



**San Jacinto River Authority
Purchasing Department
1577 Dam Site Road
Conroe, Texas 77304**

**EXHIBIT 2A - TECHNICAL SPECIFICATIONS AND
REQUIREMENTS FOR
RFP 20-0061**

**LAKE HOUSTON PUMP STATION SCREEN CHANNEL
REHABILITATION**

**TEXAS WATER ENGINEERING, PLLC.
Texas Registered Engineering Firm F-8482**



5/27/2020

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WORK COVERED BY CONTRACT DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Definitions.
2. Work Covered by Contract Documents.
3. Owner-Furnished Products.
4. Work Sequence.
5. Work Guidelines.
6. Coordination of Work.
7. Contractors Use of Premises.
8. Contract Clarification.
9. Alternate Construction Methods.
10. Warranty.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 DEFINITIONS (NOT USED)

1.5 WORK COVERED BY CONTRACT DOCUMENTS

Lake Houston Pump Station Screen Channel Rehabilitation Project, hereafter called "Project" is located at the San Jacinto River Authority's Lake Houston Pump Station in Highlands, Texas. The work of this Contract is based upon an identified need to replace the existing intake screen channels that have deteriorated. Generally, the Project includes:

- Mobilization and demobilization to and from site to perform work as shown on Drawings
- Fabrication of galvanized steel channels and installation hardware as shown on Drawings

- Diver assistance in the removal of the existing intake screens
- Removal of existing screen channels
- Installation of galvanized screen channels for the purpose of utilizing the pump station intake screens that protect the pumps from debris. Two-(2) channels will be installed on each bay for a total of eight-(8) channels.
- Underwater welding as necessary for the removal of existing and installation of new intake screen channels
- Underwater concrete drilling and grouting as applicable for the installation of new intake screen channels
- Installation of new screen hooks into existing concrete structure for the purpose of a future hoisting system for installation and removal of the intake screens.
- Installation of fiberglass grating, supports and accessories.
- Assembly and installation of new intake screens procured prior to project.

1.6 CASH ALLOWANCES (NOT USED)

1.7 OWNER-FURNISHED PRODUCTS

A. Items furnished by the Owner for installation and final installation by Contractor:

1. Owner Responsibilities:

- a. The Owner will provide four (4) intake screens and hoisting system. Screens will be stored on the project site. Each screen will be stored in two separate pieces.
- b. Owner will transport the screen sections from the on-site storage location to inside the pump station at the upper level (ground level).

2. Contractor's Responsibilities:

- a. Notify the Owner 24-hours in advance requesting Owner transport of the screen sections to inside the pump station. Contractor shall assemble and install screens in each bay. Screens shall be installed the same day that they are mobilized into the pump station, do not store screens inside pump station.
- b. Repair or replace damaged items.

1.8 WORK GUIDELINES

- A. Maintain local driveway access to public schools, residential and commercial properties adjacent to work areas at all times.
- B. Contractor shall bear the sole responsibility for damage to existing facilities resulting from its construction activities. The Contractor shall be responsible for the repair of damaged facilities, at no additional cost to the Owner.

1.9 COORDINATION OF WORK

- A. The Contractor shall coordinate with Owner regarding the operation of pumps in the station and use of crane. Only one pump can be shut down at a time,

Contractor to sequence work accordingly. Provide 24 hours notice of pump shut down request.

- B. Comply with coordination requirements outlined in Specification Section 01 14 19 – Use of Premises.
- C. All work shall be performed to the lines, grades, elevations, and locations shown on the Drawings.
- D. Prevent overstress or damage of any structure and any part or member of it during construction. This applies to new and existing facilities, utilities, and structures affected by construction operations. Contractor shall monitor and record the effect of its construction operations on new and existing facilities, utilities and structures.

1.10 CONTRACTOR USE OF PREMISES

- A. Comply with all requirements outlined in Specification Section 01 14 19 – Use of Premises.

1.11 CONTRACT CLARIFICATION

- A. Should clarification of the Contract Documents be requested, request clarification before proceeding with Work by submitting a Request for Information (RFI). Such requests shall be preceded by a diligent investigation of the Contract Documents. Include evidence of such investigation(s) in all requests for clarification.

1.12 ALTERNATE CONSTRUCTION METHODS

- A. Alternate construction means and methods will be permitted in accordance with applicable Contract Document details and specification at no additional cost to the Owner. Alternate construction means and methods shall provide a substantial benefit to the project and/or the Owner. Contractor accepts full responsibility for all additional costs, including any re-design that may be necessary to permit the alternate construction means and methods.
- B. Contractor shall submit the below listed modifications for alternate construction methods to the Owner's Representative for Principal Architect/Engineer and Owner's consideration. Submittal shall be made prior to commencement of any construction activity utilizing an alternate construction method. Contractor execution of alternate construction methods prior to its receiving Principal Architect/Engineer and Owner's approval shall be at the sole risk of the Contractor for removal and replacement at no additional cost to the Owner. The following modifications must also be signed and sealed by a Licensed Professional Engineer registered in the State of Texas prior to submittal to Owner's Representative.
 - 1. Revisions to materials specifications and installation methods;
 - 2. Proposed construction method and detailed plan of approach;

1.13 UTILITY LINES (NOT USED)

1.14 WARRANTY

- A. Comply with the warranty requirements stipulated in Contract Document General Conditions and the warranty requirements of the various specification sections of this project manual.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 14 19

USE OF PREMISES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Administrative and procedural requirements for:
 - a. Contractor Responsibilities
 - b. Limits of Construction
 - c. Storage Sheds and Buildings
 - d. Working Times
 - e. Site Access Times
 - f. Safety Requirements
 - g. First Aid Equipment
 - h. Fire Protection
 - i. Security Measures
 - j. Protection of Property
 - k. Contractor's Roads and Parking
 - l. Coordination with Facility Owner's Operations
 - m. Project Photographs.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS

- A. See Specification Section 01 33 00 – Submittals for the requirements for the mechanics and administration of the submittal process.
- B. Contractors Safety Program.
- C. All proposed notifications to adjacent occupants.
- D. Planning requests for temporary Owner's facility shutdowns.

1.4 CONTRACTOR RESPONSIBILITIES

- A. Comply with applicable requirements specified in other sections of Project Specifications.

- B. Comply with procedures for access to the site and Contractor's use of rights-of-way.
- C. Maintain and operate temporary construction facilities as needed and temporary systems to assure continuous service of Owner's and other adjacent existing facilities.
- D. Modify and extend temporary systems as Work progress requires.
- E. Completely remove materials and equipment when no longer required.
- F. Restore existing facilities used for temporary services to original or better condition, or as specified.
- G. Prior to installation of material, equipment and/or other work, verify with subcontractors, material or equipment manufacturers, and installers that the substrate or surface to which those materials will attach is acceptable for installation of those materials or equipment. (Substrate is defined as any building or construction surfaces to which materials or equipment are attached to, or required prior to installation i.e., floors, walls, ceilings, soils, utilities, site grading, and backfill etc.).
- H. Correct unacceptable substrate until acceptable for installation of equipment or materials.

1.5 LIMITS OF CONSTRUCTION

- A. Construction operations and storage areas are limited to Owner's property at the Lake Houston Pump Station.
- B. Unauthorized use of areas, or trespassing on land outside of defined limits, is not permitted.
- C. Make arrangements, at no cost to the Owner, for Contractor's temporary use of any private properties which may be needed by Contractor for performance of Work. Contractor and Contractor's surety shall indemnify and hold harmless the Owner and Owner's Representatives against claims or demands arising from use of properties outside the Limits of Construction. Submit notarized copy of any separately negotiated agreement(s) between private property owner(s) and Contractor prior to use of area.
- D. Contractor may use overhead crane located in the pump station for execution of work. Contractor to attend site meeting with Owner to obtain operation requirements of crane prior to use.
- E. Where Limits of Construction are shown on Contract Drawings to extend to a property or Right-of-Way line, keep equipment, materials, and stockpiles a minimum of 5 feet from boundary, or existing fence lines.

1.6 STORAGE SHEDS AND BUILDINGS

- A. Provide adequately ventilated, watertight storage facilities with floor above ground level for protection of materials and equipment susceptible to weather damage.
- B. Store materials in neat and orderly manner. Store materials and equipment to permit easy access for identification, inspection, and inventory.
- C. Storage of materials not susceptible to weather damage may be on blocks off ground.
- D. Storage of all fuels and chemicals shall be in designated areas by Contractor.
- E. Fill and grade site for temporary structures to provide positive drainage away from Work area, but not to impact adjacent property owners.
- F. Avoid obstructing drainage ditches or inlets. When obstruction is unavoidable due to requirements of Work, provide grading and temporary drainage structures to maintain unimpeded drainage flow. Failure of the Contractor to maintain proper site drainage shall prohibit it from making a claim against the Owner for monetary or time damages due to drainage impacts.

1.7 WORKING TIMES

- A. Construction shall be conducted during working hours of 7:00 AM to 7:00 PM Monday through Friday.

1.8 SITE ACCESS TIMES

- A. Contractor to coordinate all site access, including deliveries, outside of working hours with Owner's Representative. Neither Owner nor Owner's Representatives shall sign for any Contractor deliveries.
- B. Contractor shall coordinate with Owner to not interfere with Owner's facility operations.

1.9 SAFETY REQUIREMENTS

- A. Beware of overhead power lines existing in area and in close proximity to project. When 10 feet of clearance between energized overhead power line and construction-related activity cannot be maintained, submit a request to the appropriate utility provider to de-energize or move conflicting overhead power line(s).
- B. Submit Contractor's Safety Program in accordance with Specification Section 01 33 00 – Submittals.
- C. Conduct operations in strict accordance with the Contractor's Safety Program, in accordance with applicable Federal, State, and local safety codes and statutes, and with good construction practice. Establish and maintain procedures for safety of all work, personnel, and equipment involved in Project.

- D. Observe and comply with Texas Occupational Safety Act (Art. 5182a, V.C.S.) and with all safety and health standards promulgated by Secretary of Labor under Section 107 of Contract Work Hours and Standards Act, published in 29 CFR Part 1926 and adopted by Secretary of Labor as occupational safety and health standards under Williams-Steiger Occupational Safety and Health Act of 1970, and to other legislation enacted for safety and health of Contractor employees. Safety and health standards apply to subcontractors and their employees as well as to Contractor and its employees.
- E. Observance of and compliance with regulations is solely and without qualification responsibility of Contractor without reliance or superintendence of or direction by the Owner or Owner's Representative. Immediately advise Owner's Representative of investigation or inspection by Federal Safety and Health Inspectors of Contractor or subcontractor's work or place of work on job site under this Contract, and after investigation or inspection, advise Owner's Representative of results. Submit one copy of accident reports to Owner's Representative within 10 days of occurrence.
- F. Protect areas occupied by workmen using best available devices for detection of lethal and combustible gases. Test devices frequently to assure functional capability. Constantly observe infiltration of liquids into Work area for visual or odor evidences of contamination, and immediately take appropriate steps to seal off entry of contaminated liquids into Work area.
- G. Implement safety measures, including but not limited to safety personnel, first-aid equipment, rescue equipment, ventilating equipment, and other safety equipment, as specified or detailed on the Contract Drawings.
- H. Maintain required coordination with Police and Fire Departments during entire period covered by Contract.
- I. In safety plan, include project safety analysis. Itemize major tasks and potential safety hazards. Plan to eliminate hazards or protect workers and public from each hazard.

1.10 FIRST AID EQUIPMENT

- A. Provide first aid kit throughout construction period. List telephone numbers for hospitals, and ambulance services in each first aid kit.
- B. Have at least one person thoroughly trained in first aid and cardiopulmonary resuscitation (CPR) procedures present on site whenever Work is in progress. Contractor to conform to protocols and requirements for training and protection against "blood borne pathogens."

1.11 FIRE PROTECTION

- A. Conform to specified fire protection and prevention requirements established by Federal, State, or local governmental agencies and as provided in

Contractor's Safety Program.

1.12 SECURITY MEASURES

- A. Protect all Work materials, equipment, and property from loss, theft, damage, and vandalism. Perform duty to protect property of the Owner used in connection with performance of Work.
- B. If existing fencing or barriers are breached or removed for purposes of construction, provide and maintain temporary security fencing equal to existing.

