Rockwall INDEPENDENT SCHOOL DISTRICT

Request for COMPETITIVE SEALED PROPOSALS

RFCSP 2526.11-002
RAKOW MS PARKING LOT ADDITION

Date	Event
November 7, 2025	1st Advertisement / Issue Date
November 13, 2025	Pre-Bid Conference – 1:00 P.M. (CST)
November 18, 2025	Deadline for Questions – 12:00 P.M. (CST)
November 20, 2025	Addendum posted to Address Questions
December 4, 2025	Deadline for Responses – 2:00 P.M. CST)
December 15, 2025	Recommendation to RISD Board of Trustees

** The District will make every effort to adhere to this schedule; however, dates are subject to change. Any changes will be posted in the form of an addendum on the RISD website. Additional addendums may be posted at the discretion of RISD. Potential respondents are responsible for watching the website for such publications.*

Deliver Sealed Responses to:
Rockwall ISD Administration Building
Purchasing Department
1050 Williams Street
Rockwall, Texas 75087

Rockwall ISD Purchasing Department:
(Contact during Procurement)
Jana Hunter, MBA, RTSBA
Director of Purchasing
972-771-0605
jana.hunter@rockwallisd.org

Rockwall ISD Facilities Department:
(Contact during Project)
Eddie Guajardo
Facility Services Project Manager
972-771-0605
eddie.guajardo@rockwallisd.org

Pre-Bid Information:
November 13, 2025 – 1:00 P.M.
RISD Administration Bldg.

NOTICE

The Rockwall Independent School District (RISD) is soliciting proposals per the specifications stated elsewhere in this solicitation document. A response to this solicitation is an offer to contract with Rockwall ISD and its members based on the specifications and standard terms and conditions contained in the bid document.

Respondents are cautioned to read this document completely and submit all documents. Each respondent, by submitting a response, represents that he/she has read and understands the proposal. Failure to examine the documents will be at the vendor's risk.

Respondents shall familiarize themselves with existing conditions in the material and labor markets prior to submission of an offer. The fact that an offer is submitted will be construed by the RISD Board of Trustees to indicate that the respondent agrees to carry out the furnishing of products and services in full accordance with the specifications and other contract documents not withstanding existing material and labor market conditions. A signed, submitted proposal constitutes an offer to perform the work and/or deliver the product(s) and/or services specified in the solicitation.

The vendor should propose his/her lowest and best price. All pricing information shall be entered on the proposal in ink or typewritten. Pricing should include packaging and transportation unless otherwise noted by the vendor.

If the vendor is awarded a contract under this solicitation, the prices proposed by the vendor shall remain fixed and firm during the term of the contract, provided, however that the vendor may offer incentive discounts from this fixed price to the District at any time during the contractual term.

Jana Hunter

Jana Hunter, MBA, RTSBA
Director of Purchasing

November 7, 2025
Release Date

DISTRICT OVERVIEW

Rockwall ISD, situated in Rockwall County, Texas, comprises approximately two-thirds of the county's area and shares the county's boundary lines on the North, West and South. The eastern boundary of the district is an irregular line running through the town of Fate.

The District currently has 21 campuses comprised of 16 elementary schools, 3 middle schools, 2 high schools, a College and Career Academy and an alternative school. The District currently serves approximately 18,500 students and employs approximately 2300 employees.

Rockwall ISD has grown by more than 3,000 over the last decade and is expected to grow by nearly 6,000 students by 2030.

Rockwall ISD's Call to Action: Rockwall ISD empowers learners to embody independence, value relationships, and achieve excellence as thriving members of a dynamic community.

We believe that:

- Collaborative relationships create a culture where learners thrive.
- An effective learning environment is collaborative, safe, challenging, and responsive to the diverse needs of all students.
- Learning is a partnership that engages all members of our community to empower empathetic and responsible citizens for success among themselves.
- All learners deserve to be challenged in preparation for lifelong learning and future success.

Core Values:

- Relationships
- Innovation
- Excellence

Rockwall INDEPENDENT SCHOOL DISTRICT

Additional information about Rockwall ISD can be obtained on its website: www.rockwallisd.com

CODE OF CONDUCT

Vendors and their suppliers, installers and all others working on Rockwall ISD facilities are required to understand and adhere to the following rules and responsibilities. Failure to comply with the following rules and responsibilities may result in a work's removal from the facilities and/or the termination of all subcontractor's contract. Vendors are responsible for the suppliers and installers adherence to these policies. All personnel working on RISD facilities will indicate their understanding and agreement to comply with these rules and responsibilities by submitting a response to this solicitation.

1. Vendor's employees, installers and suppliers who will be entering the district should check in with the Rockwall ISD designated representative.
2. Vendor's employees, installers and suppliers must wear picture ID badges while on Rockwall ISD property.
3. The use of any tobacco products is prohibited on district property. These prohibited items include but are not limited to cigarettes, cigars, vapes and smokeless tobacco.
4. Drugs and alcoholic beverages are prohibited.
5. The use of vulgar or improper language is prohibited.
6. Unacceptable behavior including physical or verbal intimidation, horseplay, or fighting by any individual on district property will result in immediate remove from property.
7. School requirements may occasionally result in the untimely termination of a subcontractor's daily activities. Vendors are expected to anticipate and understand these circumstances and work with RISD to make-up any scheduling.
8. All contact with student is strictly prohibited.
9. Vendor's employees, installers and suppliers must be properly dressed in work attire which includes the use of proper work shoes and personal protection equipment (as needed).
10. Vendor's employees, installers and suppliers will promptly leave the premises at the end of each work shift or once business purpose has been served.
11. Vendor's employees, installers and suppliers will comply with all state and district rules regarding weapon free zones.
12. Vendor's employees, installers and suppliers shall submit such background information as may be requested by Rockwall ISD to perform criminal background evaluations/investigations.
13. No person who has charges pending or who has been convicted, received probation or deferred adjudication for the following shall be engaged to work on RISD property where students are present: Any offense against a child, any sex offense, any crimes against persons involving weapons or violence, any felony offense against property; or any offense that Rockwall ISD determines to compromise the safety and well-being of staff, students and/or property.

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STANDARD TERMS AND CONDITIONS

The following instructions by the Rockwall Independent School District are intended to afford potential respondents an equal opportunity to participate in the solicitation process. The following Terms and Conditions are standard for the District and apply to all types of purchasing, including this solicitation. In these Terms and Conditions, the terms *respondent, contractor*, *proposer*, *vendor*, and/or *bidder* refer to the person/firm that submits the offer to this solicitation document. The terms *RISD*, *owner*, *district*, and/or *government entity* refer to Rockwall Independent School District.

The documents contained in this solicitation represent the potential agreement between the successful respondent and the school district and supersedes any prior discussions, negotiations, representations, agreements, written or oral.

Any specifications, details, or specific instructions for this solicitation will be found following these Standard Terms and Conditions. Some of the Standard Terms and Conditions may not be applicable to a specific bid or proposal. To the extent each of the terms and conditions is applicable, these shall be deemed to be part of the vendor's bid or proposal documents. If there are specific terms and conditions contained in the bid or proposal documents which are inconsistent with the Standard Terms and Conditions, the specific terms and conditions in the bid and solicitation documents shall control. By submitting a bid or proposal, each vendor or proposer agrees to waive any claims it has or may have against the Owner, the Architect, and their respective officers, trustees, employees, agents, or representatives, arising out of or in connection with the administration, evaluation, recommendation, or selection of any bid or proposal; waiver of any requirements under the bid or proposal documents or contract documents; acceptance or rejection of any bid or proposal; and award of the contract.

The district guarantees no minimum dollar amount in purchase orders against this contract. The scope of this request and requirements of the District as shown in the specifications shall not be considered as binding on the District, and the work actually may be less than or greater than projected.

The RISD can terminate any resulting award for this request with thirty (30) calendar day notice, in the event no funds or insufficient funds are appropriated and budgeted or are otherwise not available in the next fiscal year for obligations herein provided, however, this provision shall not be construed so as to permit RISD to terminate this request in order to enter other contracts or make other arrangements for essentially the same services made the subject of this solicitation.

All bids and proposals from the vendor must remain open for acceptance for sixty (60) days after submittal.

AUTHORITY

The Board of Trustees has delegated to the superintendent the authority to make budgeted purchases for goods and services. Functional area experts, day-to-day contract administrators/managers, teachers, principals, and/or other district employees are not authorized to substantially amend this solicitation document or to substantially modify the subsequent contract. Substantially includes, but is not limited to, changes to delivery dates, place of delivery, and/or specifications that significantly alter the form, fit, and function of a product or the scope of work of a service. Amendments to solicitation documents may be made by the Director of Purchasing. Modifications to contracts/agreements will be made by the Director of Purchasing in accordance with the RISD Board of Trustee guidance, policies, and/or procedures. If a vendor acts on the guidance of a district employee that is not authorized to make changes, the vendor does so at his or her own risk or peril. Also, if a vendor attempts, or gains, a modification/amendment from a district employee that is not authorized to make changes, the vendor does this at his or her own risk or peril and risks the termination of his or her contract/agreement. The functional administrator for this contract is Eddie Guajardo, Facility Services Project Manager.

CONTACT

Contact between soliciting vendors and user departments during this solicitation process or evaluation process is prohibited. Any attempt by a soliciting firm to contact the department may result in disqualification.

VENDOR QUESTIONS

Any explanation desired or questions by a vendor regarding the meaning or interpretation of these instructions or any other documents included in this solicitation must be requested in writing to RISD, Director of Purchasing, 1050 Williams Street, Rockwall, TX 75087 (jana.hunter@rockwallisd.org) with sufficient time allowed for a reply to reach vendors before the submission of their offers. The email subject line for questions should read: "Questions" followed by the solicitation number and title. The deadline for questions regarding this solicitation is November 18, 2025.

ADDENDA

Written responses to vendor questions shall be presented in the form of an Addendum and posted on the District's website at: https://www.rockwallisd.com/Page/380. Respondents should monitor the Purchasing page on the RISD website for such postings. Oral explanations or instructions will not be binding. Rockwall ISD reserves the right to post addendums up to, and including, the business day prior to the deadline. Vendors who submit a bid or proposal without acknowledging receipt of all addenda issued may be deemed to have submitted a bid or proposal not responsive to the solicitation. Failure to receive such addenda does not relieve the vendor from any obligation under the bid or proposal submitted. All formal written addenda become a part of the vendor bid or proposal documents.

PRE-BID MEETING

Any scheduled pre-bid meeting, will be noted on the cover page of this document. In the event a pre-bid meeting is held, attendance is highly recommended to all potential responders. The purpose of this meeting will be to answer any questions regarding the proposal specifications. Proposers are reminded, however, that verbal responses are not binding – only questions answered by formal written agenda will be binding and will be made part of the proposal documents. Proposers must satisfy themselves, upon examination of these specifications in the pre-bid conference, as to the intent of the specifications. After submission of the proposal, no complaint or claim that there was any misunderstanding in regard to items listed for proposal will be entertained from either party.

SUBMISSION

The responsibility for compliance with this solicitation and the subsequent contract shall be with the bidder/respondent. In submitting a response to this solicitation, respondent understands and agrees to be bound by the terms and conditions, provided in this document, which shall be incorporated into any future contracts, agreements, or purchase orders relating to any resulting agreement between the vendor and Rockwall ISD.

Submissions to this request are due by: December 4, 2025 – 2:00 P.M. (CST)

Responses must be plainly marked on the outside with the vendor's name and address and the solicitation number. A shipping label has been provided in this packet and its use is highly encouraged. Respondents are instructed to submit (1) one original hard copy (marked ORIGINAL) and (1) one additional hard copy.

Responses must be delivered in a sealed envelope or container and submitted to the Purchasing Department at the RISD Administration Building in sufficient time to be received and time-stamped on or before the published date and time shown within this document or on any subsequent addenda. No other published dates will be binding. Late submissions will not be accepted. Unsigned, unsealed, faxed or late responses will not be accepted. Rockwall ISD will not be responsible for mail delivered from the post office. No oral, telegraphic, telephonic, electronic mail or facsimile transmitted responses will be considered. RISD Purchasing personnel will be the official time keeper for all submissions.

Each vendor shall furnish the information required by the solicitation documents. Proposals should provide straightforward, concise information that satisfies the requirements of this solicitation. Emphasis should be placed on conformity to the instructions and requirements of this solicitation and the completeness and clarity of content. Links to web sites for supporting documentation are not acceptable. Expensive bindings, color displays, and advertising materials are not necessary or desired.

Offers submitted on other than authorized forms or with different terms or provisions may be considered to be non-responsive. The vendor must sign the Offer Form and return with the other certifications provided

herein. Failure to manually sign the offer may disqualify it from being considered. The person signing the documents must initial erasures or other changes. Signatures by an agent are to be accompanied with evidence of his authority unless such evidence has been previously furnished to RISD.

EXCEPTIONS/MODIFICATIONS/WITHDRAWAL

Responses deposited with Rockwall ISD may be withdrawn prior to the time set for opening. A response may not be withdrawn after the submittal deadline. By submitting a response, the proposer warrants and guarantees that the document has been carefully reviewed and checked and that it is in all things true and accurate and free of mistakes. If any exceptions are taken to any portion of the bid or proposal, the vendor must clearly indicate the exceptions taken and include a full explanation. Vendor's failure to identify exceptions or proposed changes will constitute acceptance by the vendor of the bid or proposal as proposed by the District. The District reserves the right to reject a bid or proposal containing exceptions, additions, qualifications, or conditions. Any bid or proposal to the District by the vendor, or contract between the District and the vendor, can be modified or withdrawn only by written agreement between Rockwall ISD and the vendor.

BID OPENING

Submittals may be publicly opened immediately after the response deadline on the same day. Responses received by hand delivery or mail after the stated due date and time will remain unopened. Trade secrets and confidential information contained in response shall not generally be open for public inspection, but RISD's records are a matter of public record.

DISQUALIFICATION

Any bid or proposal that does not contain all required contents required by District may be disqualified. Vendor is strongly encouraged to carefully review its bid or proposal documents prior to submitting their response to ensure all requirements are met. Failure to provide the information requested, in its entirety, may be grounds for disqualification of the bid or proposal. Bidders or proposers may also be disqualified and their bids or proposals not considered, among other reasons, for any of the following specific reasons:

a. Reason for believing collusion exists among respondents
b. Reasonable grounds for believing that any respondent is interested in more than one solicitation for the work contemplated
c. Where the respondent, any sub-contractor or supplier, or the surety on any bond given, or to be given, is in litigation with the District or where such litigation is contemplated or imminent, in the sole opinion of the District
d. Respondent being in arrears on any existing contract/purchase order or having defaulted or failed to perform in a satisfactory manner on a previous purchase order
e. Lack of competency as revealed by pertinent facts, including but not necessarily limited to, experience and equipment, financial statement and questionnaires

f. Uncompleted work that, in the judgement of the District, will prevent or hinder the prompt completion of addition work if awarded.
g. Where the bidder or proposer has failed to perform in a satisfactory manner on a previous purchase order or contract.

RISD expressly reserves the right to:

a. Reject any or all proposals
b. Consider a response irregular if it shows any omissions, alterations of form, additions, or conditions not called for; failure to return all forms and copies; or irregularities of any kind.
c. Waive any minor informality or deficiency in a bid or proposal if it is determined to be in the best interest of RISD
d. Award to a single vendor, multiple vendors, each line item separately, or in any combination it determines to be in the best interest of the District. If the Respondent chooses to propose "All or None" or is not agreeable to multiple or split awards, it must be noted as a deviation and included with the response.
e. Reissue a request
f. Consider and accept an alternate proposal as provided herein when most advantageous to RISD, including the utilization of other District contracts, contracts awarded by other governmental agencies, other school boards, or cooperative agreements in lieu of any offer received or award made as a result of this proposal, if it is in the best interest to do so.
g. Cancel the contract with a thirty-day written notice, without prejudice, for factors including, but not limited to, non-availability or non-appropriation of funds
h. Procure any item or services by other means to meet time-sensitive requirements
i. As part of the evaluation process, seek additional information from bidders or proposers, interview bidders or proposers, and negotiate the terms of a proposal as allowed by Texas law.
j. Negotiate price/delivery for service(s)/products(s) identified by this request. The District reserves the right to reject any and all bids that comply with the specifications or to accept a higher bid that complies, when, in judgment of the District, such proposal offers additional value or function, which justifies the difference in price.
k. Make an award without discussion with any proposer.
l. Be the sole judge of acceptable proposal responses.
m. Cancel part or this entire contract at any time during the term without cause. Notification will be submitted in writing no less than thirty (30) days prior to the effective date. Upon receipt of such notice from the District, vendor shall not thereafter incur, and RISD shall have no liability for, any costs under this solicitation that are not necessary for actual performance of the request between the date of the notice of termination for convenience and the effective date of that termination for convenience. In the event of a termination for convenience hereunder, RISD shall have no liability to vendor for lost or anticipated profit resulting there from.

n. Terminate for default all or any part of this contract if vendor breaches any of the terms hereof or if the vendor becomes insolvent or files any petition in bankruptcy. Such right of termination is in addition to and not in lieu of any other remedies which RISD may have in law or equity, specifically including, but not limited to, the right to collect for damages or demand specific performance. RISD may terminate the contract and debar the vendor for future "bidding" for violations of the federal requirements including, but not limited to, "Contract Work Hours and Safety Standards Act", "Equal Employment Opportunity Act", and "Energy Policy and Conservation Act".

Purchases of service or equipment from a business owned in whole or in part by a Rockwall ISD employee shall be permitted only when approved by the Director of Purchasing and when determination has been made that such equipment or service is not an extension of the employee's regular job responsibility at the District. Failure on part of Proposer to disclose ownership by the District employee may be grounds for disqualification.

EVALUATION

Proposals may be evaluated by an Evaluation Committee comprised of key Rockwall ISD personnel in order to fairly evaluate all qualified proposals. Evaluation by committee members will be combined into one score, which will be compared to the other proposals.

To the extent allowed by law, discussions/negotiations may be conducted with vendors who are deemed to be within the competitive range. If discussions/negotiations are conducted, respondents may be required to submit a best and final offer. The best and final offer may be required as early as 24 hours after completion of discussions/negotiations.

In determining to whom to award a contract and per the Texas Government Code 2269.055, the district will consider and apply any existing laws, including any criteria, related to historically underutilized business and any existing laws, rules or applicable municipal charters, including laws applicable to local governments, related to the use of women, minority, small, or disadvantaged business. The district may also consider the following criteria. At the discretion of the district and in evaluation of this solicitation, point values are indicated after each criteria item.

Govt. Code 2269	Criteria	Weight
(1)	The Price	60
(2)	The offeror's experience and reputation	15
(3)	The quality of the offeror's goods or services	20
(4)	The offeror's proposed personnel	5
(5)	Any other relevant factor specifically listed in the request for bids, proposals or qualifications	0

In determining an award of a contract under Texas Government Code 2269.055, the government entity shall:

a. Consider and apply any existing laws, including any criteria, related to historically underutilized businesses; and
b. Consider and apply any existing laws, rules, or applicable municipal charters, including laws applicable to local governments, related to the use of women, minority, small or disadvantaged business.

As provided by Texas Government Code 2269.054 ("Right to Work"), Rockwall ISD will not consider whether the vendor is a member of, or has any other relationship, with any organization, and the specifications are not intended to, and do not, deny or diminish the right of a person to work because of the person's membership or other relationship status with respect to any organizations.

It is the intent and policy of the District not to discriminate on the basis of sex, disability, race, color, or national origin in its programs and/or activities, nor in its employment practices.

LOBBYING

In order to ensure the integrity of the selection process, the vendor's employees, officers, agents, or other representatives shall not lobby or attempt to influence a vote or recommendation related to the vendor's response, directly or indirectly, through any contact with school board members or other district officials involved in the solicitation from the date it is released until the award.

AWARD

Successful vendor(s) may be notified in writing of District's award. No assignment of a bid, proposal, or resulting contract is permitted without the prior notice to and written consent of Rockwall ISD by means of a Notice to Proceed and/or Authorized Purchase Order or signed contract after a recommendation has been accepted by the RISD Board of Trustees. If respondent requires any other agreement, a draft document must be provided with the proposal. No work shall begin, goods procured or delivered, or costs incurred by vendor until the notice is received. Any cost incurred by the vendor prior to the notice shall not be reimbursed by the District.

Tabulations may be requested by contacting the Director of Purchasing via email upon award of a contract based upon approval by the RISD Board of Trustees, if required. Otherwise, information may be released after award of the contract by the Superintendent or designee.

TERM

If this solicitation is for a set time period only, or a single purchase, the award will last until the goods or services have been delivered, completed and accepted by the District. The District reserves the right to acquire reasonable amounts of additional goods/services, as listed in the bid or proposal, subject to verification of the same or lower prices and conditions of the bid or proposal and consistent with Texas law. After the initial contract term, the District reserves the right to extend the contract as indicated in this request.

