drawings and data must be in Architect/Engineer's office within thirty (30) days from the date of the contract, and it shall be this Contractor's responsibility to maintain liaison and trace this material through. Delivery date will be a consideration in the processing of the equipment and material submittals.
- D. Each shop drawing, catalog cut and/or specification sheet shall be marked with the name and location of the project. The shop drawings shall be reviewed by the Contractor, stamped and signed certifying that he has found them to be 100% complete and accurate, prior to submission. Failure to stamp shop drawings in this way will be grounds for rejection of shop drawing.
- E. Shop drawing review is for the purpose of determining only that equipment submitted conforms with design intents.
- F. Submit shop drawings on equipment and systems required by this specification and on the following equipment and systems as a minimum (but shall not necessarily be limited to these items, and may be asked for additional items at the discretion of the Owner/Architect/Engineer):
 - 1. ELECTRICAL
 - a. Panelboards
 - b. Disconnects
 - c. Wiring/Cabling
 - d. Conduit
 - e. Enclosures/Junction Boxes

1.8 OPERATION AND MAINTENANCE MANUALS AND INSTRUCTIONS

- A. Provide operation and maintenance manuals according to the requirements of Section 017000 Execution and Closeout Requirements and the relevant specification section requirements.
- B. Prior to final payment, three (3) sets of operation and maintenance manuals shall be provided to the Architect/Engineer for submittal to the Owner.
- C. Each major piece of equipment shall be included in these manuals with operating procedures, routine maintenance recommendations, parts lists, wiring diagrams, operation sequence, etc. The above is to be predicated on types of equipment.
- D. At a predetermined time prior to the Owner operating the system, an instructional session shall take place. The installing Contractors and major suppliers shall instruct the Owner's operating personnel on operation and maintenance of the systems. The installing Contractor shall submit documentation indicating the date of instruction; names and organization of persons providing and receiving the instructions; systems the instructions covered; and materials received.

1.9 RECORD DRAWINGS

- A. During construction, a separate set of plans at the job site shall be maintained by the Contractor to keep a record of all changes of locations.
- B. Locations of conduits and other concealed facilities shall be shown by the Contractor if and when they differ from the drawings.
- C. A neat, clean, legible set of as-built reproducible drawings shall be submitted to Architect/ Engineer for review, prior to the time of request for final payment.

1.10 WORKMANSHIP AND MATERIALS

- A. All work shall be performed in a manner acceptable to the Engineer, Architect and the Owner, by properly trained, supervised and experienced personnel using new and clean materials, supplies, equipment, hardware and fixtures.

1.11 PROTECTION OF EQUIPMENT AND WORK

- A. Equipment and components shall be protected against damage due to building materials, acid, tools and equipment or any causes incidental to construction. The finished surface of each piece of equipment and fixture shall be covered with building paper or similar protection. All equipment damaged by any cause and any trim with marred or scratched finish shall be replaced at no cost to the Owner. The equipment and equipment trim protection shall be removed at the completion of construction.

1.12 TEMPORARY FACILITIES

- A. Furnish, install and keep in proper repair all temporary power, lighting and other facilities required for construction purposes. After permanent facilities are installed,

this Contractor shall remove all temporary facilities associated with construction work or purpose.

1.13 MATERIAL AND EQUIPMENT HANDLING AND STORAGE

- A. It is recognized that space at the project for storage of materials and products is limited. Coordinate the deliveries of the materials and products with the scheduling and sequencing of the work so that storage requirements at the project are minimized. In general, do not deliver individual items of equipment to the project substantially ahead of the time of installation.

1.14 MAINTENANCE OF WORK AREAS

- A. During the project, maintain work area in an organized manner, do not allow debris to accumulate and store equipment, tools and supplies in a manner which shall not cause interference with the activities of others engaged on this project.
- B. Open ends of pipe, conduit, boxes, panels, switchgear, etc. equipment and specialties shall be kept properly closed during construction and installation to avoid contamination.

1.15 HOISTING

- A. The contractor shall be responsible for hoisting all materials and equipment furnished under this section of the specifications, in accordance with all city, state and federal rules and regulations.

1.16 CLEANING

- A. Upon completion of this work, clean all equipment and devices and remove all rubbish, crating, unused material and any other debris occasioned by this installation. Contractor shall leave all work in a finished, clean and satisfactory working condition.

1.17 ACOUSTICS AND VIBRATION

- A. All equipment shall operate under all conditions of load without sound and/or vibration which is objectionable in the opinion of the Engineer or Owner. Sound and/or vibration conditions objectionable shall be corrected in the approved manner by the Contractor, at his expense.

1.18 COLORS & FINISH

- A. Color and finish of equipment in finished areas shall be determined by the Engineer at time of equipment submittal and any color or finishes shall be reviewed by Engineer.

1.19 GUARANTEE

- A. The Contractor shall, by accepting these plans and specifications and signing the contract, shall guarantee the following:
- B. All equipment, accessories and materials furnished shall be guaranteed for a period of one year from final acceptance against all defects in materials and workmanship. If any equipment fails, does not operate satisfactorily or shows undue wear, the Contractor will be notified and will be required to remedy the defect immediately at his own expense.
- C. All equipment shall be guaranteed to produce the result specified or shown.
- D. All materials, equipment and devices shall be guaranteed to be free from mechanical defects or faulty workmanship for a period of one year from the date of the Owner's building occupancy. This does not relieve the Contractor of any punch list items which remain uncorrected at the time of Owner's building occupancy.
- E. Bidders are hereby made aware that certain manufacturer's equipment guarantees are valid only for a period of one year from the date of shipment or installation and will therefore not be valid until the date of this guarantee set forth herein. It shall therefore be noted that this Contractor shall be fully responsible for all material, equipment and labor for a full guarantee period as set forth hereinbefore.
- F. Labor, equipment and material to fulfill the requirements of this guarantee shall be furnished by this Contractor at no additional cost.
- G. Labor shall include premium time to correct any faulty material, equipment or workmanship that would interrupt Owner's business.

1.20 SERVICING

- A. Provide services on the entire system for a period of one year from the date of opening, providing all periodic maintenance necessary to provide peak efficiency in operation of all phases of these systems, including operational and preventive maintenance.

1.21 SPACE AND EQUIPMENT ARRANGEMENT

- A. The Electrical Contractor shall be responsible to see that equipment proposed will fit the spaces available. The equipment mentioned by name on the drawings is the equipment whose dimensions and connection arrangements have been used for the preparation of the layouts shown on the drawings. Should the use of other approved manufacturers or of other physical shape than those shown on the drawings be proposed, it shall be the responsibility of the Contractor making the proposal to submit for review shop drawings showing the arrangement of the proposed equipment in the space available. Approval of shop drawings does not relieve the Contractor of the responsibility of arranging the equipment in an approved workable installation in the space shown on the drawings.

- B. Suggestions for changes in location of equipment, advisable in the opinion of the Contractor, shall be submitted to the Engineer/Architect for approval before proceeding with the work, with written assurance from other trades that such changes will not interfere with their installation. Such changes, if approved, shall be made at no additional cost to the Architect, Owner, or Engineer.

1.22 ACCESSIBILITY/CLEARANCE

- A. Provide adequate clearance around all equipment to adequately service and maintain per equipment manufacturer's requirements and any applicable codes

1.23 PRELIMINARY OPERATION

- A. When each and every piece of equipment is ready to operate, if it is to the advantage of the Owner or the project manager to operate the equipment, this Contractor shall allow his equipment to be operated without obligating the Owner for acceptance.

PART 2- PRODUCTS

Not Used.

PART 3- EXECUTIONS

Not Used.

END OF SECTION

SECTION 260501**EXCAVATION AND BACKFILL FOR ELECTRICAL WORK****PART 3 - GENERAL****3.1 GENERAL**

- A. All excavation and backfill required for the installation of electrical work shall be the complete responsibility of the Contractor.

PART 4 - PRODUCT

Not Used.

PART 5 - EXECUTION**5.1 EXCAVATION**

- A. Each Contractor shall be responsible for the proper layout and the establishment of all lines and levels required for the execution of their work.
- B. Provide protection for trees within 15 feet of utility excavation.

5.2 TRENCHING

- A. Unless otherwise noted on plans, all trenching and backfill for ducts shall be open cut from the surface. Where necessary to protect the labor, the work, or adjacent property, the Contractor shall provide and install shoring. The sides of the trenching shall be securely held by bracing or sheeting of either wood or steel. Shoring shall remain in place until the backfill has proceeded to a point where it can be safely removed. All shoring shall be in accordance with OSHA requirements.

5.3 PROTECTION

- A. Each Contractor responsible for excavation work shall be required to provide all necessary barricades, fencing, bracing, sheet piling, warning signs, pumping, etc., for the protection of workers, general public and properties. Excavation work shall comply with ASA Standard A10.2 "Safety Code for Building Construction" and AGC Standard, "Manual of Accident Prevention in Construction" and the Department of Labor Occupational Safety and Health Standards.

5.4 EXCESS EARTH FROM EXCAVATION

- A. Excess earth from excavation shall be removed from the site by the Contractor making the excavation or may be piled on the site at a location designated by the Owner's Representative.
- B. Debris, trash or rock not usable for fill shall be removed from the site by each Contractor.
- C. Each Contractor shall be responsible for immediate "clean-up" of streets, roadways, and private property due to excavation.

5.1 RESTORATION OF EXISTING CONDITIONS

- A. When the excavation is within the area of finished site work by the General Contractor, backfill to the height of rough grade.
- B. For paved areas required to be cut, contractor shall saw cut and properly dispose of the surface, offsite. After conduit installation and trench backfill, provide resurfacing to match existing. Field coordinate with General Contractor.
- C. Provide clean dirt for backfill, if additional dirt is required after conduit installation for backfill.

5.2 PROTECTION OF WORK

- A. Each Contractor shall be responsible for the protection of his work against being damaged by others during construction.

5.3 COMPACTION

- A. All backfill materials shall be clean and free of debris. Compact in 6" lifts to 95% of compaction per the proctor test. Hand compact all materials within 18" of conduits, pipes, etc.

END OF SECTION

SECTION 260503
ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation.
- D. Report discrepancies to *Engineer* before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems to be removed.
- B. Coordinate utility service outages with the facilities maintenance staff as required.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction, if deemed necessary. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Systems:
 - 1. Obtain written permission from Owner at least 10 work days prior before partially or completely disabling system.
 - 2. Make temporary connections to maintain service to indicated items where required.

3.3 DEMOLITION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction as indicated on the plans.
- B. The term abandoned, as applied to this section of the specification, means any portion of an electrical system(s) or electrical equipment that is not in service at the time work begins or an electrical system(s) or electrical equipment that is to be intentionally taken out of service during demolition.
- C. The electrical contractor shall be responsible for the removal and disposal of all demolished electrical equipment, regardless of whether or not means for disposal are provided on site.
- D. Remove indicated wiring to source of supply. Where wiring is direct burial cable cut off 36" below finished grade and abandon in place.
- E. Remove indicated conduit. Cut conduit off 36" below finished grade and abandon in place. Entire conduit system is not required to be removed from utilization equipment to source.
- F. Disconnect and remove indicated panelboards and equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Remove all associated electrical supports. All existing galvanized pedestals used for disconnect and receptacle mounting shall be saved for re-use.
- I. Repair adjacent construction and finishes damaged during demolition and extension of work.
- J. Extend existing installations using materials and methods as specified.

3.4 CUTTING AND PATCHING

- A. Do not cut any structural building member. This includes but is not limited to floors, walls, decks, framing, and beams.
- B. Where authorized, concrete shall be cut by core drilling or with a wet saw. Hammer driven chisel or drill shall not be considered as a reasonable means for cutting concrete.
- C. In no way shall the integrity of another trade's work be endangered by the procedures set forth to accomplish the electrical scope of work. If necessary, coordinate the electrical scope with the other trade(s) affected. If necessary, engage the services of the affected trade(s) to help with the execution of the electrical scope.

3.5 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused where indicated on the plans.
- B. Where patching is required to restore the original finish to exposed concrete, sheetrock or other finished surfaces, roofing, waterproofing, etc., due to damage caused by the

performance of the electrical scope of work, the contractor shall enlist the services of the original installer to complete any and all patch work. All patch work shall receive final approval from the Owner.

END OF SECTION

SECTION 260519
LOW VOLTAGE ELECTRICAL POWER
CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wire and cable for 600 volts and less.
- B. Wiring connectors and connections.

1.2 RELATED SECTIONS

- A. Section 26 05 53 (16075) - Identification for Electrical Systems.

1.3 REFERENCES

- A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; **2006**.
- B. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; **2007**.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; **2020**.

1.4 SUBMITTALS

- A. See Section **260500** for submittal procedures.
- B. Product Data: Provide for *each cable assembly and type*;
- C. Test Reports: Indicate procedures and values obtained.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency.
- E. Project Record Documents: Record actual locations of components and circuits.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

Technical Specifications

260519-1

LOW VOLTAGE ELECTRICAL
POWER CONDUCTORS
AND CABLES

- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with a minimum of *three* years *documented* experience.
- C. Products: Furnish products listed and classified by *Underwriters Laboratories Inc.* as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 WIRING REQUIREMENTS

- A. Exterior Locations: Use only building wire with Type THHN/THWN *insulation in raceway*.
- B. Use stranded conductors for all power and control circuits.
- C. Use conductor not smaller than 12 AWG for power circuits.
- D. Conductor sizes are based on copper.

2.2 WIRE MANUFACTURERS

- A. Cerro Wire & Cable Company: www.cerrowire.com.
- B. Industrial Wire & Cable, Inc: www.iewc.com.
- C. Southwire Company: www.southwire.com.
- D. Senator Wire and Cable.
- E. Belden
- F. Houston Wire & Cable Company
- G. Substitutions: *See Section 260500*.

2.3 BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor: **Stranded Copper**.
 - 1. For all size conductors.
- C. Insulation Voltage Rating: **600** volts.
- D. Insulation: NFPA 70 *Type THHN/THWN*.
 - 1. Use for Feeders and Branch Circuit wiring.

- E. Insulation: **Thermoplastic** material rated **90** degrees C minimum dry locations and **75** degrees C wet locations.

2.4 WIRING CONNECTORS

- A. Splices shall only be made at final connections to motors or equipment within motor terminal boxes or equipment lugs, etc. Splicing of feeder or branch circuits will not be accepted. All wiring shall be run continuously and unbroken from source to final point of termination at equipment the circuit is intended to serve.
- B. Splices on wiring sizes #10 AWG and smaller shall be made with Spring Wire Connectors (wire nuts) or terminal connectors. Splices on sizes #8 AWG and larger shall be made with Split Bolt Connectors, Compression Connectors, or Solderless Pressure Connectors.
- C. Splices shall be insulated with three or more layers of Scotch 23 rubber tape covered with 3 or more layers of scotch 33 plastic tape.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that mechanical work likely to damage wire and cable has been completed.
- B. Verify that raceway installation is complete and supported.
- C. Verify that field measurements are as indicated.

3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

- A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Route wire and cable as required to meet project conditions.
- C. Wire and cable routing indicated is approximate unless dimensioned.
- D. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
- E. Include wire and cable of lengths required to install connected devices within **10 ft** of location shown.

- F. Use wiring methods indicated.
- G. Pull all conductors into raceway at same time.
- H. Use suitable wire pulling lubricant for building wire 6 AWG and larger or as required for smaller branch circuits.
- I. Protect exposed cable from damage.
- J. Use suitable cable fittings and connectors.
- K. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- L. Clean conductor surfaces before installing lugs and connectors.
- M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- N. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller. All other taps or splices shall be made using split bolts or other approved terminal blocks.
- O. Identify and color code wire and cable under provisions of Section **260553**. Identify each conductor with its circuit number or other designation indicated.

3.4 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA STD ATS, except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2.

END OF SECTION

SECTION 260526
GROUNDING AND BONDING
FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Grounding and bonding components.
- B. Provide all components necessary to complete the grounding system(s), which includes but is not limited to the following:
 - 1. Grounding Bushings.
 - 2. Ground bus.

1.2 REFERENCES

- A. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; **2007**.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; **2020**.

1.3 SUBMITTALS

- A. See Section **26 05 00** for submittal procedures.
- B. Product Data: Provide for grounding electrodes and connections.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations of components and grounding electrodes.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum **three** years **documented** experience.

- C. Products: Listed and classified by *Underwriters Laboratories Inc.* as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Cooper Power Systems: www.cooperpower.com.
- B. Framatome Connectors International: www.fciconnect.com.
- C. Lightning Master Corporation: www.lightningmaster.com.
- D. Substitutions: *See Section 260500.*

2.2 ELECTRODES

2.3 CONNECTORS AND ACCESSORIES

- A. Mechanical Connectors:
 - 1. Bronze.
- B. Connections
 - 1. Provide connectors and terminals as recommended by the equipment manufacturer for the intended application.
 - 2. Provide exothermic weld connections to all grounding rods.
- C. Wire: Stranded copper.
 - 1. Wire size #4 AWG and smaller shall have GREEN insulation from the manufacturer.
 - 2. Wire size #3 AWG and larger shall be identified with GREEN 'phasing' tape.
- D. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. All grounding connections shall be made using exothermic welds. Mechanical connectors may be used for piping, and other metallic objects within the building required to be bonded.

Technical Specifications

260526-2

GROUNDING AND
BONDING FOR
ELECTRICAL SYSTEM

- B. Provide bonding to meet requirements described in Quality Assurance.
- C. Bond together each metallic raceway, pipe, duct and other metal object *contained within the building*.
- D. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- E. Bond all conduits carrying cables routed in the building cable tray system on one end utilizing a grounding bushing and interconnect to the existing grounding electrode conductor route along the cable tray system.

3.3 FIELD QUALITY CONTROL

- A. Provide field *inspection and testing* in accordance with Section *014000*.
- B. Inspect and test in accordance with NETA STD ATS except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.

END OF SECTION

SECTION 260529**HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Conduit and equipment supports.
- B. Anchors and fasteners.

1.2 REFERENCES

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; **2006**.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; **2020**.

1.3 SUBMITTALS

- A. See Section 260500 for submittal procedures.
- B. Product Data: Provide manufacturer's catalog data for fastening systems.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by *Underwriters Laboratories Inc.* as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Thomas & Betts Corporation: www.tnb.com.
- B. Threaded Rod Company: www.threadedrod.com

- C. Substitutions: *See Section 260500.*

2.2 MATERIALS

- A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant hot dipped galvanized materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- B. Supports: Fabricated of galvanized steel where required.
- C. Anchors and Fasteners:
1. Contractor may use spring clips, beam clamps, and spring nuts for use with Kindorf.
 2. Concrete Structural Elements: Use precast inserts; expansion anchors; powder-actuated anchors; preset inserts.
 3. Steel Structural Elements: Use *beam clamps; steel spring clips; steel ramset fasteners; welded fasteners.*
 4. Concrete Surfaces: Use *self-drilling anchors or expansion anchors.*
 5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use *toggle bolts; hollow wall fasteners; or self-drilling anchors.*
 6. Solid Masonry Walls: Use *expansion anchors; preset inserts.*
 7. Sheet Metal: Use sheet metal screws.
 8. Wood Elements: Use wood screws.
- D. Formed Steel Channel:
1. As submitted by the contractor subject to Engineer's approval.
- E. Powder-Actuated Anchors:
1. As submitted by the contractor subject to Engineer's approval.
- F. Steel Spring Clips:
1. As submitted by the contractor subject to Engineer's approval.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
 2. Do not drill or cut structural members.
- B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

- D. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 260534**CONDUIT****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Conduit, fittings and conduit bodies.