1.13 PROTECTION OF PROPERTY

- A. Prevent damage to existing facilities during construction.
- B. Shutdowns: Provide a notification to the Owner's Representative a minimum of 24 hours, excluding weekends and holidays, in advance of required pump shutdown. Shutdown planning and coordination activities shall commence a minimum of 2-weeks prior to scheduled shutdown. Coordinate all work as required.
- C. Protection of the Work, and Public and Private Property
 - 1. Take precautions, provide programs, and take actions necessary to protect the Work, and public and private property from damage.
 - 2. Do not alter condition of properties adjacent to and along Limits of Construction.
 - 3. Do not use ways, means, methods, techniques, sequences, or procedures that result in damage to adjacent properties or improvements.
 - 4. Restore properties damaged by Contractor outside of designated Limits of Construction at no cost to Owner.
 - 5. Take action to prevent damage, injury, or loss, including, but not limited to, the following:
 - a. Store materials, supplies, and equipment in orderly, safe manner that will not interfere with progress of Work or work of others.
 - b. Provide suitable storage for materials subject to damage by exposure to weather, theft, breakage, or otherwise.
 - c. Place upon Work or any part thereof only safe loads.
 - d. Frequently clean up refuse, rubbish, scrap materials, and debris created by construction operations, keeping Project site safe and orderly.
 - e. Provide safe barricades and guard rails to protect people around openings, scaffolding, temporary stairs and ramps, excavations, elevated walkways, and other hazardous areas.
 - 6. Assume full responsibility for preservation of public and private property on

or adjacent to the Limits of Construction. When direct or indirect damage is done by or on account of any act, omission, neglect, or misconduct in execution of Work by Contractor, restore to condition equal to or better than that existing before damage was done.

7. Perform daily clean up in affected construction areas in order to restore site to existing or better conditions. Areas should be free of debris, scrap material, dirt, mud, and other items identified by Owner's Representative. Do not leave buildings, roads, streets, or other construction areas unclean. If deemed necessary by the Owner's Representative, Contractor shall employ street sweeping/cleaning equipment to maintain area streets.

D. Protection of Existing Structures:

1. Surface Structures: Surface structures are defined as existing buildings, structures and other constructed installations above ground surface. Included with structures are their foundations and any extensions below the surface. Surface structures include, but are not limited to buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks, guard cables, fencing, and other facilities visible above ground surface.

E. Protection of Installed Products:

1. Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to final completion of Work.
2. Control traffic to prevent damage to equipment, materials, and surfaces.
3. Provide coverings to protect equipment and materials from damage. Cover projections, wall corners, jambs, sills, and exposed sides of openings in areas used for traffic and passage of materials in subsequent work.

1.14 CONTRACTORS ROADS AND PARKING

- A. Prevent interference with traffic on existing roads.
- B. Construct and maintain temporary access roads and parking areas.
- C. Designate temporary parking areas to accommodate Contractor's and Owner's Representative personnel. When site space is not adequate, provide additional off-site parking. Locate as approved by Owner's Representative.
- D. Minimize use by construction traffic of existing streets and driveways.
- E. Do not allow heavy vehicles or construction equipment in existing parking areas.
- F. Do not inhibit the ability of the Owner's personnel to access, operate, and maintain existing facilities during construction.

1.15 COORDINATION WITH FACILITY OWNER'S OPERATIONS

- A. Only one pump at the pump station will be shut down at a time during the work. Sequence work accordingly and provide notification to Owner and/or to the Owner's Representative a minimum of 24 hours, excluding weekends and holidays, in advance of required pump shutdown. Shutdown planning and coordination activities shall commence a minimum of 2-weeks prior to scheduled shutdown. Coordinate all work as required.
- B. Definition: A "shutdown" is when a portion of the normal operation of Owner's facility, whether equipment, systems, piping, or conduit, has to be temporarily suspended or taken out of service to perform the Work.
- C. Perform the Work such that Owner's facilities remain in continuous satisfactory operation during the Project. Schedule and conduct the Work such that the Work does not:
 - 1. Impede Owner's production or processes,
 - 2. Create potential hazards to public health or wellbeing,
 - 3. Create potential hazards to operating equipment and personnel,
 - 4. Reduce the quality of Owner's facilities' product, or
 - 5. Cause odors or other nuisances.
- D. If Contractor's operations cause an unscheduled interruption of Owner's operations, immediately re-establish satisfactory operation for Owner.
- E. Unscheduled shutdowns or interruptions of continued safe and satisfactory operation of Owner's facilities that result in fines or penalties by authorities having jurisdiction shall be paid solely by Contractor.

1.16 PROJECT PHOTOGRAPHS

- A. Refer to Specification Section 01 32 36.01 – Project Photographs

1.17 SPECIAL CONSIDERATIONS

- A. Contractor shall be responsible for negotiations of any waivers or alternate arrangements required to enable transportation of materials to the site.
- B. Maintain conditions of access road to site such that access is not hindered as the result of construction related deterioration.
- C. Contractor shall be responsible for performing any on-site welding (above the water surface) in a separate location on-site as to not interfere with pump station operation. Coordinate with and obtain approval from Owner on acceptable location for welding station and equipment laydown/staging area.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE

- A. Maintain temporary facilities in a clean, neat, and orderly manner including maintenance of all-weather surface driveway and parking areas, buildings and furnishings, and equipment or materials furnished and supplied as part of any temporary field office or storage yard for duration of Contract.

END OF SECTION

SECTION 01 25 13

PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. The procedure for requesting the approval of substitution of a product that is not equivalent to a product which is specified by descriptive or performance criteria or defined by reference to one or more of the following:
 - a. Name of manufacturer.
 - b. Name of vendor.
 - c. Trade name.
 - d. Catalog number.
2. Substitutions are not "or-equals".

B. Request for Substitution – General:

1. Base all bids on materials, equipment, and procedures specified.
2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers.
 - a. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are "or-equals," as determined by Owner's Representative.
3. Other types of equipment and kinds of material may be acceptable substitutions under the following conditions:
 - a. Or-equals are unavailable due to strike, discontinued production of products meeting specified requirements, or other factors beyond control of Contractor; or,
 - b. Contractor proposes a cost and/or time reduction incentive to the Owner.

1.2 MEASUREMENT AND PAYMENT

- A. Payment will be made in accordance with the General Conditions.**

1.3 SUBMITTALS (NOT USED)

1.4 QUALITY ASSURANCE

- A. In making request for substitution or in using an approved product, Contractor represents Contractor:
 - 1. Has investigated proposed product, and has determined that it is adequate or superior in all respects to that specified, and that it will perform function for which it is intended.
 - 2. Will provide same guarantee for substitute item as for product specified.
 - 3. 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 complete in all respects.
 - 4. Waives all claims for additional costs related to substitution which subsequently arise.

1.5 DEFINITIONS

- A. Product: Manufactured material or equipment.

1.6 PROCEDURE FOR REQUESTING SUBSTITUTION

- A. Substitution shall be considered only:
 - 1. After award of Contract.
 - 2. Under the conditions stated herein.
- B. Written request through Contractor only.
- C. Transmittal Mechanics:
 - 1. Follow the transmittal mechanics prescribed for Shop Drawings in Specification Section 01 33 00 – Submittals.
 - a. Product substitution will be treated in a manner similar to "deviations," as described in Specification Section 01 33 00 – Submittals.
 - b. List the letter describing the deviation and justifications on the transmittal form in the space provided under the column with the heading DESCRIPTION.
 - 1) Include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in the following paragraph below.
- D. Transmittal Contents:
 - 1. Product identification:
 - a. Manufacturer's name.
 - b. Telephone number and representative contact name.

- c. Specification Section or Drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.
2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.
3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
 - a. Size.
 - b. Composition or materials of construction.
 - c. Weight.
 - d. Electrical or mechanical requirements.
4. Product experience:
 - a. Location of past projects utilizing product.
 - b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
 - c. Available field data and reports associated with proposed product.
5. Data relating to changes in construction schedule.
6. Data relating to changes in cost.
7. Samples:
 - a. At request of Owner's Representative.
 - b. Full size if requested by Owner's Representative.
 - c. Held until substantial completion.
 - d. Owner's Representative not responsible for loss or damage to samples.

1.7 APPROVAL OR REJECTION

- A. Written approval or rejection of substitution given by the Owner's Representative, Principal Architect/Engineer, and the Owner.
- B. Owner's Representative reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.
- C. In the event the substitution is approved, the resulting cost and/or time reduction will be documented by Change Order in accordance with the General Conditions.
- D. Substitution will be rejected if:
 1. Submittal is not through the Contractor with his stamp of approval.

2. Request is not made in accordance with this Specification Section.
 3. In Owner's Representative opinion, acceptance will require substantial revision of the original design.
 4. In the Owner's Representative opinion, substitution will not perform adequately the function consistent with the design intent.
- E. Contractor shall reimburse Owner for the cost of the Owner's Representative evaluation whether or not substitution is approved.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 26 63
CHANGE ORDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

Procedures for processing Change Orders, including:

1. Quality Assurance.
2. Responsible Individual.
3. Documentation of Change in Contract Price and Contract Time.
4. Change Procedures.
5. Proposals and Contract Modifications.
6. Work Change Directive.
7. Change Order.
8. Execution of Change Documentation.
9. Correlation of Contractor Submittals.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 – Introductory Information, Proposing Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 QUALITY ASSURANCE

A. Reference Standards:

1. Equipment Rental Rates: equipmentwatch.com. Rental Rate is defined as full unadjusted base rental rate for appropriate item of construction equipment.

1.5 RESPONSIBLE INDIVIDUAL

A. Provide letter to the Owner's Representative indicating name, title, address and contact information of individual authorized to execute change documents and who is responsible for informing others in Contractor's employ and Subcontractors of changes to the Work. Information should be provided at the

Preconstruction Conference but, no later than 10 calendar days following the Preconstruction Conference.

1.6 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

- A. Maintain detailed records of changes in Work. Provide full information required for identification and evaluation of proposed changes, and substantiate costs of changes in Work.
- B. Document each proposal for change in cost or time with sufficient data to allow evaluation of proposal. Provide additional information upon request of the Owner or the Owner's Representative.
- C. Proposals shall include the following minimum information:
 - 1. Quantities of items in original Proposal with additions, reductions, deletions, and substitutions.
 - 2. Quantities and cost of items in original schedule of values with additions, reductions, deletions, and substitutions.
 - 3. Provide unit prices for items not included in original Proposal with supporting information when absent from original Proposal Work.
 - 4. Justification for changes in Contract Time.
 - 5. Additional data upon request.
- D. For changes in Work performed on a time-and-materials basis, provide the following additional information:
 - 1. Quantities and description of products and equipment.
 - 2. Taxes, insurance and bonds.
 - 3. Overhead and profit
 - 4. Dates, times, and by whom work was performed.
 - 5. Time records and certified copies of applicable payrolls.
 - 6. Invoices, receipts for products, rented equipment, and subcontracts, similarly documented.
- E. For changes in Work performed on a time-and-materials basis, payment for rental equipment will be as follows:
 - 1. Actual invoice cost for duration required to complete extra work without markup for overhead and profit. When extra work comprises only a portion of rental invoice where equipment would otherwise be on site, compute hourly equipment rate by dividing the actual monthly invoice by 176. (One day equals 8 hours and 1 week equals 40 hours.)
 - 2. Do not exceed estimated operating costs given on equipmentwatch.com website for items of equipment. Overhead and profit will be allowed on operating cost.

- F. For changes in Work performed on a time-and-materials basis using Contractor-owned equipment, use equipmentwatch.com rates as follows:
 - 1. Contractor-owned equipment will be paid at Rental Rate for duration of time required to complete extra work without markup for overhead and profit. Utilize lowest cost combination of hourly, daily, weekly, or monthly rates. Use 150 percent of Rental Rate for double shifts (one extra shift per day) and 200 percent of Rental Rate for more than two shifts per day. Standby rates shall be 50 percent of appropriate Rental Rate shown on equipmentwatch.com website. No other rate adjustments apply.
 - 2. Do not exceed estimated operating costs given on equipmentwatch.com. Overhead and profit will be allowed on operating cost. Operating costs will not be allowed for equipment on standby.

1.7 CHANGE PROCEDURES

- A. Changes to Contract Price or Contract Time can only be made by issuance of Change Order. Issuance of Work Change Directive will be formalized into a Change Order. Changes will be in accordance with requirements of the General Conditions.
- B. The Owner's Representative will advise of minor changes in Work not involving an adjustment to Contract Price or Contract Time as authorized by the General Conditions by issuing supplemental instructions.
- C. Request clarification of Drawings, Specifications, Contract Documents, or other information by using Request for Information. Response by the Owner's Representative to Requests for Information does not authorize Contractor to perform tasks outside scope of Work. Changes must be authorized as described in this section.

1.8 PROPOSALS AND CONTRACT MODIFICATIONS

- A. The Owner or the Owner's Representative may issue a Request for Proposal (RFP), which includes detailed description of proposed change with supplementary or revised Drawings and Specifications. The Owner or the Owner's Representative may also request a proposal in response to a Request for Information. Prepare and submit proposal within 7 days or as specified in the request.
- B. Submit request for Contractor changes to Owner's Representative describing proposed change and its full effect on Work, with a statement describing reason for change and effect on Contract Price and Contract Time including full documentation.
- C. The Owner may use the Principal Architect/Engineer to review Change Orders.

1.9 WORK CHANGE DIRECTIVE

- A. The Owner may issue a signed Work Change Directive instructing Contractor to proceed with a change in Work. Work Change Directive will subsequently be incorporated in Change Order.