PRICING

All prices proposed by the vendor, and accepted by the District, shall remain in effect throughout the term of the bid proposal, award, contract, or purchaser order, and cannot be increased during that term without written agreement between the vendor and the Rockwall ISD Board of Trustees or its designee. Rockwall ISD reserves the right to show a preference to any bid or proposal that provides a standard discount percentage for goods or services, or a discount for early payment of any bill to the vendor for its goods or services.

BILLING AND PAYMENTS

Per CH Local of District Policy - The District limits its purchases through the use of properly drawn and authorized purchase orders. Consequently, the District is not responsible for items not ordered via this method. The purchase order number shall appear on all itemized invoices to ensure payment. District employees shall not be permitted to purchase supplies or equipment for personal use through the District's business office without an authorized purchase order. Completing work or providing product without a purchase order may result in non-payment by the district and/or termination of awarded contract.

The District is a tax-exempt entity under Texas law. Vendor should not include tax on its bid, proposal, quote or invoice to the District. Vendor shall submit itemized invoices on each purchase order in a timely manner following delivery.

Invoices shall indicate the purchase order number and be submitted to RISD Business Office, Attn: Accounts Payable, 1050 Williams Street, Rockwall TX 75087 or emailed to accountspayable@rockwallisd.org.
The vendor shall make no charge or addition to the accepted price for delivering, placing, or invoicing product(s). Payment shall not be due until all items on the purchase order have been received by RISD (unless specified in the specifications) and the above instruments are submitted and the invoice has been accepted by RISD. All prices shall be F.O.B. destination.

District shall make all payments under this Agreement from current revenues available. In the event no funds,

or insufficient funds due to non-appropriation, are available at any time or during any fiscal period when such payment is due, in accordance with Local Government Code Ann. §271.903, District shall notify vendor of such occurrence and this Agreement shall terminate on the last day of the fiscal period for which payment was received without penalty or expense to District of any kind whatsoever. However, District shall be responsible to remit payment for all services provided by the Vendor to the District prior to the termination date.

GOODS

The vendor warrants that it owns and is legally able to transfer ownership of the goods or materials that are the basis of the solicitation to Rockwall ISD. The vendor warrants that it owns a clear title free of any materialman's, suppliers, or other type of liens, mortgage, encumbrance, or other security interest in the goods or materials supplied to Rockwall ISD. Any breach to this warranty of title shall be considered a default by the vendor and good cause for termination of the award, contract, or purchase order.

Strict conformance with the standards, specifications, and requirements of the bid or proposal is required by Rockwall ISD. Unless otherwise stated in the specifications, all supplies and components to be provided shall be new (not used or reconditioned, and not of such age or so deteriorated as to impair their usefulness or safety), of current production, and of the most suitable grade for the purpose intended. If at any time during the term of an awarded agreement the vendor believes the furnishings of supplies or components which are not new is necessary or desirable, it shall notify the District immediately, in writing, including the reasons and proposing any consideration which will flow to the District if authorization to use such supplies or components is granted.

If a brand name or specific model name is shown in the proposed specifications or bid form, such usage is to indicate an acceptable standard which must be considered if bidding better or equivalent products. Any bid or proposal for such better or equivalent products shall provide significant information on the products to allow the District to determine whether or not they are acceptable.

Any proposed substitution of goods or services to be supplied by the vendor shall require prior written acceptance by the District, unless stated otherwise. The vendor shall be bound to provide all proposed goods or services if its bid or proposal is accepted and awarded by Rockwall ISD, and no changes shall be acceptable unless agreed to in writing by the District.

Vendor assumes all liability for delivering non-compliant goods. The District reserves the right to reject any tender of non-compliant goods and shall require the vendor to take possession of such defective goods at no cost to District, and replace them with compliant goods at no cost to District, unless Rockwall ISD elects, in writing, to accept such non-compliant goods. Such non-confirming goods shall constitute good cause for termination of the contract, purchase order, or award, if not accepted by written agreement by Rockwall ISD or cured by the vendor.

Respondent agrees to ascertain whether goods manufactured in accordance with the specifications will give rise to the rightful claim of any third person by way of infringement or the like. If vendor is of the opinion that an infringement or the like will result, he/she will notify RISD to this effect in writing within two weeks after the signing of this a contract. If RISD does not receive notice and is subsequently held liable for the infringement or the like, vendor will indemnify RISD for any damages due to such claim. If vendor, in good faith, ascertains that production of the goods in accordance with the specifications will result in infringement or the like, this document shall be null and void. RISD may pay vendor for the reasonable cost (as determined by RISD) of his/her search as to infringements.

Respondent warrants that the product sold to RISD shall conform to the standards promulgated by the federal government including, but not limited to, the U.S. Department of Labor under the Occupational Safety and Health Act (OSHA) and the Consumer Product Safety Commission (CPSC). In the event the product does not conform to applicable safety standards, RISD may return the product for correction or replacements at the vendor's expense. In the event vendor fails to make the appropriate correction within a reasonable time (i.e., 2 weeks) correction may be made by RISD at vendor's expense.

The terms of the agreement are “no arrival, no sale”. The title and risk of loss of the goods shall not pass to the District until the District actually receives and takes possession of the goods/services at the point or points of delivery. The District shall have the right to inspect the goods at delivery before accepting them.

The vendor shall be responsible for replacing or correcting any defective product or service supplied to the District in response to the Solicitation at no cost to Rockwall ISD.

DELIVERY

Performance of service/delivery of goods shall be made to the location identified on each purchase order or resulting contract. All work performed, as herein shown under the specifications, shall be of the highest quality workmanship and shall in every respect meet or exceed the industry standards for this type of good/service. Every tender or delivery of goods must fully comply with all provisions of this contract as to time of delivery, quality and the like. All delivered equipment, materials or merchandise must be new, unused, free of liens, and in the manufacturer's original packing unless otherwise specified. If a tender is made which does not fully conform, this shall constitute a breach of the contract, purchase order, and award, and the vendor shall not have the right to substitute a conforming tender, provided, where the time for performance has not yet expired, the vendor may reasonably notify the district of his intention to cure and may then make a conforming tender within the contract time but not afterward.

The vendor will package goods in accordance with good commercial practice. Each shipping container shall be clearly and permanently packed as follows: (a) vendor’s name and address;(b) Consignee's name, address and purchase order or purchase release number and the supply agreement number if applicable; (c) Container number and total number of containers, e.g., box 1 of 4 boxes; and (d) the number of the

container bearing the packing slip. The vendor shall bear the costs of packaging and delivery at reasonable costs unless otherwise provided. Acceptance by the District of any delivery shall not relieve the vendor of any guarantee or warranty, express or implied, nor shall it be considered an acceptance of material not in accordance with the specifications and shall not waive the District's right to request replacement of defective material.

NOTICE OF DELAYS

Whenever the vendor encounters any difficulty which delays or threatens to delay timely performance, the vendor shall immediately give notice, in writing, to the District, including all relevant information. Such notice shall not in any way constitute a basis for an extension of the delivery or performance schedule or be construed as a waiver by Rockwall ISD of any right or remedies to which it is entitled by law or pursuant to provisions herein. Failure to give such notice, however, may be grounds for denial of any request for an extension of the delivery or performance schedule because of such delay.

SAFETY DATA SHEET (SDS)

The vendor shall provide, at no cost to DISTRICT, at least one (1) copy of any Safety Data Sheet (SDS) applicable to any goods or materials to be supplied by the vendor in response to this solicitation.

WARRANTIES

Warranties for goods and services shall be a minimum of one (1) year from completion of the bid or proposal. If goods or services to be provided are of comparable quality, the District may give preference to longer warranties when evaluating the bid or proposal.

The price to be paid by Rockwall ISD shall be that contained in vendor's response, which the vendor warrants to be no higher than the vendor's current prices on orders by others for products of the kind and specification covered by the agreement for similar quantities under similar or like conditions and methods of purchase. In the event the vendor breaches this warranty, the prices of the items shall be reduced to the vendor's current prices on orders by others or, in the alternative, Rockwall ISD may cancel this contract without liability to the vendor for breach or the vendor's actual expense.

The vendor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for commission, percentage, brokerage, or contingent fee excepting bona fide employees of bona fide established commercial or selling agencies maintained by the vendor for the purpose of securing business. For breach or violation of this warranty, Rockwall ISD shall have the right in addition to any other right or rights to cancel this contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee.

The vendor shall not limit or exclude any implied warranties and any attempt to do so shall render this contract

voidable at the option of the District. The vendor warrants that the goods furnished will conform to the specifications, drawings and descriptions listed in the bid invitation and to the sample(s) furnished by the vendor, if any. In the event of a conflict between the specifications, drawings and descriptions, the specifications shall govern. All equipment items awarded as a result of the bid will be covered by an all parts and labor warranty, including any/all transportation charges, for a minimum period of one (1) year.

CONTRACTORS

Persons providing services on a project ("subcontractor" in Texas Labor Code 406.096) include all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity that furnishes persons to provide services on the project.

Services include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. Services do not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

The proposer declares that in the event of the award of a contract to the undersigned to this offer will comply with the Immigration Reform & Control Act of 1986.

Respondents will provide their own tools/equipment required/expected of their craft/trade. The contractor is responsible for permits and fees required and compliance with all local, state, and federal rules, regulations, and statutes. The job site shall be in a clean, safe and orderly condition at all times. It shall be the contractor's responsibility to remove all debris, materials, and equipment from the job site upon completion of the work specified.

The contractor shall agree to waive all right of subrogation against the District, its officials, employees and volunteers for losses from work performed by contractor for the District.

The contractor shall hold the District harmless from and indemnify it against all liability, including attorney's fees, which may arise from and accrue directly from the performance of the work or any obligation of Contractor or failure of Contractor to perform any work or obligation provided for in this Agreement.

INSURANCE

The successful respondent, at his/her own expense, shall provide and maintain insurance with fiscally sound firms (at least an AM Best rating of A-) authorized to do business in Texas. Insurance requirements also apply to any sub-contractor(s) in the event that any work is sublet. The contractor is responsible for making

sure the sub-contractor(s) meets the minimum insurance requirement limits as by law.

Insurance must remain in effect for the duration of this contract. Should any policy be canceled before the expiration date, the issuing company will mail thirty (30) days written notice to the certificate holder, RISD. The contractor shall notify the district in writing by certified mail or personal delivery, within ten days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the district showing that coverage has been extended.

Vendor may be required to provide a copy of insurance coverage to RISD. If the district is to be named as an additional insured on the vendor's insurance coverage, the certificate indicating this should be provided within ten (10) calendar days from date of award. The bid/proposal number and title should be noted in the "Description of Operations/Locations/Vehicles/Special Items" block of the certificate and the "Certificate Holder" block of the certificate should read, "RISD, Attn: Director of Purchasing, 1050 Williams Street, Rockwall, TX 75087." Additional insurance requirements may be required for construction and/or services projects and will be identified elsewhere in this document.

The contractor represents to the district that all employees of the contractor who will provide services on the project will be covered by statutory workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code 401.011 (44) for all employees of the contractor, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

The contractor shall post on each project site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project is required for the duration of the project. Duration of the project includes the time from the beginning of the work on the project until the project has been completed and accepted by the district.

The contractor shall retain all required certificates of coverage for the duration of the project and for one

year thereafter. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor that entitled the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

TERMINATION

Vendor shall be considered in default, and such default shall be grounds for the District to terminate any resulting award for this solicitation and/or pursue any and all relief, at law or in equity, to which it may be entitled by reason of such default, in the presence of a failure to perform any of its obligations under any resulting agreement and fails to correct such non-performance within ten (10) calendar days of written notice from the District to do so. In case of default of the vendor, RISD reserves the right to terminate the purchase order. In case of default of three (3) purchase orders, the district reserves the right to terminate the contract and suspend future business with the vendor.

Rockwall ISD shall have the right to terminate any purchase order to, contract with, or awarded to the vendor, in whole or in part, for cause (including breach of the proposal, warranties, or contract by the vendor**,** or because of loss of federal funding) or for the District's convenience at any time. Any award, contract, or purchase order is subject to termination by the District if any person significantly involved in initiating, negotiating, securing, drafting, or creating the solicitation on behalf of the District, is at any time while the solicitation is in effect, an employee of the vendor in any capacity or as a consultant to the District with respect to the subject matter of the Solicitation.

If deemed necessary, inspections will be made by authorized District personnel on a routine basis. Any deficiencies in the work performance disclosed during such inspections must be corrected following receipt of notification by the Vendor. Continued failure to take such corrective actions could, at the District's discretion, lead to termination of any resulting award.

FORCE MAJEURE

Neither the District nor the vendor shall be responsible or deemed to be in default of its obligations to the other to the extent any failure to perform or delay in performing its obligations under the bid or proposal is caused by events or conditions beyond the reasonable control of that party, and are not due to the negligence or willful misconduct of such party (hereinafter, "Force Majeure events"). For purposes of the bid or proposal, Force Majeure events shall include, but not be limited to, acts of God or public enemy, war, riot or civil commotion, strikes, epidemic, fire, earthquake, tornado, hurricane, flood, explosion, weather-related emergencies, or other catastrophes, or events or conditions due to law, regulations, ordinances, order of a court of competent jurisdiction, or executive decree or order. However, in the event of such delayed non-performance or nonperformance, the party so delayed shall furnish prompt written notice to the other party (including the date of inception of the Force Majeure event and the extent to which it will affect performance) and shall undertake all efforts reasonably possible to cure the delay or nonperformance and mitigate its effects, or to otherwise perform. The District shall not be responsible for payment for any product or service

delayed or foreclosed by any Force Majeure event unless and until such delayed or foreclosed product or service is provided. These provisions shall not preclude the District from canceling or terminating any resulting award (or any order for any goods or services included herein), or from revising the scope of the work, as otherwise permitted under the bid or proposal.

CONFLICTS

Effective January 1, 2006 and pursuant to Texas H.B. No. 914 and in accordance with Chapter 176 of the Texas Local Government Code, Section 176.006, any person or entity who contracts or seeks to contract with RISD for the sale or purchase of property, goods, or services (as well as agents of such persons, hereafter referred to as Vendors) are required to file, on an annual basis, a Conflict of Interest Questionnaire with the District. Each covered person or entity who seeks to or who contracts with RISD is responsible for complying with any applicable disclosure requirements. RISD will post the completed questionnaires on its website. Information regarding H.B. No. 914 may be obtained from the Texas Ethics Commission's website at http://www.ethics.state.tx.us.

Any board member who has any substantial interest, either direct or indirect, in any business entity seeking to contract with the District, shall, before any vote or decision on any matter involving the business entity, file an affidavit stating the nature and extent of interest and shall abstain from any participation in the matter. This is not required if the vote or decision will not have any special effect on the entity other than its effect on the public. However, if a majority of the governing body are also required to file, and do file similar affidavits, then the member is not required to abstain from further participation.
Local Government Code Chapter 171

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The laws states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties (Form 1295) to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The business entity is responsible for first electronically filing Form 1295 with the Ethics Commission. This filing process creates a certification of filing and a completed Form 1295 must be printed, signed by an authorized agent of the business entity and submitted to the school district.

GRATUITIES

Please note that a "gift to a public servant" is a Class A misdemeanor offense if the recipient is a government employee who exercise some influences in the purchasing process of the governmental body. This would certainly apply to anyone who helps establish specifications or is involved in product selection or directs a purchase.

The District may, by written notice to the vendor, cancel this solicitation, its contract, purchase order, or award

without liability to the vendor if it is determined by the District that gratuities, in the form of entertainment, compensation, gifts, or otherwise were offered or given by the vendor, or any agent or representative of the vendor, to any Board of Trustee member, officer, or employee of the Rockwall Independent School District with an intent to secure favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such an agreement. In the event this contract is canceled by the District pursuant to this provision, Rockwall ISD shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount used by the vendor to provide such gratuities.

FACILITIES

Rockwall ISD is a tobacco-free, drug-free, weapon-free and alcohol-free environment. No one may use, consume, carry, transport or exchange alcohol beverages, tobacco, cigarettes, electronic cigarettes, controlled substances and/ or illegal drugs while in a school district building or while on school district property. It is the responsibility of the vendor to ensure that its employees, agents, and subcontractors are not under the influence of drugs or alcohol and/or in possession of drugs, tobacco, alcohol, or weapons. If an employee, agent, or subcontractor of vendor is found to be under the influence and/or in possession of drugs/tobacco, alcohol, or weapons at the time of service, the vendor will be notified at once by District that the individual(s) must be immediately restricted from all Rockwall ISD campuses/departments. Repeated offenses by vendor could result in contract termination for default.

For the safety of students, all vendor personnel will sign visitor log in the office at the campus. An identification badge will be worn as required by the campus administrator. Vendor personnel are expected to maintain proper dress and exhibit a vendor badge or wear vendor issued shirts displaying the vendor logo. All contractors must also be in a uniform that identifies them at all times.

All vendor personnel are required to stay within the designated installation areas and may only enter a teacher's classroom when accompanied by District personnel.

At the time of offer submission, the person or entity submitting an offer must give notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in this conviction of a felony. The District may terminate a contract with a person or business if the District determines that the person or business failed to give such notice or misrepresented the conduct resulting in the conviction. This requirement does not apply to a publicly held corporation.

Texas Education Code Chapter 22 requires service contractors to obtain criminal history record information regarding covered employees and to certify to the District that they have done so. Covered employees with disqualifying convictions are prohibited from serving at a school district. Covered employees are all employees of a contractor who have or will have continuing duties related to the service to be performed at the District and have or will have direct contact with students. The District will be the final arbiter of what

constitutes direct contact with students.

Vendors (owners, officers, employees, volunteers, etc.) may not work on District property where students may or may not be present when they have charges pending, have been convicted, received probation or deferred adjudication for the following:

- Any offense against a child
- Any sex offense
- Any crimes against persons involving weapons or violence
- Any felony offense involving controlled substances
- Any felony offense against property
- Any other offense the District believes might compromise the safety of students, staff, or property.

ASBESTOS

Vendors who perform work inside the RISD facilities are hereby notified that buildings may contain asbestos containing materials. This notification is required by both the State of Texas Department of State Health Services and the Federal EPA Asbestos regulations. These guidelines cover both RISD's responsibilities and the Employer's responsibility to their employees. As a Vendor it is your responsibility to check each building prior to performing any work in that facility. These building materials may include but are not limited to: ceiling tile, floor tile and mastic, sheetrock, tape and bed compound, thermal pipe insulation, spray-on ceiling material, calks, and roofing products. As there have been numerous asbestos containing products manufactured over the years, you must check each building's Asbestos Management Plan. This plan is normally kept in the main office. Check with the school secretary and she will allow you to look at it. It is the vendor's responsibility to notify all employees working for them that RISD facilities may contain asbestos and where their employees may find the facility's Asbestos Management Plan.

Products and/or services procured under this agreement may be of a construction nature and will require certification that materials utilized and installed in conjunction with any project involving construction, be it new, renovation or contracted trade services, are free of asbestos and lead.

PUBLIC INFORMATION ACT (PIA) / FREEDOM OF INFORMATION ACT (FOIA)

By entering into a contract, pursuant to Texas Government Code Ann. Chapter 552, Subchapter J, the vendor agrees to be bound by the following terms if the contract has a stated expenditure of at least $1,000,000 for the purchase of goods or services by the District or if the contract results in the expenditure of at least $1,000,000 in public funds for the purchase of goods or services by the District in a fiscal year of the Rockwall ISD. If the district receives a written request for public information related to this Contract that is in the possession or custody of the vendor and not in the possession or custody of the District, Rockwall ISD shall send, not later than the third business day after the date the District receives the written request, a written request to the vendor that vendor provide that information to the District.

The vendor must:

- Preserve all contracting information related to the contract as provided by the records retention requirements applicable to the District for the duration of the contract;

- Promptly, within four business days, provide to the District any requested contracting information that is in the custody or possession of the vendor upon request of the Rockwall ISD; and,

On completion of the contract, either:

- Provide to the District at no cost all contracting information related to the contract that is in the custody or possession of the vendor; or

- Preserve the contracting information related to the contract as provided by the records retention requirements applicable to the District.

If the requirements of Subchapter J, Chapter 552, Texas Government Code Ann. apply to this Solicitation or Contract, the vendor agrees that the contract can be terminated if the vendor knowingly or intentionally fails to comply with the requirements of that subchapter. Texas Government Code Ann. Chapter 552.374.

Further, under Texas Government Code Ann. Chapter 552.372(c), Rockwall ISD may not accept a bid from or award a contract to an entity that the District has determined has knowingly or intentionally failed in a previous bid or contract to comply with Subchapter J, unless the District determines and documents that the entity has taken adequate steps to ensure future compliance.
If a vendor fails to provide the requested information to the District, Texas Government Code Ann. §552.373 requires the District to notify the vendor in writing of the failure and allow 10 business days to cure the violation. Rockwall ISD may terminate the contract if vendor fails to remedy the failure, the District determines the failure was knowing and intentional, and steps have not been taken to ensure future compliance.