1.2 RELATED SECTIONS

- A. Section 260526- Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems.
- D. Section 260537 - Boxes.

1.3 REFERENCES

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); **2005**.
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); **2005**.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC); **2005**.
- D. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; **2006**.
- E. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association; **2006**.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; **2007**.
- G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; National Electrical Manufacturers Association; **2005**.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit; National Electrical Manufacturers Association; **2003**.

I. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association; **2004**.

J. NFPA 70 - National Electrical Code; National Fire Protection Association; **2020**.

1.4 SUBMITTALS

A. See Section **260500** for submittal procedures.

B. Project Record Documents: Accurately record actual routing of conduits larger than **1 1/2 inches**.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by **Underwriters Laboratories Inc.** as suitable for purpose specified and shown.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Conduit Size: Comply with NFPA 70.

1. Minimum Size: 3/4 inch unless otherwise specified.

B. Outdoor Locations:

1. Above Grade: Use **Schedule 80 PVC**. See plans.

2. Below Grade: Use **Schedule 40 PVC**. See plans.

C. Final Connections to Equipment Subject to Vibration as well as Lighting Fixtures as indicated on plans:

1. Liquidtight Flexible NonMetallic Conduit

2.2 NONMETALLIC CONDUIT

A. Manufacturers:

1. Cantex, Inc: www.cantexinc.com.

2. Lamson & Sessions (Carlon): www.carlon.com.

3. Beck Manufacturing, Inc: www.beckmfg.com.
 4. Picoma; <http://www.picoma.com>.
 5. Substitutions: **See Section 016000 - Product Requirements.**
- B. Fittings and Conduit Bodies: NEMA FB 1; **material to match conduit.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify routing and termination locations of conduit prior to rough-in.
- C. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.2 INSTALLATION

- A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Arrange supports to prevent misalignment during wiring installation.
- C. Support conduit using 2-hole galvanized steel straps with kindorff.
- D. Group related conduits; support using conduit rack. Construct rack using steel channel
- E. Fasten conduit supports to building structure and surfaces under provisions of Section **260529**.
- F. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- G. Do not attach conduit to ceiling support wires.
- H. Arrange conduit to maintain headroom and present neat appearance.
- I. Route **exposed** conduit parallel and perpendicular to walls.
- J. Maintain adequate clearance between conduit and piping.
- K. Maintain **12 inch** clearance between conduit and surfaces with temperatures exceeding **104 degrees F**.
- L. Cut conduit square using saw; de-burr cut ends.
- M. Bring conduit to shoulder of fittings; fasten securely.

- N. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use *hydraulic one shot bender to fabricate factory elbows for* bends in metal conduit larger than *1 1/2 inch* size.
- O. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- P. Provide suitable pull string in each empty conduit except sleeves and nipples.
- Q. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- R. Give the right-of-way in confined spaces to larger ducting, piping that must slope, and any other trades that are less conformable than electrical services.

END OF SECTION

SECTION 260537**BOXES****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Wall and ceiling outlet boxes.
- B. Pull and junction boxes.

1.2 RELATED SECTIONS

- A. Section 26 27 26 (16140) - Wiring Devices.

1.3 REFERENCES

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; *2006*.
- B. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; *2007*.
- C. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; *2003*.
- D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; National Electrical Manufacturers Association; *2003*.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; *2003*.
- F. NFPA 70 - National Electrical Code; National Fire Protection Association; *2020*.

1.4 SUBMITTALS

- A. See Section 260500 for submittal procedures.
- B. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Provide products listed and classified by *Underwriters Laboratories Inc.* as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Appleton Electric: www.appletonelec.com.
- B. Arc-Co./Division of Arcade Technology: www.arc-co.com.
- C. Unity Manufacturing: www.unitymfg.com.
- D. Thomas & Betts: www.tnb.com.
- E. Hoffman
- F. Substitutions: See Section 260500.

2.2 BOXES

- A. Boxes:
- B. Boxes shall be U.L. listed and sized for the application.
- C. Boxes shall be PVC NEMA 3R.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify locations of all outlet and junction boxes for all systems (electrical power, lighting, etc.) prior to rough-in.

3.2 INSTALLATION

- A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install in locations as shown on Drawings, and as required for wire pulling, equipment connections, and as required by NFPA 70.
- C. Coordinate installation of outlet boxes for equipment provided and connected by other divisions.
- D. Set wall mounted boxes at elevations to accommodate mounting heights as *indicated on the plans or specified elsewhere in the construction documents*.
- E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
- F. Adjust box locations up to **10 feet** if required to accommodate intended purpose.
- G. Maintain headroom and present neat mechanical appearance.
- H. Install pull boxes and junction boxes where accessible.
- I. Support all boxes from the structure independent of conduit.
- J. Each box shall have the circuit information, for the circuit it contains, identified on the cover in a neat, legible, and permanent manner. Information shall be provided on the interior and exterior face of the cover. All system circuits, as well as power circuits, including but not limited to data, communications, etc. shall be identified in this manner.

3.3 ADJUSTING

- A. Adjust boxes to be level and plumb and ensure covers are properly fastened.

3.4 CLEANING

- A. Clean boxes to remove dust, debris, and other material.
- B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 260553**IDENTIFICATION FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.

1.2 RELATED SECTIONS

- A. None.

1.3 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; **2020**.

1.4 SUBMITTALS

- A. See Section **26 05 00** for submittal procedures.
- B. Product Data: Provide catalog data for nameplates, labels, and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by *Underwriters Laboratories Inc.* as suitable for purpose specified and shown.

1.6 EXTRA MATERIALS

- A. None Required for this project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Brady Corporation: www.bradycorp.com.
- B. Seton Identification Products: www.seton.com/aec.
- C. HellermannTyton: www.hellermannityton.com.
- D. Substitutions: *See Section 26 05 00.*

2.2 NAMEPLATES AND LABELS

- A. Nameplates for the Power System and Communications Equipment:
 - 1. Engraved three-layer laminated plastic, **WHITE** letters on **Black** background
- B. Locations:
 - 1. Each electrical Panelboard cover.
 - 2. Equipment Disconnects.
 - 3. Receptacles onsite.
 - 4. Junction Box Enclosures.
- C. Letter Size:
 - 1. Use **3/8 inch** tall letters for identifying individual equipment and loads.
- D. Identifying Information:
 - 1. Each nameplate shall contain the equipment designation (name) as identified on the plans, the system voltage, system phase, system fed from and what the equipment feeds where applicable.
 - 2. Provide individual placard labels on each disconnect and site receptacle indicating the branch circuit serving the equipment.

2.3 WIRE/CONDUCTOR AND CONDUIT MARKING

- A. Manufacturer:
 - 1. 3M.
 - 2. Substitutions: *See Section 26 05 00.*
- B. Description: **Tape** type wire markers for wire size #8 AWG and larger. Wire sizes #12 and #10 AWG shall have color coded insulation.
- C. Legend:

1. 240/120 Volt System
 2. 'A' – Phase – Black
 3. 'B' – Phase – 'Orange' – "High Leg" – Field verify with utility.
 4. 'C' – Phase – Red
 5. 'Neutral' – White
 6. 'Grounding' – Green
- D. Locations: Each conductor at *switchboards, panelboards, panelboard gutters, pull boxes, outlet boxes, junction boxes*, and at each load connection shall be identified.
- E. Junction Boxes:
1. Power and Lighting Circuits: Branch circuit or feeder number for the circuit contained within the box shall be neatly identified on the junction box cover in permanent black marker and be legible on the inside face and exterior face of the cover.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive nameplates and labels.

3.2 INSTALLATION

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplates to equipment front using *screws and adhesive*.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.

END OF SECTION

SECTION 262416**PANELBOARDS****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Power distribution, Lighting and Appliance panelboards.

1.2 RELATED SECTIONS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260553- Identification for Electrical Systems.

1.3 REFERENCES

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; *2006*.
- B. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC; National Electrical Manufacturers Association; *2000 (R2005)*.
- C. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; *2001 (R2006)*.
- D. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association; *2006*.
- E. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association; *2002*.
- F. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; *2007*.
- G. NFPA 70 - National Electrical Code; National Fire Protection Association; *2020*.

1.4 SUBMITTALS

- A. See Section **26 05 00** for submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
- E. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum *three* years *documented* experience.
- C. Products: Listed and classified by *Underwriters Laboratories Inc.* as suitable for the purpose specified and indicated.

1.6 MAINTENANCE MATERIALS

- A. Furnish *two* of each panelboard key.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Square D
- B. Eaton Cutler Hammer
- C. GE Industrial
- D. Siemens

2.2 PANELBOARDS - GENERAL

- A. Description: NEMA PB 1, **circuit breaker type.**
- B. Panelboard Bus: **Tin Plated Aluminum**, Ampere ratings as indicated on the schedules. Provide ground bus in each panelboard.
- C. Minimum integrated short circuit rating: *Shall be as indicated on the panel schedules but shall not be less than 22000* amperes rms symmetrical.

- D. Molded Case Circuit Breakers: Bolt-on type with common trip handle for all poles and Thermal magnetic trip in each pole; UL listed. Tandem circuit breakers are not acceptable.
- E. Enclosure: NEMA PB 1; *NEMA 4X 316 stainless steel. Enclosure dimensions shall conform to manufacturer's standard dimensions for similar sized equipment.*
- F. Cabinet Front: Surface type, fastened with *hinged door with flush lock and metal directory frame;*
- G. Cabinet Front: *Surface, as indicated on the panel schedule,* cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.
- B. Install panelboards plumb.
- C. Height: *6 feet* to top of panelboard; install panelboards taller than *6 feet* with bottom no more than *4 inches* above floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide a typed circuit directory for each panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section **260553**.
- G. Ground and bond panelboard enclosure according to Section **260526**.

3.2 FIELD QUALITY CONTROL

- A. Perform field *inspection and* testing in accordance with Section **014000**.
- B. Inspect and test in accordance with NETA STD ATS, except Section 4.

3.3 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within *10* percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 262818
ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Fusible switches.
- B. Nonfusible switches.

1.2 RELATED SECTIONS

- A. Section 26 05 26 (16060) - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 53 (16075) - *Identification for Electrical Systems*.

1.3 REFERENCES

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; **2002**.
- B. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; **2001 (R2006)**.
- C. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; **2007**.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; **2020**.

1.4 SUBMITTALS

- A. See Section **013000** - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide switch ratings and enclosure dimensions.
- C. Project Record Documents: Record actual locations of enclosed switches.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum **three** years **documented** experience

- C. Products: Listed and classified by *Underwriters Laboratories Inc.* as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Square D
- B. Eaton Cutler Hammer
- C. GE Industrial
- D. Siemens

2.2 COMPONENTS

- A. Nonfusible Switch Assemblies: NEMA KS 1, Type **HD** enclosed load interrupter knife switch.
 - 1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
 - 2. Handle lockable in OFF position.
- B. Enclosures: NEMA KS 1.
 - 1. Exterior Locations: Type **4X 316 stainless steel**.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.2 FIELD QUALITY CONTROL

- A. Perform field inspection and adjusting in accordance with Section *01 40 00 (01400)*.
- B. Inspect and test in accordance with NETA STD ATS, except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.5.

END OF SECTION

SECTION 312316**EXCAVATION****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Clearing and grubbing, removal of existing materials, excavation and subgrade preparation required to construct the Work.

1.2 INFORMATIONAL SUBMITTALS:

- A. Excavation Plan, Detailing:
 - 1. Methods and sequencing of excavation
 - 2. Proposed locations of stockpiled excavated material
 - 3. Proposed onsite and offsite disposal sites
 - 4. Number, types, and sizes of equipment proposed to perform excavations
 - 5. Anticipated difficulties and proposed resolutions
 - 6. Reclamation of onsite spoil disposal areas

1.3 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized over excavation.

1.4 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32°F shall not be used as fill or backfill until material completely thaws.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.5 SEQUENCING AND SCHEDULING

- A. Complete applicable demolition, clearing, grubbing, stripping, and dewatering prior to initiating excavation.
- B. Excavation Support: Install and maintain as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION**3.1 GENERAL**

- A. Excavate to lines, grades, and dimensions shown as necessary to accomplish Work. Excavate to within tolerances of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. Do not over excavate without written authorization of Engineer.
- C. At a minimum, dewater the site according to the Owner-accepted dewatering plan.

3.2 CLEARING AND GRUBBING

- A. All construction areas shall be cleared of grass, shrubs, trees and organic matter or deleterious materials to a depth of at least six inches below existing grade.
- B. Unless otherwise noted, trees larger than three inches in diameter at the base shall not be removed without the Owner's approval. Any removal of trees, shrubs, fences or other improvements outside the designated construction limits by the Contractor shall first be approved by the Owner, and removed and replaced by the Contractor at the Contractor's expense.

3.3 TRENCH WIDTH

- A. Minimum Trench Width: As shown on the Drawings.
- B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

3.4 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowances for topsoil or slop protection, where shown.
- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.5 SUBGRADE PREPARATION FOR BUILDINGS, PAVING, VAULTS, PIPING AND UTILITIES

- A. Excavate to the line and grade shown on the Drawings.
- B. Notify Engineer and Owner of unexpected subsurface conditions.
- C. After clearing and excavation are completed, scarify areas which underline backfills or structures to a depth of 6 inches and until surface is free of ruts, hummocks, and other features which would prevent uniform compaction by equipment to be used.
 - 1. Recompact scarified area to density specified before placing backfill material or concrete.
- D. Over excavate soft material found at the subgrade elevation. Place and compact Structural Fill to the lines and grades shown on the Drawings.
 - 1. Over excavate to a depth at which suitable material is found, or 2 feet below soft material, whichever is greater.
 - 2. Place a geotextile above the excavation subgrade prior to placement and compaction of Structural Fill material.
- E. Proof roll and compact to 92 percent of the maximum dry density of the subgrade soil as determined by ASTM D1557 (Modified Proctor). Any soft soils or rutting shall be over-excavated and filled with structural material and compacted.
 - 1. Contractor shall allow the Owner and Engineer to inspect all subgrade excavations both before and after proof compaction. All native excavations shall be proof compacted per this specification. Notify the Owner as soon as excavation is completed in order that subgrades may be inspected.
 - 2. Do not commence further construction until the subgrade has been inspected and approved by the Owner or Engineer as being free of undesirable material, being of compaction density required by this specification, and being capable of supporting the loads to be placed thereon.
 - 3. Owner shall be given the opportunity to inspect subgrade below fill material both prior to and after subgrade compaction.
 - 4. Before concrete or fill material is placed, protect approved subgrade from becoming loose, wet, frozen, or soft due to weather, construction operations, or other reasons.

3.6 SHORING

- A. Shore, sheet pile, slope, or brace excavations as required by applicable codes or conditions to prevent them from collapsing.
- B. Remove shoring as backfilling progresses but only when banks are stable and safe from caving or collapse.

3.7 DRAINAGE

- A. Maintain excavations free of water where foundations, floor slabs, equipment support pads or fill material are to be placed.
- B. Control grading around structures so that ground is pitched to prevent water from running into excavated areas or damaging structures.
- C. Notify Engineer and Owner when groundwater is encountered during excavation.

3.8 STOCKPILING EXCAVATED MATERIALS

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.
- D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavated side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated material near or over existing facilities, adjacent property, or completed Work, if weight of stockpile material could induce excessive settlement.

3.9 DISPOSAL OF SPOILS

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk in a lawful manner.

END OF SECTION

SECTION 312323**SOILS AND AGGREGATES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes: Grading, fill placement, moisture conditioning, and compaction of specified materials to construct the Work.
1. Structural Fill
 2. Trench Zone Material
 3. Pipe Zone Material
 4. General Fill and Pavement Subbase
 5. Granular Fill under Building Floor Slabs

1.2 REFERENCE STANDARDS

- A. American Association of State Highway and Transportation Officials:
1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg Rammer and a 457-mm Drop.
- B. ASTM International:
1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 2. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
 3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (Modified Proctor).
 4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
 5. ASTM D6031/D6031M - Standard Test Method for Logging In Situ Moisture Content and Density of Soil and Rock by the Nuclear Method in Horizontal, Slanted, and Vertical Access Tubes.
 6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

- A. Section 013300 - Submittal Procedures: Requirements for submittals.
- B. Product Technical Data:

1. Submit manufacturer information for geotextile fabric, indicating physical properties and installation instructions.
2. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
3. Material Gradation, testing data and material source for each material. Clearly label individual gradations with the material names below.

C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1. Test reports shall be signed and sealed by a registered Professional Civil Engineer in the state of South Carolina.
2. Test reports for testing performed by the Contractor shall be submitted to the Engineer within 48 hours of completion of the test.

1.4 QUALITY ASSURANCE

A. Initial compaction demonstration:

1. Adequacy of compaction equipment and procedures: Demonstrate adequacy of compaction equipment and procedures before exceeding any of the following amounts of earthwork quantities:
 - a. 50 cy of earthwork adjacent to structures.
 - b. 100 cy of earthwork.
2. Compaction sequence requirements: until specified degree of compaction on previously specified amounts of earthwork is achieved, do not perform additional earthwork of the same kind.
3. After satisfactory conclusion of initial compaction demonstration and at any time during construction, provide confirmation tests as specified below.

B. Contractor shall perform all work related to this section in accordance with the approved Stormwater Management Plan (SWMP).

C. Storage and Protection: Protect from segregation and excess moisture during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Water for compacting: use water from source acceptable to the Owner.
- B. Obtain fill and backfill material necessary to produce grades required.
 1. Material and source are to be approved by the Engineer.
 2. Excavated material approved by the Engineer may also be used for fill material.

C. Structural Fill:

1. Structural fill material shall be used immediately adjacent to structures as backfill material and extend a minimum distance of 2 feet to allow for adequate compaction.
2. Materials classified as CL, CH, MH, or OH shall not be allowed as structural fill.
3. Material shall meet the following gradation:

Sieve Size	Percentage Passing
3/4-inch	100
3/8-inch	90-100
No. 4	45 - 90
No. 8	40 - 65
No. 16	30 - 50
No. 30	20 - 40
No. 50	15 - 20
No. 100	5 - 15
No. 200	0 - 10

D. Trench Zone Material

1. Structural fill free of rock, cobbles, roots or other organic matter and frozen material.

E. Pipe Zone Material

1. Shall consist of imported hard, durable well-graded sand free of organic matter, lumps or balls of clay and other deleterious matter, and meeting the following gradation.

Sieve Size	Percentage Passing
3/8-inch	100
No. 4	70 - 100
No. 8	35 - 90
No. 16	20 - 60
No. 30	8 - 65
No. 50	2 - 30
No. 100	0 - 5
No. 200	0 - 2

F. General Fill and Pavement Subbase:

1. Crushed aggregate base material with a minimum Sand Equivalent of 22 and meeting one of the following gradations.

Percent Passing		
Sieve Size	1-1/2-inch Max. Gradation	3/4-inch Max. Gradation
2-inch	100	-

1-1/2-inch	90 - 100	-
1-inch	-	100
3/4-inch	50 - 85	90 - 100
No. 4	25 - 45	35 - 55
No. 30	10 - 25	10 - 30
No. 200	2 - 9	2 - 9

2. Granular Fill Under Building Floor Slabs

- a. Clean, granular material free from organics and vegetation and classified as GW, GP, SW, SM or SP as designated by the Unified Soil Classification System (ASTM D 2487) and particles no larger than 3 inches in diameter or uncrushed gravel complying with ASTM C33 gradation No. 67, 3/4 inch to No. 4.