- B. Document will describe changes in Work and designate method of determining change in Contract Price or Contract Time.
- C. Proceed promptly to execute changes in Work in accordance with Work Change Directive.

1.10 CHANGE ORDER

- A. Stipulated Price Change Order
 - 1. Stipulated Price Change Order will be based on accepted proposal.
- B. Unit Price Change Order
 - 1. Where Unit Prices for affected items of Work are included in Proposal, unit price Change Order will be based on unit prices, subject to the General Conditions.
 - 2. Where unit prices of Work are not pre-determined in Proposal, Work Change Directive or accepted proposal will specify unit prices to be used.
- C. Time-and-Material Change Order
 - 1. Provide itemized account and supporting data after completion of change, within time limits indicated for claims in the General Conditions.
 - 2. The Owner will determine change allowable in Contract Price and Contract Time as provided in the General Conditions.
 - 3. Maintain detailed records of work done on time-and-material basis as specified in paragraph 1.4, Documentation of Change in Contract Price and Contract Time.
 - 4. Provide full information required for evaluation of changes and substantiate costs for changes in Work.

1.11 EXECUTION OF CHANGE DOCUMENTATION

- A. The Owner or the Owner's Representative will issue Change Orders, Work Change Directives, or accepted proposal for signatures of parties as described in the General Conditions.

1.12 CORRELATION OF CONTRACTOR SUBMITTALS

- A. For Stipulated Price Contracts, promptly revise Schedule of Values and Application for Payment forms to record authorized Change Orders as separate line item.
- B. For Unit Price Contracts, next monthly estimate of Work after acceptance of a Change Order will be revised to include new items not previously included and appropriate unit rates.
- C. Promptly revise progress schedules to reflect change in Contract Time, and to adjust time for other items of work affected by change, and resubmit for review.
- D. Promptly enter changes to on-site and record copies of Drawings, Specifications, or Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 29 73
SCHEDULE OF VALUES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Measurement and Payment
 - 2. Definition
 - 3. Preparation
 - 4. Submittal
- B. Related Specification Sections include but are not necessarily limited to:
 - 1. Division 00 – Introductory Information, Proposing Requirements, Contract Forms, and Conditions of the Contract.
 - 2. Division 01 – General Requirements.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS

- A. Submit Schedule of Values in accordance with requirements of Specification Section 01 33 00 – Submittals. Submit at least 10 days prior to submitting first application for progress payment. Submit via SharePoint.
- B. Revise Schedule of Values and resubmit for items affected by contract modifications, Change Orders, and Work Change Directives. After changes are reviewed without exception by Authority's Principal Architect/Engineer, make submittal at least 10 days prior to submitting next application for progress payment.

1.4 DEFINITIONS

- A. Schedule of Values: Is a schedule, prepared and maintained by the Contractor, allocating portions of the Contract Amount to various portions of the Work, including a tabulation of all of the costs of the various Subcontracts and materials which in the aggregate make up the Cost of the Work. The Schedule of Values shall be subject to Owner's approval and, after such approval, be used as the basis for reviewing the Contractor's Application For Payment.
- B. Break down costs to list major products or operations for each line item which has an installed value of more than \$5000.

1.5 PREPARATION

- A. For stipulated price contracts, subdivide Schedule of Values into logical portions of Work, such as major work items or work in contiguous geographic areas.
- B. Schedule and Schedule of Values shall be developed together. At a minimum, the Schedule of Values shall be broken out by trade and split between materials and labor as approved by the Owner. Such Prices will include overhead and profit applicable to each item of work.
- C. For lump sum equipment items where submittal of operation/maintenance data and testing are required, include separate item for equipment operation and maintenance data submittal valued at 5 percent of lump sum amount for each equipment item and separate item for testing and adjusting valued at 5 percent of lump sum amount for each equipment item.
- D. Round off figures for each listed item to nearest \$100 except for value of one item, when necessary, to make total of items in Schedule of Values equal Contract Price for stipulated price contracts or lump sum amount in Schedule of Unit Price Work.
- E. Submit Schedule of Values in approved electronic spreadsheet, formatted to print on 11" x 17" paper, to the Owner's Document Management System.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Specific requirements for the preparation, submittal, updating, status reporting and management of the construction Progress Schedule.

B. Provide Construction Schedules for Work included in Contract in accordance with requirements in this Section. Develop a Microsoft Project Gantt Chart schedule. The contractor shall utilize the plan for scheduling, coordinating, and monitoring work under the contract including all activities of subcontractors, equipment vendors, and suppliers. Provide printed activity listings and bar charts in formats described in this Section.

1.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this item. Include the cost of construction scheduling in overhead cost for this project.

1.3 SCHEDULING STAFF

A. Designate an in-house representative responsible for preparing, reviewing, and updating schedule(s) and reporting progress to the owner for the duration of the Contract. Individual shall cooperate with Owner's Representative and shall update schedule (Progress Schedule) monthly as required by the Contract's General Conditions, to indicate current status of Work.

1.4 QUALITY ASSURANCE

A. The person preparing and revising the construction Progress Schedule shall be experienced in the preparation of schedules of similar complexity.

B. Within five (5) days from award of the Contract, Contractor shall submit to Owner's Representative the name of the person responsible for the preparation, maintenance, updating and revision of all schedules.

1. Qualifications necessary:

- a. At least five (5) years verifiable experience in the preparation and updating of construction schedules for projects of similar type, size and complexity.
- b. Proficient in the use of Microsoft® Project® 2007.

1.5 DEFINITIONS

A. The following definitions shall apply to this Specification Section:

1. **BASELINE SCHEDULE:** The initial as-bid, detailed, cost and resource loaded Progress Schedule prepared by the Contractor to define its plan for

constructing the Project as required by the Contract Documents, and accepted by the Owner or Owner's Representative as meeting the requirements of the Contract Documents for specified constraints, sequences, milestones and completion dates.

2. **PROGRESS SCHEDULE:** The initially accepted Baseline Schedule, or subsequently approved Revised Baseline Schedules, updated each month to reflect actual start and finish dates of schedule activities and all time impact events whether caused by Contractor or Owner or factors beyond the control of either party.
3. **REVISED BASELINE SCHEDULE:** The initially accepted Baseline Schedule revised to reflect only approved changes.
4. **WORKING SCHEDULE:** A schedule developed from the Progress Schedule, utilizing scheduling software features not allowed for Baseline and Progress Schedules at the Contractor's sole discretion, to indicate the Contractor's plan for executing the Work, and providing for schedule recovery when approved time extensions are not sufficient to provide for timely completion due to Contractor inefficiencies beyond the control of the Owner or outside the risks accepted by the Owner.

1.6 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Scheduler qualifications.
3. Submitted within {10} days after Effective Date of the Agreement.
4. Incorporate all specified Project milestones, sequences and constraints.
5. Baseline Schedule: Submitted within 30 days after Effective Date of Agreement.
6. Monthly Progress Schedules.
7. Look-Ahead Rolling Schedules
8. Revised Baseline Schedules
9. Working Schedules
10. Explanation of any changes of logic, durations, or sequence of activities shall be presented monthly.
11. Contractor shall coordinate with Project Manager to provide hard copies of required schedules at monthly progress meetings.
12. Contractor shall submit required schedules to the Owner's Document Management System (SharePoint).

1.6 GENERAL REQUIREMENTS

- A. Contractor shall prepare and submit Baseline and Progress Schedules and updates and revisions to them as specified herein.
 - 1. All scheduling to be performed in Microsoft® Project® 2007.
 - 2. The Baseline and Progress Schedules shall be a calendar day-based Gantt Chart.
- B. The complete project Gantt Chart will contain at a minimum:
 - 1. All work events and activities as necessary to fully detail the project schedule.
 - 2. Each activity/event on the Gantt chart schedule shall contain at a minimum an activity/event description, time duration in working days, and a start and finish date.
 - 3. Activity constraints not defined in the contract will not be accepted.
 - 4. Logic events (non-work) will be permitted where necessary to reflect proper sequence among work events, but must have zero duration.
 - 5. The duration for each listed activity shall be in calendar days.
 - 6. Each activity shall be for a duration of not less than 1 and not more than 30 calendar days.
 - 7. The schedule shall take into consideration the effects of normal weather impacts.
 - 8. The Contractor is not required to “cost load” the Gantt chart. This information shall come from the Schedule of Values, which shall reflect and contain all the same activities and events identified in the Gantt Chart.
- C. By preparing and submitting the Baseline Schedule, the Contractor represents that it can and intends to execute the Work and portions thereof within the specified times and constraints and that its bid covers the costs associated with the execution of the Work in accordance with the Construction Schedule.
- D. Schedule shall conform to constraints and milestone dates listed in the Contract Documents.
- E. Schedule shall conform to constraints and milestone dates listed in the Contract Documents and indicated in the Master Construction Schedule {attached to the Drawings} {included in the Project Manual}.
- F. Contractor shall provide an electronic copy compatible with Microsoft® Project® 2007 submitted to SharePoint for the Baseline Schedule and Progress Schedule and all monthly updates of both.

1.7 SUBMITTAL PACKAGES

A. Baseline Schedule:

1. Gantt Chart
 - a. Upload electronic version (pdf) to SharePoint.
2. Supporting data:
 - a. Electronic version (pdf) uploaded to SharePoint of a list of project activities including the following:
 - 1) Holidays that will be observed during construction.
 - 2) Number of planned working days and shifts per week.

B. Monthly updates that include the following:

1. Revised Baseline Schedule as appropriate.
 - a. Update to reflect approved Change Orders occurring since the prior update.
 - b. If no new approved Change Orders since prior update, provide a narrative report indicating such, and acknowledging the pertinence of the previously approved Baseline Schedule.
2. Updated Progress Schedule.
3. Explanation of changes in logic, duration of activities.
4. Upload electronic version (pdf) to SharePoint.

C. Look-Ahead Rolling Schedule:

1. A four-week rolling schedule shall be provided by the Contractor at each progress meeting.
 - a. The schedule shall provide an accurate representation of the work performed the previous week and work planned for the current week and subsequent two (2) weeks.
2. The schedule shall be provided in a tabular format with bars representing work duration.
 - a. The schedule shall refer to activity ID numbers on the Baseline and Progress Schedules.
3. Derived from the Working Schedule, if applicable.

1.8 BASELINE SCHEDULE

A. Schedule shall include, but not be limited to, activities that show the following that are applicable to the project:

1. Project characteristics, salient features, or interfaces, including those with outside entities that could affect time of completion.

2. Project start date, scheduled completion date and other milestones.
 3. Work performed by Contractor, subcontractors and suppliers.
 4. Submittal development, delivery, review and approval, including those from Contractor, subcontractors and suppliers.
 5. Procurement, delivery, installation and testing of materials, plants and equipment.
 6. Testing and settlement periods.
 7. Utility notification and relocation.
 8. Erection and removal of falsework and shoring.
 9. Finish work and final cleanup.
- B. Schedule shall have not less than 5 activities, unless otherwise authorized by the Owner's Representative.
1. The number of activities shall be sufficient to assure adequate planning of the project, to permit monitoring and evaluation of progress, and to do an analysis of time impacts.
 2. Schedule activities shall include the following:
 - a. A clear and legible description.
 - b. Start and finish dates.
 - c. A duration of not less than one (1) working day, except for event activities, and not more than 20 working days, unless otherwise authorized by the Owner's Representative.
 - d. At least one (1) predecessor and one (1) successor activity, except for project start and finish milestones.
 - e. Required constraints: Only contractually required constraints may be inserted into the Baseline Schedule.
 - f. Codes for responsibility, stage, work shifts, location and contract pay item numbers.
- C. Working durations shall be planned to incorporate the effects of normal weather impacts. See General Conditions Article 12.2 for the "Baseline Rain Day Determination".

1.9 PROGRESS SCHEDULE

- A. Develop Progress Schedule based on approved Baseline and Revised Baseline Schedules.
- B. The Progress Schedule will be updated once per month for monitoring progress.
1. Contractor may submit one (1) additional update per month for its own convenience.

- C. Indicate progress by making entries on the most recently accepted version of the network diagram and supporting data to show:
 - 1. Activities completed.
 - 2. Activities started.
 - 3. Remaining duration for each activity started but not yet completed.
 - 4. Percent complete based on value of work in place and value of equipment or material delivered and properly stored.
 - 5. Status of activity due to be completed by the next scheduled progress meeting.
- D. Computerized Progress Schedule and percent completion of Work shall be used to verify Contractor's payment requests.
 - 1. Progress payments will not be processed by the Owner's Representative unless the updated Progress Schedule has been submitted concurrently with a pay request and found acceptable by the Owner's Representative.