INDEMNITY

Except as otherwise expressly provided or prohibited by law, respondent shall defend, indemnify, and hold RISD harmless from and against all claims, liability, loss and expenses, including reasonable costs, collection expenses, and attorneys' fees incurred, which arise by reason of the acts or omissions of respondent, its agents or employees in the performance of its obligations under this contract. This clause shall survive termination of this contract.

ANTI-TRUST

Successful respondent shall assign to RISD any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 USCA, Section 1 et seq., and which arise under

the antitrust laws of the State of Texas, Tex. Bus. & Com. Code, Section 15.01, et seq.

MEDIATION

In the event of any dispute arising out of, related to, or regarding vendor's bid or proposal, or charges for goods or services provided by the vendor, those disputes will be resolved under the terms of Texas Government Code Ann. Chapter 2251. The vendor further agrees that any dispute regarding the sufficiency of the goods or services supplied by the vendor that is not resolved by discussion with the District, will be submitted to mediation in Rockwall County, Texas, with a mutually-agreed mediator, before either party may file suit. The costs of the mediator will be divided equally between the parties. In the event of any litigation between the parties, the prevailing party shall be entitled to recover reasonable and necessary attorneys' fees from the other party.

LITIGATION

This procurement, and any resulting award, contract, purchase order, or other agreement arising out of or related to it, shall be governed and interpreted by the laws of the State of Texas, and any litigation shall be conducted in state district court. Mandatory and exclusive venue shall be in Rockwall County, Texas, or, if no county is specified, then in the county in which the Owner's main administrative office is located.

SPECIFICATIONS

PURPOSE:

Rockwall ISD is requesting solicitation of proposals for a turnkey installation of a Parking lot addition adding 85 new parking spaces. A site walk is recommended. The locations which work will be required are the following:
Rakow Middle School, 4700 Gettysburg – Fate, TX 75032

OWNER REPRESENTATIVES:

During Procurement:	Jana Hunter, Director of Purchasing
During Project Execution:	Michael Mershawn, Director of Project Planning & Construction
	Eddie Guajardo, Facility Services Project Manager

SCOPE NOTES:

- Contractor to provide all trades necessary for turn key project completion. Including but not limited to demo, grading, haul off, concrete, electrical, landscaping and irrigation.
- Contractor to follow the plans provided.
- Work to begin 5/27 and be compete 8/1

VENDOR QUALIFICATIONS:

- Proposer to provide all necessary tools, ladders, and equipment.
- Proposer must have adequate personnel on their staff to perform the required tasks as outlined in this CSP.
- ***Proposer must have job supervisor present on-site, at all times during this project***.
- Proposer to provide proof of Liability Insurance – if awarded the project.
- Proposer to provide adequate bonding as indicated in contract – if awarded the project.

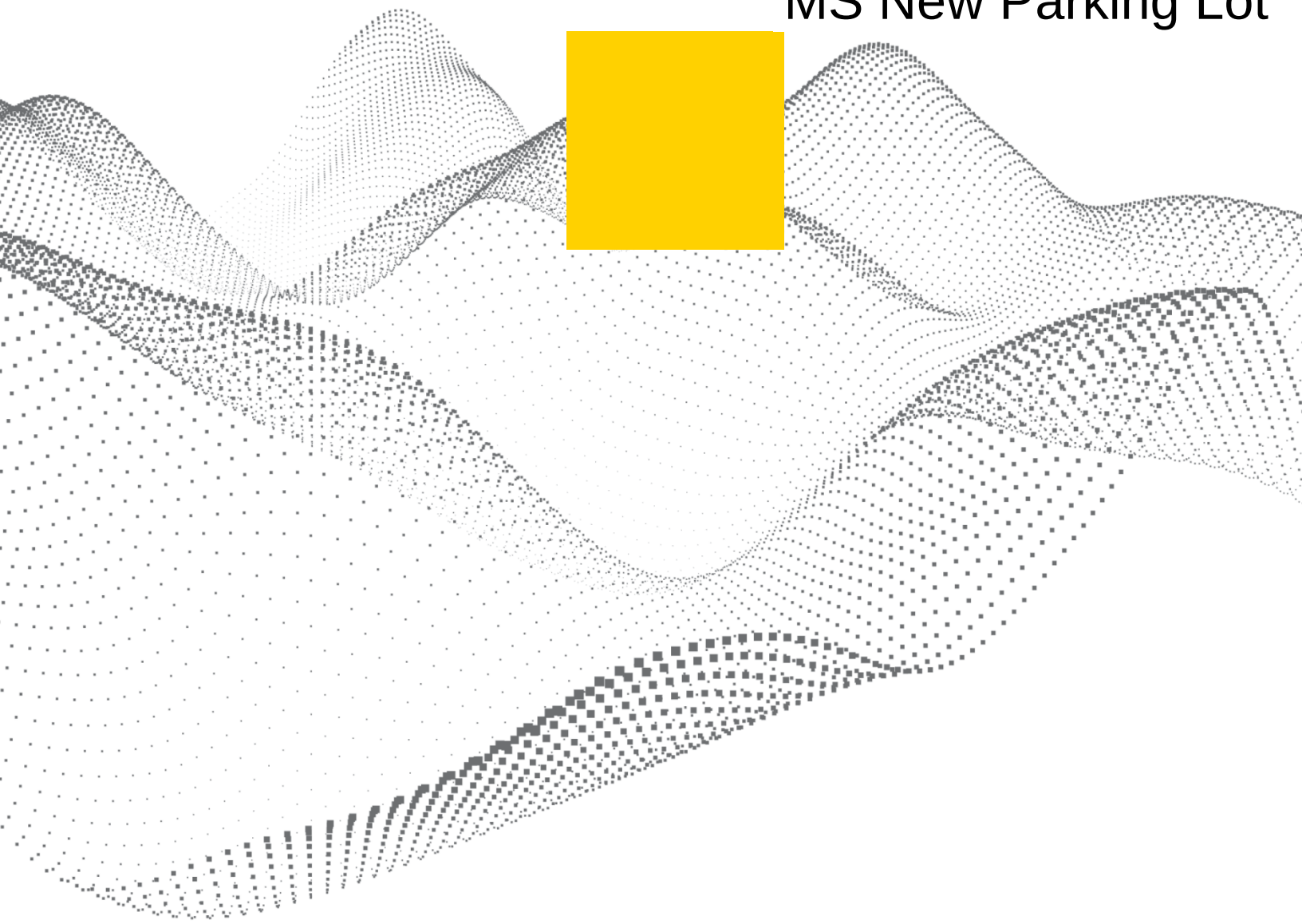
CONTRACTOR RESPONSIBILITIES:

- Contractor to communicate with Project Manager the daily inspection plan.
- Contractor to check in with the front office personnel during school hours before starting this work.
- Contractor shall wear identifying apparel and badge.
- All vendor motorized vehicles shall be identified with the company's name and/or logo in clear view.
- Contractor shall perform work in a personal and safe manner without interrupting normal business/ class routines. This may require after hours work or weekend work depending on location.
- The proposer will take adequate precautions to protect all surfaces. The proposer will repair any damages to RISD property caused as a result of carelessness or neglect.
- Contractor is responsible to daily clean work areas, all refuse to be hauled off and shall not be disposed in district dumpsters.
- Contractor shall be responsible to procure and pay for any required permits required to complete the project.

CORGAN

PROJECT MANUAL

Rockwall ISD Rakow MS New Parking Lot



Issue for Construction
30 October 2025
22286.0100

Corgan Associates, Inc.
401 North Houston Street
Dallas, Texas 75202
214 748 2000

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DOCUMENT 00 01 07

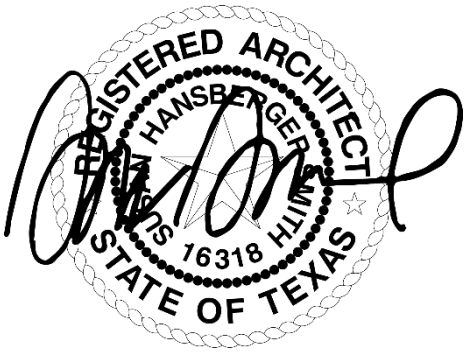
SEALS PAGE

Project Manual

Issue for Construction
30 October 2025
22286.0100

Rockwall ISD Rakow MS New Parking Lot

ARCHITECT OF RECORD
Corgan Associates, Inc.
401 North Houston Street
Dallas, Texas 75202
214 748 2000
Responsible for Sections marked with (CAI) in Document 00 01 10 "Table of Contents."



Architect of Record — Date 10/30/25

CIVIL ENGINEER OF RECORD
Glenn Engineering Corporation
4500 Fuller Drive, Suite 220
Irving, Texas 75038
972 717 5151
Firm License #: F-303
Responsible for Sections marked with (GEC) in Document 00 01 10 "Table of Contents."



The seal appearing on this document was authorized by Mike Glenn, P.E. 35059, on October 30, 2025

Civil Engineer of Record — Date: 10/30/25

LANDSCAPE ARCHITECT OF RECORD
Ramsey Landscape Architects, LLC
11914 Wishing Well Ct.
Frisco, Texas 75035
972 335 0889
Responsible for Sections marked with (RLA) in Document 00 01 10 "Table of Contents."



Landscape Architect of Record — Date: 10/30/25

ELECTRICAL ENGINEER OF RECORD
EMA Engineering & Consulting, Inc.
328 S. Broadway Ave.
Tyler, Texas 75702
903 581 2677
Firm License #: F-893
Responsible for Sections marked with (EMA) in Document 00 01 10 "Table of Contents."



Electrical Engineer of Record — Date: 10/30/25

END OF DOCUMENT

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DOCUMENT 00 01 10

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00 01 07	Seals Page		10/30/25
00 01 10	Table of Contents		10/30/25
00 73 43	Wage Rate Requirements		10/30/25
	Attachment: General Decision		10/30/25
DIVISION 01 — GENERAL REQUIREMENTS			
01 10 00	Summary	CAI	10/30/25
01 25 00	Substitution Procedures	CAI	10/30/25
01 29 00	Measurement and Payment	CAI	10/30/25
01 31 00	Project Coordination	CAI	10/30/25
01 31 19	Project Meetings	CAI	10/30/25
01 32 00	Construction Progress Schedules	CAI	10/30/25
01 32 33	Photographic Documentation	CAI	10/30/25
01 33 00	Submittal Procedures	CAI	10/30/25
01 41 00	Regulatory Requirements	CAI	10/30/25
01 42 00	References	CAI	10/30/25
01 45 16	Contractor's Quality Control	CAI	10/30/25
01 50 00	Construction Facilities and Temporary Controls	CAI	10/30/25
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26 09 23	Lighting Control Devices	EMA	10/30/25
26 20 00	Low Voltage Electrical Distribution	EMA	10/30/25
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32 13 14	Wheelchair Ramp	GEC	10/30/25
32 13 15	Concrete Curb and Gutter	GEC	10/30/25
32 17 23	Pavement Markings	GEC	10/30/25
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32 93 00	Planting	RLA	10/30/25

DIVISIONS 33 — 48

Not used

END OF DOCUMENT

DOCUMENT 00 73 43

WAGE RATE REQUIREMENTS

1.1 FEDERAL PARTICIPATION DISCLOSURE

A. This project will be partially funded with Federal funds from the United States Department of Commerce, Economic Development Administration and therefore is subject to the Federal laws and regulations associated with that program.

1.2 DUTY TO PAY PREVAILING WAGE RATES

A. In compliance with Section 2258, Subchapter B of the Texas Government Code, Contractor shall pay not less than wage scale of various classes of labor as shown in the Attachment to this Document. The wage rates set forth are minimum rates only. Owner will not consider any claims for additional compensation made by any Contractor because the Contractor pays wages in excess of the applicable minimum rate stipulated in the Contract. The Attachment is not a representation that quantities of qualified labor adequate to perform the Work may be found locally at specified wage rates.

1.3 ATTACHMENT

A. The attached Document is part of the Procurement and Contracting Requirements for Project. They provide Owner's information and are made available for Bidders' convenience and information.

B. Attachment: Document 00 73 43.10 "General Decision" dated 07/18/2025.

END OF DOCUMENT

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GENERAL DECISION

General Decision Number: TX20250281 07/18/2025

Superseded General Decision Number: TX20240281

State: Texas

Construction Type: Building

Counties: Hunt, Kaufman and Rockwall Counties in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2025
1	03/14/2025
2	07/04/2025
3	07/18/2025

ASBE0021-011 06/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 33.23	7.52

BOIL0074-003 01/01/2025

	Rates	Fringes
BOILERMAKER	$ 33.17	24.92

CARP1421-002 10/01/2023

	Rates	Fringes
MILLWRIGHT	$ 32.02	11.27

ELEV0021-006 01/01/2025

	Rates	Fringes
ELEVATOR MECHANIC	$ 51.93	38.435+a+b

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day,

Christmas Day, and Veterans Day.

ENGI0178-005 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 32.85	13.10
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 32.35	13.10

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* IRON0263-005 06/01/2025

	Rates	Fringes
IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 29.64	8.43

PLUM0100-005 11/01/2024

	Rates	Fringes
HVAC MECHANIC (HVAC Unit Installation Only)	$ 39.76	14.04
PIPEFITTER (Excludes HVAC Pipe Installation)	$ 39.76	14.04

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* SUTX2014-061 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 19.89	0.00
CARPENTER, Excludes Drywall Hanging, Form Work, and Metal Stud Installation	$ 16.62 **	0.00
CAULKER	$ 15.16 **	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.21 **	0.00
DRYWALL HANGER AND METAL STUD INSTALLER	$ 15.42 **	0.00
ELECTRICIAN (Alarm Installation Only)	$ 20.93	3.86

ELECTRICIAN (Communication Technician Only)	$ 17.62 **	2.92
ELECTRICIAN (Low Voltage Wiring Only)	$ 17.97	2.63
ELECTRICIAN, Excludes Low Voltage Wiring and Installation of Alarms/Sound and Communication Systems	$ 20.65	3.05
FORM WORKER	$ 12.13 **	0.00
GLAZIER	$ 16.55 **	3.13
HIGHWAY/PARKING LOT STRIPING: Operator (Striping Machine)	$ 10.04 **	2.31
INSTALLER - SIDING (METAL/ALUMINUM/VINYL)	$ 14.74 **	0.00
INSTALLER - SIGN	$ 15.61 **	0.00
INSULATOR - BATT	$ 13.00 **	0.00
IRONWORKER, REINFORCING	$ 12.37 **	0.00
LABORER: Common or General	$ 11.25 **	0.00
LABORER: Mason Tender - Brick	$ 10.54 **	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.75 **	0.00
LABORER: Pipelayer	$ 13.00 **	0.35
LABORER: Plaster Tender	$ 12.22 **	0.00
LABORER: Roof Tearoff	$ 11.28 **	0.00
LABORER: Landscape and Irrigation	$ 11.09 **	0.00
LATHER	$ 16.00 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 12.83 **	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93 **	0.00
OPERATOR: Bulldozer	$ 18.29	1.31

OPERATOR: Drill	$ 15.69	**	0.50
OPERATOR: Forklift	$ 13.21	**	0.81
OPERATOR: Grader/Blade	$ 12.96	**	0.00
OPERATOR: Loader	$ 13.46	**	0.85
OPERATOR: Mechanic	$ 17.52	**	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 18.44		0.00
OPERATOR: Roller	$ 15.04	**	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 13.21	**	2.33
PAINTER: Drywall Finishing/Taping Only	$ 13.76	**	2.84
PLASTERER	$ 15.75	**	0.00
PLUMBER (HVAC Pipe Installation Only)	$ 22.16		5.46
PLUMBER, Excludes HVAC Pipe Installation	$ 22.31		5.18
ROOFER	$ 17.19	**	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 20.88		5.19
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 24.88		5.97
SPRINKLER FITTER (Fire Sprinklers)	$ 22.94		0.00
TILE FINISHER	$ 11.22	**	0.00
TILE SETTER	$ 14.25	**	0.00
TRUCK DRIVER: 1/Single Axle Truck	$ 16.40	**	0.81
TRUCK DRIVER: Dump Truck	$ 12.39	**	1.18
TRUCK DRIVER: Flatbed Truck	$ 19.65		8.57

TRUCK DRIVER: Semi-Trailer
Truck.....$ 12.50 ** 0.00

TRUCK DRIVER: Water Truck.....$ 12.00 ** 4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($17.75) or 13658 ($13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical

order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that

classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as

conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

END OF ATTACHMENT

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SECTION 01 10 00

SUMMARY

PART 1 -

PART 2 - GENERAL

2.1 SUMMARY

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

2.2 PROJECT INFORMATION

A. Project Identification: Rockwall ISD Rakow MS New Parking Lot.

B. Owner: Rockwall Independent School District, Rockwall, TX.

C. Construction Manager at Risk
1. Construction Manager has been engaged for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for construction between Owner and each Contractor or subcontractor, according to a separate contract between Owner and Construction Manager.
a. Construction Manager: Northstar, 3401 Olympus Blvd, Coppell, TX 75019.
b. Construction Manager for this Project is Project's constructor. The terms "Construction Manager" and "Contractor" are synonymous.

2.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:
1. General construction and renovations of two Ninth Grade Centers for Rockwall Independent School District and other work indicated in the Contract Documents.

B. Type of Contract:
1. Single Prime: Project will be constructed under a single prime (lump sum) contract.
2. Project is tax exempt. The Contract will be executed with separate contract sums for materials and services to comply with requirements of 1991 Texas House Bill 11.

3. Contract: AIA A133 - Standard Form of Agreement Between Owner and Construction Manager as Constructor, 2019 Edition Agreement.
   a. A copy of the Contract may be obtained at the local AIA office.

2.4 CONTRACTOR USE OF SITE AND PREMISES

A. Restricted Use: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Limits on Use of Site: Limit use of site to work in areas indicated. Do not disturb portions of site beyond areas in which the work is indicated.
   1. Limits: Confine construction operations to areas shown on Drawings.
   2. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances, fire exits or lanes, public rights-of-way, and delivery routes serving premises clear and available to Owner, Owner's employees, the public, and emergency vehicles. Do not use these areas for parking or for storage of materials.

C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

2.5 COORDINATION WITH OCCUPANTS

A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the work, prior to Substantial Completion of the work, provided occupancy does not interfere with completion of the Work. Placement of equipment and limited occupancy shall not constitute acceptance of the total work.
   1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the work to be occupied prior to Owner acceptance of the completed Work.
   2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
   3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of work.
   4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of work.

2.6 WORK RESTRICTIONS

A. Work Restrictions: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

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

1. Notify Construction Manager not less than two days (24 hours) in advance of proposed utility interruptions.
2. Obtain Construction Manager's written permission before proceeding with utility interruptions.

C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Construction Manager not less than two days (24 hours) in advance of proposed disruptive operations.
2. Obtain Construction Manager's written permission before proceeding with disruptive operations.

D. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.

E. Restricted Substances and Firearms: Use of tobacco products and other controlled substances and firearms on Project site is not permitted.

F. Employee Identification: Provide identification tags for Contractor personnel working on site. Always require personnel to use identification tags. Additionally, each Contractor personnel will need to badge in with owner’s “Raptor” system monthly and display the badge on their person / helmet during on site activities.

G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on site.
1. Maintain list of approved screened personnel with Owner's representative.
2. These individuals receiving keys/badges should certify in a letter to Rockwall ISD that they have passed the government-required background checks for working in schools, as they may at some point come into contact with students.
3. In accordance with the Texas Education Code (TEC) 22.0834:
   a. A contractor (entity or individual) that provides services to a school district/charter school, and has direct contact with students, must be fingerprinted before beginning work.
   b. The contractor shall certify to the school district that it is in compliance with the fingerprinting laws. The school district/charter school may review the background check results for contracted employees in the DPS FACT Clearinghouse as provided by Section 411.0845, of the Government Code.
   c. Additionally, a subcontractor must certify to the school district/charter school and to the contracting entity that the subcontractor has fingerprinted all individuals providing services to the district under the terms of the contract.
   d. The school district/charter school may request additional information from a contractor in order to verify that the fingerprinting has been completed.

2.7 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 - General Requirements: Requirements of Sections in Division 01 apply to the work of the specification sections.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 3 - PRODUCTS

3.1 ASBESTOS

A. Owner requires, under terms of this Contract, that products and materials used comply with the following requirements:
1. The Texas Asbestos Health Protection Act, Texas Civil Statutes, Article 4477-3a, as amended.
2. Contain not more than 1.0% of any type or combination of asbestos, determined by the Environmental Protection Agency (EPA) recommended test methods as listed in EPA/600R-93/116 July 1993 Method for the Determination of Asbestos in Bulk Building Materials. This means one material component or a structure or layer of a material sample. Composite sample analysis is not allowed.