2.2 GEOTEXTILE FILTER FABRIC

- A. Nonwoven type.
- B. Pervious sheet of polyester, polypropylene, or polyethylene fabricated into stable network of fibers that retain their relative position with respect to each other. Nonwoven geotextile shall be composed of continuous or discontinuous (staple) fibers held together through needle-punching, spun-bonding, thermal-bonding, or resin-bonding.
- C. Edges: selvaged or otherwise finished to prevent outer material from pulling away from geotextile.
- D. Apparent opening size: 70-120 U.S. Standard Sieve Size (ASTM D4751).
- E. Flow Rate: 40 gal/min/sf, minimum (ASTM D4491)
- F. Grab Strength: 160 lbs, minimum in either direction (ASTM D4632)
- G. CBR Puncture Strength: 310 psi minimum (ASTM D6241)
- H. Approved Products, or approved equal:
 1. Typar 2501
 2. Skaps GT-160

PART 3 - EXECUTION

3.1 GENERAL

- A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.

- B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- C. During filling and backfilling, keep level of fill and backfill around each structure and buried utility or tank even.
- D. Do not place fill or backfill if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.
- E. Tolerances:
 - 1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
 - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

3.2 PROTECTION

- A. Protect existing surface and subsurface features on-site and adjacent to site as follows:
 - 1. Protect and maintain benchmarks, monuments, or other established reference points and property corners.
 - a. If disturbed or destroyed, replace at Contractor's expense to full satisfaction of Owner and controlling agency.
 - 2. Avoid surcharge or excavation procedures which can result in heaving, caving or slides
- B. Dispose of waste materials, legally, off site. Burning as a means of waste disposal is not permitted.

3.3 PLACEMENT

- A. Construct structures and fills at locations to lines and grades indicated on the Drawings.
- B. Place loose fill material in successive layers that do not exceed 12 inches in depth after compaction.
- C. Bring each layer to a moisture content between optimum moisture content and 3 percent above optimum moisture content before compacting.
- D. Defective compact fills shall be removed and recompacted.

3.4 COMPACTION

- A. Provide specified compaction for backfills, cuts, embankments, fills, roadway fills and other earthwork.
- B. Perform confirmation tests to verify and confirm that work has complied, and is complying at all times, with compaction requirements specified in this Section for initial compaction demonstration and field quality control testing.
- C. In-place density of compacted backfills, cuts, embankments, fills, and roadway fills determined in accordance with ASTM D 1556, or with ASTM D 6938.
- D. Maximum density obtained in laboratory when tested in accordance with ASTM D 1557, Modified Proctor Test.
- E. Compact to percentage of maximum density as follows:
 - 1. Backfill adjacent to structures: Backfill adjacent to structures: 95 percent of ASTM D 1557, Modified Proctor Test.
 - 2. Pavement Subgrade: 95 percent of ASTM D 1557, Modified Proctor Test.
 - 3. Upper 6 inches of cuts: 95 percent of ASTM D 1557, Modified Proctor Test.
 - 4. Fills: 95 percent of ASTM D 1557, Modified Proctor Test.
 - 5. Proof Compaction for Native Excavations: 95 percent of ASTM D 1557, Modified Proctor Test.

3.5 FIELD QUALITY CONTROL

- A. Confirmation tests:
 - 1. Contractor's responsibilities:
 - a. Accomplish specified compaction for backfill, fill, and other earthwork.
 - b. Where soil is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined by modified proctor in accordance with ASTM D1557.
 - c. Field density in-place tests will be performed in accordance with ASTM D 1556, ASTM D6938, or by such other means acceptable to the Engineer.
 - d. Control operations by confirmation tests to verify that compaction work complies, and is complying at all times, with requirements specified in this Section concerning compaction, control, and testing.
 - e. Cost of confirmation tests shall be paid for by the Contractor.
 - f. Qualifications of Contractor's testing laboratory: Perform confirmation testing by soils testing laboratory acceptable to the Engineer.
 - g. Copies of confirmation test reports: Submit promptly to the Engineer.
 - 2. Frequency of confirmation testing:

- a. Perform testing not less than the following:
 - 1) In-place density (ASTM D6938) every 20 cy of placement or more often as determined by Engineer if variation in gradation is occurring, or if material appears to depart from Specifications.
- b. Tests shall be completed at each structural fill or pipe bedding location, at any change in backfill material and as directed by the Engineer.

B. Compliance tests:

- 1. Periodic compliance tests will be required by the Owner or Engineer to verify that compaction is meeting requirements previously specified.
- 2. Remove overburden above level at which the Owner or Engineer required to be tested. Backfill and recompact excavation after testing is completed.
- 3. If compaction fails to meet specified requirements, perform remedial work by one of the following methods:
 - a. Remove and replace materials at proper density.
 - b. Bring density up to specified level by other means acceptable to the Engineer.

C. Retesting:

- 1. Contractor bears the costs of retesting required to confirm and verify that remedial work has brought compaction within specified requirements.
- 2. Contractor's confirmation tests during performance of remedial work: Double the normal rate specified.

3.6 ADJUSTING AND PROTECTION

- A. Repair and reestablish grades to required elevations and slopes due to any settlement or erosion that may occur from action of the elements or any other cause prior to final acceptance.
- B. Protect newly graded areas from erosion and deterioration by action of the elements.

END OF SECTION

**SECTION 317700
GEOMEMBRANE LINER**

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. High Density Polyethylene (HDPE) geomembrane liner

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. ASTM International (ASTM):

1. D1004
2. D1204
3. D1505/D792
4. D1603
5. D4437
6. D4833 FTMS 101 / Method 2065
7. D5199
8. D5596
9. D6392
10. D6693

1.3 SUBMITTALS

A. Submittals shall be in accordance with Section 013300.

B. Contractor Certifications:

1. Submit a project reference list documenting the experience of the liner contractor on a minimum of 5 projects using similar materials and methods of at least 300,000 square feet of installed HDPE geomembrane each
2. Resume of the geomembrane installation crew, including supervisor and quality control manager. Key individuals listed above must have a minimum of 3 years' experience with similar installations.

C. Liner material submittal shall include, but not be limited to the following:

1. Catalog data and drawings complete with dimensions, part numbers, materials of construction and material specifications (AISI, ASTM, SAE, etc.)
2. Submit to Owner and Engineer, one 6"x6" sample each of the proposed geomembrane liner

- D. Liner installation plan shall detail the methods to be used for installation of the complete liner envelope. Plan shall include layout drawings that indicate the panel configuration and location of seams. Each panel shall be given a numeric identifier for simplifying discussions. All information including installation temperature range, subsurface preparation, weld procedures, and testing procedures shall be provided.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Each pond to be rehabilitated shall use a single, textured HDPE liner with a nominal thickness of 60 MIL.
- B. The liner shall be manufactured to be suitable for use in the specified exposed condition. It shall conform to the requirements of this specification, and the requirements shown on the drawings. The liner shall be manufactured from virgin polymers and other compounding materials. Regrind, reworked, or trim materials shall be from the same manufacturer and the same formulation as the liners. Recycled materials shall not be allowed. The liner shall be uniform in color, thickness, and surface texture. The liner shall be resistant to fungal or bacterial attack and free of cuts, abrasions, holes, blisters, contaminants, and other imperfections. The liner shall meet the requirements specified in Geosynthetics Research Institute (GRI) Test Method GM13, and presented below:

Property	Unit	Requirement
Density	g/cc	0.940
Asperity Height	Mills	10
Yield Strength	lb/in	126
Break Strength	lb/in	90
Yield Elongation	%	12
Break Elongation	%	100
Tear Resistance	lb	42
Puncture Resistance	lb	90
Carbon Black Content	%	2.0 – 3.0
Seam Shear Strength	lb/in	120
Seam Peel Strength	lb/in	91

- C. Vents and pipe boots shall be compatible with the liners, as shown on the drawings and recommended by the liner manufacturer.
1. Gasket material shall be neoprene, closed-cell medium, 0.25-inch thick, with adhesive on one side, as shown on the drawings. Clamps shall be 0.25-inch thick by 2-inch wide stainless steel (McMaster Carr #3309T713 or similar). Bolts shall be stainless steel. Sealant shall be Sikaflex 1A Caulking, or as recommended by the manufacturer and approved by the Engineer.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Surfaces to be lined shall be smooth and free of debris, roots and angular or sharp rocks to a minimum depth of 1-ft. The subgrade shall have no sudden sharp or abrupt changes in grade. All fill shall consist of well-graded material free of organics, trash, clayballs or other harmful material and shall meet the specified material requirements.
- B. The surface shall be compacted in accordance with project specification, but in no event shall be below the minimum required to provide a firm unyielding foundation sufficient to permit the movement of vehicles and welding equipment over the surface without causing rutting or other harmful events.

3.2 CREST ANCHORAGE SYSTEM

- A. The anchor trench shall be excavated to the lines and widths shown on the design drawings prior to geomembrane placement.
- B. Corners in the anchor trench shall be slightly rounded where the membrane enters the trench to minimize sharp bends in the liner.
- C. Before backfilling the anchor trench, partially fill the reservoir to 30% of total capacity.

3.3 FIELD PANEL PLACEMENT

- A. If panels require a different position than indicated on the layout drawings, the revised location shall be noted in the field on a layout drawing. Final as-built layout drawings shall be submitted to the Owner at the completion of the project that reflect actual panel locations.
- B. Geomembrane placement shall not be done in the presence of any precipitation, excessive moisture, in an area of standing or ponded water or during high winds.
- C. Method of Deployment:
 - 1. The method and equipment used to deploy the panels must not damage the geomembrane or the supporting subgrade surface. The supporting sub-grade must be prepared and maintained in a condition to support the equipment needed for the installation.
 - 2. The rolls of liner will be deployed from a spreader bar apparatus supported by a fork lift, loader or other piece of heavy equipment that can safely lift and move the rolls. Heavy equipment will not be allowed to operate directly on geomembrane.
 - 3. No personnel working on the liner will smoke, wear shoes that can damage the geomembrane, or engage in actions which could result in damage to the geomembrane.
 - 4. Adequate temporary ballast and/or anchoring, (i.e. sandbags,) which will not damage the geomembrane, will be placed to prevent uplift of the liner by wind.
 - 5. The geomembrane will be deployed in a manner to minimize wrinkles.

6. Rubber tired and tracked ATV's and similar equipment are acceptable to operate on the geomembrane with ground pressure less than 8 psi. Tires and tracks will be checked for sharp edges, rocks or debris that may damage the liner before operating on the geomembrane. Driving paths will be as straight as possible avoiding sharp turns, sudden stops and starts.
7. Any damage to a panel of geomembrane will be repaired in accordance with this specification and to the satisfaction of the Engineer and Owner. Any area of a panel seriously damaged (torn, twisted, or crimped) will be marked, cut out, and removed from the work area with resulting seaming and/or repairs performed in accordance with this Specification.

3.4 FIELD SEAMING

- A. In general, seams shall be oriented parallel to the slope, (down hill) not across the slope. Whenever possible, horizontal seams should be located not less than five (5) feet from the toe of the slope. Each seam shall be numbered in a manner compatible with the panel layout drawing for documentation of seam testing results
- B. All personnel performing seaming operations shall be trained in the operation of the equipment being used and will qualify by successfully welding a test seam as described herein. The project foreman will provide direct supervision of all personnel seaming to verify proper welding procedures are followed.
- C. **Double Fusion Welding:** Fusion Welding consists of placing a heated wedge, mounted on a self propelled vehicular unit, between two (2) overlapped sheets such that both sheets are heated to temperatures ranging from 600 degrees F. to 950 degrees F. After being heated by the wedge, the overlapped edges pass through a set of preset pressure rollers which compress the panels together forming a continuous homogenous fusion weld. The fusion welder shall be equipped with a temperature readout device which continuously monitors the temperature of the wedge.
 1. Seam Preparation:
 - a. Overlap the panels approximately five (5) inches.
 - b. Clean the seam area prior to seaming to assure the area is clean and free of moisture, dust, dirt and debris.
 - c. No grinding is required for fusion welding. T joints with adjoining panels may be ground to facilitate air testing of the seam.
 - d. Adjust the panels so that seams are aligned with the fewest possible number of wrinkles and "fishmouths".
- D. **Extrusion Welding:** Extrusion welding consists of introducing a ribbon of molten resin along the edge of the seam overlap to the two sheets to be welded. The molten polymer causes some of the material of each sheet to be liquefied resulting in a homogeneous bond between the molten weld bead and the surfaces of the sheets. The extrusion welder is equipped with gauges giving the temperature in the apparatus and the preheat temperature at the nozzle.
 1. Seam Preparation:
 - a. Overlap the panels a minimum of four (4) inches.
 - b. Temporarily bond the panels to be welded taking care not to damage the geomembrane.

- c. Grind seam overlap prior to welding within 15 minutes of welding operation in manner that does not cause excessive damage the geomembrane.
- d. Clean the seam area prior to seaming to assure the area is clean and free of moisture, dust dirt and debris of any kind.
- e. Purge the extruder prior to beginning the seam to remove all heat-degraded Extrudate from the barrel.
- f. Keep welding rod clean and dry.

E. General Seaming Procedure:

- 1. Seaming shall extend to the outside edge of the containment area and may include panels to be placed in the anchor trench.
- 2. While welding a seam, monitor and maintain the proper overlap.
- 3. Inspect seam area to assure area is clean and free of moisture, dust, dirt and debris of any kind.
- 4. While welding a seam, monitor temperature gauges to assure proper settings are maintained and that the machine is operating properly.
- 5. Align wrinkles at the seam overlap to allow welding through a wrinkle.
- 6. Fishmouths or wrinkles at seam overlaps that cannot be welded through shall be cut along the ridge in order to achieve a flat overlap. The cut area shall be seamed. Any portion where the overlap is inadequate shall be patched with an oval or round patch extending six inches beyond the cut in all directions.
- 7. It is preferable for cross/butt (T) seams between two rows of seamed panels to be welded during the coolest time of the day to allow for contraction of the geomembrane if possible.
- 8. All "T" joints shall have the overlap from the wedge welder seam trimmed back to allow an extrusion fillet weld. Then grind two inches on either side of the seam and extrusion weld all of the area prepared by grinding.

3.5 QUALITY CONTROL

- A. Test seams shall be performed at the beginning of each seaming period and at least once every 4 hours for each seaming apparatus used that day. Test seams shall be made on fragment pieces of the liner and under the same conditions as actual seams.
 - 1. The test seams shall be at least three feet long, made by joining two pieces at least 9-inches in width.
 - 2. Sampling Procedures:
 - a. Visually inspect the seam for squeeze out, footprint, pressure and general appearance.
 - b. Two samples one inch wide shall be cut from the test seam. The samples shall then be tested in peel and shall not fail in the seam. Failure shall be a film tear bond (FTB). If a sample fails, the entire procedure shall be repeated. ASTM D6392 will be method of testing samples GRI GM19 will be used for strength and locus of break.

- c. If any of the second set of samples fails, the machine shall not be accepted and used for seaming until the problem is corrected and 2 passing tests are achieved.
- d. After completion of the test the remaining portion of the test seam shall be discarded. Documentation of the test seams will be maintained by listing machine I.D. number, operators name, temperature control setting and test results.
- e. Passing test results records shall be maintained on NWL's trial weld report form.
- f. If test samples are to act as destructive samples then the sample shall be marked, logged and saved. If samples are to be cut from the actual finished seam for Lab Testing, the test seams shall be discarded per above.

B. Air Pressure Testing

1. All field seams, over their full length shall be air pressure tested to verify the continuity and integrity of the seams in accordance with ASTM D5820.
2. Inflate the test channel to a pressure between 25 to 30 PSI, in accordance with the following schedule, close valve, and allow 2 minutes for the injected air to come into equilibrium in the channel. Observe initial pressure after approximately 2 minutes.

HDPE Material Thickness (MIL)	Initial Pressure Schedule		Maximum Pressure Difference After 5 Minutes (PSI)
	Min. Pressure (PSI)	Max. Pressure (PSI)	
40	25	30	4
50	26	30	4
60	27	30	4
80	30	30	4
100	30	30	4

3. Observe and record the air pressure five minutes after the relaxing period ends. If loss of pressure exceeds the value above or if the pressure does not stabilize, locate the faulty area and repair.
4. Upon completion of the pressure test the end of the seam opposite the pressure gauge is cut. A decrease in gauge pressure must be observed or the air channel will be considered blocked and the test will be repeated after the blockage is corrected.
5. Remove needle and seal resulting hole by extrusion welding.
6. Record test results on a non-destructive test form. All test results shall be submitted to Engineer and Owner for approval.

7. In the event of a non-complying air pressure test, check seam-end seals and retest seams. If non-compliance reoccurs, cut one inch samples from each end of the seam and additional samples at the distance specified. Perform destructive field peel test on the samples as described below.
 - a. If all samples pass destructive testing, remove the overlap left by the wedge welder and perform an air pressure/soap test or vacuum test as described below.
 - b. If a leak is detected by the air pressure/soap or vacuum test, repair by extrusion welding. Test repair by vacuum testing.
 - c. If no leak is detected by the air pressure/soap testing or vacuum testing, the seam will pass non-destructive testing.
 - d. If one or more samples fail the peel test, additional samples will be taken.
 - e. When two passing samples are located, the seam between these two locations will be considered complying. The area outside this length will be considered non-complying and the entire length extrusion welded.
 - f. Test the entire length of the repaired seam by vacuum testing..
- C. **Air Pressure/Soap Testing:** used when the seam fails the air pressure test due to slow pressure loss. The procedure is to constantly supply pressure to the seam air channel while spraying the length with a soap and water solution and visually examining the seam for bubbles.
 1. Trim excess overlap material off at edge of seam
 2. Insert needle gauge assembly in opposite ends of the seam to be tested to show that pressure is continuous throughout the channel.
 3. Maintain 30 psi
 4. Apply soap solution to the weld edge and visually examine for bubbles.
 5. If no bubbles appear the problem is with the inside track "secondary weld". This seam is acceptable providing it has passed peel tests.
 6. If any bubbles appear on the outside track "Primary weld", repair defect by extrusion welding and vacuum test the repair.
- D. **Vacuum Testing:** used when the geometry of the weld makes air pressure testing impossible or impractical or when attempting to locate the precise location of a defect believed to exist after air pressure testing. Method of testing is based on ASTM D5641 Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
 1. Equipment:
 - a. Vacuum box consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly and a vacuum gauge.
 - b. Electric vacuum motor attached to the housing, a vacuum pump assembly, or a compressor with a venturi equipped with a pressure controller and pipe connections.
 - c. A rubber pressure/vacuum hose with fittings and connections if required.
 - d. A soap solution with a means to apply the solution.

2. Trim excess overlap from seam.
3. Apply soap solution to the area to be tested.
4. Place the vacuum box over the area and apply sufficient downward pressure to seal the box against the liner.
5. Turn on the vacuum motor attached to the housing, or open the vacuum valve. Apply 3-5 in. Hg vacuum to the area as indicated by the gauge on the box.
6. Ensure that a leak-tight seal is created.
7. For a period of not less than five seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.
8. If no bubbles appear after five to ten seconds, stop the vacuum and move overlap and repeat the process.