1.10 REVISIONS TO PROGRESS SCHEDULE

- A. Contractor shall submit data for a revised Progress Schedule within five (5) days of the occurrence of any of the following:
 - 1. When contractor-caused delay in completion of any activity or group of activities indicates an overrun of the Contract Time or Control Dates by 15 working days or 10 percent of the remaining duration, whichever is less.
 - 2. When delays in submittals, deliveries, or work stoppages are encountered making necessary the replanning or rescheduling of the Work.
 - 3. When the schedule does not represent the actual progress of the Work.
 - 4. When a change order significantly affects the contract completion date.
- B. The revised Progress Schedule shall be the basis of a Working Schedule showing:
 - 1. How Contractor intends to return to schedule.
 - 2. How Contractor intends to avoid falling behind schedule on future activities.
 - 3. Any modifications or changes to future activities.
 - 4. Any new activities.
- C. Provide written narrative report as needed to define:
 - 1. Problem areas, anticipated delays, and impact on the current schedule.
 - 2. Corrective action recommended, and its effect.
 - 3. Major changes in scope.
 - 4. Revised projections of progress and completion.

5. The revised Project Schedule and narrative shall be presented to the Owner no later than the next scheduled progress meeting.
- D. Except as provided in the following subparagraphs 1 and 2, the cost of revisions to the Progress Schedule resulting from changes in the Work shall be included in the cost for the change in the Work, and shall be based on the complexity of the revision or Change Order, man-hours expended in analyzing the change, and the total cost of the change.
 1. The cost of revision to the Construction Schedule not resulting from authorized changes in the Work shall be the responsibility of the Contractor.
 2. The cost of revision to the Construction Schedule for the Contractor's convenience shall be the responsibility of the Contractor.
- E. Revisions to the Progress Schedule for the Contractor's convenience:
 1. Must be approved by the Owner's Representative before Contractor changes the sequence of Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 32 36.01

PROJECT PHOTOGRAPHS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Technical and submittal requirements for project photographs, including:
 - a. Measurement and Payment

1.2 MEASUREMENT AND PAYMENT

A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 DEFINITIONS:

1. Pre-construction Photographs: Photographs taken, in sufficient numbers and detail, prior to beginning field activities, to show original construction site conditions.
2. Progress Photographs: Photographs, taken throughout the duration of construction at regular intervals from vantage points, approved by the Owner's Representative, that document progress of the Work.
3. Completed Project Photographs: Photographs, taken at the completion of the project from progress photograph vantage points, approved by the Owner's Representative, that document the completion of the Work.

1.4 SUBMITTALS:

1. Refer to Section 01 33 00 – Submittals.
2. Format and Media. Digital photography shall be used for Preconstruction and Progress Photographs. Digital or film photography may be used for Completed Project Photographs. Submit color prints of photographs whether produced by digital or film photography for hard copy submittals. Submit digital Joint Photographic Experts Group (JPEG) images for electronic submittals.
 - a. Media
 - 1) Digital Photography. Use at least 6.0 megapixel density for photographs. Submit digital photographic files to SJRA project SharePoint site in JPEG format.
3. Submit Preconstruction Photograph digital images with embedded GPS coordinates (latitude, longitude and compass direction of view) shown on the image. Contractor shall download digital images and GPS coordinates to the Owner's GIS system if directed by the Owner's Representative.
4. Submit Progress Photograph digital images to SJRA project SharePoint site.

5. Submit Completed Project Photograph digital images to SJRA project SharePoint site.
6. Submittal Quantities and Frequencies
 - a. Preconstruction photographs: Submit one set of digital images to the SJRA Project SharePoint site.
 - b. Progress Photographs: Submit one set of digital images each month with each Application for Payment. Monthly Applications for Payment shall be deemed incomplete if not accompanied by the required Progress Photographs. Contractor's failure or election to not submit a monthly Application for Payment shall not affect the requirement for monthly Progress Photographs:
 - 1) For Facility Contracts with a Total Bid Price over \$100,000, at least once each month during construction: Provide five (5) progress photos as directed by Owner's Representative.
 - c. Completed Project Photographs:
 - 1) Submit two sets of Completed Project Photographs, after Date of Substantial Completion and prior to final payment. Two sets of Completed Project photos shall be taken from two vantage points. Each of the two vantage points pre-approved by the Owner. Vantage points for Finished Photographs will be approved separately from vantage points approved for Progress Photographs.
7. Labeling:
 - a. Digital Images: .
 - 1) For each digital image create a file name which has as part of the name the date the photograph was taken and the location of the photograph by station, coordinates or other unique identifier
8. Photographic files become the property of the Owner with all rights of reproduction to the Owner. Do not publish photographs without written consent by the Owner.

B. Quality Assurance:

1. Contractor shall be responsible for the quality of and timely execution and submittal of photographs.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



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SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanics and administration of the submittal process for:
 - a. Shop Drawings.
 - b. Samples.
 - c. Miscellaneous submittals.
2. General content requirements for Shop Drawings.

B. Related Specification Sections include but are not necessarily limited to:

1. Sections in Divisions 02 through 48 identifying required submittals.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 DEFINITIONS

A. Shop Drawings:

1. See General Conditions.
2. Product data and samples are Shop Drawing information.

B. Miscellaneous Submittals:

1. Submittals other than Shop Drawings and O&M Manuals.
2. Representative types of miscellaneous submittal items include but are not limited to:
 - a. Construction schedule.
 - b. Manufacturer's installation certification letters.
 - c. Warranties.
 - d. Service agreements.
 - e. Construction photographs.
 - f. Record Documents.
 - g. Cost breakdown (Schedule of Values).
 - h. Safety Plan(s).

1.5 SUBMITTAL SCHEDULE

A. Schedule of Shop Drawings:

1. Submitted and approved within 20 days of receipt of Notice to Proceed.
2. Account for multiple transmittals under any specification section where partial submittals will be transmitted.

B. Shop Drawings: Submittal and approval prior to 50 percent completion.

1.6 PREPARATION OF SUBMITTALS

A. General:

1. All submittals and all pages of all copies of a submittal shall be completely legible.
2. Submittals which, in the Owner's Representative's or Principal Architect/Engineer's sole opinion, are illegible will be returned without review.

B. Shop Drawings:

1. Scope of any submittal and shop drawing transmittal:
 - a. Submit shop drawings utilizing Owner's standard Submittal Transmittal Form.
 - b. Limited to one (1) Specification Section.
 - c. Do not submit under any Specification Section entitled (in part) "Basic Requirements" unless the product or material submitted is specified, in total, in a "Basic Requirements" Section.
2. Numbering letter of transmittal:
 - a. Include a series number, "xx", beginning with "01" and increasing sequentially with each additional transmittal.
 - b. Assign consecutive series numbers to subsequent transmittals.
3. Describing transmittal contents:
 - a. Provide listing of each component or item in submittal capable of receiving an independent review action.
 - b. Identify for each item:
 - 1) Manufacturer and Manufacturer's Drawing or data number.
 - 2) Contract Document tag number(s).
 - 3) Unique page numbers for each page of each separate item.
 - 4) Use divider sheets with labeled tabs to separate independent items within a single submittal.
 - c. When submitting "or-equal" items that are not the products of named manufacturers, include the words "or-equal" in the item description.

4. Contractor stamping:

a. General:

- 1) Contractor's review and approval stamp shall be applied either to the letter of transmittal or a separate sheet preceding each independent item in the submittal.
 - a) Contractor's signature and date shall be wet ink or electronic signature.
 - b) Shop Drawing submittal stamp shall read "(Contractor's Name) has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval as stipulated under General Conditions Paragraph 6.20.4."
- 2) Submittals containing multiple independent items shall be prepared with an index sheet for each item listing the discrete page numbers for each page of that item, which shall be stamped with the Contractor's review and approval stamp.
 - a) Individual pages or sheets of independent items shall be numbered in a manner that permits Contractor's review and approval stamp to be associated with the entire contents of a particular item.
 - b) Use divider sheets with labeled tabs to separate independent items within a single submittal.

b. Electronic stamps:

- 1) Contractor may electronically embed Contractor's review and approval stamp to either the Submittal Transmittal Form or a separate index sheet preceding each independent item in the submittal.
- 2) Contractor's signature and date on electronically applied stamps shall be wet ink or electronic signature.

5. Resubmittals:

- a. Number with original root number and a suffix letter starting with "A" on a new Submittal Transmittal Form.
- b. Do not increase the scope of any prior transmittal.
- c. Account for all components of prior transmittal.
 - 1) If items in prior transmittal received "A" or "B" Action code, list them and indicate "A" or "B" as appropriate (See also 1.6, this Section).
 - a) Do not include submittal information for items listed with prior "A" or "B" in resubmittal.
 - 2) Indicate items to be resubmitted "at a later date" for any prior "C" or "D" Action item not included in resubmittal.
 - a) Obtain Principal Architect/Engineer's approval to exclude items.

6. Electronic submittals utilizing web based document management system (SharePoint®):
 - a. Shop drawing submittals shall be produced (scanned) in Adobe Acrobat's Portable Document Format (PDF) Version 5.0 or higher.
 - b. Do not password protect and/or lock the PDF document.
 - c. Create one (1) PDF document (PDF file) for each submittal.
 - d. Drawings or other graphics must be converted to PDF format and made part of the single (one [1]) PDF document.
 - 1) Scanning to be used only where actual file conversion is not possible.
 - e. Limit PDF document size to 5MB.
 - f. Rotate pages that must be viewed in landscape to the appropriate position for easy reading.
 - g. Images only shall be scanned at a resolution of 300 dpi or greater.
 - 1) Perform Optical Character Recognition (OCR) capture on all images.
 - 2) Achieve OCR with the "original image with hidden text" option.
 - 3) Word searches of the PDF document must operate successfully to demonstrate OCR compliance.
 - h. Create bookmarks in the navigation frame, for each entry in the Table of Contents/Index.
 - 1) Normally three (3) levels deep (i.e., "Chapter," "Section," "Sub-section").
 - i. Thumbnails must be generated for each PDF file.
 - j. Set the opening view for PDF files as follows:
 - 1) Initial view: Bookmarks and Page.
 - 2) Magnification: Fit in Window.
 - 3) Page layout: Single page.
 - 4) Set the file to open to the cover page of the submittal with bookmarks to the left, and the first bookmark linked to the cover page.
 - k. All PDF documents shall be set with the option "Fast Web View" to open the first pages of the document for the viewer while the rest of the document continues to load.
 - l. File naming conventions:
 - 1) File names shall use a "nine dot three" convention (XXXXXX-YY-Z.PDF) where XXXXXX is the Specification Section number, YY is the Shop Drawing Root series number and Z is an ID number used to designate the associated volume.

7. Provide clear space (3 In Sq) for Principal Architect/Engineer stamping of each component defined in the PREPARATION OF SUBMITTALS Article – Contractor Stamping.
8. Contractor shall not use red color for marks on transmittals.
 - a. Duplicate all marks on all copies transmitted, and ensure marks are photocopy reproducible.
 - b. Outline Contractor marks on reproducible transparencies with a rectangular box.
9. Transmittal contents:
 - a. Coordinate and identify Shop Drawing contents so that all items can be easily verified by the Owner's Representative and the Principal Architect/Engineer.
 - b. Identify equipment or material use, tag number, Drawing detail reference, weight, and other Project specific information.
 - c. Provide sufficient information together with technical cuts and technical data to allow an evaluation to be made to determine that the item submitted is in compliance with the Contract Documents.
 - d. When a Shop Drawing submittal is called for in any Specification Section, include as appropriate, scaled details, sizes, dimensions, performance characteristics, capacities, test data, anchoring details, installation instructions, storage and handling instructions, color charts, layout Drawings, rough-in diagrams, wiring diagrams, controls, weights and other pertinent data in addition to information specifically stipulated in the Specification Section.
 - 1) Arrange data and performance information in format similar to that provided in Contract Documents.
 - 2) Provide, at minimum, the detail specified in the Contract Documents.
 - e. Provide warranty information.
 - f. If proposed equipment or materials deviate from the Contract Drawings or Specifications in any way, clearly note the deviation and justify the said deviation in detail in a separate letter immediately following transmittal sheet.

C. Miscellaneous Submittals:

1. Prepare in the format and detail specified in Specification requiring the miscellaneous submittal.

1.7 TRANSMITTAL OF SUBMITTALS


A. Shop Drawings:

1. Transmit all submittals via Owner's Document Management System (SharePoint).

2. Utilize SJRA Standard Submittal Transmittal Form (to be provided by Owner) to transmit all Shop Drawings, Samples and Operation and Maintenance Manuals.
 3. All submittals must be from Contractor.
 - a. Submittals will not be received from or returned to subcontractors.
 4. Provide submittal information defining specific equipment or materials utilized on the Project.
 - a. Generalized product information, not clearly defining specific equipment or materials to be provided, will be rejected.
- B. Miscellaneous Submittals:
1. Transmit under Contractor's standard Submittal Transmittal Form or letterhead.
 2. Submit in triplicate or as specified in individual Specification Section.
 3. Provide copy of Submittal Transmittal without attachments to Owner's Representative.