B. By executing this Contract, the Contractor accepts responsibility for prohibiting materials or products containing asbestos from being used.

3.2 MOLD AND MILDEW

A. If mold is present on the inside of the building; determine source of moisture and correct prior to performing the following:
1. Nonporous Surfaces: Clean mold growing on steel, aluminum or nonporous materials using methods recommended by an Environmental Inspector licensed by the Texas Department of Health.
2. Porous Surfaces: Remove mold contaminated surface and legally disposed using methods recommended by an Environmental Inspector licensed by the Texas Department of Health.
3. Upon mold abatement, provide a report prepared by an Environmental Inspector licensed by the Texas Department of Health that the building is free from mold contamination.

PART 4 - EXECUTION
Not Used.

END OF SECTION

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SECTION 01 25 00

SUBSTITUTION PROCEDURES

1.1 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents, and proposed by Contractor, prior to award of Contract.
   1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

B. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents, and are not subject to requirements specified in this Section.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Architect will consider only written requests from Contractor for any substitution of products in place of those specified, using form provided at the end of this Section.
   1. Submit one PDF copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
      c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
      d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
      e. Samples, where applicable or requested.

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

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

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

1.6 CONTRACTOR'S REPRESENTATION

A. In making formal request for substitution Contractor represents that:
   1. He has investigated proposed product and has determined that it is equal to or superior in respects to that specified.
   2. He will provide same warranties or bonds for substitution as for product specified.
   3. He will coordinate installation of accepted substitution into Work, and will make such changes as may be required for Work to be complete.

4. He waives claims for additional costs caused by substitution which may subsequently become apparent.
5. Cost data is complete and includes related costs under his Contract, but not costs under separate contracts.

1.7 ARCHITECT DUTIES

A. Architect will determine acceptability of proposed substitutions.

B. Review Contractor's requests for substitutions with reasonable promptness.

C. Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS, GENERAL

A. Properties including, but not limited to following, will be considered as applicable:
1. Physical dimension requirements to satisfy space limitations.
2. Static and dynamic weight limitations, structural properties.
3. Audible noise levels.
4. Vibration generation.
5. Interchangeability of parts or components.
6. Accessibility for maintenance, possible removal or replacement.
7. Colors, textures and compatibility with other materials, products, assemblies and components.
8. Equipment capacities and performance characteristics.

B. Substitutions will not be considered for acceptance when:
1. They are indicated or implied on Shop Drawings, Product Data Submittals, or Requests for Information (RFIs).
2. They are requested directly by subcontractor or supplier.
3. Acceptance would require substantial revisions to Contract Documents or Contract time.
4. Additional cost to Owner is involved.

C. Substitute products shall not be ordered or installed without written acceptance of Architect. If proposed substitution is not accepted, provide specified product or materials.

D. Burden of proof for merits of proposed substitute is upon proposer. Architect's decision of acceptance or rejection of proposed substitution will be final.

E. Review of Architect, acceptance or failure to take exceptions to substitutions or other review documents, shall not relieve Contractor of his responsibility for compliance with performance or other requirements of Contract Documents.

F. Contractor shall be responsible for and pay for any expenses incurred by Owner or Architect for changes to Contract Documents ultimately required by accepted Contractor requests for substitutions.

2.2 SUBSTITUTIONS

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

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    b. Substitution request is fully documented and properly submitted.
    c. Requested substitution will not adversely affect Contractor's construction schedule.
    d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    e. Requested substitution is compatible with other portions of the Work.
    f. Requested substitution has been coordinated with other portions of the Work.
    g. Requested substitution provides specified warranty.
    h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed, unless otherwise indicated.

C. Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after commencement of the Work. Requests received after that time may be considered or rejected at sole discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    b. Requested substitution does not require extensive revisions to the Contract Documents.
    c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    d. Substitution request is fully documented and properly submitted.
    e. Requested substitution will not adversely affect Contractor's construction schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

REQUEST FOR SUBSTITUTION

Contract Award Date: _____ Project Name and Number: _____

To:

_____

Substitution Requested By: _____

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

Drawing No.	Specification Section	Paragraph	Specified Item
_____	_____	_____	_____

Proposed Substitution: _____

1. Attached data includes product description, specifications, drawings, photographs, performance and test data sufficient for evaluating the substitution; applicable portions of the data are identified, both on the proposed substitution and the original specified product.
2. Attached data includes description of changes to Contract Documents which the proposed Substitution will require for its proper installation.

The Substitution Request is made during ____ bidding _____ construction period.

Submit the following in accordance with Section 01 33 00 and submittal requirements of the individual Specification Section.

1. Technical data, cost, and time information relating to changes to Construction Documents required by proposed substitution.
2. Detailed comparison of proposed substitution and specified product including but not limited to warranty, significant variations, qualifications of manufacturers, and maintenance.
3. Complete technical data, detailed shop drawings, samples, installation procedures, warranty, and substantiating data marked to indicate equivalent quality and performance to that specified. Manufacturer sell sheets are not acceptable submittals.

Reason for Request: _____

Cost saving realized by Owner _____

Does the substitution affect adjacent work, Construction Documents, cost, schedule, quality, and related submittals?
Yes _____No ____ On a separate sheet, explain affects to the work, documents, schedule, and submittals.

The Contractor is responsible for associated costs and additional time of the proposed substitution including costs incurred by the Architect and Engineers for evaluation of substitution and changes to the documents. Describe costs for changes to design, including engineering and detailing costs caused by the requested substitution.

_____

Warranty: Is the warranty for the requested substitution the same? Yes _____ No _____

Explain Differences: _____

Contractor Certification:

In making a request for substitution, the Contractor certifies that:

1. The proposed substitution has been thoroughly researched and evaluated and determined as equivalent or superior to specified product or material, will fit into space provided, and is compatible with adjacent materials.
2. It warrants the intent of the Specifications have been met.
3. The proposed substitution does not affect dimensions indicated on the drawings.
4. The substitution provides the same or better warranty at no additional cost to the Owner.
5. Cost data is complete and includes related costs under the Contract. Claims for additional costs related to the proposed substitution resulting from the proposed substitution that may subsequently become apparent are waived.
6. It will assume the responsibility for delays and costs caused by the proposed substitution, if approved, are accepted by the Contractor unless delays and costs are specifically included and approved in writing by the Owner and the Architect.
7. It will assume the liability for the performance of the substitution and its performance.
8. The installation of the proposed substitution is coordinated with the work and with changes required for the work. The proposed substitution has no adverse effect on other trades, the construction schedule, or warranty requirements.
9. Maintenance and service parts are locally available for the proposed substitution.
10. It will reimburse the Owner and Architect for evaluation and redesign services associated with the substitution request and, when required, by approval by governing authorities.

Signature shall be by an individual authorized to legally bind the Contractor to the above terms. Failure to provide legally binding signature will result in retraction of approval.

1. Contractor Acceptance:

_____ _____ _____
Signed by: Date: Representing:

2. Owner: _____ Accepted _____ Rejected

_____ _____ _____
Signed by: Date: Representing:

3. Architect: ____ Accepted ____ Rejected ____ Accepted as Noted ____Received to Late

____ Resubmit with complete supporting documentation

_____ _____ _____
Signed by: Date: Representing:

END OF REQUEST

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SECTION 01 29 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Applications for Payment to Architect in accordance with schedule established by Conditions of Contract, and Agreement Between Owner and Contractor.
2. Schedule of Values allocated to various portions of Work in accordance with schedule established in this Section. Upon request of Architect, support values with data which substantiate correctness.
3. Unit Prices.
4. Change Order Procedures.

1.2 SCHEDULE OF VALUES

A. Preparation:
1. Coordinate preparation of Schedule of Values with preparation of Construction Progress Schedule.
2. Correlate line items in Schedule of Values with other required administrative schedules and forms, including following:
   a. Construction Progress Schedule, in CPM or bar chart format.
   b. Application for Payment form.
   c. List of subcontractors.
   d. Schedule of alternates.
   e. List of products.
   f. List of principal suppliers and fabricators.
   g. Schedule of submittals.
3. Submit initial Schedule of Values to Architect within 14 days of Notice to Proceed.
4. Submit revised Schedule of Values at earliest possible date, but no later than minimum of 20 days before scheduled date of Initial Application for Payment.

B. Form and Content:
1. Arrange Schedule of Values on 8-1/2" x 11" tabular form on white paper in format acceptable to Architect.
2. Use bar chart or CPM chart as guide to establish format; compile information based on completed tasks.
3. Project Identification:
   a. Project name and location.
   b. Name of Architect.
   c. Project number.
   d. Contractor's name and address.
   e. Date of submittal.

f. Owner's contract designation.

4. Provide columns to indicate following for each item listed:
   a. Generic name.
   b. Specific task description.
   c. Change Orders numbers that have affected value.
   d. Dollar value.
   e. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
5. Follow table of contents of Project Manual as format for listing component items; identify each line item with number and title of respective major section of specifications.
6. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports.
7. Break principal subcontract amounts down into several line items by completed task in various locations.
8. For each major line item, list sub-values of major products or operations under item.
9. Round amounts off to nearest whole dollar, total of listed values shall equal total Contract Sum.
10. For each part of Work where Application for Payment includes materials or equipment purchased, fabricated, and stored, but not yet installed, include separate line items on Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of Work.

C. Margins of Cost:
1. Show line items for indirect costs, and margins on actual costs, only to extent that such items will be listed individually in Applications for Payment.
2. Each item in Schedule of Values and Application for Payment shall be complete, including its total cost and proportionate share of general overhead and profit margin.
3. At Contractor's option, temporary facilities and other major cost items that are not direct costs of actual work-in-place may be shown as separate line items in Schedule of Values.
4. Furnish line item cost for each of following general cost items:
   a. Bonds.
   b. Insurance.
   c. Field supervision and layout.
   d. Temporary facilities and controls.
   e. Testing.

D. Resubmittal:
1. After review by Architect, revise and resubmit schedule as necessary.
2. Resubmit revised schedule monthly in same manner.

E. Subschedule of Unit Material Values:
1. Submit subschedule of unit costs and quantities for following:
   a. Products on which progress payments will be requested for stored products.

2. Form and Content:
   a. Form of submittal shall parallel that of Schedule of Values, with each item identified same as line item in Schedule of Values.
   b. Unit quantity for bulk materials shall include an allowance for normal waste.
3. Unit values for materials shall be broken down as follows:
   a. Cost of material, delivered and unloaded at Project Site, with taxes paid.
   b. Installation costs, including overhead and profit.
4. Installed unit value multiplied by quantity listed shall equal cost of that item in Schedule of Values.
5. After review by Architect, revise and resubmit subschedules as necessary.
6. Resubmit revised subschedules monthly in same manner.

1.3 APPLICATIONS FOR PAYMENT

A. Progress payments shall be made as Work proceeds at intervals stated in Contract.

B. Work covered by Progress Payments shall, at time of payment, become property of Owner.

C. Form of Application for Payment will be notarized AIA Document G702 - Application and Certification for Payment, supported by AIA Document G703 - Continuation Sheet, submitted in quadruplicate.

D. Contractor shall submit to Architect within 15 days of execution of Owner -Contractor Agreement proposed sample of Lien Waiver and Bills Paid Affidavit forms for review and acceptance by Architect for use on this Contract.

E. Conditions governing regular schedule for applications, payment, and retainage are as stated in Contract.

F. Monthly Applications for Payment shall include Waivers of Liens for Work included in previous months' Application for Payment. Waiver of Liens for subcontractors and materialmen shall be total amount paid prior to previous month's Application for Payment.

G. With each Application for Payment, Contractor shall certify that such Application for Payment represents just estimate of cost reimbursable to Contractor under terms of Contract, and shall also certify that there are no Mechanics' or Materialmens' Liens outstanding at date of Application for Payment, that due and payable bills with respect to Work have been paid to date or shall be paid from proceeds of Application for Payment, and that there is no known basis for filing of Mechanics' or Materialmens' Liens against surety in connection with Work, and that Waivers and Bills Paid Affidavit forms from subcontractors and materialmen have been, or will be, obtained in form specified in Contract.

H. Preparation of Application:
   1. Format and data required:
      a. Submit itemized applications on AIA Document G702 - Application and Certification for Payment Form, with AIA Document G703 Continuation Forms.

b. Provide itemized data on continuation sheets with format, schedules, line items, and values stipulated in Schedule of Values and acceptable to Architect.

2. Application Form:
   a. Fill in required information, including Change Orders executed prior to date of submittal of applications.
   b. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
   c. Execute certification with signature of responsible officer of Contract firm.
3. Continuation Sheets:
   a. Fill in total list of scheduled component items of Work with item number and scheduled dollar value for each item.
   b. Fill in dollar value in each column for each scheduled line item when Work has been performed or products stored.
   c. Round off values to nearest dollar or as specified for Schedule of Values.
   d. List each Change Order executed prior to date of submission at end of continuation sheets.
   e. List by Change Order number and description as for original component item of Work.

I. Initial (First) Application for Payment:
1. Contractor to submit to Architect within 15 days of execution of Owner-Contractor Agreement proposed sample of Lien Waiver and Bills Paid Affidavit forms for review and acceptance by Owner for use on this Contract.
2. Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include, but are not limited to, the following:
3. List of subcontractors, with indications of MBE or WBE Owner firms.
   a. List of principal suppliers and fabricators.
   b. Schedule of Values.
   c. Contractor's Construction Schedule (preliminary if not final).
   d. Submittal Schedule (preliminary if not final).
   e. Copies of building permits.
   f. Copies of authorizations and licenses from governing authorities for performance of Work.
   g. Initial progress report.
   h. Report of Pre-Construction meeting.
   i. Certificates of Insurance and insurance policies.
   j. Additional items as required in General Conditions.

J. Typical Monthly Application for Payment:
1. Each Application for Payment shall be consistent with previous Applications for Payments reviewed by Architect and paid by Owner.
2. Review pencil copy of Application for Payment with Architect at last scheduled job meeting each month, or at other agreeable time as can be scheduled.
3. Submit monthly Application for Payment on 15th day of each month.
4. Period of construction Work covered by each Application for Payment is period ending 15 days prior to date for each progress payment and starting day following end of proceeding period.

5. Work covered by Progress Payments shall, at time of payment, become property of Owner.
6. Form of Application for Payment will be on specified forms, submitted in quadruplicate.
7. Complete each entry on forms, including notarization and execution by person authorized to sign legal documents on behalf of Contractor.
8. Incomplete Applications for Payment will be returned without action.
9. Entries shall match data of Schedule of Values and Contractor's Construction Schedule.
10. Use updated schedules if revisions have been made.
11. Include amounts of Change Orders and Construction Change Directives issued prior to last day of construction period covered by application.
12. Transmit executed copies of each Application for Payment to Architect by means ensuring receipt within 24 hours.
13. Transmit each copy with complete transmittal form listing attachments, and recording appropriate information related to Application in acceptable manner.
14. Waiver of Liens:
    a. With each Application for Payment, submit waivers of mechanics liens from each contractor, subcontractor and materialman who may be lawfully entitled to file mechanics lien arising out of Contract, and related to Work covered by payment application.
    b. Submit waivers of lien on forms, and in manner, acceptable to Architect.
    c. Waiver of liens shall be total paid prior to previous month's Application for Payment.
15. With each Application for Payment, Contractor certifies the following:
    a. Application for Payment represents just estimate of cost reimbursable to Contractor under terms of Contract.
    b. That there are no Mechanics' or Materialmens' Liens outstanding at date of this Application for Payment.
    c. That due and payable bills with respect to the Work have been paid to date or shall be paid from proceeds of that Application for Payment.
    d. That there is no known basis for filing of Mechanics' or Materialmens' Liens against surety in connection with Work, and that Waivers and Bills Paid Affidavit forms from subcontractors and materialmen have been, or will be, obtained in form specified in Contract.
16. Progress payments will be made in accordance with General Conditions.

K. Application for Payment at Substantial Completion:
1. Following issuance of Certificate of Substantial Completion, submit Application for Payment with following administrative actions and submittals that must precede or coincide with application:
2. Proper training of Owner's personnel.
3. Occupancy permits and similar required approvals.
4. Warranties and maintenance agreements.
5. Test, adjust, and balance records.
6. Maintenance instructions.
7. Start-up performance reports.

8. Change-over information related to Owner's occupancy, use, operation, and maintenance.
9. Final cleaning.
10. Application for reduction of retainage, and Consent of Surety.
11. Advise on shifting insurance coverage.
12. [Final progress photographs.]
13. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
14. Transmittal of required Project construction records to Owner.
15. Removal of temporary facilities and services.
16. Removal of surplus materials, rubbish, and similar elements.
17. Additional items as required by General Conditions.

1.4 UNIT PRICES

A. Unit price is defined as amount stated in construction Contract as price for each unit of measurement for materials or services.

1.5 CHANGE ORDER PROCEDURES

A. Submit to Architect within 15 days of execution of Owner-Contractor Agreement name of individual authorized to accept changes on behalf of Contractor, and shall be responsible for informing others in Contractor's employ of changes in Work.

B. Change Order forms will be furnished and issued by Architect.

C. Contractor Documentation of Changes:
1. Maintain detailed records of Work done on accounting basis acceptable to Architect and Owner.
2. Provide full information required for evaluation of proposed changes.
3. Document each quotation for a change in cost or time with sufficient data to allow evaluation of quotation.
4. On request, provide additional data to support computations:
   a. Quantities of products, labor and equipment.
   b. Insurance and bonds.
   c. Overhead and profit.
   d. Justification for change in Contract Time.
   e. Credit for deletions from Contract, similarly documented.
5. Support each request for additional costs, and for Work proposed on time and material basis, with description of products, equipment, cost of labor and subcontracts, completely documented.
6. Computation for changes in Work will be computed in one of manners described in Conditions of the Contract.

D. Initiation of Changes:
1. Architect may submit Proposal Request which includes detailed description of change with supplementary or revised Drawings and Specifications.

2. Contractor may initiate proposed change by submittal of request to Architect describing proposed change with statement of reason for change, and proposed effect on Contract Sum and Contract Time with full documentation, and statement of effect on Work of separate contractors.
3. Document requested substitutions in accordance with Section 01 25 00.
4. Submission of such requests and receipt of same by Architect does not mean acceptance or approval of proposed change.

E. Authorization:
1. Owner may request, through Architect, Construction Change Directive, in writing, instructing Contractor to proceed with changes in Work, for subsequent inclusion in Change Order that is pending.
2. Directive will propose basis for necessary adjustments, to Contract Sum or Time.
3. Changes that affect Contract Sum or Contract Time will require Change Order signed by Owner and Architect.
4. Contractor's signature indicates agreement.
5. Orders, written or oral, by Owner through Architect or by Architect shall be treated as Change Order only if Contractor gives Owner proper written notice as described in Conditions of Contract.
6. Promptly execute change in Work only upon receipt of approved Change Order or Owner's written Construction Change Directive.

F. Execution:
1. Architect will issue Change Orders for signatures of parties as provided in Conditions of Contract.
2. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum as shown on Change Order.
3. Promptly revise Progress Schedules to reflect change in Contract Time, revise subschedules to adjust times for other items of Work affected by Change, and resubmit Schedule.
4. Promptly enter Changes in Project Record Documents.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

END OF SECTION

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SECTION 01 31 00

PROJECT COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
      a. General coordination procedures.
      b. Digital project management procedures.
      c. Coordination of Submittals.
      d. Requests for Information (RFIs).
      e. Coordination of space and installation.
      f. Coordination of finishes.
      g. Coordination of Contract closeout.

B. Related Work:
   1. Section 01 31 19 “Project Meetings”

1.2 DEFINITIONS

A. BIM: Building Information Modeling.

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

1.3 GENERAL COORDINATION

A. Coordinate scheduling, submittals, and work of various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements with provisions for accommodating items furnished by Owner to be installed by Contractor.

B. Coordinate construction operations included under different sections of Project Manual that are dependent upon each other for proper installation, connection, and operation.

C. Contractor shall review and coordinate requirements of Divisions 21, 23 and 26 in Project Manual and MEP&FP drawings with other Work. Report discrepancies to Architect.

D. Contractor shall maintain services of major subcontractors throughout duration of Contract, except as required by provisions of Conditions of Contract. Contractor shall notify Architect in writing of intention to replace subcontractors, outlining reasons for action and naming proposed replacement subcontractor.

E. Each subcontractor shall ensure that devices and equipment installed under their subcontract is operational. Subcontractor shall inform Contractor when completion and

operation of their system is dependent on Work of other trades. Arbitrate and resolve coordination conflicts between subcontractors to ensure complete and operational systems.