E. **Destructive Peel Testing:** The purpose of destructive testing is to determine and evaluate seam strength. These tests require direct sampling and thus subsequent patching. Therefore, destructive testing should be held to a minimum to reduce the amount of repairs required.

1. Destructive test samples shall be marked and cut out randomly at a minimum average frequency of one test location every 750 feet of seam length.
2. Additional test may be taken in areas of contamination, offset welds, visible crystallinity or other potential cause of faulty welds.
3. ASTM D6392 will be method of testing samples GRI GM19 will be used for strength and locus of break standards.
4. The sample should be twelve inches wide with a seam fourteen inches long centered lengthwise in the sample. The sample may be increased in size to accommodate independent lab testing by the Owner or Engineer as specified onsite.
5. 10 one inch sample shall be cut from each test seam sample for field testing on a calibrated field tensiometer. 5 peel and 5 shear tests will be performed and recorded.

F. **Defects and Repairs.**

1. Any portion of the geomembrane showing a flaw, or failing destructive or non-destructive test shall be repaired. Several methods exist for repairs, and the decision as to the appropriate method shall be recommended by the Contractor and approved by the Engineer prior to repair. Methods available for repair:
 - a. Patching - used to repair large holes, tears and destructive sample locations. All patches shall extend at least six inches beyond the defect and all corners of patches shall be rounded.
 - b. Grinding and welding - used to repair sections of extruded seams.
 - c. Spot welding or seaming - used to repair small tears, pinholes or other minor localized flaws.
 - d. Capping - used to repair lengths of failed extruded areas.
 - e. Removal of a bad seam and replacement with a strip of new material seamed into place.

2. Every repair shall be non-destructively tested using the methods set out in this Specification. Repairs which pass the non-destructive test shall be deemed adequate. Large repairs may require a destructive test. Repair test results shall be logged on a repair report form. The repair location shall be recorded on a record drawing.

END OF SECTION

SECTION 400507
PIPE SUPPORTS - GENERAL

PART 1 - GENERAL

1.1 THE REQUIREMENT

- A. Provide pipe supports, hangers, guides and anchors, complete and in place, as indicated in the Drawings.

1.2 SUMMARY

- A. This Section includes the pipe supports for the civil and mechanical system valves and piping:

1.3 SUBMITTALS

- A. Furnish submittals in accordance with the requirements of Section 013300 - Submittal Procedures.
- B. Submit shop drawings of the pipe supports that include the following information:
 - 1. Drawings of pipe supports, including locations dimensions, materials of construction, and methods of fabrication or product number if applicable.

1.4 REFERENCE STANDARDS

- A. American Welding Society:
 - 1. AWS D1.1 - "Structural Welding Code--Steel."
 - 2. AWS D1.3 - "Structural Welding Code--Sheet Steel."
 - 3. AWS D1.4 - "Structural Welding Code--Reinforcing Steel."
- B. American Society of Mechanical Engineers:
 - 1. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Piping systems and pipe connections to equipment shall be properly anchored and supported in order to prevent undue deflection, vibration and dislocation due to seismic events, line pressures, pipe weight, fluid weight, liquid movement, thermal changes, vibration, probable forces applied during construction and stresses on piping, equipment and structures.
- B. Supports for plumbing piping shall be in accordance with the latest edition of the applicable plumbing code or local administration requirements.
- C. Structural members
 - 1. Wherever possible, pipes shall be supported from structural members.
 - 2. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided by the Contractor in accordance with the requirements of the Building Code and the American Institute of Steel Construction as acceptable to the Engineer.
- D. Pipe hangers
 - 1. Pipe hangers shall be capable of supporting the pipe in operation, allowing free expansion and contraction of the piping and preventing excessive stress on equipment.
 - 2. Hangers shall have a means of vertical adjustment after erection.
 - 3. Hangers shall be designed to prevent becoming disengaged by any movement of the supported pipe.
 - 4. Hangers subject to shock, seismic disturbances or thrust imposed by the actuation of safety valves shall include hydraulic shock suppressors.
- E. Hangers subject to horizontal movement
 - 1. At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit such movement.
 - 2. Where horizontal pipe movement is greater than 1/2 in., or where the hanger rod deflection from the vertical is greater than 4 degrees from the cold-to-hot position of the pipe, the hanger rod and structural attachment shall be offset in such a manner that the rod is vertical in the hot position.
- F. Riser Supports
 - 1. Where practical, risers shall be supported on each floor with riser clamps and lugs, independent of the connected horizontal piping.
- G. Freestanding Pipe

1. Freestanding pipe connections to equipment such as chemical feeders and pumps shall be firmly attached to steel frames fabricated from angles, channels, or WF members anchored to the structure.
2. Exterior, freestanding overhead piping shall be supported on fabricated pipe stands consisting of pipe columns anchored to concrete footings, or with horizontal, welded steel angles and U-bolts or clamps securing the pipes.

H. Materials of Construction

1. Pipe support assemblies, including framing, hardware and anchors, shall be of steel construction, galvanized after fabrication, or fiberglass unless otherwise indicated.
2. Submerged supports, as well as piping, conduits and equipment in hydraulic structures within 24 inches of the water level, shall be supported with support assemblies, including framing, hardware and anchors constructed of Type 316 stainless steel unless otherwise indicated.

I. Point Loads

1. Meters, valves, heavy equipment and other point loads on PVC, FRP or other plastic pipes shall be supported on both sides, according to manufacturer's recommendations in order to avoid undue pipe stresses and failures.
2. In order to avoid point loads, the supports on PVC, FRP or other plastic piping shall be equipped with extra wide pipe saddles, bracket, clip or hanger.

J. Noise Reduction

1. In order to reduce the transmission of noise in piping systems, copper tubes in buildings and structures shall be wrapped with a 2-in. wide strip of rubber fabric or similar suitable material at each pipe support, bracket, clip or hanger.

2.2 SUPPORT SPACING

- A. Supports for piping with the longitudinal axis in approximately a horizontal position shall be spaced to prevent excessive sag, bending and shear stresses in the piping with special consideration given where components such as flanges and valves impose concentrated loads.
- B. Pipe support spacing shall not exceed the maximum indicated spans.
- C. For temperatures other than ambient temperature or those listed, and for other piping materials or wall thicknesses, the pipe support spacings shall be modified in accordance with the pipe manufacturer's recommendations.
- D. Vertical supports shall be provided to prevent the pipe from being overstressed from the combination of loading effects.

2.3 MANUFACTURED SUPPORTS

A. Stock Parts

1. Where not specifically indicated, designs that are generally accepted as exemplifying good engineering practice and using stock or production parts shall be used whenever possible.
2. Such parts shall be locally available, new, of best commercial quality and designed and rated for the intended purpose.

B. Manufacturers, or equal:

1. Grinnell Corp. (Anvil International)
2. Tolco Incorporated
3. Bergen-Paterson Pipe Support Corp.

2.4 COATINGS

A. Galvanizing

1. Unless otherwise indicated, fabricated pipe supports other than stainless steel or non-ferrous supports shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A123.

B. Other Coatings

1. Other than stainless steel or non-ferrous supports, supports shall receive protective coatings in accordance with the requirements of Section 09910.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Pipe supports, hangers, brackets, anchors, guides and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions.

B. Appearance

1. Pipe supports and hangers shall be positioned in order to produce an orderly, neat piping system.
2. Hanger rods shall be vertical, without offsets
3. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings and roofs as possible, and without interference with other work.

3.2 FABRICATION

A. Quality Control

1. Pipe hangers and supports shall be fabricated and installed by experienced welders and fitters, using the best welding procedures available.

END OF SECTION

SECTION 400510**GENERAL PIPING PROVISIONS****PART 1 - GENERAL****1.1 THE REQUIREMENT**

- A. Provide the piping system indicated, complete and operable in accordance with the Contract Documents.
- B. The provisions of the Section shall apply to all piping sections in Division 40.
- C. The mechanical and civil drawings define the general layout, configuration, routing, method of support, pipe size and pipe type.
- D. The mechanical and civil drawings are not pipe construction or fabrication drawings.
- E. Where pipe supports and spacings are indicated on the Drawings and are referenced to a Standard Detail, the Contractor shall use that Detail.
- F. Where pipe supports are not indicated on the Drawings, it is the Contractor's responsibility to develop the details necessary to design and construct mechanical piping systems to accommodate the specific equipment provided and to provide spacers, adapters, supports, and connectors for a complete and functional system.
- G. Coordinate flange bolting patterns between connecting piping, valves and equipment as necessary.

1.2 SUBMITTALS

- A. Furnish submittals in accordance with Section 013300 - Submittal Procedures.
- B. Shop Drawings shall contain the following information at a minimum:
 - 1. Layout drawings including necessary dimensions, details, pipe joints, fittings, specials, bolts and nuts, gaskets, valves, appurtenances, anchors, guides, and materials of construction. Fabrication drawings shall include spacers, adapters, connectors, fitting and pipe supports to accommodate the equipment and valves in a complete and functional system.
 - 2. Submit gasket manufacturer's catalog indicating that the recommended product is suitable for each fluid service application.
 - 3. Manufacturer's catalog sheet showing materials and installation procedures for all sleeve couplings, dismantling joints, and other mechanical couplings for pipes.
- C. Necessary certifications, test reports and affidavits of compliance shall be obtained by the Contractor.

- D. A certification from the pipe fabricator that each pipe will be manufactured subject to the fabricator's or a recognized Quality Control Program. An outline of the program shall be submitted to the Engineer for review prior to the manufacture of any pipe.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protect pipe coating during handling using methods recommended by manufacturer. Use of bare cables, chains, hooks, metal bars or narrow skids in contact with coated pipe is not permitted.
- B. Piping materials, fittings, valves and accessories shall be delivered in a clean and undamaged condition and stored off the ground for protection against oxidation caused by ground contact. Materials subject to damage from exposure to the sun shall be covered.
- C. Prevent damage to pipe during transit. Repair abrasions, scars, and blemishes. If repair of satisfactory quality cannot be achieved, replace damaged material immediately.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pipe Supports
 - 1. Pipes shall be adequately supported, restrained and anchored in accordance with Section 400507 - Pipe Supports - General and as indicated on the Drawings.
- B. Pipe Lining and Coating
 - 1. Pipes shall be lined and coated in accordance with Section 099600 - Protective Coatings.
- C. Pressure Rating
 - 1. Piping systems shall be constructed for a maximum test pressure of 150 psi unless otherwise noted.
- D. Inspection
 - 1. Pipes shall be subject to inspection at the place of manufacture.
 - 2. During the manufacture, the Engineer and Owner shall be given access to areas where manufacturing is in progress and shall be permitted to make inspections necessary to confirm compliance with requirements.
- E. Tests
 - 1. Except where otherwise indicated, materials used in the manufacture of the pipe shall be tested in accordance with the applicable specifications and standards.
 - 2. Welds shall be tested as indicated.

3. The Contractor shall be responsible for performing all material tests.

F. Welder Qualifications

1. Welding shall be performed by skilled welders and welding operators who have adequate experience in the methods and materials to be used.
2. Welders shall be qualified under the provisions of AWS D1.1.
3. Machines and electrodes similar to those used in the work shall be used in qualification tests.
4. Qualification testing of welders and materials used during the testing is part of the work.

2.2 PIPE FLANGES

A. General

1. Flanges shall be provided with flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise indicated.
2. Attachment of the flanges to the pipe shall conform to the applicable requirements of AWWA C207 and the Drawings.
3. Flange faces shall be perpendicular to the axis of the adjoining pipe.
4. Flanges for miscellaneous small diameter pipes shall be in accordance with the standards indicated for these pipes.

B. Flange Type

1. Flanges shall be 150 lb. class conforming to AWWA Class D.
2. Do not expose flanges to test pressures to greater than 125 percent of rated capacity.
3. For higher test pressures, the next higher rated AWWA flange should be selected.

C. Blind Flanges

1. Provide blind flanges in accordance with AWWA C207 or as indicated for miscellaneous small pipes.

D. Flange Coating

1. Machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

E. Flange Bolts

1. Exposed (above-ground) flange bolts shall be ASTM A307, Grade A, zinc plated.
2. Below-ground and submerged flange bolts shall be stainless steel, Type 304, 314 or 316.
3. Washers shall be the same material and alloy as found in accompanying bolts and nuts.

4. Use all-thread studs on valve flange connections where space restrictions preclude the use of regular bolts.

F. Flange Gaskets

1. Gaskets for flanged joints used in general water service shall be full-faced type, non-asbestos type with material and thickness in accordance with AWWA C207, suitable for temperatures to 300 degrees F, a pH of 1 to 11, and pressures up to 150 psi.
2. Blind flanges shall be provided with gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange.
3. Ring gaskets will not be accepted unless otherwise indicated.
4. Manufacturers, or equal
 - a. John Crane, Style 2160.
 - b. Garlock, Style 3000.
5. Gaskets for flanged joints used in water with chloramines shall be Glyon, style 3500 as manufactured by Garlock or equal.
6. Gaskets for flanged joints used in chemicals, air, solvents, hydrocarbons, steam, chlorine and other fluid service shall be made of materials compatible with the service, pressure and temperature.

G. Insulating Flange Sets

1. Provide insulating flange sets where indicated.
2. Each insulating flange set shall consist of an insulating gasket, insulating sleeves and washers, and a steel washer.
3. Insulating flanges shall be provided with bolt holes 1/4-inch diameter greater than the bolt diameter.
4. Steel washers shall be in conformance with ASTM A325, 120/105 ksi tensile strength.
5. Insulating gaskets shall be full-face.
6. Insulating sleeves and washers shall be one piece when flange bolt diameter is 1-1/2 inch or smaller and shall be made of acetal resin.
7. For bolt diameters larger than 1-1/2 inch, insulating sleeves and washers shall be 2-piece and shall be made of polyethylene or phenolic material.
8. Manufacturers, or equal:
 - a. JM Red Devil, Type E.
 - b. Maloney Pipeline Products Co.
 - c. PSI Products, Inc.

2.3 MECHANICAL-TYPE COUPLINGS (GROOVED OR BANDED PIPE)

- A. Provide cast mechanical-type couplings where indicated, conforming to the requirements of AWWA C606.

- B. Gaskets for mechanical couplings shall be compatible with the piping service, temperatures and pH, and fluid used in accordance with the coupling manufacturer's recommendations.
- C. The wall thickness of grooved piping shall conform to the coupling manufacturer's recommendations to suit the highest expected pressure.
- D. In order to avoid excessive load on equipment caused by pipe movement due to steady state or transient pressure conditions, equipment connections with mechanical-type couplings shall be provided with rigid grooved couplings or flexible type couplings with harness in sizes where rigid type couplings are not available, unless thrust restraint is provided by other means.
- E. The contractor shall have the coupling manufacturer's service representative verify the correct choice and application of couplings and gaskets, and the workmanship, to assure the correct installation.
- F. Grooving tools shall be from the same manufacturer as the grooved components.
- G. Testing: Shop proof test in accordance with AWWA C606. Couplings shall be leak proof.
- H. Manufacturers, or equal:
 - 1. Victaulic Style 41 or 44 (banded, flexible)
 - 2. Victaulic Style 77 (grooved, flexible or rigid)
 - 3. Victaulic Style 07 or HP-70 (grooved, rigid)

2.4 SLEEVE COUPLINGS

- A. Provide self-contained sleeve couplings where indicated, conforming to AWWA C219. Sleeve couplings shall be furnished as a complete assembly consisting of a center ring, gaskets, and fasteners.
- B. Rating: Class 150
- C. Fasteners: Type 316 stainless steel
- D. Paint: Manufacturers fusion bonded epoxy
- E. Testing: Shop proof test in accordance with AWWA C219. Sleeve couplings shall be leak proof.
- F. Manufacturers, or equal:
 - 1. Smith-Blair, Style 411
 - 2. Romac Style 400 for pipe greater than 12-in. diameter
 - 3. Romac Style 511 for pipe under 12-in. diameter

2.5 DISMANTLING JOINTS

- A. Provide self-contained flanged restrained dismantling joints conforming to AWWA C219. Dismantling joints shall be furnished as a complete assembly consisting of spigot piece, flange adaptor, tie bars and gasket. Flanges shall conform to AWWA C207.
- B. Rating: Class 150
- C. Materials of Construction:
 - 1. Spigot: Carbon steel per ASTM A283, Grade C
 - 2. Flange Adaptor: Ductile iron as per ASTM A536, Grade 65-45-12 or carbon steel per ASTM A283, Grade C
 - 3. Tie bars and miscellaneous hardware: Type 304 stainless steel unless otherwise approved by Owner
- D. Paint: Manufacturer's standard epoxy paint system
- E. Testing: Shop proof test in accordance with AWWA C219. Dismantling joint shall be leak proof.
- F. Manufacturers, or equal:
 - 1. Viking Johnson
 - 2. Romac

PART 3 - EXECUTION

3.1 GENERAL

- A. Install piping, fitting and appurtenances in accordance with the manufacturer's recommendations, the Drawings and the applicable Sections of Division 15.
- B. Flange Bolts:
 - 1. All bolts shall be tightened in a progressively diametrically opposite sequence and torqued with a suitable, approved and calibrated torque wrench. Torque values shall be as recommended by the pipe manufacturer. All clamping torque shall be applied to the nuts only.
 - a. All torqueing shall proceed in a progressive sequence of: 1) hand tight, 2) 30% of required torque, 3) 60% of required torque, and 4) 100% of required torque.
 - b. Bolts and nuts shall be installed with washers to protect all faying surfaces of flanges.
- C. Harness, Thrust Restraint, and Tie Rod Bolts:

1. Harness, thrust restraint, and tie rod bolts used for sleeve couplings, flange coupling adaptors or dismantling joints shall be tightened gradually and equally at diametrically opposed sides until snug in order to prevent misalignment and to ensure that all studs carry equal loads.
 2. In order to prevent induced stress or misalignment, do not over-torque connections to adjoining pumps or equipment.
- D. Groove ends shall be clean and free from indentations, projections and roll marks in the area from the pipe end to the groove.
- E. After installation, joints shall meet the indicated leakage rate.

3.2 EXTERIOR BURIED PIPING INSTALLATION

- A. Unless otherwise shown on the Drawings, provide a minimum of 3 foot and maximum of 8 foot earth cover over exterior buried piping systems and appurtenances conveying water, fluids, or solutions subject to freezing.
- B. All piping underneath the Hatchery Building or other structures shall be encased in concrete.
- C. Enter and exit through structure walls, floors, and ceilings by using penetrations, seals and mechanical joints as shown on Drawings.
- D. Install expansion devices as necessary to allow expansion and contraction movement.
- E. Laying Pipe in Trench:
1. Excavate and backfill trench in accordance with Division 31.
 2. Clean each pipe length thoroughly and inspect for compliance to Specifications.
 3. Grade trench bottom and excavate for pipe bell and lay pipe on trench bottom.
 4. Install gasket or joint material according to manufacturer's directions after joints have been thoroughly cleaned and examined.
 5. Lay pipe in only suitable weather with good trench conditions. Never lay pipe in water except where approved by Engineer.
 6. Seal open end of line with watertight plug if pipe laying stopped.
 - a. Remove water in trench before removal of plug.
- F. Anchorage and Blocking:
1. Provide thrust blocking, anchors, joint harnesses, or other acceptable means for preventing movement of piping caused by forces in or on buried piping tees, wye branches, plugs, or bends.
 2. Place concrete blocking so that it extends from fitting into solid undisturbed earth wall. Concrete blocks shall not cover pipe joints.
 3. Provide bearing area of concrete in accordance with the Drawings.
- G. Install insulating components where dissimilar metals are joined together.