1.8 PRINCIPAL ARCHITECT/ENGINEER 'S REVIEW ACTION

- A. Shop Drawings and Samples:
1. Items within transmittals will be reviewed for overall design intent and will receive one of the following actions:
 - a. NO EXCEPTION.
 - b. EXCEPTIONS AS NOTED.
 - c. REVISE & RESUBMIT
 - d. REJECTED - RESUBMIT.
 - e. ACKNOWLEDGE RECEIPT.
 - f. FOR INFORMATION PURPOSES ONLY.
 - g. SUPPLEMENTARY INFORMATION.
 2. Submittals received will be initially reviewed to ascertain inclusion of Contractor's approval stamp.
 - a. Submittals not stamped by the Contractor or stamped with a stamp containing language other than that specified herein will not be reviewed for technical content and will be returned without any action.
 3. In relying on the representation on the Contractor's review and approval stamp, Owner and Principal Architect/Engineer reserve the right to review and process poorly organized and poorly described submittals as follows:
 - a. Submittals transmitted with a description identifying a single item and found to contain multiple independent items:

- 1) Review and approval will be limited to the single item described on the transmittal letter.
 - 2) Other items identified in the submittal will:
 - a) Not be logged as received by the Principal Architect/Engineer.
 - b) Be removed from the submittal package and returned without review and comment to the Contractor for coordination, description and stamping.
 - c) Be submitted by the Contractor as a new series number, not as a re-submittal number.
 - b. Principal Architect/Engineer, at Principal Architect/Engineer's discretion, may revise the transmittal letter item list and descriptions, and conduct review.
 - 1) Unless Contractor notifies Principal Architect/Engineer in writing that the Principal Architect/Engineer's revision of the Submittal Transmittal Form item list and descriptions was in error, Contractor's review and approval stamp will be deemed to have applied to the entire contents of the submittal package.
- 
4. Submittals returned with Action "A" or "B" are considered ready for fabrication and installation.
 - a. If for any reason a submittal that has an "A" or "B" Action is resubmitted, it must be accompanied by a letter defining the changes that have been made and the reason for the resubmittal.
 - b. Destroy or conspicuously mark "SUPERSEDED" all documents having previously received "A" or "B" Action that are superseded by a resubmittal.
 5. Submittals with Action "A" or "B" combined with Action "C" (Revise and Resubmit) or "D" (Rejected) will be individually analyzed giving consideration as follows:
 - a. The portion of the submittal given "C" or "D" will not be distributed (unless previously agreed to otherwise at the Preconstruction Conference).
 - 1) One (1) copy or the one (1) transparency of the "C" or "D" Drawings will be marked up and returned to the Contractor.
 - a) Correct and resubmit items so marked.
 - b. Items marked "A" or "B" will be fully distributed.
 - c. If a portion of the items or system proposed are acceptable, however, the major part of the individual Drawings or documents are incomplete or require revision, the entire submittal may be given "C" or "D" Action.
 - 1) This is at the sole discretion of the Principal Architect/Engineer.

- 2) In this case, some Drawings may contain relatively few or no comments or the statement, "Resubmit to maintain a complete package."
- 3) Distribution to the Owner and field will not be made (unless previously agreed to otherwise).
6. Failure to include any specific information specified under the submittal paragraphs of the Specifications will result in the submittal being returned to the Contractor with "C" or "D" Action.
7. Calculations: Requirements for the submittal of calculations in the individual Specification Sections shall be satisfied through the submittal of a certification sealed by the Principal Architect/Engineer that the calculations have been performed. Certification will be received for information purposes only and will be returned stamped "D. ACKNOWLEDGE RECEIPT".
8. Transmittals of submittals which the Principal Architect/Engineer considers as "Not Required" submittal information, which is supplemental to but not essential to prior submitted information, or items of information in a transmittal which have been reviewed and received "A" or "B" Action in a prior submittal, will be returned with Action "E. Acknowledge Receipt" (Principal Architect/Engineer's Review Not Required).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 35 05

ENVIRONMENTAL PROTECTION AND SPECIAL CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Addresses:

1. Minimizing the pollution of air, water, or land; control of noise, the disposal of solid waste materials, and protection of deposits of historical or archaeological interest.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for this item. Include the cost of same in associated items for this project.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Prior to the start of any construction activities submit:
 - a. A detailed proposal of all methods of control and preventive measures to be utilized for environmental protection.
 - b. A drawing of the work area, haul routes, storage areas, access routes and current land conditions including trees and vegetation.

1.4 ENVIRONMENTAL CONTROLS

- A. Provide and maintain methods, equipment, and temporary construction as necessary for controls over environmental conditions at construction site and adjacent areas.
- B. Work to minimize impact to surrounding environment. Adopt construction procedures that do not cause unnecessary excavation and filling of terrain, indiscriminate destruction of vegetation, air or stream pollution, nor harassment or destruction of wildlife.
- C. Recognize and adhere to environmental requirements of Project. Limit disturbed areas to boundaries established by Contract. Avoid pollution of “on-site” streams, sewers, wells, or other water sources.
- D. Burning of rubbish, debris, or waste materials is not permitted.

1.5 POLLUTION CONTROL

- A. Provide systems for control of atmospheric pollutants.
 1. Prevent toxic concentrations of chemicals.

2. Prevent harmful dispersal of pollutants into atmosphere.
- B. Use equipment that conforms to current Federal, State, and local laws and regulations.
- C. Install or otherwise implement positive controls to prevent hazardous materials migrating from Work area.

1.6 NOISE CONTROL

- A. The Lake Houston Pump Station has no official noise limit, but is governed by state regulations that dictate a maximum level of 85 decibels at any time of the day or night. Local municipal noise limits may be more restrictive and shall be followed as required.
- B. Provide vehicles, equipment, and construction activities that minimize noise to greatest degree practicable. Conform noise levels to latest OSHA standards. Do not permit noise levels to interfere with Work or create nuisance in surrounding areas.
- C. Conduct construction operations during daylight hours except as approved by Owner's Representative.
- D. Select construction equipment to operate with minimum noise and vibration. When in opinion of Owner's Representative, objectionable noise or vibration is produced by equipment, rectify conditions without additional cost to Owner. Sound Power Level (PWL) of equipment shall not exceed 85 dbA (re: 10-12 watts) measured 5 feet from piece of equipment. Explicit equipment noise requirements are specified with equipment specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Employ and utilize environmental protection methods, obtain all necessary permits, and fully observe all local, state, and federal regulations.
- B. Prohibit equipment and vehicles from maneuvering on areas outside of dedicated rights-of-way and easements for construction. Immediately repair damage caused by construction traffic to erosion and sediment control systems.
- C. Prepare spill response and containment procedures to be implemented in event of significant materials spill. Significant materials include but are not limited to: raw materials; fuels; materials such as solvent, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of CERCLA; chemical required to be reported pursuant to Section 313 of Title III of SARA; fertilizers; pesticides, and waste products such as slag, ashes and sludge that have potential to be released with storm water

discharges. Spill containment procedures shall be kept on-site or in construction field office.

D. Properly label significant materials or waste containers used for construction activities and stored on-site overnight.

E. Land Protection:

1. Except for any work or storage area and access routes specifically assigned for the use of the Contractor, the land areas outside the limits of construction shall be preserved in their present condition.

a. Contractor shall confine his construction activities to areas defined for work within the Contract Documents.

F. Solid Waste Disposal:

1. Collect solid waste on a daily basis.

2. Provide disposal of degradable solid waste to an approved solid waste disposal site.

3. Provide disposal of nondegradable solid waste to an approved solid waste disposal site or in an alternate manner approved by Owner's Representative and regulatory agencies.

4. No building materials wastes or unused building materials shall be buried, dumped, or disposed of on the site.

G. Fuel and Chemical Handling:

1. Store and dispose of chemical wastes in a manner approved by regulatory agencies.

2. Take special measures to prevent chemicals, fuels, oils, greases, herbicides, and insecticides from entering drainage ways.

3. Do not allow water used in onsite material processing, concrete curing, cleanup, and other waste waters to enter a drainage way(s) or stream.

4. The Contractor shall provide containment around fueling and chemical storage areas to ensure that spills in these areas do not reach waters of the state.

H. Burning:

1. Do not burn material on the site.

I. Control of Noise:

1. Control noise by fitting equipment with appropriate mufflers.

J. Completion of Work:

1. Upon completion of work, leave area in a clean, natural looking condition.

2. Ensure all signs of temporary construction and activities incidental to construction of required permanent work are removed.

3.2 KEEPING STREETS CLEAN

- A. Keep streets clean of construction debris and mud carried by construction vehicles and equipment. **EQUIPMENT MAINTENANCE AND REPAIR**
- A. Confine maintenance and repair of construction machinery and equipment to areas specifically designated for that purpose. Locate areas so that oils, gasoline, grease, solvents, and other potential pollutants cannot be washed directly into receiving streams or storm water conveyance systems. Provide these areas with adequate waste disposal receptacles for liquid as well as solid waste. Clean and inspect maintenance areas daily.

3.3 WASTE COLLECTION AND DISPOSAL

- A. Formulate and implement a plan for collection and disposal of waste materials on construction site. In plan, designate locations for trash and waste receptacles and establish a collection schedule. Specify and carry out methods for ultimate disposal of waste in accordance with applicable local, state, and federal health and safety regulations. Make special provisions for collection and disposal of liquid wastes and toxic or hazardous materials.
- B. Keep receptacles and waste collection areas neat and orderly to extent possible. Waste shall not be allowed to overflow its container or accumulate from day-to-day. Locate trash collection points where they shall least likely be affected by concentrated storm water runoff.

3.4 STORAGE OF CONSTRUCTION MATERIALS AND CHEMICALS

- A. Isolate sites where chemicals, cements, solvents, paints, or other potential water pollutants are stored in areas where they shall not cause runoff pollution.
- B. Store toxic chemicals, materials, pesticides, paints, and acids in accordance with manufacturers' guidelines. Protect groundwater resources from leaching by placing a plastic mat, packed clay, tar paper, or other impervious materials on areas where toxic liquids are to be opened and stored.

3.5 SANITARY FACILITIES

- A. Provide construction sites with adequate portable toilets for workers in accordance with applicable health regulations.

END OF SECTION

SECTION 01 45 16.32

CONTRACTOR'S QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Measurement and Payment
 - 2. Quality Assurance/Control of Installation
 - 3. References
 - 4. Manufacturer's Field Services and Reports

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for this item. Include the cost in associated items for this project.

1.3 SUBMITTALS (NOT USED)

1.4 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality at no additional cost to the Owner.
- B. Comply fully with manufacturers' installation instructions, including each step in sequence.
- C. Request clarification Owner's Representative before proceeding when manufacturers' instructions conflict with Contract.
- D. Comply with specified standards as minimum requirements for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce specified level of workmanship.

1.5 REFERENCES

- A. Obtain copies of standards and maintain at job site when required by individual Specification sections.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual Specification sections or as required by Owner's Representative, provide material or product suppliers' or manufacturers' technical representative to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, operator training, test, adjust and balance of equipment as applicable and to initiate operation, as required. Conform to minimum time requirements for start-up operations and operator training when defined in Specification sections.

- B. At Owner's Representative's request, submit qualifications of manufacturers' representative to Owner's Representative 15 days in advance of required representatives' services. Representative is subject to approval by Owner's Representative.
- C. A manufacturers' representative is to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to a manufacturer's written instructions. Submit report within 14 days of observation to Owner's Representative for review.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 13

MOBILIZATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for mobilization.

1.2 MEASUREMENT AND PAYMENT

- A. Mobilization payments will be included in periodic progress payment upon written application subject to following provisions:
1. Authorization for payment of 50 percent of Contract Price for mobilization will be made upon receipt and approval by Owner's Representative of the following items, as applicable:
 - a. Schedule of Values submittal in accordance with Specification Section 01 29 73 – Schedule of Values
 - b. Safety Program/Plan submittal
 - c. Construction Schedule submittal in accordance with Specification Section 01 32 16 – Construction Progress Schedule
 - d. Confirmation of equipment on-site.
 2. Authorization for payment of remaining 50 percent of Contract Price for mobilization will be made upon completion of Work amounting to 5 percent of Contract Price less mobilization unit price.
- B. Mobilization payments will be subject to retainage amounts.

1.3 SUBMITTALS (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for construction waste management and disposal.

1.2 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for waste material disposal under this Section. Include payment in unit price for related sections.

1.3 SUBMITTALS

- A. Conform to requirements of Specification Section 01 33 00 – Submittals.
- B. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances. Submit a copy of all disposal permits to the Owner's Representative.
- C. Submit copy of written permission from property owner(s) outside limits of Project, with description of property, prior to disposal of excess material. Submit written and signed release from property owner upon completion of disposal work. Copies of the permission and release documents are to be submitted to the Owner's Representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SALVAGEABLE MATERIAL

- A. Demolished Material: When indicated on Drawings, load, haul, and deposit demolished material at location outside limits of Project.
- B. Other Salvageable Materials: Conform to requirements of individual Specification Sections.
- C. Coordinate with the Owner's Representative the loading of salvageable material.