F. Contractor shall be responsible for coordination of Work of subcontractors, and for recording subcontractor installation data on Project Record Documents in accordance with Section 01 78 39.

G. Contractor shall coordinate installation of Owner-furnished equipment as scheduled on Section 01 11 00. Cost of receiving, handling, and storing Owner-furnished equipment shall be included in Contract Sum and shall result in no additional cost to Owner.

H. Communications to Owner from Contractor regarding Contract requirements shall be through Architect.

1.4 PROJECT MEETINGS

A. Refer to Section 01 31 19 “Project Meeting.”

1.5 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's BIM model are available from the Architect for the express purpose of preparing coordination drawings, Shop Drawings, and Project record drawings.
   1. Digital Data Software Program: The Drawings are available in Revit RVT format, operating in Microsoft Windows operating system.
   2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to the Drawings.
   3. Execution of the Architect's Release Form is required to obtain the digital data files of the Drawings. Provision of the digital data files is subject to both the terms described herein and on the Release Form. It is offered at the Architect's sole discretion, and may be withheld by the Architect for reasons deemed appropriate.
      a. A copy of the Architect's Release Form is available upon request.

B. Web-Based Project Software: Use Architect's web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.

C. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.

D. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
   1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.

3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.6 COORDINATION OF SUBMITTALS

A. Schedule and coordinate submittals.

B. Coordinate Work of various trades having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate requests for substitutions to assure compatibility of space, of operating elements, effect on Work of other trades, and on Work scheduled for early completion.

1.7 REQUESTS FOR INFORMATION (RFIS)

A. Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
   1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
   2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. RFIs will be accepted and processed by the Architect only on Contract Documents prepared by the Architect or its consultants that are sealed and have been issued for construction.
   1. Requests for information or interpretation of preliminary Drawings or Specifications shall be made by normal correspondences, not by RFI. Architect's responses to such requests do not constitute Contract requirements of the Work.

C. Submission of an RFI constitutes representation that the Contractor requires additional information about the Contract Documents after having made careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared coordination drawings, and prior project correspondence or documentation.
   1. Architect will not respond to requests where information is conveyed or contained in the Contract Documents or other documents and/or methods as outlined in paragraph above.

D. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
   1. Project name.
   2. Project number.
   3. Date.
   4. Name of Contractor.
   5. Name of Architect.
   6. RFI number, numbered sequentially.
   7. RFI subject.
   8. Specification Section number and title and related paragraphs, as appropriate.

9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

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

F. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven workdays for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following workday.
1. The following RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.
2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 29 00.
    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

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

H. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.

7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.8 COORDINATION OF SPACE AND INSTALLATION SEQUENCE

A. Coordinate use of Project space and sequence of installation of equipment, elevators, escalators, walks, mechanical, electrical, plumbing, or other Work that is indicated diagrammatically on Drawings. Follow routings shown for tubes, pipes, ducts, conduits, and other items as closely as practical, with due allowance for available physical space. Make runs parallel with lines of building, except where not feasible by construction. Utilize space efficiently to maximize accessibility for other installations, for Owner maintenance, and for repairs.

B. Except as otherwise indicated in finished areas, conceal ducts, pipes, wiring, and other non-finish items within construction. Coordinate locations of concealed and exposed items with finish elements.

C. Where availability of space is limited, coordinate installation of different components to ensure maximum accessibility for required maintenance, service and repair.

D. Coordinate with architectural reflected ceiling plans exact location and dimensioning of exposed items and items which occur within hung ceilings. In event of conflict, request clarification from Architect prior to proceeding with fabrication or installation.

E. Contractor shall be responsible for coordination of Work. Each subcontractor shall be responsible for coordination of their respective Work with the Work of the Contractor and other trades. Prepare coordination drawings in accordance with this Section.

F. Where installation of one part of Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in sequence required to obtain best results.

G. Make adequate provisions to accommodate items scheduled for later installation, including accepted Bid alternates, Owner-supplied Contractor-installed items, work by others, and installation of products purchased with allowances.

1.9 COORDINATION OF FINISHES

A. Identify each room by name and number as it appears on Finish Schedules by posting room identification sign outside each room at main entry to each room. Identification shall be clearly visible, legible, and attached without damaging surface.

B. Post accepted finishes scheduled for each room on each door or frame in manner that does not damage or stain surface. Use copy of accepted finish schedule that clearly identifies each finish and location of finishes for that particular room or area.

C. Room identification signs and finish schedules shall remain posted until permanent interior signage has been installed and finishes have been reviewed by Architect, unless otherwise directed.

D. Where mounting heights are not indicated, refer decisions to Architect prior to installation.

1.10 COORDINATION OF CONTRACT CLOSEOUT

A. After Owner occupancy of premises, coordinate access to site by requirements of individual Specification Sections regarding correction of defective Work and Work not in accordance with Contract Documents. Minimize disruption of Owner's operations.

B. Assemble and coordinate Closeout submittals in accordance with Section 01 77 00.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Preconstruction meeting.
   2. Progress meetings.

1.2 GENERAL PROCEDURES

A. Contractor shall schedule and administer pre-construction meeting, periodic progress meetings, and specially called meetings and conferences throughout progress of Work. Contractor shall:
   1. Prepare agenda for meetings.
   2. Distribute written notice of each meeting four workdays minimum in advance of meeting date.
   3. Make physical arrangements for meetings.
   4. Preside at meetings.

B. Representatives of Contractor, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of each represents.

C. Architect will attend meetings to ascertain that Work is expedited consistent with Contract Documents and construction schedules.

D. Contractor will record attendees and minutes of meetings, including significant proceedings and decisions. Contractor will reproduce and distribute copies of minutes after each meeting to attendees and to parties affected by decisions made at meeting.

1.3 PRE-CONSTRUCTION MEETING

A. Pre-construction meeting will be held at construction job site prior to beginning of work at time designated by Architect, but not later than 15 days after date of Notice to Proceed.

B. Representatives of Owner, Architect and Contractor, Contractor's Superintendent, and major subcontractors shall be present.

C. Minimum Agenda:
   1. Major subcontractors and suppliers.
   2. Tentative construction schedule.
   3. Critical work sequencing and phasing of construction.
   4. Major equipment deliveries and priorities.

5. Designation of responsible personnel.
6. Procedures and processing of field decisions, proposal requests, Submittals, color coordination, change orders and applications for payment.
7. Adequacy of distribution of Contract Documents.
8. Procedures for maintaining Record Documents.
9. Review of Shop Drawings.
10. Use of premises.
11. Construction facilities, controls and construction aids.
12. Temporary utilities.
13. Security procedures.
14. Housekeeping procedures.
15. Discussion of project quality control procedures and requirements.

1.4 PROJECT PROGRESS MEETINGS

A. Schedule regular periodic progress meetings at project field office, as required.

B. Hold additional meetings as necessary by progress of construction activity.

C. Representatives of Architect and his consultants as needed, Owner's project representative as needed, Contractor's Superintendent and major subcontractors as appropriate to agenda, shall be present.

D. Minimum Agenda:
1. Review and accept memorandum of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication and delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress schedule for succeeding work period.
9. Coordination of schedules.
10. Review Submittal schedules and status of Submittals.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for effect on construction schedule, on completion, date and effect on other contracts of Project.
14. Other applicable business.

E. Additional progress meetings shall be held by Contractor at project field office as required.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

END OF SECTION

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SECTION 01 32 00

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for schedules required for proper performance of the Work.

1.2 FORMAT

A. Prepare Schedules as horizontal bar chart with separate bar for each major portion of Work or operation, identifying first workday of each week, or prepare network analysis system using critical path method, as outlined in The Associated General Contractors of America (AGC) publication "The Use of CPM in Construction - A Manual for General Contractors."

B. Sequence of Listings: Chronological order of start of each item of Work according to Table of Contents of this Project Manual.

C. Scale and Spacing: To provide space for notations and revisions.

D. Sheet Size: Multiples of 8-1/2" x 11."

1.3 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification Section number.

C. Provide sub-schedules for each stage of Work identified in Section 01 11 00.

D. Provide sub-schedules to define critical portions of entire Schedule.

E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of first day of each month.

F. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products and products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision data for selection of finishes.

G. Indicate delivery dates for Owner furnished products] and products identified under Allowances.

H. Coordinate content with Schedule of Values.

1.4 REVISIONS TO SCHEDULES

A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

1.5 INFORMATIONAL SUBMITTALS

A. Submit initial Schedules within 15 days after date Award of Contract. established in Notice to Proceed. After review, resubmit required revised data within 10 days.

B. Submit revised Progress Schedules with each Application for Payment.

C. Submit number of opaque reproductions which Contractor requires, plus two copies which will be retained by Architect.

1.6 DISTRIBUTION

A. Distribute copies of reviewed Schedules to project site file, Subcontractors, suppliers, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in Schedules.

PART 2 - PRODUCTS
Not Used.

PART 3 - EXECUTION
Not Used.

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 - - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Photography.
   2. Views and Techniques
   3. Images
   4. Media

1.2 PHOTOGRAPHY

A. Employ and pay photographer to take construction record photographs periodically during course of Work.

B. Furnish construction photographs taken on commencement of Work and at monthly intervals.

C. Submit prints and digital media monthly with each pay application.

D. Photos may be incorporated into monthly construction report which should include schedule, progress of work, etc.

E. Do not display photographs in publications, contests or other public or private forum without written consent of Owner and Architect.

F. Parties requiring additional copies of digital images prints will order from and pay photographer directly.

1.3 QUALITY ASSURANCE

A. Qualifications - Photographer: Qualified as commercial photographer, engaged as professional in photography business for minimum period of three years.
   1. Employ photographer only after review of his qualifications by Architect prior to commencing construction.
   2. Employ photographer that Architect and Owner have no objections to. Should Architect or Owner object to photographer selected by Contractor, Contractor shall immediately select another photographer, without delay to Project Schedule.

1.4 INFORMATIONAL SUBMITTALS

A. Submit qualifications and experience record of photographer prior to receipt of written Notice to Proceed.

B. Submit examples of photographer's work similar to that required prior to written Notice to Proceed.

PART 2 - - PRODUCTS

2.1 DIGITAL IMAGES

A. Provide color digital images, taken at 1028 x 768 minimum resolution.

B. Size: Print images on 8.5" x 11" photograph quality paper, full resolution. Maximum two images per sheet.

C. Bindings: 2" margin, placed on left hand of 11" side.

D. Identify each print on back, listing time and date of exposure, location and orientation of view, project name and address of photographer, and photographer's numbered identification of exposure.

2.2 DIGITAL MEDIA

A. Digital/media (CD Rom) images will become property of Owner.

B. Catalog and index digital images in chronological sequence. Provide typed table of contents. Place negatives in archive negative sheets and compiled in three-ring commercial quality binder.

PART 3 - - EXECUTION

3.1 VIEWS REQUIRED

A. Consult with Architect for instructions concerning views required at each specified visit to site.

B. Photograph from locations to adequately illustrate condition of construction and state of progress.

C. Minimum views and quantities required:

D. At each specified time, take photographs from 12 different views.

E. Furnish six digital image prints of each view.

F. Architect will have right to request fewer photographs be taken at certain intervals so that more photographs may be taken at other times, providing that total number of photographs remains unchanged.

3.2 DELIVERY OF DIGITAL IMAGES

A. Deliver digital images prints with each monthly pay application.

B. Deliver one set of digital images to Architect, one to Owner, and place one set of digital images in Project Record file as specified in Section 01 78 39.

END OF SECTION

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittal schedule requirements.
   2. Administrative and procedural requirements for Submittals.

1.2 DEFINTIONS

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

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

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit as an action submittal, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
   1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
   2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
   3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
      a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
   4. Format: Arrange the following information in a tabular format:
      a. Scheduled date for first submittal.
      b. Specification Section number and title.
      c. Submittal category: Action; informational.
      d. Name of subcontractor.
      e. Description of the Work covered.
      f. Scheduled date for Architect's final release or approval.
      g. Scheduled date of fabrication.

h. Scheduled dates for purchasing.
i. Scheduled dates for installation.
j. Activity or event number.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:
1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique number for each Submittal, including revision identifier as follows:
a. Include Specification Section number, followed by sequential alphanumeric identifier, followed by sequential alphanumeric suffix for resubmittals (e.g., 06 10 53 – 001 – 00).
b. Update sequential alphanumeric suffix for each subsequent resubmittal (e.g., 06 10 53 – 001 – 01).
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of review and transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
1. Contractor's responsibility for deviations in Submittals from requirements of Contract Documents is not relieved by Architect's review of Submittals unless Architect gives specific written acceptance for each specific deviation.

D. Electronic Submittal Requirements:
1. Prepare submittals as PDF package, assembling complete submittal package into a single, indexed PDF file incorporating transmittal form and all submittal requirements of a Specification Section with internal bookmark links enabling for navigation to each item. Name PDF file with Submittal number.

2. Provide electronic stamp to permanently record Contractor's review and approval markings and space for electronic stamp for action taken by Architect and Consultants as needed.
3. Metadata: Include the following information as keywords in the electronic submittal file metadata:
   a. Project name.
   b. Number and title of appropriate Specification Section.
   c. Manufacturer name.
   d. Product name.
4. Post electronic submittals in Adobe PDF format directly to Newforma Info Exchange at https://projects.corgan.com/.
5. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

E. Transmittals for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor. Provide locations on form for the following information:
1. Project name.
2. Date.
3. Destination (To:).
4. Source (From:).
5. Name and address of Architect.
6. Name of Construction Manager.
7. Name of Contractor.
8. Name of firm or entity that prepared submittal.
9. Names of subcontractor, manufacturer, and supplier.
10. Type of submittal.
11. Submittal purpose and description.
12. Specification Section number and title.
13. Specification paragraph number or drawing designation and generic name for each of multiple items.
14. Drawing number and detail references, as appropriate.
15. Indication of full or partial submittal.
16. Transmittal number, numbered consecutively.
17. Submittal and transmittal distribution record.
18. Remarks.
19. Signature of transmitter.

1.5 SUBMITTAL PROCEDURES

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

1. Email Submittals: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include information in email subject line as requested by Architect.
    a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
    a. Post electronic submittals in Adobe PDF format directly to Newforma Info Exchange at https://projects.corgan.com/.

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

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow seven days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow seven days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 14 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

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

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

E. Distribution: Furnish copies of final Submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
1. Distribute accepted samples as directed by Architect.

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

1.6 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
   a. Manufacturer's catalog cuts.
   b. Manufacturer's product specifications.
   c. Standard color charts.
   d. Statement of compliance with specified referenced standards.
   e. Testing by recognized testing agency.
   f. Application of testing agency labels and seals.
   g. Notation of coordination requirements.
   h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
   a. Wiring diagrams that show factory-installed wiring.
   b. Printed performance curves.
   c. Operational range diagrams.
   d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.

d. Notation of coordination requirements.
e. Notation of dimensions established or confirmed by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

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

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
   a. Project name and submittal number.
   b. Generic description of Sample.
   c. Product name and name of manufacturer.
   d. Sample source.
   e. Number and title of applicable Specification Section.
   f. Specification paragraph number and generic name of each item.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
   a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

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

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

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

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

G. Certificates:

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

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
   a. Name of evaluation organization.
   b. Date of evaluation.
   c. Time period when report is in effect.
   d. Product and manufacturers' names.
   e. Description of product.
   f. Test procedures and results.
   g. Limitations of use.

1.7 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
   1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and one paper copy of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
   1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

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

1. Submittals without Contractor's stamp and Submittals which, in the opinion of the Architect or Owner, are incomplete, contain numerous errors, have not been reviewed, or have only been reviewed superficially, will be returned without Architect's review or comments. Resultant schedule delays incurred are Contractor's responsibility.

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

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

1.9 ARCHITECT'S REVIEW

A. Architect's review of Submittals is for general design conformance and compliance with information provided in Contract Documents. Contractor is responsible for meeting requirements and characteristics of products and systems specified; dimensions and quantities to be confirmed and correlated at the Project site; and information that pertains solely to fabrication processes, installation techniques, and coordination of work required by other trades. Architect's review and indication of action to be taken shall not relieve Contractor of responsibility for deviation from requirements of Contract Documents.

B. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it. Architect will indicate, via markup on each submittal, the appropriate action as follows:

1. Final Unrestricted Release: When submittal is marked "No Exception Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Final-But-Restricted Release: When submittal is marked "Comments Included," that part of the Work covered by the submittal may proceed provided it complies with both the Architect's notations and comments on the submittal and requirements of the Contract Documents; final acceptance will depend upon that compliance.
3. Returned for Resubmittal: When submittal is marked "Revise and Submit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the Architects notations or corrections; resubmit without delay.
    a. Do not permit submittals marked "Revise and Submit" to be used at the Project site or elsewhere where construction is in progress.
4. Rejected: When submittal is marked "Rejected" do not proceed with that part of the work as submission is either incomplete, not coordinated, or does not conform to requirements of Contract Documents. Resubmission of the same submittal will not be considered. Prepare and submit new submittal meeting requirements of Contract Documents.

5. Not Reviewed: When submittal is marked "Not Reviewed. Submittal not required by Contract Documents" it has not been reviewed because the submittal was neither requested nor required by Contract Documents.
6. Close-Out Submittal: When submittal is marked "Reviewed for Project Close-Out Requirements Only" it has only been reviewed only for compliance with close-out submission requirements. It has not been reviewed for accuracy or completeness. Burden of accuracy and completeness rests with the Contractor.
7. Substitution Request: When a submittal is marked "Proposed Substitution. Resubmit. Comply with Section 01 25 00" submission does not conform to requirements of Contract Documents. Contractor may elect to resubmit under the provisions, conditions, and procedures outlined in Section 01 25 00 "Substitution Procedures," or prepare and submit new submittal meeting requirements of Contract Documents.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements.

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

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

F. Architect will return without review submittals received from sources other than Contractor.

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

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: General regulatory requirements.

1.2 REFERENCES

A. ASTM International
   1. ASTM E 119: Test Methods for Fire Tests of Building Construction and Materials

B. Underwriters Laboratories Inc.
   1. UL 263: Fire Tests of Building Construction and Materials.

1.3 GENERAL REQUIREMENTS

A. General: Additional information with legal implications regarding applicable governing laws and jurisdictions can be found in Conditions of Contract.

B. Codes:
   1. Where references are made on Drawings or Specifications to codes, they shall be considered an integral part of the Contract Documents as minimum standards. Nothing contained in Contract Documents shall be so construed as to be in conflict with law, bylaw or regulation of municipal, State, Federal or other authorities having jurisdiction.
   2. Perform Work in compliance with Codes shown on Construction Drawings.
      a. National, state and local barrier free codes, laws and ordinances.

C. Contractor shall, without additional expense to Owner, obtain necessary licenses and permits, and be responsible for complying with Federal, state, county, and municipal laws, codes, and regulations applicable to performance of Work, including, but not limited to, laws or regulations requiring use of licensed contractors to perform parts of Work.

D. Environmental Requirements: Contractor shall comply with applicable local, state, and federal air and water quality standards with pollution control laws; and with such rules, regulations and directives as may be lawfully issued for the protection of the environment in the areas surrounding the confines of this contract.
   1. Obtain certificates of registration, issued by The Texas Water Commission, for work involving the installation removal, or repair of underground storage tank systems, including piping.

E. Occupancy Permit: The General Contractor shall be responsible for securing a Certificate of Occupancy permit at completion of project and shall deliver such permit to Owner. Final Payment shall be retained until permit has been received by Owner.

1.4 FIRE-RESISTANCE REQUIREMENTS

A. Fire Resistance Ratings and Fire Tests: Fire-resistance ratings of building elements, components, and assemblies shall be determined only in accordance with the test procedures set forth in ASTM E 119 or UL 263, or by alternative methods approved by applicable authorities having jurisdiction.
   1. Fire-resistance ratings shall be determined or listed based on fire tests performed by one of the following testing agencies, or other agencies acceptable to governing authorities having jurisdiction.
      a. Factory Mutual Laboratories.
      b. Intertek
      c. Southwest Research Institute.
      d. Underwriters Laboratories, Inc.
   2. Where reference is made to only one testing authority, equivalent fire ratings as determined or listed by another testing agency are acceptable if approved by applicable authorities having jurisdiction.

B. Marking and Identification: Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions, or any other walls required to have protected openings or penetrations, shall be permanently identified with signage or stenciling. Such identification shall:
   1. Be located in accessible floor plenums, ceiling plenums, or attic spaces.
   2. Be repeated at intervals not exceeding 30 feet o.c., measured horizontally along the partition or wall.
   3. Include lettering not less than 0.5- inch in height, worded as follows: “FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS AND PENETRATIONS.”

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 – GENERAL

1.1 DEFINITIONS

A. "Acceptance", "acceptable", or words of similar import: Acceptance, acceptable or similar words shall be as determined by Architect.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract. Approval does not release Contractor from responsibility to fulfill Contract Document requirements.