3.3 INTERIOR AND EXPOSED EXTERIOR PIPING INSTALLATION

- A. Install piping in vertical and horizontal alignment as shown on Drawings.
- B. Alignment of piping smaller than 4 inches may not be shown. However, install according to Drawing intent and with clearance and allowance for:
 - 1. Expansion and contraction.
 - 2. Operation and access to equipment, doors, windows, hoists, moving equipment.
 - 3. Headroom and walking space for working areas and aisles.
 - 4. System drainage and air removal.
- C. Enter and exit through structure walls, floors, and ceilings by using penetrations, seals and mechanical joints as shown on Drawings.
- D. Install vertical piping runs plumb and horizontal piping runs parallel with structure walls.
- E. Pipe Support: Use methods of piping support as shown on Drawings and as required in Section 400507.
- F. Use reducing fittings throughout piping systems. Bushings will not be allowed unless specifically approved.
- G. Equipment Drainage and Miscellaneous Piping:
 - 1. Provide drip pans and piping at equipment where condensation may occur.
 - 2. Hard pipe stuffing box leakage to nearest floor drain.
 - 3. Avoid piping over electrical components such as motor control centers, panelboards, etc.
 - a. If piping must be so routed, use 16 GA, 316 stainless steel drip pan under piping and over full length of electrical equipment.
- H. Hard pipe drainage to nearest floor drain.
 - 1. Collect system condensate at drip pockets, traps and blowoff valves.
 - 2. Provide drainage for process piping at locations shown on Drawings and in accordance with the Drawing details.
 - 3. For applications defined above and for other miscellaneous piping which is not addressed by a specific piping service category in PART 1, provide 304 stainless steel piping and fittings. Size to handle application with 3/4 inch being minimum size provided.
- I. Unions:
 - 1. Install in position which will permit valve or equipment to be removed without dismantling adjacent piping.
 - 2. Mechanical-type couplings, sleeve couplings, or dismantling joints may serve as unions.

- J. Install expansion devices as necessary to allow expansion/contraction movement.
- K. Install insulating components where dissimilar metals are joined together.

3.4 CONNECTIONS WITH EXISTING PIPING

- A. Where connection between new work and existing work is made, use proper fittings to suit conditions encountered.
- B. Perform connections with existing piping at time and under conditions which will least interfere with service to hatchery operations affected by such operation.
 - 1. Notify Owner in writing a minimum of 7 days before a connection is made that may impact hatchery operations.
- C. Provide suitable equipment and facilities to dewater, drain, and dispose of liquid removed without damage to property.
- D. Where connection involves potable water systems, provide disinfection methods as required by the local jurisdiction.
- E. Once tie-in to each existing system is initiated, continue work continuously until tie-in is made, tested and approved by Owner.

3.5 FIELD QUALITY CONTROL

- A. Pipe Testing - General:
 - 1. Test piping systems as follows:
 - a. Test exposed, non-insulated piping systems upon completion of system.
 - b. Test exposed, insulated piping systems upon completion of system but prior to application of insulation.
 - c. Test concealed interior piping systems prior to concealment and, if system is insulated, prior to application of insulation.
 - d. Test buried piping (insulated and non-insulated) prior to backfilling and, if insulated, prior to application of insulation.
 - 2. Use pressures, media and pressure test durations as specified on the Piping Schedules.
 - 3. Isolate equipment which may be damaged by the specified pressure test conditions.
 - 4. Perform pressure test using calibrated pressure gages and calibrated volumetric measuring equipment to determine leakage rates.
 - a. Select each gage so that the specified test pressure falls within the upper half of the gage's range.
 - 5. Notify the Engineer 48 hours prior to each test.
 - 6. Completely assemble and test new piping systems prior to connection to existing pipe systems.

7. Acknowledge satisfactory performance of tests and inspections in writing to Owner and Engineer prior to final acceptance.
8. Contactor shall bear the cost of all testing and inspecting, locating and remedying of leaks and any necessary retesting and re-examination.

B. PRESSURE TESTING

1. Allowable leakage rates:
 - a. All exposed piping systems, all pressure piping systems and all buried, insulated piping systems which are hydrostatically pressure tested shall have zero leakage at the specified test pressure throughout the duration of the test.
2. Hydrostatic pressure testing methodology:
 - a. General:
 - 1) All joints, including welds, are to be left exposed for examination during the test.
 - 2) Provide additional temporary supports for piping systems designed for vapor or gas to support the weight of the test water.
 - 3) Provide temporary restraints for expansion joints for additional pressure load under test.
 - 4) Isolate equipment in piping system with rated pressure lower than pipe test pressure.
 - 5) Do not paint or insulate exposed piping until successful performance of pressure test.

C. GRAVITY PLANT PIPING

1. Plug downstream end of segment to be tested. Provide bracing as required.
2. Fill segment and upstream structure to normal operating level as per hydraulic profile.
3. Allow 24 hours for absorption losses. Refill to original level.
4. Record reservoir water volume at beginning and end of test.

3.6 CLEANING, DISINFECTION AND PURGING

A. Cleaning:

1. Clean interior of piping systems thoroughly before installing.
2. Maintain pipe in clean condition during installation.
3. Before jointing piping, thoroughly clean and wipe joint contact surfaces and then properly dress and make joint.
4. Immediately prior to pressure testing, clean and remove grease, metal cuttings, dirt, or other foreign materials which may have entered the system.
5. At completion of work and prior to Final Acceptance, thoroughly clean work installed under these Specifications. Clean equipment, fixtures, pipe, valves, and fittings of grease, metal cuttings, and sludge which may have accumulated by operation of system, from testing, or from other causes. Repair any stoppage or discoloration or other damage to parts of building, its finish, or furnishings, due to failure to properly clean piping system, without cost to Owner.

B. Disinfection of Potable Water Systems:

1. After favorable performance of pressure test and prior to Final Acceptance, thoroughly flush entire potable water piping system including supply, source and any appurtenant devices and perform disinfection as prescribed.
2. Perform work, including preventative measures during construction, in full compliance with AWWA C651.
3. Perform disinfection using sodium hypochlorite complying with AWWA B300.
4. Flush each segment of system to provide flushing velocity of not less than 2.5 feet per second.
5. Drain flushing water to sanitary sewer. Do not drain flushing water to receiving stream.
6. Use continuous feed method of application. Tag system during disinfection procedure to prevent use.
7. After required contact period, flush system to remove traces of heavily chlorinated water.
8. After final flushing and before placing water in service, obtain an independent laboratory approved by the Owner to collect samples and test for bacteriological quality. Repeat entire disinfection procedures until satisfactory results are obtained.
9. Secure and deliver to Owner, satisfactory bacteriological reports on samples taken from system. Ensure sampling and testing procedures are in full compliance to AWWA C651, local water purveyor and applicable requirements of State of Idaho.

3.7 LOCATION OF BURIED OBSTACLES

- A. Furnish exact location and description of buried utilities encountered and thrust block placement.
- B. Reference items to reference point locations such as found property corners, entrances to buildings, existing structure lines, fire hydrants and related fixed structures.
- C. Include such information as location, elevation, coverage, supports and additional pertinent information.
- D. Incorporate information on the As-Built Drawings.

END OF SECTION

SECTION 400515
PIPE AND FITTING MATERIALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Requirements for pipe and fitting materials, including:
 - 1. Cast Iron Soil Pipe
 - 2. PVC Pressure Pipe
 - 3. Plastic Pressure Pipe
 - 4. HDPE Pipe
- B. See the Piping Schedule on the drawings for additional piping system specifications.

1.2 REFERENCE STANDARDS

- A. American National Standard Institute (ANSI)
- B. ASTM International (ASTM)
- C. American Water Works Association (AWWA)

1.3 DELIVERY, STORAGE AND HANDLING

- A. Protect piping materials from sunlight, scoring and distortion.
- B. Do not allow surface temperatures on pipe and fittings to exceed 100 degrees Fahrenheit.
- C. Store and handle pipe and fittings as recommended by manufacturer in published instructions.

1.4 SUBMITTALS

- A. Submittals shall be in accordance with Section 013300 - Submittal Procedures.
- B. Shop drawings for each pipe assembly shall include, but not be limited to the following:
 - 1. Layout drawings including necessary dimensions, details, pipe joints, fittings, specials, bolts and nuts, gaskets, valves, appurtenances, anchors, guides, pipe wall thicknesses, and materials of construction. Fabrication drawings shall include spacers, adapters, connectors, fitting and pipe supports to accommodate the equipment and valves in a complete and functional system.

2. Details of shop and field welds, locations and details for connection to infrastructure, location of length adjustments, temporary supports, and pulled joint details for alignment conformance.
 3. Manufacturer's catalog sheet showing materials and installation procedures for all sleeve couplings, dismantling joints, and other mechanical couplings for pipes.
- C. Material data sheets for all pipe types to include material specifications, pipe wall thickness, inside and outside diameter and joint types.
- D. Pipe lining and coating information.
1. Technical data sheets itemizing chemical composition, technical and performance information that indicates compliance with the Specifications and Drawings.
 2. Color Chart, if applicable.
 3. Manufacturer's name, product number or name, thickness, surface prep and application instructions.
- E. Necessary certifications, test reports and affidavits of compliance shall be obtained by the Contractor.
1. Weld testing
 2. Coating thickness testing
 3. Flange bolt torque logs
 4. Field Testing Plan. Submit at least 15 days prior to testing and include
 5. Field Testing Plan: Submit at least 15 days prior to testing and include at least the following information:
 6. Testing dates.
 7. Piping system and sections to be tested.
 8. Method of isolation.
 9. Method of conveying water from source to system being tested.
 10. Handling of test water after test completion.
 11. Calculation of maximum allowable leakage for piping sections to be tested.

PART 2 - PRODUCTS

2.1 CAST IRON SOIL PIPE

- A. Cast Iron Soil Pipe shall conform to ASTM A74 and CISPI 301 with no hub joints and fittings and gaskets conforming to ASTM C564.

2.2 PVC PRESSURE PIPING, SCHEDULE TYPE

- A. Provide piping with Schedule 80 fittings and appurtenances meeting the requirements of ASTM D1785 at the locations shown on the Drawings and indicated on the Piping Schedule.
- B. Manufacture pipe, fittings and valves from materials that have been tested and approved for conveying potable water by the National Sanitation Foundation (NSF).

- C. Fittings shall be solvent welded socket or flanged as shown on the Drawings and meet ASTM D2564 AND D1785 with the same pressure and temperature rating as the pipe.
- D. Coat all PVC exposed to sunlight per Section 099600.

2.3 PLASTIC PRESSURE PIPING

- A. Install AWWA C900 PVC with a minimum pressure class of 100 psi at the locations shown on the Drawings and as indicated on the Piping Schedule.

2.4 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. General:
 - 1. Pipe and fittings: High-density polyethylene.
 - 2. Dimensions of pipe and fittings: Based on controlled outside diameter in accordance with ASTM F714.
 - a. SDR: as given in the piping schedule; or, if not given, maximum SDR = 9.
 - 3. Pipe Diameter: DIPS dimensions, or as indicated on the Drawings and schedules.
- B. Materials:
 - 1. Manufacturers, or approved equal:
 - a. Performance Pipe
 - b. WL Plastics
 - c. ISCO Industries
 - 2. Pipe, fittings and adapters shall be furnished by the same manufacturer, or compatible with components in the same system and with components of other systems to which connected.
 - 3. Polyethylene: As listed by the PPI under the designation PE 4710; and have a minimum cell classification, in accordance with ASTM D3350, of 445574C:
 - a. Pipe and fittings: Manufactured from material with the same cell classification.
 - b. Manufacturer shall certify that pipe and fittings meet the above classifications.
 - 4. Polyethylene fittings and custom fabrications:
 - a. Molded or fabricated.
 - b. Butt fusion outlets shall be made to the same outside diameter, wall thickness, and tolerances as the mating pipe.
 - c. Pressure de-rated fabricated fittings shall not be rated for less than the test pressure indicated in the Pipe Schedule.
 - 5. Molded Fittings:
 - a. Manufactured in accordance with ASTM D3261, Butt Heat Fusion Polyethylene (PE) Plastic Fittings for PE Plastic Pipe and Tubing, and shall be so marked.
 - b. Each production lot of molded fittings shall be subjected to the tests required under ASTM D3261.
 - 6. X-ray Inspection: The manufacturer shall submit samples from each molded fittings production lot to x-ray inspection for voids, and shall certify that voids were not found.
 - 7. Fabricated Fittings:

- a. Made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock, or molded fittings.
- b. Rated for internal pressure service at least equal to the test pressure indicated in the pipe schedule.
- 8. Polyethylene Flange Adapters:
 - a. Flange adapters shall be made with sufficient through-bore length to be clamped in a butt fusion joining machine without the use of a stub-end holder.
 - b. The sealing surface of the flange adapter shall be machined with a series of small v-shaped grooves to provide gasketless sealing, or to restrain the gasket against blowout.
- 9. Flange Gaskets:
 - a. Gaskets for HDPE to HDPE flange connections are not required unless required by the flange manufacturer to satisfy the test pressure given in the pipe schedule.
 - b. Gaskets for HDPE flanges mating to ductile iron or IPS flanges are required to be PTFE for low bolt load applications:
 - c. Manufacturer: One of the following or equal:
 - 1) Garlock Style 3545, full faced.
- 10. Back-up Rings and Flange Bolts:
 - a. Flange adapters shall be fitted with Type 304 or 316 stainless steel back-up rings pressure rated equal to or greater than the mating pipe.
 - b. The back-up ring bore shall be chamfered or radiused to provide clearance to the flange adapter radius.
 - c. Flange bolts and nuts shall be the same material as backing flange unless noted otherwise.

PART 3 - EXECUTION

3.1 SOURCE QUALITY CONTROL

- A. HDPE piping:
 - 1. Manufacturer's quality control: The pipe and fitting manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials.
 - 2. Incoming polyethylene materials:
 - a. Inspected for density, melt flow rate, and contamination.
 - b. The cell classification properties of the material shall be certified by the supplier, and verified by manufacturer's quality control.
 - c. Approved by quality control before processing into finished goods.
 - 3. Outgoing materials shall be checked for:
 - a. Outside diameter, wall thickness, and eccentricity in accordance with ASTM D2122 at a frequency of at least once per hour.
 - b. Out of roundness at a frequency of at least once per hour.
 - c. Straightness, inside and outside surface finish, markings and end cuts shall be visually inspected in accordance with ASTM F714 on every length of pipe:
 - 1) Quality control shall verify production checks and test for:

- a) Density in accordance with ASTM D1505 at a frequency of at least once per extrusion lot.
 - b) Melt Index in accordance with ASTM D1238 at a frequency of at least once per extrusion lot.
 - c) Carbon content in accordance with ASTM D1603 at a frequency of at least once per day in accordance with extrusion line.
 - d) Quick burst pressure in accordance with ASTM D1599 at a frequency of at least once per day per line.
 - e) Ring Tensile Strength in accordance with ASTM D2290 at a frequency of at least once per day per line.
- d. X-ray inspection shall be used to inspect molded fittings for voids, and knit line strength shall be tested. All fabricated fittings shall be inspected for joint quality and alignment.
- 4. Permanent records: The manufacturer shall maintain permanent QC and QA records.
 - 5. Compliance tests:
 - a. Manufacturer's inspection and testing of the materials:
 - b. In case of conflict with manufacturer's certifications, the Contractor, Engineer, or Owner may request retesting by the manufacturer or have retests performed by an outside testing service.
 - c. All retesting shall be at the requestor's expense, and shall be performed in accordance with this Section.

3.2 INSTALLATION

- A. Install products in accordance with industry standards (ANSI, ASTM, AWWA, etc.) and manufacturer's instructions.
- B. Bell-and-spigot pipe shall be laid with the bells upstream of the flow. All types of piping shall be laid and fitted together so that, when complete, the pipe will have a smooth and uniform invert. Lay pipe, fittings and accessories with proper equipment and in a manner to prevent damage. Each length of pipe laid shall be thoroughly swabbed to remove all foreign material before the next length is laid. Each pipe shall be inspected for defects before being lowered into the trench. Any defective pipe materials found during inspection, prior to placing within the trench, shall be replaced at the expense of the Contractor. When pipe laying is not in progress, seal the open ends of installed pipe to prevent entrance of water into the line. Whenever water is excluded from the interior of the pipe, place enough backfill on the pipe to prevent floating in the event of dewatering failure. Remove any pipe that has floated from the trench and restore the bedding. No pipe shall be laid when the trench conditions or the weather are unsuitable for proper installation as determined by the Owner.

3.3 HDPE FUSION PROCESS

- A. General:
 - 1. Perform butt and saddle fusion of PE4710 pipe and fittings in accordance with ASTM F2620 and the manufacturer's recommended joining procedure.

2. Perform electrofusion of PE4710 pipe and fittings in accordance with ASTM F1290 and electrofusion fitting manufacturer's recommended procedure.
 3. Fuse PE4710 pipe and fittings by qualified fusion technicians, as documented by the fusion provider. Provide training records for qualified fusion technicians to Engineer upon request.
 4. Record and log pressure, time, and temperature parameters by an electronic monitoring device (data logger) affixed to the fusion machine as each fusion joint is constructed. Submit joint data as part of the As-Recorded information in accordance with this Specification.
 5. Include the following elements in butt fusion machines:
 - a. Heat plate.
 - b. Carriage.
 - c. Data logger.
 6. Include the following additional equipment for fusion processes:
 - a. Pipe Rollers: Use to support pipe on either side of butt fusion machine. Rollers provide for vertical and lateral pipe alignment straight through the butt fusion machine.
 - b. Protective Enclosure: Provide protective enclosure for full machine motion of the clamps, heat plate, fusion assembly, and carriage for fusion in inclement or windy weather. Cover or block open pipe ends that allow winds to blow through pipe.
 - c. Maintenance Manual: Keep fusion machine operations and maintenance manual with the fusion machine at all times.
 7. Joint Recording:
 - a. Record and log each fusion joint using an electronic monitoring device (data logger) connected to the fusion machine. Manually log data not logged by the data logger and include in fusion technician's joint report.
- B. Heat fusion joining:
1. Joints between plain end pipes and fittings shall be made by butt fusion, and joints between the main and saddle branch fittings shall be made utilizing saddle fusion employing only procedures that are recommended by the pipe and fitting manufacturer.
 2. External and internal beads shall be removed.
- C. Heat fusion training services:
1. The manufacturer shall provide training in the manufacturer's recommended butt fusion and saddle fusion procedures to the Contractor's installation personnel, and to the inspector(s) representing the Owner, prior to the start of construction.
 2. The Contractor shall certify, in writing, that persons making heat fusion joints have received and passed a training course on the manufacturer's recommended fusion procedures and have had at least 3 years current experience in the heat fusion butt welding process.
 3. The Contractor shall maintain records of trained personnel, and shall certify that training was not received more than 12 months before commencing construction.
- D. Mechanical joining:
1. Polyethylene pipe and fittings may be joined together or to other materials by means of flanged connections (flange adapters and back-up rings) or, where specifically indicated on the Drawings, flexible couplings designed for joining polyethylene pipe or for joining polyethylene pipe to another material.