3.2 EXCESS MATERIAL

- A. Remove and legally dispose of rubble, broken concrete, metals, anchors, debris, and other materials not designated for salvage from job site.
- B. Remove waste materials from site daily, in order to maintain site in neat and orderly condition, unless otherwise authorized by the Owner.

END OF SECTION

SECTION 03 31 32

CONCRETE FINISHING AND REPAIRS OF SURFACE DEFECTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete finishing and repair of surface defects.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Concrete Institute (ACI):
 - a. 116R – Cement and Concrete Terminology.
2. ASTM International (ASTM):
 - a. C150 – Standard Specification for Portland Cement.
 - b. C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - c. C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
 - d. D4258 – Standard Practice for Surface Cleaning Concrete for Coating.
 - e. D4259 – Standard Practice for Abrading Concrete.
3. Society for Protective Coatings/NACE International (SSPC/NACE):
 - a. SP 13/NACE No. 6 – Surface Preparation of Concrete.

B. Qualifications:

1. Manufacturer of surface/filler shall have minimum of five (5) years experience in manufacturing of same with documented performance history for similar installations.
2. Installer/applicator of surface/filler shall have minimum of three (3) years experience installing similar coatings.

1.4 DEFINITIONS

A. Vertical Surface Defects:

1. Any void in the face of the concrete deeper than 1/8 IN, such as:
 - a. Tie holes.

- b. Air pockets (bug holes).
 - c. Honeycombs.
 - d. Rock holes.
- 2. Foreign material embedded in face of concrete.
- 3. Fins 1/16 IN or more in height.
- B. Installer or Applicator:
 - 1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
 - 2. Installer and applicator are synonymous.
- C. Other words and terms used in this Specification Section are defined in ACI 116R.

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
 - 2. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
- B. Miscellaneous Submittals:
 - 1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's recommendations and requirements for materials used.

1.7 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Structural Repair and Patching Material (dry applications):
 - a. Sika Corporation
 - b. Five Star Products, Inc.
 - 2. Underwater Patching Material:
 - a. Splash Zone A-788

- B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

- A. Structural Repair/Patching Material: Use prepackaged non-shrink, non-slump, non-metallic, quick setting patching mortar; as approved by the manufacturer for each application and applied and cured in accordance with the manufacturer's recommendations. Use on all concrete surfaces not submerged under water.
1. Sika Corporation "SikaTop 122 Plus" or "SikaTop 123 Plus."
 2. Five Star Products, Inc. "Five Star Structural Concrete."
- B. Underwater Repair/Patching Material: Use prepackaged non-shrink, non-slump, non-metallic, quick setting patching mortar; as approved by the manufacturer for each application and applied and cured in accordance with the manufacturer's recommendations. Use on all concrete surfaces submerged under water.
1. Sika Corporation "Sikament 100 SC".
 2. Five Star Products, Inc. "Five Star Underwater Hand Pack."
- C. Underwater Patching of Embedded Anchors: Use two-part epoxy to cover all burned off ends of embedded anchors submerged under water.
1. Splash Zone A-788

PART 3 - EXECUTION

3.1 PREPARATION

- A. Preparation of Repair Products:
1. Mix Prepackaged Repair Mortar per manufacturer's requirements. Extend mix with aggregate in accordance with manufacturer's requirements.
 2. Mix bonding agent and water together in separate container in accordance with manufacturer's instructions.
 3. Add only enough bonding agent/water mixture to cement/aggregate mixture to allow handling and placing.
 4. Let stand with frequent manipulation with a trowel, until mix has reached stiffest consistency to allow placement.
 5. Prepare surfaces to accept underwater patching material per manufacturer's instructions.
- B. Clean surfaces in accordance with ASTM D4258 to remove dust, dirt, form oil, grease, or other contaminants prior to abrasive blasting, chipping, grinding or wire brushing.

1. Abrasive blast surfaces in accordance with ASTM D4259 and SSPC SP13/NACE No. 6 to completely open defects down to sound concrete and remove laitance.
 - a. If additional chipping or wire brushing is necessary, make edges perpendicular to surface or slightly undercut.
 - b. No feathered edges will be permitted.
2. Rinse surface with clean water and allow surface water to evaporate prior to repairing surface defects.
3. Prepare surface as recommended by Repair Mortar manufacturer.

3.2 INSTALLATION AND APPLICATION

- A. Do not repair surface defects or apply wall or floor finishes when temperature is or is expected to be below 50 DegF.
 1. If necessary, enclose and heat area to between 50 and 70 DegF during repair of surface defects and curing of patching material.
 - a. Use only clean fuel, indirect fired heating apparatus.
- B. Concrete Finishes for Vertical Wall Surfaces:
 1. Give concrete surfaces finish to match adjacent concrete.
 2. Prepare surface in accordance with the PREPARATION Article and repair the following surface defects:
 - 1) Tie holes.
 - 2) Honeycombs deeper than 1/4 IN.
 - 3) Air pockets deeper than 1/4 IN.
 - 4) Rock holes deeper than 1/4 IN.
 - b. Chip or rub off fins exceeding 1/4 IN in height.

3.3 FIELD QUALITY CONTROL

- A. Concrete patching finishes will be accepted provided:
 1. Applicable specification requirements are satisfied.
- B. Unacceptable finishes shall be replaced or, if approved in writing by Owner's Representative, may be corrected provided strength and appearance are not adversely affected.
 1. High spots to be removed by grinding and/or low spots filled with a patching compound or other remedial measures to match adjacent surfaces.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel, including the fabrication and installation of structural steel members, including connections.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 05 50 00 – Metal Fabrications.

1.2 MEASUREMENT AND PAYMENT

- A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Institute of Steel Construction (AISC):
 - a. 360 – Specifications for Structural Steel Buildings (referred to herein as AISC Specification).
 - b. 303 – Code of Standard Practice for Steel Buildings and Bridges dated March 18, 2005.
 - c. Quality Certification Program for Fabricators.
2. American Society of Civil Engineers (ASCE).
3. American Society of Mechanical Engineers (ASME):
 - a. B18.22.1 – Plain Washers.
4. ASTM International (ASTM):
 - a. A6 – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 - b. A36 – Standard Specification for Carbon Structural Steel.
 - c. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - d. A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
 - e. A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

- f. A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - g. A325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - h. A490 – Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
 - i. A563 – Standard Specification for Carbon and Alloy Steel Nuts.
 - j. A992 – Standard Specification for Steel for Structural Shapes.
 - k. F436 – Standard Specification for Hardened Steel Washers.
 - l. F593 – Standard Specification for Stainless Steel Bolts, Hex Caps Screws and Studs.
 - m. F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
5. American Welding Society (AWS):
- a. A5.1 – Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
 - b. A5.5 – Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding.
 - c. A5.17 – Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding.
 - d. A5.18 – Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding.
 - e. A5.20 – Specification for Carbon Steel Electrodes for Flux Cored Arc Welding.
 - f. A5.23 – Specification for Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding.
 - g. A5.28 – Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding.
 - h. A5.29 – Specification for Low-Alloy Steel Electrodes for Flux Cored Arc Welding.
 - i. D1.1 – Structural Welding Code - Steel (referred herein as AWS Code).
 - j. Steel stud connectors and their installation to comply with requirements of AWS Code.
6. Research Council on Structural Connections (RCSC):
- a. Specification for Structural Joints using ASTM A325 or ASTM A490 Bolts, referred to herein as Specification for Structural Joints.
7. Building code:

- a. International Code Council (ICC):
 - 1) International Building Code and associated standards, 2018 Edition including all amendments, referred to herein as Building Code.
- B. Qualifications:
 - 1. Steel fabricator:
 - a. Minimum of 10 years experience in fabrication of structural steel and shall be certified under AISC Quality Certification Program.
 - b. Use a professional engineer on fabrication staff.
 - 2. Underwater Steel Member Installer:
 - a. Minimum of 10 years of experience in the installation of structural steel in under water applications.
 - b. As described in the Building Code, with an active and enforced quality assurance program in place.
 - 3. Qualify welding procedures and welding operators in accordance with AWS.

1.4 DEFINITIONS

- A. Code: AISC 303, Code of Standard Practice for Steel Buildings and Bridges.
- B. Owner: May mean the Owner's Representative for Construction.
- C. Galvanizing: Hot-dipped galvanizing per ASTM 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.

1.5 SUBMITTALS

- A. Shop Drawings:
 - 1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
 - 2. Fabrication and/or layout drawings:
 - a. Prepare Shop Drawings under National Institute of Steel Detailing Quality Procedures Program certification.
 - b. Complete Shop Drawings for all of the work showing clearly all pieces, sizes, dimensions, details, connections materials and shop coatings.
 - 1) All Shop Drawings must be checked and signed "approved" before submittal.
 - 2) Show all cuts, copes, and holes.
 - 3) Indicate all shop and field bolts.
 - 4) Indicate all shop and field welds using AWS symbols.
 - c. Prepare complete erection drawings showing the location and marks of all pieces.

- 1) Copies of up-to-date erection drawings shall accompany the Shop Drawings.
 - a) Use match marks on the erection drawings to indicate the sheet number on which each particular member is detailed.
 - d. Correct any incorrect or unacceptable material or fabrication due to incorrect detailing, shop work, or erection, without additional charge.
3. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Detailed supplemental specification relating to load indicator washers or high-strength bolts - alternate design for approval of Owner's Representative (submitted at Contractor's option if desired by Contractor for use).
 - d. Source and certification of quality for high-strength bolts, nuts and washers.
4. Certifications:
 - a. Certificates of compliance with standards specified for all major components and fasteners incorporated into work.
 - b. Certificates for underwater divers.
 - c. Copies of current welding certificates for each welder assigned to perform welding indicating compliance with testing specified by AWS.
 - d. Welder qualification data and prequalified procedures.
5. Test reports:
 - a. Certified copies of mill tests.
 - b. Manufacturer's load test and temperature sensitivity data for expansion anchor bolts and adhesive anchor bolts.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store steel members above ground on skids or other supports.
 1. Keep free of dirt and other foreign material and protect against corrosion.

1.7 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel, Structural Shapes and Plate, unless noted otherwise on Drawings:
 1. All W-shapes and WT-shapes:

- a. ASTM A992, 50 ksi yield.
2. All other plates and rolled shapes: ASTM A36.
- B. Plate and Bar: ASTM A36.
- C. High-Strength Bolts, Nuts and Washers, ASTM A325 with ASTM A563 nuts or ASTM A490 for galvanized:
 1. High-strength bolts:
 - a. Provide two (2) ASTM F436 washers for all bolts.
 - b. Provide beveled washers at connections of sloped/tapered sections.
 2. High-strength bolts with load indicating devices, ASTM F959, Type 325.
 - a. Provide at Contractor's option and subject to approval of Owner's Representative.
 3. Alternate high-strength design:
 - a. Provide at Contractor's option and subject to approval of Owner's Representative.
- D. Bolts and Nuts, Unfinished: ASTM A307, Grade A.
- E. Washers, Plain (Unfinished Bolts): ASME B18.22.1, Type B.
- F. Welding Electrodes (AWS):
 1. Shielded metal arc: AWS A5.1 or AWS A5.5, E70XX or E801X-X.
 2. Submerged arc: AWS A5.17 or AWS A5.23, F7XX-EXXX or F8XX-EXXX-XX.
 3. Gas metal arc: AWS A5.18, E70S-X or E70U-1 or AWS A5.28, ER805-XX, E80C-XXX.
 4. Flux cored arc: AWS A5.20, E7XT-X (except 2, 3, 10, GS), AWS A5.29, E7XT-X or E8XTX-X, E8XTX-XM.
- G. Anchor Rods and Bolts:
 1. ASTM F1554, Grade 55 with weldability supplement S1 or ASTM A36 for threaded rods (galvanized).
 2. ASTM A307, Grade A for headed bolts (galvanized).
 3. ASTM F593 Type 304 or 316 stainless steel with matching nut and washer.
- H. 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:
 - a. ASTM A496, complying with AWS Code Section 7 Type C.
 - b. Minimum yield strength: 70,000 psi.
 - c. Minimum tensile strength: 80,000 psi.
 - d. Straight, unless indicated otherwise.
 - e. Solid flux.
3. After welding, remove ceramic ferrules and maintain free from any substance which would interfere with function, or prevent bonding to concrete.

2.2 FABRICATION

- A. Comply with requirements of applicable Building Code and AISC Specification (AISC 360) 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.
 1. Shop assemble components into largest size possible commensurate with transportation and handling limitations.
 2. Shop connections: Bolted with high-strength bolts or welded.
- C. Connection Details:
 1. Connections not fully detailed on Drawings shall be designed by a Professional Engineer registered in the State of Texas retained by Contractor, based on requirements of Contract Documents.
 2. Where beam reactions are shown on Drawings, design beam connection to support reaction shown.
 3. Where no reactions are shown each beam connection shall be designed to support one-half of total uniform load capacity tabulated in AISC tables for "Uniform Load Constants for Beams" for the given shape, span and steel specified.
 4. Where indicated on the Drawings, design beam connections for the axial load or transfer forces indicated in addition to the shear value indicated above.
 5. Design bracing connections for loads indicated on the Drawings.
- D. Provide as a minimum, two (2) 3/4 IN DIA, high-strength bolts for all bolted connections.