C. "At no extra cost to Owner", "With no extra compensation to Contractor", "At Contractor's own expense", or words of similar import: Terms shall be understood to mean that Contractor shall perform or provide specified operation of Work at no increase to Contract Sum stated in executed Contract.

D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

E. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

F. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated." No limitation on location is intended except as specifically noted.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Installer" is entity engaged by Contractor, either as employee, subcontractor or sub-subcontractor for performance of particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in operations they are engaged to perform. Term "experienced", when used with term "installer", means having minimum five previous projects similar in size and scope to this Project, and familiar with precautions required, and has complied with requirements of authority having jurisdiction.

I. "NIC": Work of this Project which is not being performed or provided as part of Contract; term shall mean "Not in This Contract" or "Not Part of Work to be Performed or Provided by Contractor". "NIC" work is indicated as aid to Contractor in scheduling amount of time and materials necessary for completion of Contract.

J. "Other acceptable manufacturer", "equal", "acceptable equal", "equivalent", or words of similar import: It shall be understood that words are followed by expression "at sole discretion of Architect" even though words may not appear in print.

K. "Perform": Contractor, at his own expense, shall perform operations necessary to complete Work, including furnishing of necessary labor, tools and equipment, and further including and installing of materials indicated, specified or required to complete performance.

L. "Project Site" is space available to Contractor for performance of Work, either exclusively or in conjunction with others performing construction as part of Project. Extent of Project Site is shown on Contract Drawings, and may or may not be identical with description of land upon which Project is to be built.

M. "Provide": Contractor, at his own expense, shall furnish and install Work complete in place and ready for use, including furnishing of necessary labor, materials, tools, equipment and transportation. Definitions apply same to future, present and past tenses, except word "provided" may mean "contingent upon" where context is apparent.

N. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

O. "Require" and words of similar import: As required to complete Work and as required by Architect.

P. "Testing Laboratory" is independent entity engaged to perform specific inspections or tests, either at Project Site or elsewhere, and to report on, and if required, to interpret results of those inspections or tests.

1.2 SPECIFICATION SENTENCE STRUCTURE

A. Specifications are written in modified brief style. In general, words "the", "a", "an", "shall", "shall be", and "all" are not used. Requirements indicated and specified apply to work of same kind, class, and type even though word "all" is not stated.

B. Simple imperative mood of sentence structure is used in Specification Sections which places verb as first word in sentence. Where "perform", "provide", "install", "erect", "furnish", "connect", "test", or words of similar import are used, it shall be understood that words include meanings of phrase "Contractor Shall..." before words.

C. Standard paragraph titles and other identifications of subject matter in Specifications are intended as aid in locating and recognizing various requirements in Specifications. Titles do not define, limit or otherwise restrict Specifications text. Capitalizing of words in text does not signify or mean that words convey special or unique meanings having precedence over other parts of Contract Documents. Specification text shall govern over titling and shall be understood to be interpreted as a whole.

1.3 DOCUMENT ORGANIZATION

A. Organization of Project Manual and Contract Drawings are not intended to control or to lessen responsibility of Contractor in dividing Work among his subcontractors, or in establishing extent of Work to be performed by each trade.

1.4 SYMBOLS

A. Graphic symbols used in Contract Documents are those symbols recognized in construction industry for indicated purposes. Where not otherwise noted, symbols are those defined in "Architectural Graphics Standards", published by John Wiley & Sons, Inc., Eighth Edition.

B. Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, mechanical and electrical symbols are supplemented by more specific symbols recommended by technical associations including ASME, ASPE, IEEE, and similar organizations. Request clarification from Architect if symbols are unfamiliar.

1.5 REFERENCE STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
   1. When conflict exists between requirements of reference standards and Contract Documents, request clarification from Architect before proceeding.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Make reference standards available as requested or required by Architect or Owner. Maintain copies of standard at project site throughout construction period.
   2. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.6 ABBREVIATIONS AND ACRONYMS

A. Language used on Drawings and in Specifications is of the abbreviated type in certain instances and implies abbreviations listed on the Drawings.

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
   1. AABC - Associated Air Balance Council; www.aabc.com.
   2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.

3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.

43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; www.eciaonline.org.
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; www.eima.com.
76. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
77. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; www.evo-world.org.
80. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
83. FM Approvals - FM Approvals LLC; www.fmglobal.com.

84. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
86. FSA - Fluid Sealing Association; www.fluidsealing.com.
87. FSC - Forest Stewardship Council U.S.; www.fscus.org.
88. GA - Gypsum Association; www.gypsum.org.
89. GANA - Glass Association of North America; www.glasswebsite.com.
90. GS - Green Seal; www.greenseal.org.
91. HI - Hydraulic Institute; www.pumps.org.
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
95. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
96. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
97. IAS - International Accreditation Service; www.iasonline.org.
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; www.iccsafe.org.
101. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
102. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
103. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
104. IEC - International Electrotechnical Commission; www.iec.ch.
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
109. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
110. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
111. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
116. ISO - International Organization for Standardization; www.iso.org.
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; www.itu.int/home.
119. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; www.lightning.org.
122. MBMA - Metal Building Manufacturers Association; www.mbma.com.
123. MCA - Metal Construction Association; www.metalconstruction.org.
124. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
125. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.

126. MHIA - Material Handling Industry of America; www.mhia.org.
127. MIA - Marble Institute of America; www.marble-institute.com.
128. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
129. MPI - Master Painters Institute; www.paintinfo.com.
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
131. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
132. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
133. NADCA - National Air Duct Cleaners Association; www.nadca.com.
134. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
135. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
136. NBI - New Buildings Institute; www.newbuildings.org.
137. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
138. NCMA - National Concrete Masonry Association; www.ncma.org.
139. NEBB - National Environmental Balancing Bureau; www.nebb.org.
140. NECA - National Electrical Contractors Association; www.necanet.org.
141. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
142. NEMA - National Electrical Manufacturers Association; www.nema.org.
143. NETA - InterNational Electrical Testing Association; www.netaworld.org.
144. NFHS - National Federation of State High School Associations; www.nfhs.org.
145. NFPA - National Fire Protection Association; www.nfpa.org.
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; www.nfrc.org.
148. NHLA - National Hardwood Lumber Association; www.nhla.com.
149. NLGA - National Lumber Grades Authority; www.nlga.org.
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
152. NRCA - National Roofing Contractors Association; www.nrca.net.
153. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
154. NSF - NSF International; www.nsf.org.
155. NSPE - National Society of Professional Engineers; www.nspe.org.
156. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
158. NWFA - National Wood Flooring Association; www.nwfa.org.
159. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
160. PDI - Plumbing & Drainage Institute; www.pdionline.org.
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
162. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
163. RFCI - Resilient Floor Covering Institute; www.rfci.com.
164. RIS - Redwood Inspection Service; www.redwoodinspection.com.
165. SAE - SAE International; www.sae.org.
166. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
167. SDI - Steel Deck Institute; www.sdi.org.
168. SDI - Steel Door Institute; www.steeldoor.org.
169. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.

170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; www.siaonline.org.
172. SJI - Steel Joist Institute; www.steeljoist.org.
173. SMA - Screen Manufacturers Association; www.smainfo.org.
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
175. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
176. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
177. SPIB - Southern Pine Inspection Bureau; www.spib.org.
178. SPRI - Single Ply Roofing Industry; www.spri.org.
179. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
180. SSINA - Specialty Steel Industry of North America; www.ssina.com.
181. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
182. STI - Steel Tank Institute; www.steeltank.com.
183. SWI - Steel Window Institute; www.steelwindows.com.
184. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
185. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
186. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
190. TMS - The Masonry Society; www.masonrysociety.org.
191. TPI - Truss Plate Institute; www.tpinst.org.
192. TPI - Turfgrass Producers International; www.turfgrasssod.org.
193. TRI - Tile Roofing Institute; www.tileroofing.org.
194. UL - Underwriters Laboratories Inc.; www.ul.com.
195. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
196. USAV - USA Volleyball; www.usavolleyball.org.
197. USGBC - U.S. Green Building Council; www.usgbc.org.
198. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
199. WASTEC - Waste Equipment Technology Association; www.wastec.org.
200. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
201. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
202. WDMA - Window & Door Manufacturers Association; www.wdma.com.
203. WI - Woodwork Institute; www.wicnet.org.
204. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
205. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
   1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
   2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
   3. ICC - International Code Council; www.iccsafe.org.
   4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
   1. COE - Army Corps of Engineers; www.usace.army.mil.
   2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
   3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
   4. DOD - Department of Defense; www.quicksearch.dla.mil.
   5. DOE - Department of Energy; www.energy.gov.
   6. EPA - Environmental Protection Agency; www.epa.gov.
   7. FAA - Federal Aviation Administration; www.faa.gov.
   8. FG - Federal Government Publications; www.gpo.gov.
   9. GSA - General Services Administration; www.gsa.gov.
   10. HUD - Department of Housing and Urban Development; www.hud.gov.
   11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
   12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
   13. SD - Department of State; www.state.gov.
   14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
   15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
   16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
   17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
   18. USP - U.S. Pharmacopeial Convention; www.usp.org.
   19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
   1. ADAAG - Americans with Disabilities Act (ADA); Architectural Barriers Act (ABA); Accessibility Guidelines for Buildings and Facilities; Available from U.S. Access Board; www.access-board.gov
   2. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
   3. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
   4. DSCC - Defense Supply Center Columbus; (See FS).
   5. FED-STD - Federal Standard; (See FS).
   6. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
   7. Available from Defense Standardization Program; www.dsp.dla.mil.
   8. Available from General Services Administration; www.gsa.gov.
   9. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
   10. MILSPEC - Military Specification and Standards; (See DOD).
   11. USAB - United States Access Board; www.access-board.gov.

12. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 45 16

CONTRACTOR'S QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:
1. Section 01 45 29 "Testing Agency Services" for testing and inspecting requirements.

1.2 DEFINITIONS

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

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

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

D. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

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

1.3 CONFLICTING REQUIREMENTS

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

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

1.4 ACTION SUBMITTALS

A. Shop Drawings: For mockups.
1. Provide plans, sections, and elevations, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

1.6 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
   1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
   2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
   3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.7 REPORTS AND DOCUMENTS

A. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of technical representative making report.
   2. Statement on condition of substrates and their acceptability for installation of product.
   3. Statement that products at Project site comply with requirements.
   4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
   5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   6. Statement whether conditions, products, and installation will affect warranty.
   7. Other required items indicated in individual Specification Sections.

B. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
   1. Name, address, and telephone number of factory-authorized service representative making report.
   2. Statement that equipment complies with requirements.
   3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
   4. Statement whether conditions, products, and installation will affect warranty.
   5. Other required items indicated in individual Specification Sections.

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

1.8 QUALITY ASSURANCE

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

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

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

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

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

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
   1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

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

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

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
   a. Allow seven days for initial review and each re-review of each mockup.
6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

1.9 QUALITY CONTROL

A. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."

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

C. Coordination: Coordinate sequence of activities to accommodate required testing, quality-assurance, and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

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SECTION 01 50 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Requirements for temporary services and facilities including but not limited to the following:
   1. Temporary Utilities:
      a. Water service and distribution.
      b. Lighting.
      c. Electrical power service and distribution.
      d. Telephone and facsimile service.
      e. Computer Internet service
      f. Storm and sanitary sewers.
   2. Temporary construction and support facilities:
      a. Temporary heat.
      b. Field offices and storage sheds.
      c. Sanitary facilities, including drinking water.
      d. Temporary enclosures.
   3. Security and protection facilities:
      a. Temporary fire protection.
      b. Barricades, warning signs, and lights.
      c. Webcam
      d. Enclosure fence.

1.2 REFERENCE

A. National Fire Protection Association:
   1. NFPA 70 - National Electrical.
   2. NFPA 70E - Electrical Safety Requirements for Employee Workplaces.
   3. NFPA 241 - Safeguarding Construction, Alteration and Demolition Operations.

1.3 USE OF EXISTING FACILITIES

A. Existing facilities shall not be used for field offices or for storage.

B. Contractor's employees shall not use permanent facilities or existing restrooms within existing building that are concurrently being used by Owner or general public.

1.4 USE OF PERMANENT FACILITIES

A. Permanent facilities shall not be used for field office or for storage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Materials may be new or used, adequate in capacity for required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Provide warning signs to help prevent damage and injury.

C. Should it become necessary to temporarily remove safety items, replace item immediately, in conformance with applicable regulations.

D. Wood materials used in barricades and barriers within building and in material storage areas shall be fire-retardant.

2.2 TEMPORARY ELECTRICITY AND LIGHTING

A. Owner will pay for temporary power used during construction. Arrange with utility company to provide service required for power and lighting of construction trailers, facilities and for construction operations.

B. Install circuit and branch wiring, with weather-resistant area distribution boxes located so that power and lighting is available throughout construction by use of construction-type power cords.

C. Provide adequate artificial lighting for areas of work when natural light is not adequate for work, and for areas accessible to public.

D. Provide construction lighting throughout construction areas as necessary to maintain safety and security. Maintain lighting on daily basis, including weekends, holidays, and foul-weather days so construction site is adequately lighted.

2.3 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of Work, to meet specified minimum conditions for installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases. Provide adequate ventilation during use of volatile or noxious substance.

C. Portable heaters shall be standard units complete with controls.

D. Pay costs of installation, maintenance, operation and removal, and for fuel consumed.

E. Open flame heating equipment is not permissible.

2.4 TEMPORARY WATER

A. Owner will pay for temporary water used for construction purposes from existing building.

B. Pay costs for installation, maintenance and removal.

C. Install branch piping with taps located so that water is available throughout construction by use of hoses. Protect piping and fittings against freezing.

2.5 COMMUNICATION SERVICES

A. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
   1. Provide additional telephone lines for the following:
      a. Provide a dedicated telephone line for each facsimile machine in each field office.
      b. Provide one telephone line(s) for Owner's use.
   2. At each telephone, post a list of important telephone numbers.
      a. Police and fire departments.
      b. Ambulance service.
      c. Contractor's home office.
      d. Architect's office.
      e. Engineers' offices.
      f. Owner's office.
      g. Principal subcontractors' field and home offices.
   3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

B. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
   1. Processor: Intel Core i5 or i7.
   2. Memory: 4 gigabyte.
   3. Disk Storage: 500 gigabyte hard disk drive and combination DVD-RW/CD-RW drive.
   4. Display: 24 inch (610 mm) LCD monitor with 256-Mb dedicated video RAM.
   5. Full size keyboard and mouse.
   6. Network Connectivity: 10/100BaseT Ethernet or Gigabit.
   7. Operating System: Microsoft Windows 10 Professional.
   8. Productivity Software:
      a. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook.
      b. Adobe Reader 11.0 or higher.
      c. WinZip 7.0 or higher.
   9. Printer: All in one unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
   10. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum 1.0 Mbps upload and 15 Mbps download speeds at each computer.
   11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
   12. Backup: External hard drive, minimum 2 terabyte, with automated backup software providing daily backups.

C. Pay costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by party who places call.

2.6 TEMPORARY SANITARY FACILITIES

A. Provide temporary sanitary facilities outside of existing building for use of Contractor's employees.

B. Provide chemical-type sanitary facilities in compliance with applicable health laws, and State and local regulations and ordinances.

C. Service, clean and maintain facilities and enclosures.

2.7 TEMPORARY SEWER AND DRAIN CONNECTIONS

A. When existing sewers have to be taken up or removed, provide and maintain temporary outlets and connections for public or private drains and sewers.

B. Take care of sewage and drainage which will be received from these drains and sewers. Provide and maintain, adequate pumping facilities and temporary outlets or diversions.

C. Construct troughs, pipes, or other structures necessary. Dispose of drainage and sewage received from temporary connections until permanent connections are built and in service.

D. Keep existing sewers and connections in service and maintained under Contract, except where specified or ordered to be abandoned by Owner.

E. Dispose of water or sewage in satisfactory manner so that no nuisance is created and that Work under construction will adequately be protected.

2.8 TEMPORARY FIRE PROTECTION

A. During construction, provide temporary fire protection in accordance with local Fire Department Protection Code and applicable governing authorities.

B. Take necessary precautions in welding or cutting operations to keep work area free of combustible materials. Do not use welding equipment around flammable liquids or vapors.

C. Keep welding and cutting equipment outdoors wherever possible. Remove welding and cutting equipment wherever practical from building daily.

D. At completion of work operations, examine work and adjacent area for hazards. When work operation is near building opening, examine areas above, below or adjacent to work area for hazards.

E. Do not open, turn off, interfere with, attach pipe or hose to, or connect to existing fire hydrant, stop valves, or stop clock, or tap water main without prior written permission of proper authority or owner.

2.9 SCAFFOLDING

A. Provide scaffolding, ramps, runways, platforms, guardrails, stairs and ladders as required by job conditions.

2.10 LIFTING AND HOISTING

A. Provide hoists, cranes or other lifts as required for material handling.

B. Determine need, provide appropriate equipment, coordinate installation and location with Architect and Owner.

2.11 CONSTRUCTION AND INSPECTION AIDS

A. Provide construction aids, inspection aids, and equipment required by Contractor’s personnel to facilitate execution of Work.

B. Provide Personal Protective Equipment (PPE) for use by Architect’s personnel while on jobsite that meets or exceeds Contractor’s jobsite safety program and local OSHA requirements.

2.12 BARRICADES

A. Provide barriers to prevent public entry, to protect existing trees and plants, to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage.

B. Cover trenches and holes when not in use. Erect barriers at sharp changes in plane of more than 3 feet.

2.13 CONSTRUCTION FENCE

A. Prior to start of Work at Project site, install enclosure fence with locked entrance gates.

B. Provide construction fence around material storage and construction areas to prevent unauthorized access.
   1. Construct 6'-0" high chain link fence of 2" x 2" mesh maximum; galvanized steel angle iron or pipe post; securely anchored line, corner and gate posts.
   2. Provide lockable gates, padlocked during nonworking hours.
   3. Locate personnel gates, as necessary, to provide controlled entry from construction parking to construction area.

2.14 TEMPORARY ENCLOSURES

A. Provide temporary weathertight enclosures of exterior walls for successive areas of building as work progresses as necessary to maintain acceptable working conditions.

B. Provide weather protection for interior materials, allow for effective temporary heating, and to prevent entry of unauthorized persons.

C. Provide temporary exterior doors with hardware and padlocks. Other enclosures shall be removable as necessary for work and handling of materials.

2.15 FIELD OFFICES

A. Provide and maintain temporary field office during entire construction period for use of Contractor, and periodic use of Owner's Representative and Architect.

B. Field office shall be structurally sound, weathertight, with floors raised above ground. At Contractor's option, portable or mobile buildings may be used. Do not use mobile buildings for living quarters. Size as required for Contractor's needs and to provide space for project meetings.

C. Field office shall have operable, screened windows with locks. Secure entrance door with one key for each occupant.

D. Sanitary Facilities: Furnish private lavatory-toilet facilities with soap and towel dispensers and trash can.

E. Heating and Air Conditioning: Provide as dictated by outside temperature.

F. Fire Extinguisher: Furnish appropriate type at each office and each storage area.

G. Office for Architect and Owner's Representatives:
   1. Furnish self-contained space for use of Architect and Owner's representatives within Contractor's field office.
   2. Furnishings: Provide two standard size desks, with drawers, two swivel chairs, one drafting table and stool, two lockable four-drawer legal metal file cabinets, two visitor chairs, and one plan rack.

2.16 DRINKING WATER

A. Furnish potable water for personnel connected with Work.

B. Pipe or transport to keep clean and fresh.

C. Provide drinking water in suitable containers or dispensers and paper cups located in close proximity to where work is in progress.

D. Provide field offices with bottled drinking water, dispenser and cooling apparatus. Contractor shall pay for service; maintain daily and remove when offices are removed.

2.17 TEMPORARY SECURITY

A. Provide temporary security as necessary to protect project site, existing building, and Contractor's staging areas during construction.

B. Provide 24 hour temporary webcam service for remote security to protect project site and materials during construction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine site and review conditions and factors which affect construction procedures and construction facilities, including adjacent properties and public facilities which may be affected by execution of Work.

3.2 PREPARATION

A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.3 INSTALLATION

A. Comply with applicable requirements of each Specification Section.

B. Install facilities of neat and reasonable, uniform appearance, structurally adequate for required purposes. Maintain during entire construction period.

C. Prior to start of Work at project site, install enclosure fence with locked entrance gates.

D. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed. Construct or locate construction offices and sheds on proper foundation, with utility connections, provide steps and landing at entrances. Locate construction offices and sheds as directed by Architect.

E. Locate thermometer in convenient location, out of direct sunlight.

F. Keep working and storage areas free from standing water. Do not pump or drain water onto adjacent property. Distribute discharge to prevent erosion.