2. Flexible couplings shall be fully pressure rated and fully thrust restrained such that when installed in accordance with manufacturer's recommendations, a longitudinal load applied to the mechanical coupling will cause the pipe to yield before the mechanical coupling disjoins.

3.4 FIELD QUALITY CONTROL

- A. Test piping systems in accordance with Section 400510 - General Piping Provisions.

END OF SECTION

SECTION 400551**VALVES AND APPURTENANCES****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Butterfly Valves
 - 2. Air Vacuum/Air Release Valves
 - 3. Pinch Valves
 - 4. Knife Gate Valves

1.2 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. American Water Works Association (AWWA):
 - 1. C500 - Metal-Seated Gate Valves for Water Supply Service.
 - 2. C504 - Rubber-Seated Butterfly Valves
- B. American National Standards Institute (ANSI):
 - 1. B16.1 - Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.

1.3 SUBMITTALS

- A. Submittals shall be in accordance with Section 013300 - Submittal Procedures.
- B. Shop Drawings for each type/size of valve shall include, but not be limited to the following:
 - 1. Catalog data and drawings complete with dimensions, part numbers, materials of construction and material specifications (AISI, ASTM, SAE, etc.).
 - 2. Drawings of actuators including dimensions and dynamic seating and unseating torque for motor actuated valves.
 - 3. Installation instructions.
 - 4. Quantity and valve numbers on each submittal.
 - 5. Include manufacturer's certification that the valve complies with the applicable AWWA provisions.
- C. Operation and Maintenance Manuals for each type/size of valve and according to Section 01340.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Valves shall be of the body, type, pressure class, end joint and actuator indicated on the Drawings.
- B. Coordinate bolt hole drilling pattern and orientation and flange face design between valves, gates, and adjacent flanges.
- C. Materials for all valves that come in contact with water used for fish rearing shall not contain bronze, brass or any other yellow metals.
- D. Valve Labeling:
 - 1. Valves shall have the name of the manufacturer and size of the valve cast or molded onto the valve body or bonnet or shown on a permanently attached nameplate as indicated in Section 400597 - Identification, Stenciling, and Tagging System.
 - 2. Direction of flow shall be cast or stamped on the valve body.
 - 3. Direction of opening for the valve manual actuator shall be indicated on the actuator mechanism.
- E. Protective Coatings:
 - 1. Coat the exterior surface of valves and the wet interior surfaces of ferrous valves of sizes 4-inch and larger in accordance with the requirements of Section 099600 - Protective Coatings.
 - 2. Do not epoxy-coat the flange face of valves.
 - 3. The valve manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturer's plant prior to shipment, in accordance with the indicated requirements.
- F. Valve Factory Testing:
 - 1. As a minimum, unless otherwise indicated or recommended by the reference standards, test valves 3 inches in diameter and smaller in accordance with the manufacturer's standard procedure.
 - 2. Factory-test valves 4 inches in diameter and larger as follows:
 - a. Hydrostatic Testing
 - 1) Subject valve bodies to an internal hydrostatic pressure equivalent to twice the water-rated pressure of the valve.
 - 2) Metallic valves rating pressure shall be at 100 degrees F.
 - 3) Plastic valves pressure rating pressures shall be at 71 degrees F, or at a higher temperature according to material type.
 - 4) During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall parts of the valve be permanently deformed.

- 5) Allow a test duration of at least 10 minutes in order to visually examine for leakage.
- b. Seat Testing
- 1) Test the valves for leaks in the closed position, with the pressure differential across the seat equal to the water rated pressure of the valve.
 - 2) Provide a test duration of at least 10 minutes in order to visually examine for leakage.
 - 3) The leakage rate shall be the more stringent of the following:
 - a) As recommended by the reference standard for that type of valve
 - b) Leakage past the closed valve not to exceed one fluid ounce per hour per inch diameter for metal seated valves and drop-tight for resilient seated valves.
- c. Performance Testing
- 1) Shop-operate the valves from the fully-closed to the fully-open position, and reverse under no-flow conditions in order to demonstrate that the valve assembly operates properly.

2.2 BUTTERFLY VALVES

- A. Butterfly valves used in ponds and in contact with saltwater shall be UV resistant PVC body and fitted with SCH 80 flanges suitable for steady-state water working pressure and steady-state differential pressure of up to 100 psi and for saltwater service having a pH range from 6 to 10 and temperature range from 30 to 80 degrees F shall conform to AWWA C504 and be as indicated.
- B. Materials of Construction:
1. Unless otherwise indicated, material of construction shall be in accordance with AWWA C504, suitable for the service.
 2. Body: PVC
 3. End Flanges: AWWA Class D, same material as valve body
 4. Valve Stem: Stainless Steel
 5. Valve Discs: PVC or Polypropylene
 6. Seats: New natural or synthetic rubber
 - a. Seats shall be positively clamped or bonded into the disc or body of the valve, but cartridge-type seats that rely on a high coefficient of friction for retention shall not be acceptable. Seat materials shall be guaranteed to last for at least 75 percent of the number of cycles in the AWWA C504 proof-of-design test without premature damage.
 7. Seals: Same as seating material
 8. Clamps and Retainer Rings: Type 316 retaining rings and cap screws

9. Valve Bearings: Self lubricating materials per AWWA C504
 10. Shaft Seals: Resilient non-metallic materials suitable for service
- C. Manual Actuators: Unless otherwise indicated, manually-actuated butterfly valves shall be equipped with a handwheel or 2-in. square actuating nut and position indicator.
1. Direction of opening and the word OPEN to be cast in handwheel.
 2. Size actuator to produce required torque with a maximum pull of 50 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.
 3. Valve actuators located more the 60 in. above the operating floor shall be equipped with a chain operator. The chain shall include a means to secure it out of the way of other equipment and walking paths.
- D. Manufacturers, or approved equal:
1. Praher
 2. Asahi

2.3 AIR RELEASE VALVES

- A. General: Conform to AWWA C512.
- B. Air Release Valve (Water):
1. Acceptable manufacturers or approved equal:
 - a. APCO
 - b. Valmatic
 - c. GA Industries
 2. Materials:
 - a. Body and cover: Cast iron or Ductile iron.
 - b. Float: Stainless steel.
 - c. Linkage and trim: Stainless steel.
 - d. Seal: Buna-N
 - e. Accessories: Tubing fittings and pilots - stainless steel.
 3. Design requirements:
 - a. Provide 3/16" orifice for valves.
 - b. Release 10 cfm at 10 psi differential at 150 psi line pressure.

2.4 PINCH VALVES

- A. Pinch valves used in ponds and in contact with saltwater shall be of the open frame, mechanical pinch type with flange joint ends on the sleeve trim, supported by backing plates secured to the frame. Valve shall be suitable for steady-state water working pressure and steady-state differential pressure of up to 100 psi and for saltwater service having a pH range from 6 to 10 and temperature range from 30 to 80 degrees F and be as indicated.
- B. Materials of Construction:
 - 1. Material of construction shall be suitable for the service.
 - 2. Body/Frame: Fabricated Carbon Steel Frame
 - 3. Sleeves: Pure Gum Rubber (PGR)
 - 4. End Flanges: AWWA Class D
- C. Manual Actuators: Unless otherwise indicated, manually-actuated pinch valves shall be equipped with a handwheel or 2-in. square actuating nut and position indicator.
 - 1. Direction of opening and the word OPEN to be cast in handwheel.
 - 2. Size actuator to produce required torque with a maximum pull of 50 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.
 - 3. Valve actuators located more the 60 in. above the operating floor shall be equipped with a chain operator. The chain shall include a means to secure it out of the way of other equipment and walking paths.
- D. Manufacturers, or approved equal: Red Valve, Series 70

2.5 KNIFE GATE VALVES

- A. Knife gate valves used in ponds and in contact with saltwater shall be bonnetless wafer body type suitable for steady-state water working pressure and steady-state differential pressure of up to 50 psi and for saltwater service having a pH range from 6 to 10 and temperature range from 30 to 80 degrees F.
- B. Wetted metal parts and stem, Type 316 stainless steel, yoke sleeve bronze, gate finish ground both sides with a sharp knife edge.
- C. Packing system leak-tight seal around the gate, valve superstructure and yoke designed for full peripheral access to gland bolts when valve is equipped with manual or power actuator.
- D. In compliance with MSS SP-81.
- E. ASME B16.1 flanged ends.
- F. Manual Actuators: Unless otherwise indicated, manually-actuated knife gate valves shall be equipped with a handwheel or 2-in. square actuating nut and position indicator.

1. Direction of opening and the word OPEN to be cast in handwheel.
 2. Size actuator to produce required torque with a maximum pull of 50 LB at the maximum pressure rating of the valve provided and withstand without damage a pull of 200 LB on handwheel or chainwheel or 300 foot-pounds torque on the operating nut.
 3. Valve actuators located more the 60 in. above the operating floor shall be equipped with a chain operator. The chain shall include a means to secure it out of the way of other equipment and walking paths.
- G. Manufacturers, or approved equal:
1. Dezurik KGV-ES
 2. Pratt, Figure 77
 3. ITT Fabri-Valve; Figure 37L

PART 3 - EXECUTION

3.1 JOINTS

- A. Flanges shall be two-holed. Bolt holes of flanged valves shall straddle the horizontal and vertical centerlines of the pipe run to which the valves are attached. Flange assembly, sequence of tightening bolts and controlling torque shall be in accordance with the Drawings. If flanges leak under pressure testing, loosen or remove the nuts and bolts, rescat, or replace the gasket, re-install bolts and nuts and retest the joints. Joints shall be watertight.
- B. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves and fittings. Joints shall be watertight.

3.2 INSTALLATION OF VALVES AND OPERATORS

- A. Unless otherwise indicated on the Drawings, install valves with their operating stems vertical.

3.3 VALVE FIELD AND LEAKAGE TESTING

- A. Clean, inspect, and operate valve to ensure all parts are operable and valve seats properly.
- B. Operate manual valves through five (5) full cycles of opening and closing. Valves and gates shall operate from full open to full close without sticking or binding. If valves or gates stick or bind, repair or replace and repeat the tests.
- C. Gear actuators shall operate gates and valves from full open to full close through five (5) cycles without binding.

- D. The pull required to operate handwheel-operated valves shall not exceed 30 pounds. The torque required to operate valves having a 2-in. AWWA nuts shall not exceed 100 ft-lbs.
- E. If actuators stick or bind or if pulling forces and torques exceed the values stated previously, repair or replace the actuator and repeat the tests. Fully lubricate operators in accordance with the manufacturer's recommendations prior to operating.
- F. Test valves and gates for leakage at the same time that the connecting piping is tested. Protect or isolate any parts of the valves, actuators, or other systems whose pressure rating is less than the pressure test.

END OF SECTION

SECTION 400597**IDENTIFICATION, STENCILING AND TAGGING SYSTEMS****PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Identification, stenciling, and tagging of piping, electrical equipment, and valves, pumps, ductwork, process equipment and similar items and including hazard and safety signs.

1.2 QUALITY ASSURANCE**A. Referenced Standards:**

1. American National Standards Institute (ANSI):
2. A13.1 - Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS**A. Shop Drawings:**

1. See Section 013300 - Submittal Procedures.
2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Identification register listing all items to be identified, type of identification system to be used, lettering, location and color.
 - c. Catalog information for all tagging systems.
 - d. Updated, complete, identification register with nonconflicting numerical assignments submitted prior to project acceptance.

PART 2 - PRODUCTS**2.1 MANUFACTURED UNITS****A. Metal Tags (Type A):**

1. Approved manufacturers:

- a. W H Brady Co., Catalog S-10, #23210 (1-1/2 inch Brass), #23211 (2 inch brass), #B-906 (2 inch aluminum).
 - b. National Band and Tag Co., Catalog 862, Style 81 or Style 93.
 - c. Carlton Industries, Inc., #8813 or #8814 (aluminum), #BT-220 or #BT-230 (brass).
 2. Material: Brass or aluminum, optional, except where specified.
 3. Size:
 - a. 1-1/2 IN DIA for one line of text, 2 inch DIA for two lines.
 - b. Brass: 12 gage.
 - c. Aluminum: 0.04 inch.
 4. Legend: Stamped and filled.
- B. Fiberglass Reinforced Plastic Tags (Type B):
1. Approved manufacturers and catalog numbers:
 - a. W H Brady Co., Catalog S-10, #B-120.
 2. Material: Fiberglass reinforced plastic.
 3. Size: Approximately 2 x 2 inch.
 4. Legend: Preprinted and permanently embedded.
- C. Laminated Plastic Tags (Type C):
1. Approved manufacturers and catalog numbers:
 - a. W H Brady Co., Catalog S-10, #B-911.
 2. Material: Polyester laminate.
 3. Size: Approximately 2 x 2 inch.
 4. Legend: Preprinted and permanently embedded.
- D. Fiberglass Reinforced Plastic Signs (Type D):
1. Approved manufacturers and catalog numbers:
 - a. W H Brady Co., Catalog S-10, #B-120.
 2. Material: Fiberglass reinforced plastic.
 3. Size:
 - a. Surface: As scheduled.
 - b. Thickness: 0.10 inch.
 4. Fabrication:
 - a. Rounded corners.
 - b. Adhesive backs.

5. Legend: Preprinted and permanently embedded.

E. Phenolic Name Plates (Type E):

1. Approved manufacturers and catalog numbers:
 - a. W H Brady Co., Catalog S-10, #B-1.
2. Materials: Phenolic.
3. Size:
 - a. Surface: As required for text.
 - b. Thickness: 1/16 inch.
4. Fabrication:
 - a. Three layers laminated.
 - b. Legend engraved through top lamination into center lamination.
 - c. Drilled holes with grommets for mounting.

F. Pressure Sensitive Vinyl Cloth Markers (Type F):

1. Approved manufacturers and catalog numbers:
 - a. W H Brady Co., Catalog S-10, #B-946.
2. Material: Self-sticking vinyl.
3. Size:
 - a. Surface: As required by text.

G. Underground Alarming Tape (Type G):

1. Approved manufacturers and catalog numbers:
 - a. W H Brady Co., Catalog S-10, #91296.
2. Material: Polyethylene.
3. Thickness: 3.5 mils.
4. Tensile strength: 1750 psi.
5. Size: 6 IN wide (minimum).
6. Legend: Preprinted and permanently imbedded.
 - a. Message continuous printed.

H. Stenciling System (Type H):

1. Material:
 - a. Exterior type stenciling enamel.
 - b. Black or white for best contrast.
 - c. Either brushing grade or pressurized spray can form and grade.

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I. Substitutions:

1. Submit requests for substitutions in accordance with Specifications.

J. Acceptable Manufacturers and Catalog Numbers:

1. Products listed above by manufacturer and catalog number are approved, subject to compliance with Contract Documents.

K. Underground Tracer Wire:

1. Approved Manufacturer
 - a. Kris Tech Wire Company & Tracer Wire
2. Material: Copper
3. Thickness: 18 GA

2.2 ACCESSORIES

A. Fasteners:

1. Bead chain: #6 brass or stainless steel (BC).
2. Plastic strap: Nylon, urethane or polypropylene (PS).
3. Screws: Self-tapping, stainless (screws).
4. Grommets: Stainless steel.
5. Anchor for brass tag: See paragraph 2.1 A.
6. Adhesive, solvent activated.

2.3 EXTRA MATERIALS

- A. Furnish minimum of 5 percent extra stock of each identification material required, including tags (not less than 3).
- B. Where stenciled markers are provided, clean and retain stencils after completion and include in extra stock, along with required stock of paints and applicators.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install tagging, stenciling, and identification items at required locations.
- B. Provide arrows and identification markers on piping and ducts.
 1. At 20-foot maximum centers along continuous lines.
 2. At changes in direction (route) or obstructions.
 3. At valves, risers, "T" joints, machinery or equipment.

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4. Where pipes and ducts pass through floor, wall, ceiling, cladding assemblies and like obstruction.
 - a. Provide markers on both sides of obstruction.
- C. Position markers on both sides of pipe or duct with arrow markers pointing in flow direction. If flow is in both directions use double headed arrow markers.
- D. Apply tapes and stenciling in uniform manner parallel to piping and ducts.
- E. Attach tags to equipment with sufficient surface or body area with solvent activated adhesive applied to back of each tag.
- F. Attach tags with 1/8-inch round or flat head screws to equipment without sufficient surface or body area, or porous surfaces. Where attachment with screws should not or cannot penetrate substrate, attach with plastic strap.
- G. Single items of equipment enclosed in a housing or compartment to be tagged on outside of housing. Several items of equipment mounted in housing to be individually tagged inside the compartment.
- H. Anchor for Brass Tag Attached to Concrete: See Detail in Contract Drawings.
- I. For electrical trenches with ductbanks or directly buried cable, install underground hazard tape 6 inches below finished grade where conduit or ductbank is 12 inches or more below finished grade, and 3 inches below finished grade where conduit or ductbank is less than 12 inches below finished grade.

3.2 SCHEDULE

- A. Identify, tag, or stencil the items shown in the following schedule as applicable:

ITEM	ID TYPE	FASTENER
1. Yard valves, buried, with valve box and concrete pad.	A, Brass only	Embedded
a. Fastener: Use tag with anchor. Embed in concrete pad.		
b. Legend: Valve designation as indicated on Contract Drawings.		
2. Valves and slide gates:		
a. Exterior.	A or B	BC or PS
b. Interior.	A or B	BC or PS
c. Legend: Item designation as indicated on Contract Drawings.		
3. Pumps, pump motors, blowers, air compressors, and other rotating equipment:	A, B or H	Screws or Adhesive

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a.	Legend: Item designation as indicated on Contract Drawings.		
4.	Instrumentation, e.g., flow control valves, primary elements, etc.:	A or B	BC or PS
a.	Legend: Item designation as indicated on Contract Documents.		
5.	Process equipment tanks and basins.	A or H	Screws
a.	Legend: Item designation indicated on Contract Documents.		
b.	Size: 7 x 10.		
c.	Letters: 1 inch high black letters on white background.		
6.	Piping:	F or H	N/A
a.	Legend: Item designation as indicated on Contract Documents.		
b.	In accordance with ANSI A13.1.		
c.	Provide flow arrows.		
d.	Frequency: 10 feet		
7.	Miscellaneous tanks, e.g., break tanks, chemical tanks, hydropneumatic tanks, air receivers, etc.:	F or H	N/A
a.	Legend: Item designation as indicated on Contract Documents.		
b.	Size: As required by legend.		
c.	Letters: 1 inch high black letters on white background.		
8.	HVAC equipment:		
a.	If possible: Alternate, with approval of Shop Drawing by Owner.	D or H	Screws
b.	Legend: Item description as indicated on Contract Drawings.		
c.	Size: As required by legend.		
d.	Letters: 1 inch high black letters on white background.		
9.	Ductwork:	F or H	N/A
a.	Legend: Item designation as indicated on Contract Drawings.		
b.	Size: As required by legend.		