- E. Provide bearing type connections for all bolted connections, unless specified otherwise or required to be slip-critical by the RCSC Specification for Structural Joints.
- F. One-sided or other types of eccentric connections not indicated will not be permitted without prior approval.
- G. Field Connections:
 - 1. Provide bolts for all field connections except where shown otherwise on the Drawings.
 - 2. Use high-strength bolts unless shown or specified otherwise.
 - 3. Use of high-strength bolts: Conform to RCSC Specification for Structural Joints.
 - 4. Unfinished bolts may be used for attaching stair treads to stringers.
 - 5. If structural steel details (field welds versus shop welds, etc.) shown on design Drawings are not compatible with selected erection procedures, submit proposed modifications for review.
 - 6. Connections to structural steel provided by others: Provide all connectors and coordinate location of bolt holes to match connection holes in steel provided by others.
- H. Accurately mill column end bearing surfaces to true plane.
- I. Fabricate and erect beams with non-specified camber in accordance with AISC Specification (AISC 360) Chapter L1.
- J. 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.
- K. Make allowance for draw in all cross bracing to provide small amount of initial tension in members.
- L. Make splices only where indicated or where approved.
- M. Flame cut bevels for welds, provided such cutting is done automatically.
 - 1. Leave free of burrs and slag by grinding or planing the cut edges.
- N. Grind smooth all rough welds and sharp steel edges shall be ground to approximately 1/8 IN radius.
- O. 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 by the use of controlled heating, and mechanical straightening, subject to the limitations of the AISC Specification (AISC 360).
2. Fabrication tolerance:
 - a. Member length:
 - 1) Both ends finished for contact bearing: 1/32 IN.
 - 2) Framed members 30 FT or less: 1/16 IN.
 - b. Member straightness:
 - 1) Compression members: 1/1000 of axial length between points laterally supported.
 - 2) Non-compression members: ASTM A6 tolerance for wide flange shapes.
 - c. Specified member camber (except compression members):
 - 1) 50 FT or less: +1/2 IN.
 - 2) Over 50 FT: +1/2 IN (plus 1/8 IN per 10 FT over 50 FT).
 - 3) Members received from mill with 75 percent of specified camber require no further cambering.
 - 4) Beams/trusses without specified camber shall be fabricated so after erection, camber is upward.
 - 5) Camber shall be measured in fabrication shop in unstressed condition.
 - d. At bolted splices, depth deviation shall be taken up by filler plates.
 - 1) At welded joints, adjust weld profile to conform to variation in depth.
 - 2) Slope weld surface per AWS requirements.
 - e. Finished members shall be free from twists, bends and open joints.
 - 1) Sharp kinks, bends and deviation from the above tolerances are cause for rejection of material.

2.3 WELDING

- A. 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.
- B. 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.
- C. Before Starting Welding:
 1. Carefully plumb and align members in compliance with specified requirements.
 2. Fully tighten bolts.
 3. Comply with Section 5 of AWS Code for assembly and surface preparation.
 4. Preheat base metal to temperature stated in AWS Code.
 - a. When no preheat temperature is given in AWS Code and base metal is below 50 DegF, preheat base metal to at least 70 DegF.
 - b. Maintain temperature during welding.
 - c. Preheat surface of all base metal within distance from point of welding equal to thickness of thicker part being welded or 3 IN, whichever is greater, to specified preheat temperature.
 - d. Maintain this temperature during welding.
 5. Each welder shall use identifying mark at welds.
- D. Make flange welds before making web welds.
- E. Where groove welds have back-up plates, make first three (3) passes with 1/8 IN round electrodes.
 1. Use backup plates in accordance with AWS Code, extending minimum of 1 IN either side of joint.
- F. Flame cut edges of stiffener plates at shop or field butt weld.
 1. Do not shear.
- G. Grind flush web fillets at webs notched to receive backup plates for flange groove welds.
- H. Low Hydrogen Electrodes: Dry and store electrodes in compliance with AWS Code.
- I. Do not perform welding when ambient temperature is lower than 0 DegF or where surfaces are wet or exposed to rain, snow, or high wind, or when welders are exposed to inclement conditions.
- J. Headed Studs and Deformed Bar Anchors:
 1. Automatically end welded in accordance with the AWS Code and manufacturer's recommendations.
 2. Fillet welding of headed studs and deformed bar anchors is not allowed unless approved by Owner's representative.
- K. Test in-place studs in accordance with requirements of AWS Code to ensure satisfactory welding of studs to members.

1. Replace studs failing this test.
- L. When headed stud-type shear connectors are to be applied, clean top surface of members to receive studs in shop to remove oil, scale, rust, dirt, and other materials injurious to satisfactory welding.
 1. Do not shop paint or galvanize metal surfaces to receive field applied studs.

2.4 SHOP COATING

- A. Provide galvanized to coating to steel members as indicated on the drawings.
- B. Provide suitable methods of handling and transporting coated steel to avoid damage to coating.
- C. Do not coat following surfaces:
 1. All other members for which no coating is specified.
 2. Contact surfaces at bolted slip-critical connections, unless surface condition conforms to the RCSC Specification for Structural Joints, Part 3b.
- D. Clean thoroughly all surfaces not coated before shipping.
 1. Remove loose mill scale, rust, dirt, oil and grease.
 2. Protect machined surfaces.

2.5 SOURCE QUALITY CONTROL

- A. Owner may elect to provide a third-party inspector and Owner shall pay for inspection and testing:
- B. Inspection may include underwater and above water inspection:
 1. Inspect shop and field welding in accordance with AWS Code Section 6 including the following non-destructive testing:
 - a. Visually inspect all welds.
 2. Inspect high-strength bolting in accordance with the RCSC Specification for Structural Joints, Section 9.
 - a. Verify proper pretension for slip-critical bolted connection.
 - b. Verify direct tension indicator gaps.
 3. Inspect structural steel which has been erected to verify compliance with Contract Documents.

PART 3 - EXECUTION

3.1 GENERAL

- A. Contractor is solely responsible for safety.
 1. Construction means and methods and sequencing of work is the prerogative of the Contractor.

- a. 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.
2. Partially complete structural members shall not be loaded without an investigation by the Contractor.
3. Until all elements of the permanent structure and lateral bracing system are complete, provide temporary bracing designed, furnished, and installed by the Contractor for the partially complete structure.
- B. 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.
 - a. If not obvious from experience or from the Drawings, the Contractor shall confer with the Owner's Representative 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.
- C. 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.
 1. Report defects in work-in-place which may influence satisfactory completion of the work.
 2. Absence of such notification will be construed as acceptance of work-in-place.
- D. Field Measurement:
 1. Take field measurements as necessary to verify or supplement dimensions indicated on the Drawings.
 2. Contractor responsible for the accurate fit of the work.

- E. Check the elevations of all finished footings or foundations and the location and alignment of all anchor bolts before starting erection.
 - 1. Notify Owner's Representative of any errors or deviations found by such checking.

3.2 ERECTION

- A. Framing member location tolerances after erection shall not exceed the frame tolerances listed in the FIELD QUALITY CONTROL Article in this Specification Section.
- B. Erect plumb and level; introduce temporary bracing required to support erection loads.
- C. Use light drifting necessary to draw holes together.
 - 1. Drifting to match unfair holes is not allowed.
- D. Welding:
 - 1. Conform to AWS D1.1 and requirements of this Specification.
 - 2. When joining two (2) sections of steel of different ASTM designations, welding techniques shall be in accordance with a qualified AWS D1.1 procedure.
- E. Shore existing members when unbolting of common connections is required.
 - 1. Use new bolts for rebolting connections.
- F. Clean stored material of all foreign matter accumulated during erection period.
- G. Clean bearing and contact surfaces before assembly.
- H. Anchor Bolts:
 - 1. Use anchors to concrete as specified on the Drawings.
 - 2. Anchor bolt location tolerance per AWS Code Section 7.5.
 - 3. Tie anchor bolts in position to embedded reinforcing steel using wire.
 - 4. Welding or tack welding is prohibited.
 - 5. Provide steel templates for locating anchor bolts.
 - 6. Coat bolt threads and nuts with heavy coat of clean grease.
- I. Install high strength bolts with hardened washers.
 - 1. Install and tighten in accordance with the RCSC Specification for Structural Joints, Section 8.
 - 2. Coordinate installation with inspection.
 - a. Do not start installation until coordination with Testing Agency is complete.
 - 3. Bearing-type connections: High-strength bolts shall be tightened to snug-tight condition.

4. Slip-critical connections:
 - a. Perform calibration testing for all methods of installation of high-strength bolts in accordance with the RCSC Specification for Structural Joints, Section 8(b).
 - b. Turn-of-nut tightening: Torque wrenches shall be used only by laboratory personnel.
 - c. Calibrated wrench tightening: Calibrate on a daily basis.
 - d. Direct tension indicator tightening: If previously approved by Owner's Representative.
 - e. Installation of alternate design bolts: If previously approved by Owner's Representative.
5. In the event any bolt in a connection is found to be defective, check and retighten all bolts in the connection.
- J. Do not use gas cutting to correct fabrication errors.
 1. In case members do not fit or holes do not match, ream out the holes and insert the next larger size bolt.
 - a. If the connections require new holes, then drill new holes.
 - b. Make no such corrections without prior approval of the Owner's Representative.
 2. Burning of holes: Not permitted.
- K. 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.
- L. Tighten and leave in place erection bolts used in welded construction.
- M. 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.
- N. After bolts are tightened, upset threads of ASTM A307 unfinished bolts and anchor bolts to prevent nuts from backing off.
- O. 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.

3.3 FIELD QUALITY CONTROL

- A. Inspection responsibilities are described in SOURCE QUALITY CONTROL Article in PART 2.
- B. Erected Frame Tolerance (Unless noted otherwise on the Drawings):
 1. Overall finished dimensions shall not exceed cumulative effect of rolling, fabrication and erection tolerance.

2. Erection tolerances are defined relative to member working points and working lines as follows:
 - a. Actual centerline of top flange or surface at each end for horizontal members.
 - b. Actual center of member at each end for all other members.
 - c. Other points may be used, providing they are based on these definitions.
 - d. Working line is straight line connecting member working points.
3. Tolerances on position and alignment are as specified in the Code, unless otherwise modified.
 - a. "Adjustable items" such as lintels, wall supports, curb angles, window mullions and similar members shall be provided with adjustable connections to supporting structural frame.
4. Steel erector shall certify the location of erected structural steel is acceptable for plumbness, level and aligned within tolerances specified.
 - a. Such certification can be provided upon completion of any part of work and shall be done prior to start of work by other trades that may be supported, attached or applied to structural steel work.

3.4 CLEANING AND REPAIR OF SHOP PRIMER PAINT AND GALVANIZING

- A. After erection, clean all steel of mud or other foreign materials, and repair any damage.
 1. Repair damaged galvanizing per Specification Section 05 50 00 – Metal Fabrications.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fabricated metal items and certain manufactured units not otherwise indicated to be supplied under work of other Specification Sections.
2. Design of all temporary bracing not indicated on Drawings.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 05 12 00 – Structural Steel.

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American Institute of Steel Construction (AISC):
 - a. Manual of Steel Construction - Allowable Stress Design (ASD).
2. ASTM International (ASTM):
 - a. A6 – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
 - b. A36 – Standard Specification for Carbon Structural Steel.
 - c. A47 – Standard Specification for Ferritic Malleable Iron Castings.
 - d. A48 – Standard Specification for Gray Iron Castings.
 - e. A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - f. A108 – Standard Specification for Steel Bars, Carbon and Alloy, Cold Finished.
 - g. A123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - h. A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - i. A197 – Standard Specification for Cupola Malleable Iron.
 - j. A269 – Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

- k. A276 – Standard Specification for Stainless Steel Bars and Shapes.
 - l. A307 – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - m. A325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - n. A496 – Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
 - o. A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - p. A501 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 - q. A666 – Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - r. A668 – Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
 - s. A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
 - t. A786 – Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 - u. A967 – Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts.
 - v. A992 – Standard Specification for Steel for Structural Shapes.
 - w. F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
3. American Welding Society (AWS):
- a. A5.1 – Standard Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.
 - b. D1.1 – Structural Welding Code Steel.
4. Occupational Safety and Health Administration (OSHA):
- a. 29 CFR 1910 – Occupational Safety and Health Standards, referred to herein as OSHA Standards.
5. Building code:
- a. International Code Council (ICC):
 - 1) International Building Code and associated standards, 2018 Edition including all amendments, referred to herein as Building Code.

B. Qualifications:

- 1. Qualify welding procedures and welding operators in accordance with AWS.

2. Fabricator shall have minimum of 5 years experience in fabrication of metal items specified.
3. Engineer for contractor-designed systems and components: Professional structural engineer licensed in the State of Texas.