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c.	Letters: 1 inch high black letters on white background.		
d.	Provide flow arrows.		
e.	Frequency: 10 feet.		
10.	Enclosures for electrical, mechanical, and I&C equipment, e.g., motor control centers, panelboards, switchboards, safety switches, control panels, PLC's, etc., that have a name and number as shown on the Contract Drawings.	D	Adhesive
a.	Legend: Name and number of enclosure as indicated on the Contract Drawings.		
b.	Size: As required by legend.		
c.	Letters: 1 inch black letters on white background.		
11.	Nameplate for elements or components within or surface mounted on enclosures for electrical, mechanical, and I&C equipment including switches, instruments, etc:	E	Adhesive
a.	Legend: Name and number of each element or component as indicated on the Contract Drawings.		
b.	Size: As required by legend.		
c.	Letters: 1/2 inch high letters for element or component names and 1/4 inch high letters for element or component number. White letters on black background.		
12.	Electrical wiring and cables carrying 600 V or less:	F	Self
a.	Legend: Wire or cable number as shown on Contract Drawings, on each end of each wire or cable.		
b.	Size: As required by legend.		
c.	Letters: Minimum 1/4 inch high yellow letters on standard background.		
13.	Electrical conduit carrying over 600 V:	F	Self
a.	Legend: Word "DANGER" followed by voltage from utility. Mark each end of conduit.		
b.	Size: As required by legend.		
c.	Letters: 1/2 inch high black letters on orange background.		
d.	Interval: 20 feet.		
14.	Electrical panelboards with 480 V or more:	F	Self
a.	Legend: 480 volts		
b.	Size: As required		
c.	Letters: Danger 480 volts		

Technical Specifications

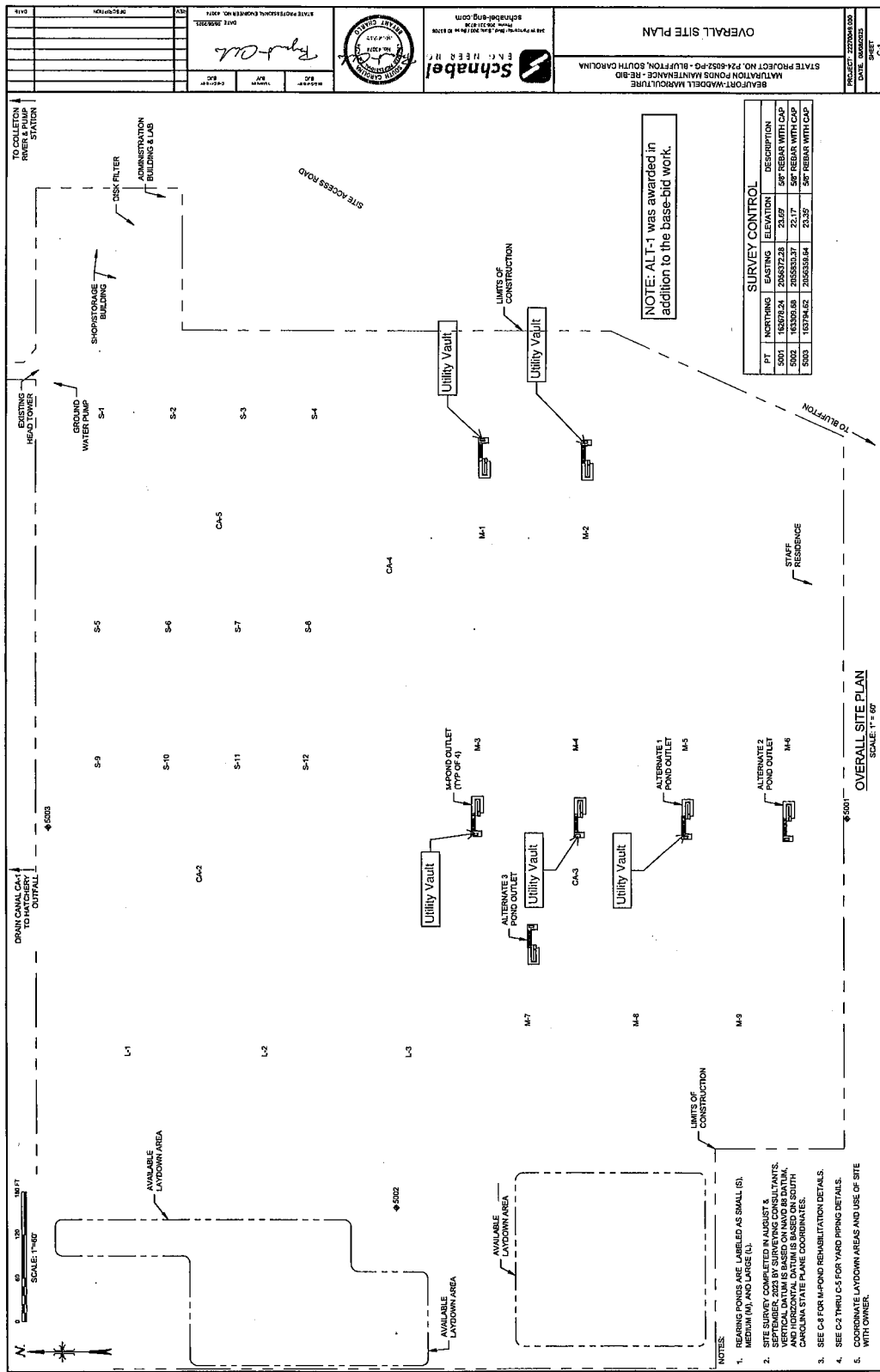
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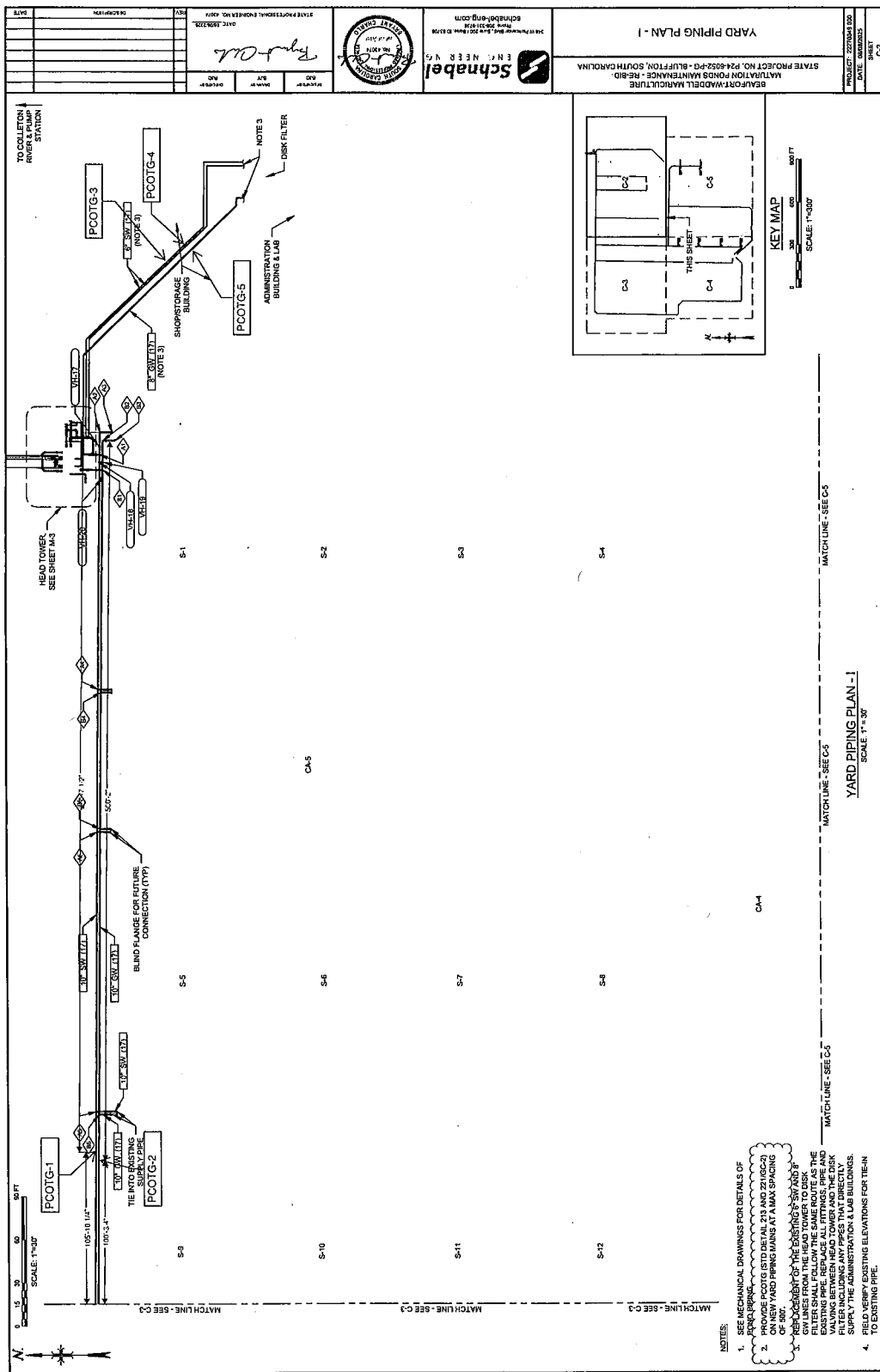
IDENTIFICATION,
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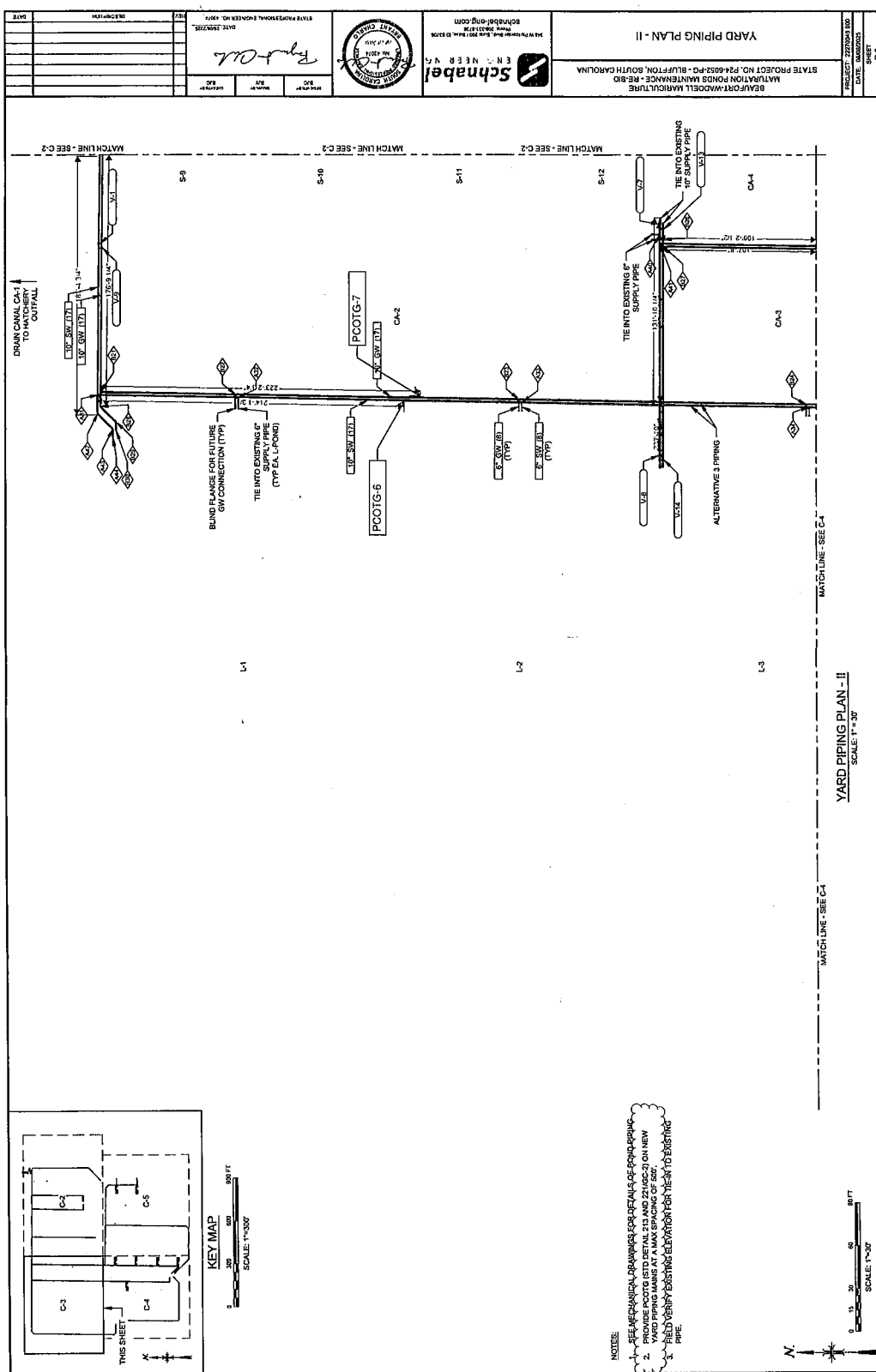
15. Electrical trenches with ductbanks or directly buried conduit:	G	N/A
a. Legend: CAUTION CAUTION CAUTION BURIED ELECTRIC LINE	(1 st line) (2 nd line)	
b. Letters: 1-1/4 inch minimum.		
c. Interval: Continuous.		
d. Color: Red with black letters.		
16. Trenches with direct buried or conduit encased telephone lines:	G	N/A
a. Legend: CAUTION CAUTION CAUTION BURIED TELEPHONE LINE	(1 st line) (2 nd line)	
17. Buried non-metallic potable water piping:	G and K	
a. Legend: CAUTION CAUTION CAUTION BURIED WATER LINE	(1 st line) (2 nd line)	
18. Buried non-metallic storm and sanitary sewer lines:	G and K	N/A
a. Legend: CAUTION CAUTION CAUTION BURIED SEWER LINE	(1 st line) (2 nd line)	
19. Buried non-metallic (non-potable) water piping, except 3 IN and smaller irrigation pipe:	G and K	N/A
a. Letters: 1-1/4 inch minimum.		
b. Interval: Continuous.		
c. Color: Green with black letters.		
20. Trenches with direct buried or conduit encased computer or SCADA system communication lines, or fiber optic lines	G	N/A
a. Legend: CAUTION CAUTION CAUTION BURIED COMPUTER LINE	(1 st line) (2 nd line)	
21. Hazard and safety signs:		Adhesive
a. To be installed where indicated in the schedule below:		
b. Type of sign:		
1) Danger signs.		
2) Caution signs.		
3) Safety instructional signs.		

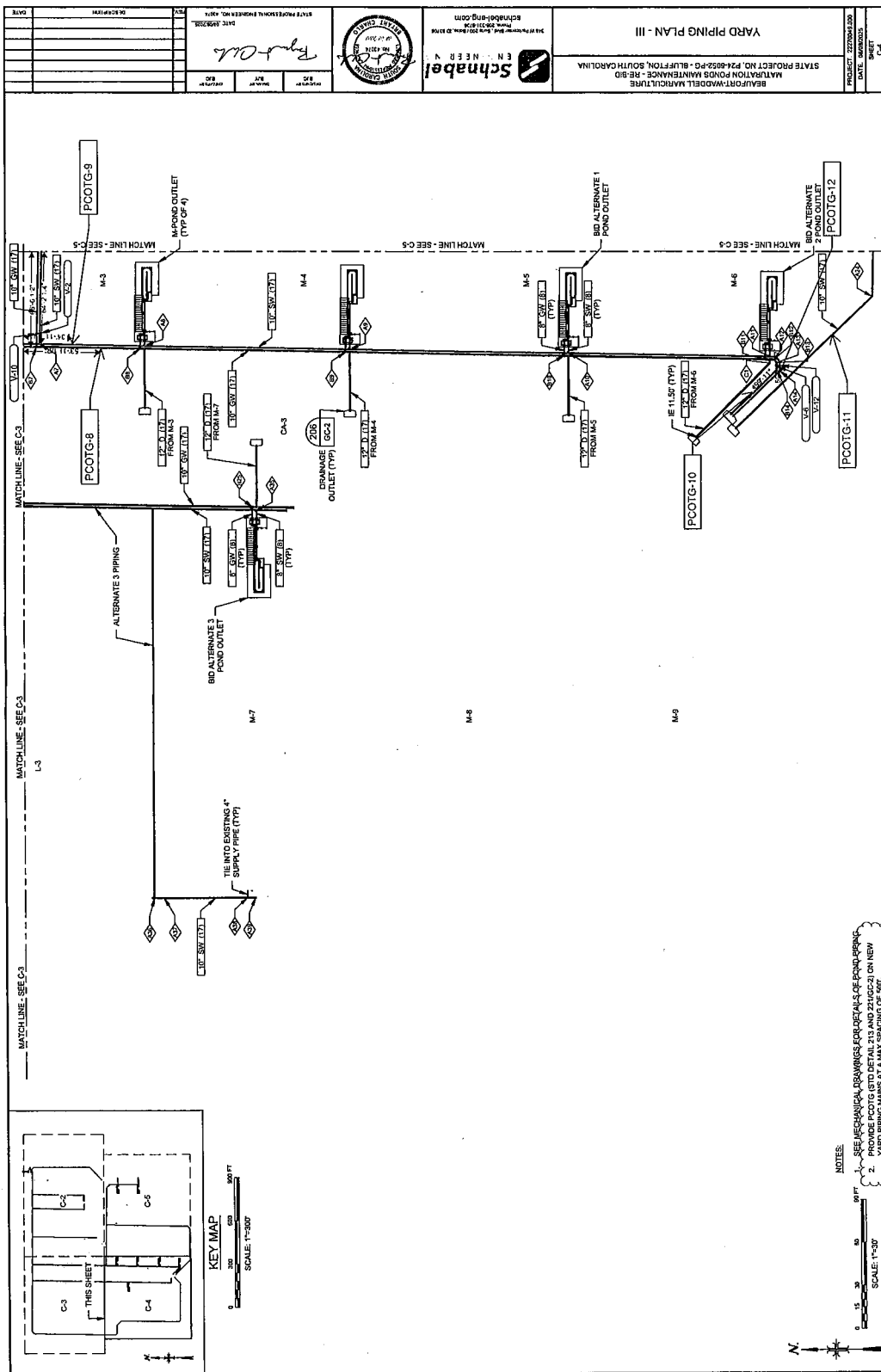
c.	Size:		
	1) As required by legend.		
	2) Minimum size, 7 x 10 inches.		
	3) As indicated in the schedule below:		
d.	Letters:		
	1) 2 inches for words "DANGER" or "CAUTION" or other words placed in the panel.		
	2) 3/4 inch for other text except as indicated in the schedule below.		
e.	Danger signs:		
	1) White background.		
	2) White letters for word "DANGER" placed on standard red oval with black panel.		
	3) Additional letters black.		
	4) Additional text: As indicated on schedule below.		
f.	Caution signs:		
	1) Yellow background.		
	2) Yellow letters for word "CAUTION" placed on black panel.		
	3) Additional letters black.		
	4) Additional text: As indicated in schedule below.		
g.	Safety instruction signs:		
	1) White background.		
	2) White letters for words "SAFETY FIRST" placed on green panel.		
	3) Additional letters black.		
	4) Additional text: As indicated in schedule below.		