1.4 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

B. Hardware: As defined in ASTM A153.

C. Galvanizing: Hot-dip galvanizing per ASTM A123 or ASTM 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.

1.5 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Fabrication and/or layout drawings and details:
 - a. Submit drawings for all fabrications and assemblies.
 - 1) Include erection drawings, plans, sections, details and connection details.
 - b. Identify materials of construction, shop coatings and third party accessories.
3. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's installation instructions.
 - c. Provide manufacturer's standard allowable load tables for the following:
 - 1) Grating and checkered plate.
 - 2) Expansion anchor bolts.
 - 3) Adhesive anchor bolts.
 - 4) Castings, trench covers and accessories.
 - 5) Owner's representative will review for general compliance with Contract Documents.

B. Miscellaneous Submittals:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Certification of welders and welding processes.
 - a. Indicate compliance with AWS.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and handle fabrications to avoid damage.
- B. Store above ground on skids or other supports to keep items free of dirt and other foreign debris and to protect against corrosion.

1.7 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 1. Expansion anchor bolts:
 - a. Hilti Inc.
 - b. ITW Ramset/Red Head.
 - c. Simpson Strongtie.
 2. Epoxy adhesive anchor bolts:
 - a. Hilti Inc.
 - b. ITW Ramset/Red Head.
 - c. Simpson Strongtie.
 3. Galvanizing repair paint:
 - a. Clearco Products Co., Inc.
 - b. ZRC Products.
- B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

- A. Steel, Structural Shapes and Plate unless otherwise note on Drawings:
 1. Structural:
 - a. W-shapes and WT-shapes: ASTM A992, 50 ksi yield.
 - b. All other plates and rolled sections: ASTM A36.
 2. Bolts, nuts and washers, high strength:
 - a. ASTM A325.

- b. Provide two (2) washers with all bolts.
- 3. Bolts and nuts:
 - a. ASTM A307, Grade A.
- 4. Welding electrodes: AWS D1.1, E70 Series.
- 5. Steel forgings: ASTM A668.
- B. Washers: Same material and alloy as found in accompanying bolts and nuts.
- C. Embedded Anchor Bolts:
 - 1. Building anchor bolts:
 - a. ASTM F1554, Grade 55 with weldability supplement S1 or ASTM A36 for threaded rods galvanized.
 - b. ASTM A307, Grade A for headed bolts galvanized.
 - 2. All other anchor bolts: Type 304 or 316 stainless steel with matching nut and washer.
- D. Expansion Anchor Bolts and Adhesive Anchor Bolts:
 - 1. Stainless steel, Type 304, 314 or 316.
 - 2. Provide minimum edge distance cover and spacing as recommended by manufacturer, or as indicated on Drawings whichever is larger.
 - a. Minimum embedment as recommended by manufacturer or eight (8) diameters of bolt, whichever is larger.
 - b. Notify Owner's Representative if required depth of embedment cannot be achieved at a particular anchor bolt location.
 - c. Follow manufacturer's recommendations for installation and torque.
- E. Headed Studs: ASTM A108 with a minimum yield strength of 50,000 psi and a minimum tensile strength of 60,000 psi.
- F. Deformed Bar Anchors: ASTM A496 with a minimum yield strength of 70,000 psi and a minimum tensile strength of 80,000 psi.
- G. Iron and Steel Hardware: Galvanized in accordance with ASTM A153 when required to be galvanized.
- H. Galvanizing Repair Paint:
 - 1. Specification Section 09 91 00
 - 2. High zinc dust content paint for regalvanizing welds and abrasions.
 - 3. ASTM A780.
 - 4. Zinc content: Minimum 92 percent in dry film.
 - 5. ZRC "ZRC Cold Galvanizing" or Clearco "High Performance Zinc Spray."
- I. Dissimilar Materials Protection: See Specification Section 09 91 00.

2.3 FABRICATION

- A. Verify field conditions and dimensions prior to fabrication.
- B. Form materials to shapes indicated with straight lines, true angles, and smooth curves.
 - 1. Grind smooth all rough welds and sharp edges.
 - a. Round all corners to approximately 1/16 IN nominal radius.
- C. Provide drilled or punched holes with smooth edges.
 - 1. Punch or drill for field connections and for attachment of work by other trades.
- D. Weld Permanent Shop Connections:
 - 1. Welds to be continuous fillet type unless indicated otherwise.
 - 2. Full penetration butt weld at bends in stair stringers and ladder side rails.
 - 3. Weld structural steel in accordance with AWS D1.1 using Series E70 electrodes conforming to AWS A5.1.
 - 4. Weld aluminum in accordance with AWS D1.2.
 - 5. All headed studs to be welded using automatically timed stud welding equipment.
 - 6. Grind smooth welds that will be exposed.
- E. Conceal fasteners where practicable.
- F. Fabricate work in shop in as large assemblies as is practicable.
- G. Tolerances:
 - 1. Rolling:
 - a. ASTM A6.
 - b. 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 by the use of controlled heating and mechanical straightening, subject to the limitations of the AISC Specifications.
 - 2. Fabrication tolerance:
 - a. Member length:
 - 1) Both ends finished for contact bearing: 1/32 IN.
 - 2) Framed members:
 - a) 30 FT or less: 1/16 IN.
 - b) Over 30 FT: 1/8 IN.
 - b. Member straightness:

- 1) Compression members: 1/1000 of axial length between points laterally supported.
- 2) Non-compression members: ASTM A6 tolerance for wide flange shapes.
- c. Specified member camber (except compression members):
 - 1) 50 FT or less: Minus 0/plus 1/2 IN.
 - 2) Over 50 FT: Minus 0/plus 1/2 IN (plus 1/8 IN per 10 FT over 50 FT).
 - 3) Members received from mill with 75 percent of specified camber require no further cambering.
 - 4) Beams/trusses without specified camber shall be fabricated so after erection, camber is upward.
 - 5) Camber shall be measured in fabrication shop in unstressed condition.
- d. At bolted splices, depth deviation shall be taken up by filler plates.
 - 1) At welded joints, adjust weld profile to conform to variation in depth.
 - 2) Slope weld surface per AWS requirements.
- e. Finished members shall be free from twists, bends and open joints.
 - 1) Sharp kinks, bends and deviation from above tolerances are cause for rejection of material.

2.4 SOURCE QUALITY CONTROL

- A. Meet structural requirements of Specification Section 05 12 00 – Structural Steel for inspection and testing items of structural nature.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide items to be built into other construction in time to allow their installation.
 1. If such items are not provided in time for installation, cut in and install.
- B. Prior to installation, inspect and verify condition of substrate.
- C. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation.

3.2 INSTALLATION

- A. Set metal work level, true to line, plumb.
 1. Shim and grout as necessary.
- B. Bolt Field Connections: Where practicable, conceal fastenings.
- C. Grind welds smooth where field welding is required.

- D. Field cutting grating or checkered plate to correct fabrication errors is not acceptable.
 - 1. Replace entire section.
- E. Remove all burrs and radius all sharp edges and corners of miscellaneous plates, angles, framing system elements, etc.
- F. Unless noted or specified otherwise:
 - 1. Connect steel members to steel members with 3/4 IN DIA ASTM A325 high strength bolts.
 - 2. Provide washers for all bolted connections.
 - 3. Where exposed, bolts shall extend a maximum of 3/4 IN and a minimum of 1/2 IN above the top nut.
 - a. If bolts are cut off to required maximum height, threads must be dressed to allow nuts to be removed without damage to the bolt or the nuts.
- G. Install and tighten ASTM A325 high-strength bolts in accordance with the AISC Manual of Steel Construction - Allowable Stress Design (ASD).
 - 1. Provide hardened washers for all ASTM A325 bolts.
 - a. Provide the hardened washer under the element (nut or bolt head) turned in tightening.
- H. After bolts are tightened, upset threads of ASTM A307 unfinished bolts or anchor bolts to prevent nuts from backing off.
- I. Do not field splice fabricated items unless said items exceed standard shipping length or change of direction requires splicing.
 - 1. Provide full penetration welded splices where continuity is required.
- J. Provide each fabricated item complete with attachment devices as indicated or required to install.
- K. Anchor such that work will not be distorted nor fasteners overstressed from expansion and contraction.
- L. Tie anchor bolts in position to embedded reinforcing steel using wire.
 - 1. Tack welding prohibited.
 - a. Coat bolt threads and nuts with heavy coat of clean grease.
 - 2. Anchor bolt location tolerance:
 - a. 1/16 IN.
- M. Repair damaged galvanized surfaces in accordance with ASTM A780.
 - 1. Prepare damaged surfaces by abrasive blasting or power sanding.
 - 2. Apply galvanizing repair paint to minimum 6 mils DFT in accordance with manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

- A. Tolerances shall meet structural requirements of Specification Section 05 12 00 for erecting items of structural nature.

3.4 CLEANING

- A. After erection, installation or application, clean all miscellaneous metal fabrication surfaces of all dirt, weld slag and other foreign matter.

END OF SECTION

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SECTION 06 82 00

FIBERGLASS REINFORCED PLASTIC FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass reinforced plastic (FRP) safety grating panels

1.2 MEASUREMENT AND PAYMENT

A. Stipulated Price (Lump Sum). If Contract is a Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. American National Standards Institute (ANSI):
2. Occupational Safety and Health Administration (OSHA):
 - a. 29 CFR 1910 – Occupational Safety and Health Standards, referred to herein as OSHA Standards.
3. Building code:
 - a. International Code Council (ICC):
 - 1) International Building Code and associated standards, 2018 Edition including all amendments, referred to herein as Building Code.

1.4 DEFINITIONS

A. Skid-resistant:

1. Manufacturer's standard applied abrasive grit coating.
2. Abrasive coated tape is not acceptable.

1.5 SYSTEM DESCRIPTION

A. Provide fiberglass grating supported by steel I-beam as shown on the Drawings.

1.6 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 – Submittals for requirements for the mechanics and administration of the submittal process.
2. Fabrication and/or layout drawings.
 - a. Plan showing profile, location, section and details of each item including anchorage or support system(s).
3. Product technical data including:

- a. Acknowledgement that products submitted meet requirements of standards referenced.
- b. Manufacturer's installation instructions.
- c. Manufacturer's recommendations on reinforcing field cut openings.
- 4. Manufacturer's full line of colors available for each component.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and handle each item to preclude damage.
- B. Store all items on skids above ground.
 - 1. Keep free of dirt and other foreign matter which will damage items or finish and protect from corrosion and UV exposure.

1.8 WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - 1. Grating:
 - a. Fibergrate Composite Structures International.
 - b. IKG Industries.
 - c. Enduro Composite Systems.
 - d. Strongwell.
- B. Submit request for substitution in accordance with Specification Section 01 25 13 – Product Substitutions.

2.2 MATERIALS

- A. Gratings:
 - 1. Polyester resin with fiberglass reinforcing.
 - 2. Fire retardan}.
 - 3. Color: To be selected by Owner's Representative when more than one color is available for any one component.
- B. Fasteners, Clips, Saddles, and Miscellaneous Components:
 - 1. Fiberglass where possible.
 - 2. Galvanized steel may be used if fiberglass component is not available.
- C. Adhesive: Recommended by manufacturer.
- D. Skid-resistant Surfacing: Manufacturer-applied abrasive grit coating.

2.3 FABRICATION

A. General:

1. Verify field conditions and dimensions prior to fabrication.
2. Preassemble items in shop to greatest extent possible.
3. Drill or punch holes with smooth edges.

B. Grating Material:

1. Design live load, unless noted otherwise:
 - a. 100 psf uniform live load.
 - b. 300 LBS concentrated load.
 - c. Maximum deflection of $l/300$ of span under a superimposed live load.
 - d. Design for the most severe loading condition noted above.
2. Minimum grating depth: 1-1/2 IN.
3. Bar span: Maximum of 1-1/2 IN center to center.
4. Walking surface: Manufacturer's standard applied abrasive grit coating.

C. Embedded Grating Supports:

1. Provide as shown on the Drawings

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Set work accurately in location, alignment and elevation, plumb, level, and true.

1. Measure from established lines and levels.
2. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.
3. Tolerances:
 - a. Maximum variation from plumb in vertical line: 1/8 IN in 3 FT.
 - b. Maximum variation from level of horizontal line: 1/4 IN in 20 FT.
 - c. Maximum variation from plan location: 1/4 IN in 20 FT.
4. Provide two washers for each bolt.

C. Attach grating to each end and intermediate support clip or saddle with bolts, nuts and washers.

1. Maximum spacing: 1 FT OC with minimum of two per side.
2. Attach clips or saddles to bearing bars only.

- 3. Reinforce all field cut openings in accordance with manufacturer's recommendations.
- D. File cut ends of all fiberglass to a 1/32 IN radius.
- E. Seal cut ends of all items with catalyzed resin as recommended by manufacturer.
 - 1. Provide same resin used in fabrication of item as a minimum.
- F. Provide all modular framing components as required to suit condition.
 - 1. Install in accordance with manufacturer's recommendations.

END OF SECTION