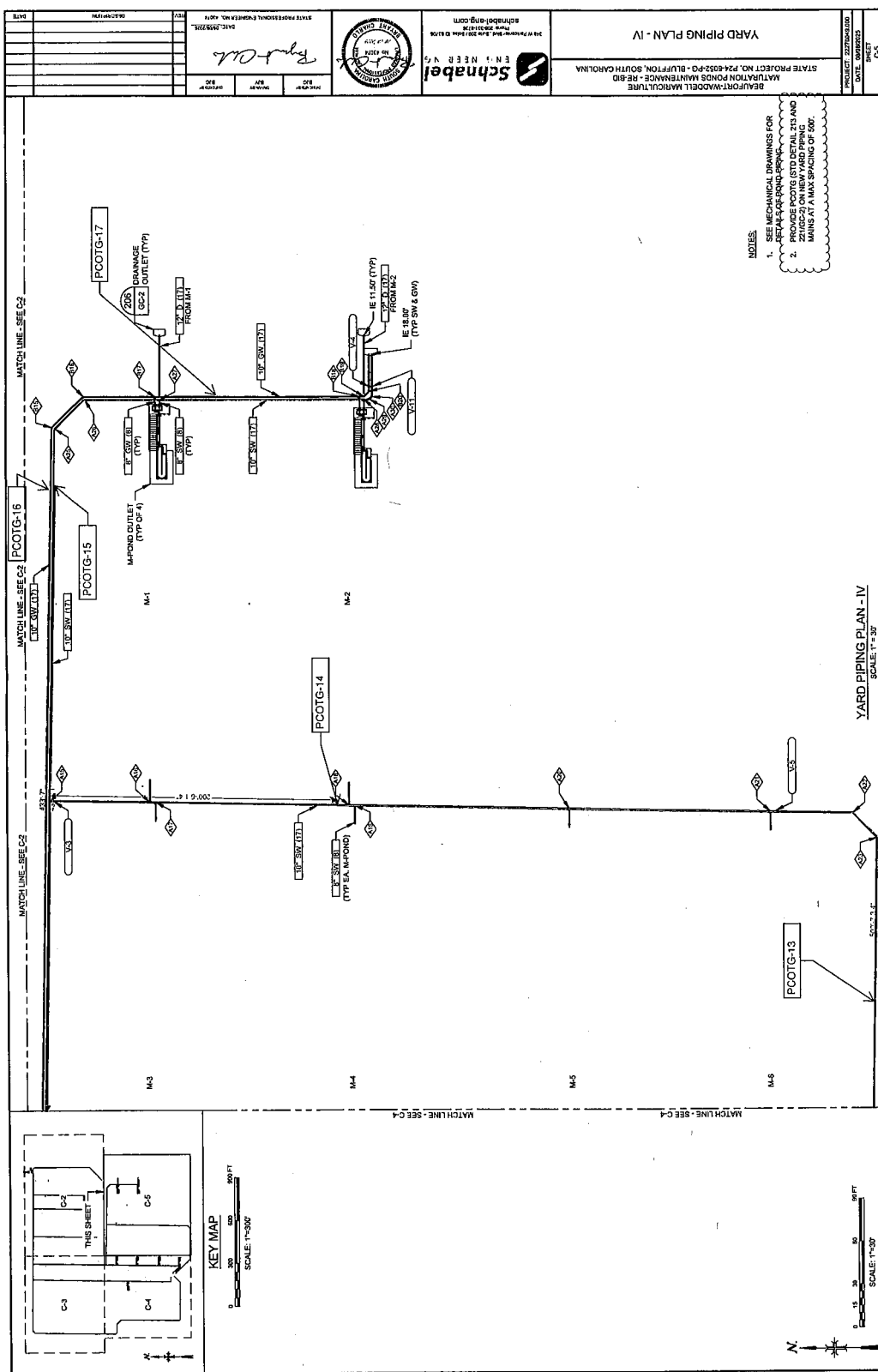
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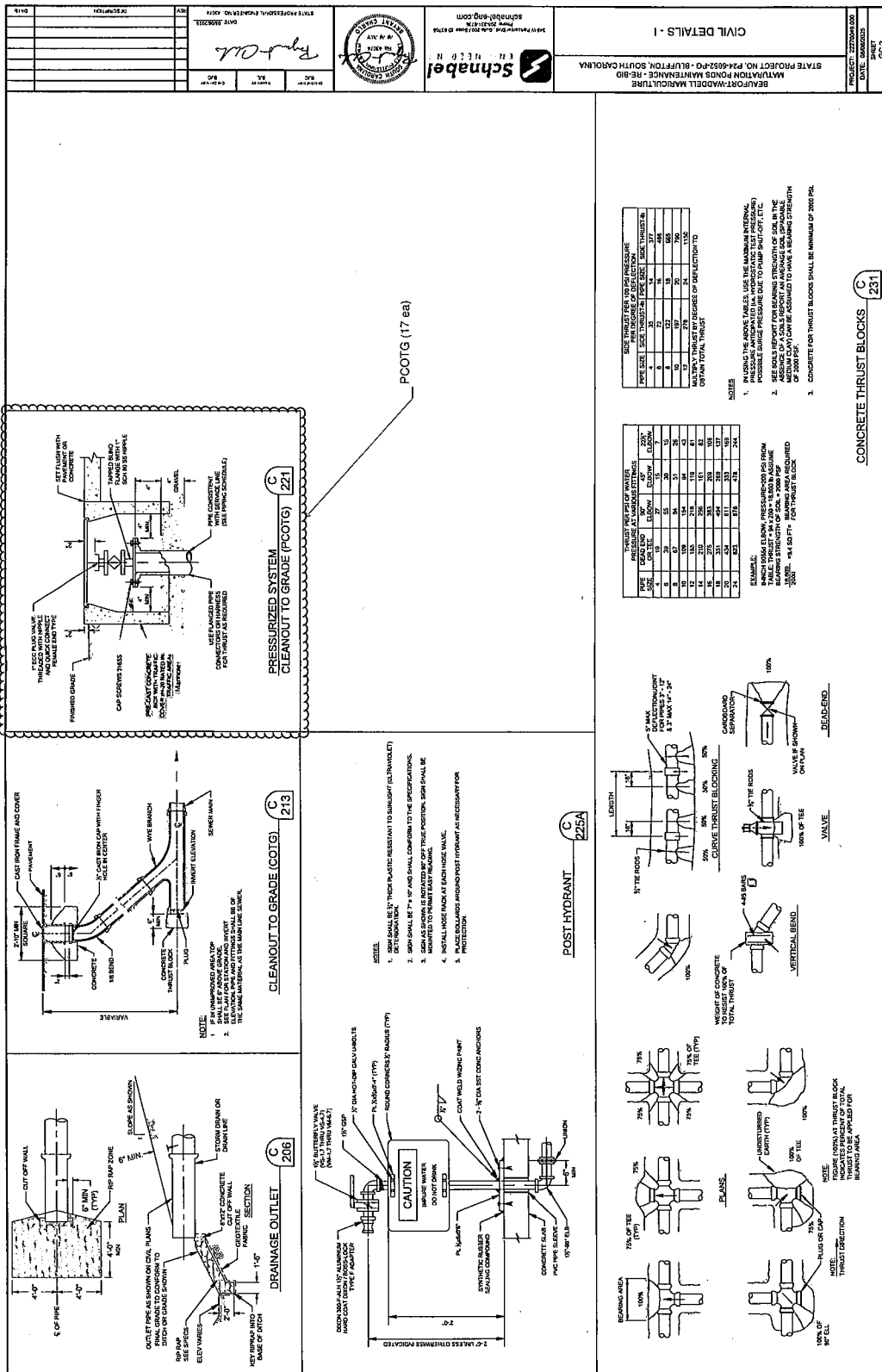


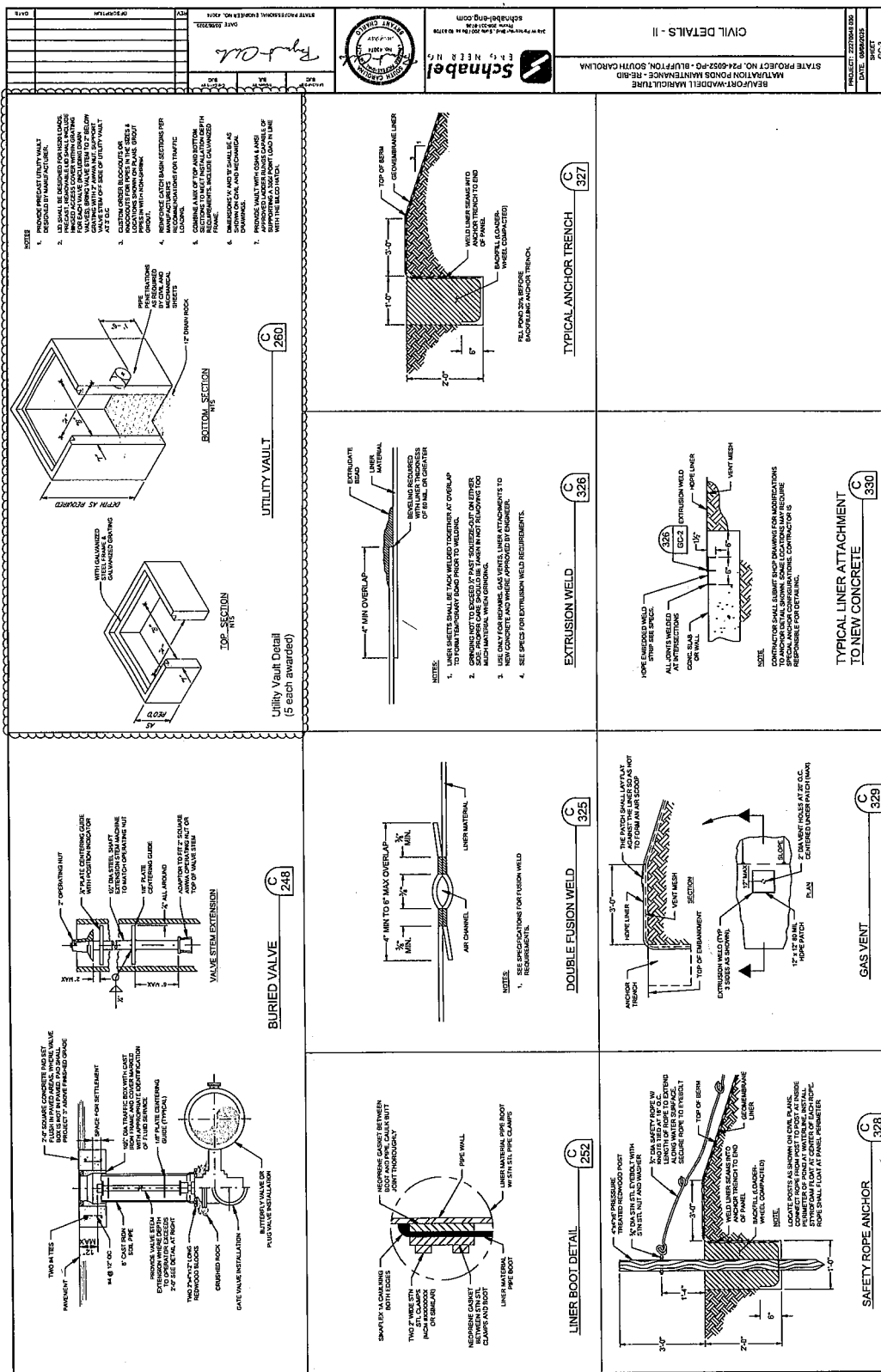




OUTLET MONK KETTLE STRUCTURE COORDINATE SCHEDULE			
POND #	NORTHING	EASTING	DESCRIPTION
M-1	151777.22	2556847.09	NW CORNER
M-2	152552.22	2556844.09	NW CORNER
M-3	153203.22	2556844.09	SW CORNER
M-4	152187.22	2556842.09	SE CORNER
M-5	153500.22	2556840.80	NE CORNER
M-6	153500.22	2556840.80	SE CORNER
M-7	153102.48	2556838.87	SW CORNER

YARD PIRING COORDINATE SCHEDULE			
POINT #	NORTHING	EASTING	DESCRIPTION
A1	153778.35	2556991.40	10" TEE
B1	153776.17	2557011.79	10" TEE
B2	153797.62	2557011.79	10" TEE
B3	153777.78	2556848.38	10" TEE
B4	153500.22	2556848.38	10" TEE
B5	153500.22	2556848.38	10" TEE
B6	153771.53	2556843.61	10" TEE
B7	153771.53	2556843.61	10" TEE
B8	153759.84	2556842.35	10" TEE
B9	153556.84	2556838.85	10" TEE
B10	152904.84	2556837.20	10" TEE
B11	152783.84	2556834.74	10" TEE
B12	152758.00	2556834.64	45° ELBOW
B13	152758.00	2556834.64	45° ELBOW
B14	152758.00	2556834.64	45° ELBOW
B15	152758.00	2556834.64	45° ELBOW
B16	152758.00	2556834.64	45° ELBOW
B17	152758.00	2556834.64	45° ELBOW
B18	152758.00	2556834.64	45° ELBOW
B19	152758.00	2556834.64	45° ELBOW
B20	152758.00	2556834.64	45° ELBOW
B21	152758.00	2556834.64	45° ELBOW
B22	152758.00	2556834.64	45° ELBOW
B23	152758.00	2556834.64	45° ELBOW
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B25	152758.00	2556834.64	45° ELBOW
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B40	152758.00	2556834.64	45° ELBOW
B41	152758.00	2556834.64	45° ELBOW
B42	152758.00	2556834.64	45° ELBOW
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B49	152758.00	2556834.64	45° ELBOW
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B51	152758.00	2556834.64	45° ELBOW
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B57	152758.00	2556834.64	45° ELBOW
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B59	152758.00	2556834.64	45° ELBOW
B60	152758.00	2556834.64	45° ELBOW
B61	152758.00	2556834.64	45° ELBOW
B62	152758.00	2556834.64	45° ELBOW
B63	152758.00	2556834.64	45° ELBOW
B64	152758.00	2556834.64	45° ELBOW
B65	152758.00	2556834.64	45° ELBOW
B66	152758.00	2556834.64	45° ELBOW





South Carolina Department of Labor, Licensing and Regulation
Office of Investigation and Enforcement
P.O. Box 11329, Columbia, South Carolina 29211-1329
(803) 896-4470

CITATION AND NOTIFICATION OF PENALTY FOR GENERAL AND/OR MECHANICAL CONTRACTING

PARAGON BUILDERS
[REDACTED]

License Number: CLG. 100190

☒ General ☐ Mechanical

Issuance Date: 8/5/2025

CASE NO.: 2025-495

This citation describes alleged violation(s) of Title 40, Chapter 11 of the South Carolina Code of Laws Ann., 1976, (as amended). The penalties listed are based on these violations. You must pay the proposed penalties pursuant to §40-11-100. Any citation and/or penalty assessed by the South Carolina Department of Labor, Licensing and Regulation may be appealed without payment by requesting a hearing in writing before the Board. Such requests must be addressed to: South Carolina Contractor's Licensing Board, P. O. Box 11329, Columbia, S.C., 29211-1329, and must be mailed within 15 days of receipt of this Citation. This citation concerns application of the South Carolina Contractors Practice Act and Regulations and does not necessarily resolve all aspects of any disciplinary action currently pending before the Board or which may be filed in the future. Disciplinary action by the Board may result in you being required to pay the costs associated with the investigation and prosecution of the case. If no appeal is filed, the citation will become a final order of the South Carolina Contractor's Licensing Board and the citation penalty must be paid within 30 days of issuance of the citation. Failure to pay this citation within 30 days from the date of issuance may result in administrative suspension of your license until the citation is paid in full.

ITEM#	DISCIPLINARY AUTHORITY	DESCRIPTION OF VIOLATION	PENALTY AMOUNT
1. <u>X</u>	1. §40-11-110(A)(5)....	1. Engaging or offering to engage in contracting work or submitting a bid when not properly licensed or while a license is under suspension or revocation. (§40-11-30)	1. <u>500.00</u>
2. _____	2. §40-11-110(A)(5)....	2. Use of the term 'licensed contractor' without being licensed. (§40-11-370)(A))	2. _____
3. _____	3. §40-11-110(A)(5)....	3. Issuing a building permit to an unlicensed general or mechanical contractor. (§40-11-350)	3. _____
4. _____	4. §40-11-110(A)(5)....	4. Failure to immediately withdraw from a construction project after violation of licensing requirements. (§40-11-300(B))	4. _____
5. _____	5. §40-11-110(A)(5)....	5. Acting as a construction manager without being registered by the Department or in excess of group limitation or license classification. (§40-11-320 and Reg. 29-5)	5. _____
6. _____	6. §40-11-110(A)(5)....	6. Dividing work into portions to avoid licensing requirements or group limitations. (§40-11-300(A))	6. _____
7. _____	7. §40-11-110(A)(5)....	7. Engaging in a name other than the exact name that appears on the licensee's license. (§40-11-370)(B))	7. _____
8. _____	8. §40-11-110(A)(5)....	8. Failure to obtain a building permit as required by local or state jurisdiction - First Offense. (§40-11-110(A)(13))	8. _____
9. _____	9. §40-11-110(A)(5)....	9. Failure to maintain a business address accessible to the public. (§40-11-110(A)(18))	9. _____
10. _____	10. §40-11-110(A)(5)....	10. Failure to notify the Department of any change in current mailing address, home address, home and/or office telephone number. (Reg. 29-9)	10. _____
11. _____	11. §40-11-110(A)(5)....	11. Failure to notify the Department of changes in information required in an original or renewal application. (§40-11-110(20))	11. _____
12. _____	12. §40-11-110(A)(5)....	12. Departure from an applicable building code of the State of South Carolina or any of its political subdivisions as determined by a court of competent jurisdiction. (§40-11-110(A)(23))	12. _____
13. _____	13. §40-11-110(A)(5)....	13. Failure to notify the Department of a change in status of primary qualifying party within fifteen (15) days of disassociation. (§40-11-230)(B)(3))	13. _____
14. _____	14. §40-11-110(A)(5)....	14. Contracting without a primary qualifying party after license suspension. (§40-11-230)(B)(3))	14. _____
15. _____	15. §40-11-110(A)(5)....	15. Failure to have a certified primary qualifying party in full-time employment in a responsible management position. (§40-11-240(A)(2))	15. _____
16. _____	16. §40-11-110(A)(5)....	16. Failure to comply with joint venture bid requirements. (§40-11-340)	16. _____
17. _____	17. §40-11-110(A)(9)....	17. Aiding or abetting an unlicensed entity to evade the Practice Act, combining or conspiring with an unlicensed entity, allowing one's license to be used by an unlicensed entity, or acting as agent, partner, or associate, of an unlicensed entity. (§40-11-200)	17. _____
18. _____	18. §40-11-110(A)(10)...	18. Entering into a contract with an unlicensed contractor for work to be performed for which a license is required. (§40-11-200)(B))	18. _____
19. _____	19. §40-11-110(A)(11)...	19. Using false, misleading, or deceptive advertising whereby a member of the public may be misled and injured. (§40-11-370)	19. _____
20. _____	20. §40-11-110(A)(21)...	20. Contracting or offering to contract for construction work exceeding the limitations of a group or outside the classification or subclassification of a license. (§40-11-270(A))	20. _____

TOTAL PENALTY: \$500.00

Scott Geib, Investigator III

Copy received: _____

Signature of Respondent

Date

CERTIFICATE OF SERVICE BY MAIL

This is to certify that the undersigned has this date served this Citation and Notification of Penalty in the above entitled action upon all parties to this cause by depositing a copy hereof in the United States mail, certified return receipt requested, and postage paid, or in the Interagency Mail Services, addressed to the parties (or their attorneys) in the following address:

• [REDACTED]
This 04 day of August, 2025.

By: Scott Geib, Investigator III

Please make check or money order payable to:
South Carolina Contractor's Licensing Board

Date Fine Received: _____

Check No.: _____

Received By: _____

Revised 03/31/2023