3.4 MAINTENANCE

A. Maintain and clean construction office, sheds, furnishings, and equipment as required.

B. Maintain approach walks free of mud, water, and snow.

C. Maintain and operate systems to assure continuous service. Modify and extend systems as work progress requires.

3.5 DEBRIS CONTROL

A. Maintain areas under Contractor's control free of extraneous debris and litter.

B. Initiate and maintain specific program to prevent accumulation of debris at construction site, storage and parking areas, or along access roads and haul routes.
   1. Furnish on-site containers for collection of waste materials, debris and rubbish.
   2. Prohibit overloading of trucks to prevent spillages on access and haul routes.
   3. Periodically examine traffic areas to enforce requirements.
   4. Remove waste material, debris and rubbish from site daily.
   5. Do not drop or throw materials from heights.
   6. Lower waste materials in controlled manner with as few handlings as possible.

C. Hazards Control:
   1. Store volatile wastes in covered metal containers.
   2. Remove containers from premises daily.
   3. Prevent accumulation of wastes which create hazardous conditions.
   4. Provide adequate ventilation during use of volatile or noxious substances.

D. Conduct disposal operations to comply with local ordinances and anti-pollution laws.

E. Do not burn or bury rubbish and waste materials on Project site. Do not dispose of wastes into streams or waterways. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.

3.6 DUST CONTROL

A. Provide positive methods and apply dust control materials to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from dispersing into atmosphere.

B. Wet down materials and rubbish to prevent blowing dust.

3.7 EROSION AND SEDIMENT CONTROL

A. Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

B. Plan and execute construction and earthwork by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.

C. Hold areas of bare soil exposed at one time to minimum. Provide temporary control measures such as berms, dikes, and drains.

D. Construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode.

E. Periodically examine earthwork to detect evidence of start of erosion, apply corrective measures as required by erosion control.

3.8 POLLUTION CONTROL

A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by discharge of noxious substances from construction operations.

B. Perform emergency measures required to contain spillage and to remove contaminated soil or liquids. Excavate and dispose of contaminated earth off site and replace with suitable compacted fill and topsoil.

C. Prevent harmful substances from entering public waters. Prevent disposal of wastes, effluence, chemicals or other substances adjacent to streams or in sanitary or storm sewers.

D. Provide systems for control of atmospheric pollutants. Prevent toxic concentrations of chemicals. Prevent harmful dispersal of pollutants into atmosphere.

3.9 REMOVAL

A. Remove temporary materials and equipment when no longer required and when acceptable to Architect.

B. Remove construction office, sheds, and barriers including foundations and contents at completion of project.

C. Grade site to required elevation and clean area.

D. Replace landscaping damaged by Contractor's operations.

3.10 CLEANING

A. Clean and repair damage caused by temporary installations or temporary facilities.

3.11 ADJUSTING

A. Restore existing facilities used for temporary services to specified or original condition.

B. Restore permanent facilities used for temporary services to specified condition.

C. Prior to final inspection, remove temporary lamps and install new lamps.

END OF SECTION

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EROSION AND SEDIMENT CONTROL PLAN-SWPPP

Rockwall ISD Rakow Middle School
New Parking Lot
In
Rockwall, Texas

Prepared for:

Rockwall Independent School Distract

October 2025

Prepared By:
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SECTION 01 5723 - EROSION & SEDIMENT CONTROL PLAN

PART 1 – GENERAL

SUMMARY

This plan has been designed for drainage improvements and will identify and describe pollutant sources from the subject property (construction of the infill turf) with the potential to affect the quality of storm water discharges from the site. The Erosion & Sediment Control Plan will further describe measures to be used to prevent or reduce pollutants in storm water. These measures will include:

Erosion and sediment controls to be implemented to reduce pollutants generated during construction in storm water discharges;

Storm water management measures to limit storm water pollutants in discharge which generally occur after construction activities are completed;

Other controls (i.e., housekeeping practices, etc.);

Spill prevention and control practices; and

Description of non-storm water discharges.

Copies of the plan shall be maintained at the site of activity by the General Contractor until Certification of Substantial Completion is issued and made available to the Environmental Protection Agency (EPA) and appropriate State and local agencies upon request.

This document is to be retained by the General Contractor during construction until Final Certificate of Occupancy is issued and then by the school district for a period of at least three years from the date of final stabilization.

SITE EVALUATION

Site Description

On-going activities at the subject site will include construction of the Rockwall ISD Rakow MS new parking lot. Construction of the utilities and grading is the first phase of a common plan which includes construction of the building. Soil disturbing activities will include: clearing and grading; installing a stabilized construction entrance, perimeter and other erosion and sediment controls; excavation for utilities, construction of additions and paving; and preparation for final planting and seeding. The proposed sequence of construction activities is listed below and will include an area of _____± acres. Approximately _____± acres are estimated to be disturbed through construction activities including the installation of water, sanitary sewer storm sewer, and building additions.

Install stabilized construction entrance;

Clearing and grubbing;

Demolition of existing structures

Rough grading;

Construct drainage swales;

Install erosion control devices (silt fences, hay bales, etc.) See Sediment Control Plan Sheet;

Stabilize denuded areas and stockpiles within fourteen (14) days as outlined in Section III A;

Install utilities;

Construct improvements (including building);

Complete final paving;

Remove accumulated sediment from drainage swales;

When all construction activity is complete and site is stabilized, remove erosion control devices and reseed any areas disturbed by their removal.

Figure 1 Site Location Map

PART 3 - EXECUTION

CONTROLS

Erosion and Sediment Controls

Erosion and sediment controls for each major activity resulting in soil disturbance stated in Section II B shall include stabilization practices as well as structural practices (See Sediment Control Plan). Stabilization practices will be implemented to preserve existing vegetation and trees where practical and to outline stabilization practices for disturbed areas. Structural practices will be initiated to limit the discharge of pollutants from exposed areas of the site to the degree attainable by diverting or reducing flow velocities from exposed soils, detention of flows or otherwise limiting run-off.

Stabilization

Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed as soon as practical and not more than fourteen (14) days after the construction activity in that portion of the site that has temporarily or permanently ceased unless construction activities are to resume within twenty-one (21) days. Interim and permanent stabilization practices will include the following:

Top soil stockpiles and disturbed portions of the site where construction activity temporarily ceases for at least twenty-one (21) days will be stabilized with temporary seasonal grass seed and mulch or other acceptable practices.

At the end of each working day, place a temporary diversion dike around the top of each cut or fill slope to direct any possible run-off away from the face of the slope to a non-erosive outlet area.

Stabilize all points of ingress and egress with crushed stone until just prior to paving operations to prevent tracking of mud onto public roadways.

Seed all embankments and all drainage swales immediately after grading. Permanent stabilization of embankment may be done by hydromulching with Bermuda during the months of May through September and Cool Grow during the months of October through April.

Permanent stabilization of embankment may be done by hydromulching with Bermuda during the months of May through September and Cool Grow during the months of October through April. If stabilization of disturbed areas is to be accomplished during September 15 through April 1, the stabilization shall consist of Cool Grow or Winter Rye.

Protect all trees to be preserved during construction operations.

Disturbed portions of the site where construction activities permanently cease shall be stabilized with seasonal seed no later than fourteen (14) days after the last construction activity. Permanent stabilization shall include seeding with an appropriate grass mixture (See above).

During hot summer months, the General Contractor may need to install temporary irrigation to insure adequate watering of grasses.

Structural Practices

At a minimum, silt fences or hay bales, or equivalent sediment controls are required for all side slopes and down slope boundaries of the construction area. Structural measures should be placed on upland soils to the degree attainable. The following structural controls will also be implemented:

All construction and materials shall conform to local erosion and control measures.

Silt barriers shall be constructed around all inlets and shall be maintained throughout construction. Sediment accumulated behind silt barriers shall be removed when it reaches a depth of six inches or the capacity is reduced by one-half (See Erosion Control Plan for details).

Temporary straw bale berms/dikes shall be installed across drainage channels/swales from disturbed areas. Hay bales shall be securely anchored utilizing steel or wooden stakes. Bales should be replaced at least once every two months or upon failure, etc.

Contractor shall install straw bale dike as shown on Erosion Control Plan and as required by City/architect/engineer/owner.

Contractor shall control mud accumulation on all streets surrounding the project. No mud accumulation will be allowed in public streets. Mud found in streets shall be cleaned up at the end of each work day.

General Contractor shall maintain all erosion control devices during construction to prevent any blockages from accumulated sediment. Additional straw bales may be required during construction as specified by architect, engineer, or City inspector.

All proposed parking areas to be paved as soon as possible after subgrade is prepared.

General Contractor shall remove all temporary erosion and sediment controls and remove siltation only when there is a sufficient growth of ground cover to prevent further erosion.

Storm Water Management

Storm water management practices should be implemented during construction activities to limit pollutants in storm water discharged from the site subsequent to completion of construction processes. The measures will attempt to control the potential increase in the amount and velocity of run-off and amount of pollutants from the site which may result from the change in land use. The following measures should be implemented:

Re-vegetation and natural depressions to provide pollutant removal and storm water infiltration.

Installation of retention structures and/or storm water detention areas.

Other Controls

"Other controls" targets the housekeeping practices of construction sites to limit increases in pollutant discharges. The following should be implemented:

Equipment wash down areas should be located in an area where wash down water can be controlled.

Comply with applicable State and local waste and sanitary regulations by providing adequately maintained sanitary facilities and waste receptacles.

All hazardous waste materials will be disposed of in the manner specified by local or State regulation or by the manufacturer. Site personnel will be instructed in these practices and the individual who manages day-to-day site operations will be responsible for seeing that these practices are followed.

All sanitary waste will be collected from the portable units a minimum of three times per week by a licensed sanitary waste management contractor, as required by local regulation.

Equipment shall only be repaired and maintained in specific and adequately prepared areas.

Stabilize all points of ingress and egress with crushed stone until just prior to paving operations to prevent tracking of mud and construction sediments onto public ways.

All chemicals, paints, solvents, etc. should be stored in protected areas (See Section IV).

Certification of Compliance with Federal, State, and Local Regulations

The storm water pollution prevention plan reflects local requirements for storm water management and erosion and sediment control.

SPILL PREVENTION AND CONTROL

Spill Prevention

Good housekeeping practices will be implemented to reduce the potential for spills of materials maintained on-site. General housekeeping/management practices to be utilized will include the following:

Construction materials will be covered or stored in a covered area if practical.

Products will be kept in their original containers with the original manufacturer's label.

Substances will not be mixed with one another unless recommended by the manufacturer.

Whenever possible, all of a product will be used up before disposing of the container.

Manufacturers' recommendations for proper use and disposal will be followed.

The site pollution prevention inspector will routinely inspect construction site to ensure proper use and disposal of materials on-site.

Original labels and material safety data will be retained.

If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

Specific products and materials maintained on-site and good housekeeping practices to be utilized are presented in the table below:

Materials/Products	Material Management Practices
Petroleum Products	Routine maintenance practices and checks for equipment leaks will be implemented for on-site vehicles. Petroleum products maintained on-site (i.e., gasoline, diesel, oil, tar) will be stored in labeled, sealed containers and will be maintained over an impermeable surface in a bermed area. Any asphalt substances used on-site will be applied according to the manufacturer's recommendations. Material Safety Data Sheets (MSDS) will be retained.
Fertilizers	Fertilizers will be stored over an impermeable surface and covered. Quantities will be used, per manufacturer's recommendations. Exposure of fertilizers to storm water will be minimized during and following application and storage. MSDS will be retained.
Paints	All containers will be tightly sealed and stored when not being used. Excess paint will not be discharged to the storm sewer system or discharged to the ground but will be properly disposed of according to manufacturer's instructions or State and local regulations. MSDS will be retained.
Detergents, Cleaners	Substances will be stored in original labeled containers. MSDS will be retained. Excess detergents and cleaners will not be discharged to the storm sewer or discharged to the ground but will be properly disposed of according to manufacturer's instructions or State and local regulations.
Concrete, Wood, Construction Materials	Materials will be covered or stored in an enclosed area if practical.

Spill Control

The following spill control practices will be implemented to reduce the potential for exposure of spilled materials to storm water run-off.

Fuel storage tanks will be maintained over an impermeable synthetic liner in an area bermed with hay bales to minimize run-off contaminated rainwater.

Manufacturers' recommended methods for spill clean-up will be available and site personnel will be made aware of the procedures and the location of the information and clean-up supplies.

All spills will be cleaned up immediately after discovery.

Personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, including the Texas Water Commission (TWC) Spill Response (800/633-9368 or 298-6171). The Owner and Engineer will also be contacted.

Per regulations found at 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, in the event of a release which exceeds Reportable Quantity, contact the National Response Center immediately at (800/424-8802). Within fourteen (14) days, submit a written description of the release to the EPA Regional office providing the date and circumstances of the release and the steps to be taken to prevent another release. For a listing of reportable quantities call the E.P.A.

The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the clean-up measures will also be included.

The site pollution prevention inspector responsible for the day-to-day site operations will be the spill prevention and clean-up coordinator. This individual will become responsible for prevention and clean-up.

MAINTENANCE AND INSPECTION

This plan must be amended for changes in design, construction, operation, or maintenance that may result in significant effects on the potential for the discharge of pollutants. Additional requirements for amendments may include ineffective practices of the plan in its current state, or a change in contractor or subcontractor.

Regular inspections must be performed by General Contractor and supplied to the Client. The areas to be inspected shall include:

- non-finally stabilized areas of the subject property;
- storage areas exposed to precipitation; and
- locations of vehicle ingress and egress.

The following inspection and maintenance practices will be implemented by General Contractor:

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within twenty-four (24) hours of report.
- Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.
- Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
- Diversion dike will be inspected and any breaches promptly repaired.
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.
- The site pollution prevention inspector will select individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance report.

The inspections by General Contractor should take place not less than once every seven calendar days and within twenty-four (24) hours of any storm of 0.5 inches or greater. Inspections shall occur once per month for areas which are *finally* stabilized. *The attached report forms (See Appendix B) should be used during inspections and should be retained by the Owner as part of the Storm Water Pollution Prevention Plan for at least three years from the date that the site is finally stabilized.*

Any inadequacies revealed in the inspection require revision of the site description and pollution prevention measures. Any changes to the plan must be carried out within seven days of the site inspection. Revisions to the plan are to be included in *Appendix C* and submitted to Glenn Engineering Corporation.

Retention of Records

The Owner is required to retain records or copies of all reports required by this permit, including storm water pollution prevention plans and records of all data used to complete the NOI to be covered by the permit, for a period of at least three years from the date of final stabilization. This period may be extended by request of the EPA. The General Contractor shall turn over this report with the Certification of Substantial Completion and file a N.O.T with the EPA.

NON-STORM WATER DISCHARGES

It is expected that the following non-storm water discharges will occur from the site during the construction period:

- Water from water line flushing and testing;
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred); and
- Uncontaminated groundwater (from dewatering excavation).

All non-storm water discharges will be directed to discharge points (i.e., storm sewer, filtration devices, grassy swale, etc.) capable of appropriately handling the suspected contaminants contained within the discharge.

EROSION CONTROL PLAN

STORM WATER POLLUTION PREVENTON

01 5723 - EROSION CONTROL DETAILS

STONE OUTLET SEDIMENT TRAP SPECIFICATIONS

PART 1-GENERAL

DESCRIPTION

A stone outlet sediment trap is an impoundment created by the placement of an earthen and stone embankment to prevent soil and sediment loss from a site. This includes all labor and materials associated with installation and maintenance of the stone outlet sediment trap as shown in the construction drawings or similar document.

The purpose of a sediment trap is to intercept sediment-laden runoff and trap the sediment in order to protect drainage ways, properties and rights of way below the sediment trap from sedimentation. A sediment trap is usually installed at points of discharge from disturbed areas. The drainage area for a sediment trap is recommended to be less than five (5) acres.

SCHEDULE

Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work included in the construction plans, as are applicable for clearing and grubbing, grading, construction and paving. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials.

CONFLICT

In the event of conflict between these requirements and storm water pollution control laws, rules or regulations of other Federal, State, or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 2 - MATERIALS

MATERIALS

Filter Stone shall conform to North Central Texas Council of Governments (NCTCOG) specifications for Type 'A' Rip Rap as defined in section 2.1.6. (b).

Geotextile Fabric shall be a non-woven polypropylene fabric conforming to NCTCOG specification number 2.23.3 and be designed specifically for use as a soil filtration media with an approximate weight of 6 OZ. /YD2, a mullen burst rating of 140 psi as measured by ASTM D 751 and having an equivalent opening size (EOS) greater than a #70 sieve as measured by ASTM D 4751.

PART 3 - EXECUTION

TEMPORARY STONE OUTLET SEDIMENT TRAP

Earth Embankment: Place fill material in layers not more than 8 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the material. Compact each layer to 95 percent standard proctor density. Do not place material on surfaces that are muddy or frozen. Side slopes for the embankment are to be 3:1. A gap is to be left in the embankment in the location where the natural confluence of runoff crosses the embankment line. The gap is to have a width in feet equal to 6 times the drainage area in acres.

Geotextile Covered Rock Core: A core of filter stone having a minimum height of 1.5 feet and a minimum width at the base of 3 feet shall be placed across the opening of the earth embankment and shall be covered by geotextile fabric which shall extend a minimum distance of 2 feet in either direction from the base of the filter stone core.

Filter Stone Embankment: Filter stone shall be placed over the geotextile and is to have a side slope which matches that of the earth embankment of 3:1 and should cover the geotextile/rock core a minimum of 6 inches when installation is complete.

Maintenance: Accumulated silt shall be removed from behind the embankment when the level of silt is one foot below the top of the filter stone at its lowest point.

PART 4 - MEASUREMENT AND BASIS OF PAYMENT

MEASUREMENT

Measurement for payment for stone outlet sediment trap will be complete in place according the Drawings and these Specifications.

BASIS OF PAYMENT

Earth embankment, geotextile fabric and stone will be paid for by lump sum, which payment shall include furnishing all materials, labor, and equipment necessary to provide a complete and finished unit as specified.

SILT FENCE SPECIFICATIONS

PART 1-GENERAL

DESCRIPTION

Silt Fence is a barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. This includes all labor and materials associated with installation and maintenance of the silt fence as shown in the construction drawings or similar document.

The purpose of a silt fence is to intercept and detain water-borne sediment from unprotected areas to a limited extent. Silt fence is used during the period of construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This fence shall remain in place until the disturbed area is permanently stabilized. Silt fence should not be used where there is a concentration of water in a channel or drainage way or where soil conditions prevent a minimum toe-in depth of six (6) inches or installation of support post to depth of 12 inches. If concentrated flow occurs after installation, corrective action must be taken such as placing rock berm in the areas of concentrated flow.

SCHEDULE

Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work included in the construction drawings, as are applicable for clearing and grubbing, grading, construction and paving. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials.

CONFLICT

A. In the event of conflict between these requirements and storm water pollution control laws, rules or regulations of other Federal, State, or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 2 - MATERIALS

MATERIALS

Silt Fence Fabric shall be nylon reinforced polypropylene fabric which conforms to NCTCOG specification number 2.24.4 and has a built-in cord running the entire length of the top edge of the fabric. The fabric must meet the following minimum criteria:

1. Tensile Strength, ASTM D4632 90 lbs.,
2. Puncture Rating, ASTM D4833 60 lbs.,
3. Mullen Burst Rating, ASTM D3786 280 psi,
4. Apparent Opening Size, U.S. Sieve No. 70.

Fence Posts shall be galvanized steel and may be rolled, formed or tubular in cross-section in accordance with NCTCOG standard specification 2.8.2. (b) (2) "T" posts may be used when in conformance with specification.

Woven Wire Support: The minimum acceptable support material shall be W1.4 x W1.4, 4" x 4", and zinc coated (galvanized) steel woven wire fence fabric conforming to ASTM A116. Standard 2" x 2" chain link fence fabric is acceptable as well as other welded steel fabrics consisting of equal or greater gauge wire and equal or smaller spacing as that listed herein.

PART 3 - EXECUTION

SILT FENCE

Silt Fence shall consist of nylon reinforced polyester netting supported by woven wire mesh, W1.4 x W1.4 and galvanized steel posts set a minimum of I foot depth and spaced not more than 6 feet on center. A 6 inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel. This entrenchment prevents any bypass of runoff under the fence. Fabric shall overlap at abutting ends a minimum of 3 feet and shall be joined such that no leakage or bypass occurs.

PART 4 - MEASUREMENT AND BASIS OF PAYMENT

MEASUREMENT

Measurement for payment for Silt Fence will be made by the linear foot, complete, in place and ready for use inclusive of all components necessary for a complete and working installation.

BASIS OF PAYMENT

Silt Fencing, measured as herein specified will be paid for at the unit price bid per linear foot, which payment shall include furnishing all materials, labor, and equipment necessary to provide a complete and finished product as specified.

STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS

PART 1-GENERAL

DESCRIPTION

The work shall consist of constructing a temporary stabilized construction entrance as shown in the plans and remaining in place for the duration of the construction period to prevent sediment from leaving the project site and becoming a nuisance on a paved surface. This includes all labor and materials associated with installation and maintenance of the stabilized construction entrance as shown in the construction drawings or similar document.

SCHEDULE

Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work included in the construction drawings, as are applicable for clearing and grubbing, grading, construction and paving. Also submit a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials.

CONFLICT

In the event of conflict between these requirements and pollution control laws, rules or regulations of other Federal, State, or Local agencies, the more restrictive laws, rules or regulations shall apply.

PART 2 - MATERIALS

MATERIALS

Stone material shall consist of type 'A' rip-rap conforming to NCTCOG standard specification 2.1.6. (b) (2) and shall be placed in a layer of at least 6 inches thickness.

Geotextile Fabric shall be a non-woven polypropylene fabric conforming to NCTCOG specification number 2.23.3 and be designed specifically for use as a soil filtration media with an approximate weight of 6 OZ. /YD2, a mullen burst rating of 140 psi as measured by ASTM D 751 and having an equivalent opening size (EOS) greater than a #50 sieve as measured by ASTM D 4751.

PART 3 - EXECUTION

STABILIZED CONSTRUCTION ENTRANCE

A temporary stabilized construction entrance shall be installed at any point where traffic will be entering or leaving a construction site to or from a paved surface such as a street, alley, sidewalk or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking or flowing of sediment onto paved surfaces. The entrance must be properly graded or incorporate a drainage swale to prevent runoff from leaving the construction site. The length of the entrance shall be as shown on the plans.

The temporary stabilized construction entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto paved surfaces. This may require periodic top dressing with additional stone as conditions demand. All sediment spilled, dropped, washed or tracked onto public rights of way must be removed immediately by the contractor.

When necessary, vehicles must be cleaned to remove sediment prior to entrance onto public right of way. When washing is required, it shall be done on an area stabilized with crushed stone which drains into and approved sediment trap or sediment basin or other sedimentation/ filtration device. All sediment shall be prevented from entering any storm drain, ditch or watercourse using approved methods.

PART 4 --MEASUREMENT AND BASIS OF PAYMENT

MEASUREMENT

Measurement for payment for stabilized construction entrance will be made by the square foot, complete, in place and ready for use inclusive of all components necessary for a complete and working installation.

BASIS OF PAYMENT

Stabilized construction entrance, measured as herein specified, will be paid for at the unit price bid per square foot. Payment shall include furnishing all materials, labor, and equipment necessary to provide a complete and finished product as specified.

CERTIFICATION FORMS

LIST OF OPERATORS	
OPERATOR (Company Name)	(Company Owner, Address, Phone No.)
OWNER: Rockwall ISD	Rockwall ISD 1191 T.L. Townsend Drive Rockwall, Texas 75067 469.689.7031
Operator w/ Control over Construction Plans and Specifications; OWNER: Rockwall ISD	Rockwall ISD 1191 T.L. Townsend Drive Rockwall, Texas 75067 469.689.7031
Operator w/ Day to Day operational Control; GENERAL CONTRACTOR:	

POLLUTION PREVENTION PLAN CERTIFICATION
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
Signed: _____ Cheralyn Armijo, P.E. Project Engineer Title Glenn Engineering Corporation Company
Date: _____

Storm Water Pollution Prevention Plan
Owner/Contractor Certification Form

Site Description

As identified on the Storm Water Pollution Prevention Plan (SWPPP).

Project Name: Rakow Middle School New Parking Lot

Project Location: Rockwall, Texas

A duly authorized representative of the Owner and a duly authorized representative of the Contractor must be identified and sign the following certification statement.

Persons signing this certification must do so in compliance with the signatory requirements of the permit as found at CFR 122.22 as follows:

For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

For the municipality, State, Federal or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes (1) the chief executive officer of the agency, or (2) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g. Regional Administrators of EPA)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Owner: Rockwall Independent School District

By: _____ _____
Signature **Title**

_____ _____
Printed Name **Date**

Contractor:

By: _____ _____
Signature **Title**

_____ _____
Printed Name **Date**

Letter of Authorization

October 29, 2025

"Executive Director"
TCEQ
Storm Water & General Permits Team: MC-148
P.O. Box 13087
Austin, Texas 78711-3087

Dear Executive Director:

This letter serves to designate either a person or specifically described position as an authorized person for signing reports, storm water pollution prevention plans, certifications or other information as required. The following person or position is hereby authorized to sign reports, plans or certifications other than an NOI application.

A qualified Storm Water Inspector Employed by:_____

Name:_____ Title:_____

Project Name: Rakow Middle School New Parking Lot

Project Location: Rockwall, Texas

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in the Texas Administrative Code Title 30 Part 1 Chapter 305 Subchapter C Rule 305.44 and Title 30 Part 1 Chapter 305 Subchapter F Rule 305.128.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Signature:_____ Date_____

Printed Name:_____ Title:_____

Company Name:_____

October 29, 2025

"Executive Director"
TCEQ
Storm Water & General Permits Team: MC-148
P.O. Box 13087
Austin, Texas 78711-3087

Dear Executive Director:

This letter serves to designate a Company who will have day-to-day operational control of those activities at a construction site which are necessary to ensure compliance with the storm water pollution prevention plan that has been developed for this site.

Name: _____

Title: General Contractor/Daily Operational Controls

Project Name: Rakow Middle School New Parking Lot

Project Location: Rockwall, Texas

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in the Texas Administrative Code Title 30 Part 1 Chapter 305 Subchapter C Rule 305.44 and Title 30 Part 1 Chapter 305 Subchapter F Rule 305.128.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Signature:_____ Date:_____

Printed Name:_____ Title:_____

Owner Name: **Rockwall Independent School District**

Endangered Species and Historical Places Certification

Endangered Species

A list of endangered species in Rockwall County is attached. There is no evidence upon review of the site that this project will have any adverse affect on any of the endangered species listed.

Historical Places

A list of Historic Places in Rockwall County per the National Register of Historical Places is attached. There is no evidence upon review of the site that this project will have any adverse affect on any of the historic sites listed.

_____ _____
Signature **Date**

Printed Name: Cheralyn Armijo, P.E., Project Engineer
Glenn Engineering Corporation

SWPPP for:

Rockwall Independent School District

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designated to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are specific penalties for submitting false information, including the possibilities of fine and imprisonment for knowing violations."

Owner Certification:

_____ _____
Signature **Date**

Printed Name:

Contractor Certification:

_____ _____
Signature **Date**

Printed Name:

APPENDICES

APPENDIX A

Inspection Report Forms

Make copies as needed

INSPECTION REPORT FORM

Name and qualifications of Inspector: _____

_____

_____

_____

Date: _____

Date of last rainfall and amount: _____

DISTURBED AREAS:

Inspect for evidence of, or the potential for, pollutants entering the drainage system. Comments/Observations:

_____

_____

_____

_____

STORAGE AREAS EXPOSED TO PRECIPITATION:

Inspect for evidence of, or the potential for, pollutants entering the drainage system. Comments/Observations:

_____

_____

_____

_____

EROSION/SEDIMENT CONTROL MEASURES:

Hay bale berms/dikes

Is this system operating correctly? _____ **Yes** _____ **No**

Comments: _____

_____

_____

_____

Silt Fences

Is this system operating correctly? _____ **Yes** _____ **No**

Comments: _____

_____

_____

_____

ACCESSIBLE DISCHARGE POINTS:

Inspect to determine whether erosion control measures are effective in preventing significant impacts to receiving waters i.e., any signs of erosion or sediments associated with discharge location. Comments/Observations: _____

_____

_____

_____

INGRESS/EGRESS LOCATIONS:

Any evidence of off-site sediment tracking:_____

_____

_____

_____

_____

_____

Signature

APPENDIX B

Pollution Prevention Plan Revisions

POLLUTION PREVENT PLAN REVISIONS

Date: _____

Reason for revision: _____

_____

_____

_____

Description of revision: _____

_____

_____

_____

_____

_____

_____

APPENDIX C

EPA Forms

APPENDIX D

BMP Descriptions

The BMP Descriptions that follow were obtained from the North Central Texas Council of Government's (NCTCOG) iSWM Design Manual for Construction, December 2003. These descriptions are for reference and example and are not all inclusive. Additional BMPs, approaches and methodologies are described in the iSWM Manual.

Variations to these BMPs, approaches and methodologies may be required to adapt to varying site conditions and design considerations.

Copies of the entire manual can be obtained from NCTCOG or downloaded from their website (www.iswm.nctcog.org).

NOTE:

The Owner and General Contractor must complete and sign the NOI before mailing. Please complete sections A, C, and F as necessary. Also complete the "Check/ Money Order No." and "Name Printed on Check" information on the top of the first page of the NOI.

The NOI should be sent to:

Texas Commission on Environmental Quality
Storm Water Processing Center (MC288)
12100 Park 35 Circle
Austin, TX 78753

The Payment Submittal Form and check should be sent to:

Texas Commission on Environmental Quality
Financial Administration Division
Cashier's Office, MC-214
12100 Park 35 Circle
Austin, TX 78753

For immediate coverage, complete the NOI online using STEERS (State of Texas Environmental Electronic Reporting System).

https://www6.tceq.state.tx.us/steers/

Send a copy of your NOI(s) and NOT(s) to the following MS4:

The City of Rockwall:

Street Sweeping Log

This Street Sweeping log applies to Rakow Middle School New Parking Lot:

Area Swept	Date	Name	Company	Comments

SECTION 01 58 00

PROJECT IDENTIFICATION AND SIGNS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project identification signs.

1.2 ACTION SUBMITTALS

A. Shop Drawings: Submit shop drawings of proposed project signs within 15 days of written Notice to Proceed showing content, layout, lettering, color, foundation details, structural materials, sizes and grades of members.

1.3 QUALITY ASSURANCE

A. Sign Painter Qualifications: Experienced as a professional sign company.

1.4 MAINTENANCE

A. Maintain signs and supports in a neat, clean condition. Repair damages to structure, framing or finish of sign.

PART 2 – PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Design sign and structure to withstand [70][50] mph wind velocity.
   2. Sign Construction: Project identification signs shall be constructed of new materials and painted new for the project.
   3. Finishes/Painting: Adequate to withstand weathering, fading, and chipping for duration of Construction.

2.2 SIGN MATERIALS

A. Structure and Framing:
   1. Sign Posts: Use 4-inch by 4-inch treated wood posts, sized to fix top of sign at 6 feet above grade.
   2. Sign Supports: Treated 2-inch by 4-inch wood framing material.
   3. Fasteners:
      a. Use galvanized steel fasteners.
      b. Use 3/8-inch by 5-1/2-inch button head carriage bolts to attach sign to posts. Secure with nuts and flat head washers at locations as recommended by Sign Manufacturer.
      c. Cover button heads with white reflective film or paint to match sign background.

B. Sign and Sign Header: Use medium density overlaid marine plywood, minimum 3/4-inch thick. Use full-size 4-foot by 8-foot sheets for sign and a single piece for header to minimize joints; do not piece wood to fabricate a sign face.

C. Paint and Primers: White paint used to prime surfaces and to resist weathering shall be an industrial grade, fast-dying, oil-based paint with gloss finish. Paint structural and framing members white on all sides and edges to resist weathering. Paint sign and sign header material white on all sides and edges to resist weathering. Paint all sign surfaces with this weather-protective paint prior to adding any sign paint or adhered graphic image applications.

D. Colors and Graphics: Follow criteria provided by Architect.

2.3 SIGNAGE

A. Project Identification Sign:
1. Painted sign of size, lettering and construction shown on drawing provided by Architect.
2. Location and number on site as indicated by Architect.
3. Paint graphics in styles and sizes as selected by Architect.

B. Other Informational Signs:
1. Painted signs with painted lettering, or standard products.
2. Size of signs and lettering to be as required by regulatory agencies, or as appropriate to usage.
3. Colors to be as required by applicable regulatory agencies, or otherwise of uniform colors throughout job as selected by Architect.
4. Erect informational signs at locations necessary to provide required information.
5. Graphics in styles and sizes as provided by Architect.
6. Install at height for optimum visibility, on ground-mounted poles or as attached to temporary structural surfaces.

PART 3 – EXECUTION

3.1 PREPARATION

A. Construct and erect project signs at locations directed by Architect or as required by governing authority.

3.2 INSTALLATION

A. Install project identification signs within 30 days of written Notice to Proceed.

B. Install additional informational signage as required by regulatory agencies or as appropriate to usage.

C. Sink posts a mínimum of 30-inches below grade in 10-inch diameter postholes. Stabilize posts with sharp sand or concrete to minimize lateral motion. Leave a mínimum of 8-feet of post above existing grade for mounting of the sign and header.

D. Erect sign level and plumb. Cut off post tops extending above sign after erected.

3.3 RELOCATION/REMOVAL

A. Remove signs, framing, supports and foundations at completion of Project.

B. Relocate informational signs as required by progress of work.

END OF SECTION

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Administrative and procedural requirements governing the selection of products for use in the project.
2. Product delivery, storage, and handling.
3. Manufacturers' standard and special warranties on products.
4. Manufacturers' instructions and certifications.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

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

1.3 ACTION SUBMITTALS

A. Proposed Products List: Within period of 30 days after award of Contract, submit to Architect five (5) copies of complete list of major Products, which are proposed for installation.
1. Tabulate products by Specification Section number, title, and Article number.

2. For products specified only by reference standards, list for each such product:
   a. Name and address of manufacturer.
   b. Trade name.
   c. Model or catalogue designation.
   d. Manufacturer's Data including reference standards and performance test data.
3. Architect will reply promptly in writing stating whether there is reasonable objection to any listed items. Failure to object to a listed item shall not constitute waiver of requirements of Contract Documents.

B. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
   1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
   2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
      a. Form of Architect's Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
      b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

A. Materials specified are to a define standard of quality or performance and to establish basis for evaluation of proposals and substitutions.

B. Comply with individual Specification Sections and referenced standards as minimum requirements.

C. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
   1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
   2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

D. Source Limitations: Components required to be supplied in quantity within Specification Section shall be of same manufacturer and shall be interchangeable.

E. Nameplates and Labels: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trade marks on surfaces of products which will be exposed to view in occupied spaces[**, including elevators,**] or on the exterior:

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface approved by Architect and governing authorities.
2. Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturers printed instructions, obtain and distribute copies of instructions to parties involved in installation, including two copies to Architect, prior to commencing work.
1. Maintain one set of complete instructions at job site during installation and until complete.
2. Maintain one set of complete instructions for Project Record Documents.

B. Handle, install, connect, clean, condition and adjust products in strict accord with manufacturer's instructions and in conformity with specified requirements.
1. Should job conditions or specified requirements conflict with manufacturer's instructions, notify Architect in writing for further instructions.

2. Do not proceed with work without clear instructions.

C. Perform Work in accordance with manufacturer's instructions. Do not omit preparatory steps of installation procedures unless specifically modified or exempted by Contract Documents.

1.7 CERTIFICATION

A. Prior to Final Acceptance of Work, for items designated in Specification Sections, an authorized representative of each manufacturer of materials or equipment installed under work of that Section shall examine installation and operation of his materials, system and equipment to determine they are correctly installed and operating properly.

B. Examination and testing shall be accomplished for work which will be concealed during execution of Work, after completion of installation and prior to concealment and for Work which will not be concealed, at completion of Work.

C. Each representative shall submit signed statement to Owner, through Contractor, certifying to his examination and to correct installation and proper operation of materials, systems or equipment. Certification shall list items included.

D. Contractor shall transmit certifications to Architect at or prior to Final Acceptance Inspection. Transmittal shall include list of certifications included.

1.8 MAINTENANCE

A. For mechanical and electrical equipment in long-term storage, provide manufacturer's service instructions shown on exterior of package.

B. Service equipment on a regular basis as recommended by manufacturer. Maintain log of maintenance services. Submit log as Project Record Document in accordance with requirements of Section 01 78 39.

1.9 WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
   1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

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

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 PRODUCTS

2.1 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   4. Where products are accompanied by the term "as selected," Architect will make selection.
   5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
   6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience.
   1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
      a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"
   2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
      a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"
   3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will [**will not**] be considered unless otherwise indicated.
      a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"
   4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.
      a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"
   5. Limited List of Manufacturers: Where Specifications include a list of manufacturers'

names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will [**will not**] be considered unless otherwise indicated.
   a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.
   a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
   a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.

C. Performance Specifications Requirements: Where specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated.

D. Compliance with Standards, Codes and Regulations: Where specifications require compliance with an imposed code, standard or regulation, select a product that complies with the code, standard or regulations specified.

E. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
   1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.

F. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
   1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
   2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance,

weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

2.3 SUBSTITUTIONS

A. Refer to Section 01 25 00 – “Substitution Procedures.”

PART 3 EXECUTION

3.1 EXAMINATION

A. Make periodic examinations of stored materials to verify that products are maintained under specified conditions and are free from damage or deterioration.

B. Verify that storage facilities comply with manufacturer's product storage requirements.

C. Verify that manufacturer required environmental conditions are maintained continually.

D. Verify that surfaces of products exposed to elements are not adversely affected and that weathering of finishes is within acceptable tolerances under requirements of Contract Documents.

3.2 PROTECTION

A. Furnish protection against weather. Cover building openings to protect interior of building from weather.

B. Maintain work, materials, apparatus and fixtures free from damage.

C. Protect items having factory finish to prevent damage to finish and equipment.

D. At end of day's work, cover new work likely to be damaged or otherwise protect as necessary.

E. After installation, secure substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.

F. Remove protection when no longer needed. Upon completion of work, remove storage facilities from site.

3.3 ADJUSTING

A. Do not use materials in work which have deteriorated, become damaged or are otherwise unfit for use.

B. Replace stored items damaged by inadequate protection or environmental controls.

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: This Section specifies administrative and procedural requirements for field engineering services, including, but not limited to the following:

1. Land Survey Work.

1.2 QUALITY CONTROL

A. Land Surveyor: Registered in the State of Texas and acceptable to Architect.

1.3 INFORMATIONAL SUBMITTALS

A. Submit name, address, and telephone number of Land Surveyor before starting survey work.

B. On request of Architect, submit documentation to verify accuracy of survey.

C. Submit certificate signed by Land Surveyor that elevations and locations of Work are in conformance with Contract Documents.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain complete and accurate log of control and survey work as it progresses.

B. On completion of foundation walls and major site improvements, prepare certified survey showing dimensions, locations, angles, and elevations of construction and site work.

C. Record data on Project Record Documents in accordance with requirements of Section 01 78 39.

D. Record deviations from required lines and levels. Advise Architect when deviations that exceed indicated or recognized tolerances are detected.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations of survey control points prior to starting work.

B. Verify grades, lines, levels, and dimensions indicated.

C. Promptly notify Architect of any discrepancies discovered.

3.2 SURVEY REFERENCE POINTS

A. Owner will locate and protect survey control and reference points.

B. Control datum for survey is that established by Owner provided survey.

C. Protect survey control points prior to starting site work. Preserve permanent reference points during construction.

D. Promptly report to Architect loss or destruction of reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

3.3 SURVEY REQUIREMENTS

A. Provide field engineering services. Utilize recognized engineering survey practices.

B. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on Project Record Documents.

C. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.

D. Periodically verify layouts by same means.

3.4 SURVEYS FOR MEASUREMENT AND PAYMENT

A. Perform surveys to determine quantities of unit cost work, including control surveys to establish measurement reference lines. Notify Architect prior to starting work.

B. Contractor's Engineer shall sign surveyor's field notes or keep duplicate field notes.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Requirements and limitations of cutting and patching of Work.
2. Execute cutting, fitting and patching, including attendant excavation and backfill, required to complete Work or to:
   a. Make its several parts fit together properly.
   b. Uncover portions of the Work to provide for installation of ill-timed work.
   c. Remove and replace defective work.
   d. Remove and replace work not conforming to requirements of Contract Documents.
   e. Remove samples of installed work as specified for testing.
   f. Make routine penetrations of non-structural surfaces for installation of mechanical, electrical and plumbing Work.
   g. Uncover work that has been covered prior to Architect's required observation.

1.2 SUBMITTALS

A. Submit written request to Architect in advance of executing cutting or alteration, other than required by Contract Documents, which affects:
1. Work of Owner or separate contractor.
2. Structural value or integrity of any element of Project.
3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
4. Efficiency, operational life, maintenance or safety of operational elements.
5. Visual qualities of sight-exposed elements.

B. Request shall include:
1. Identification of Project.
2. Location and description of affected work.
3. Necessity for cutting, alteration or excavation.
4. Effect on work of Owner or separate contractor, or on structural or weatherproof integrity of Project.
5. Description of proposed work:
   a. Scope of cutting, patching, alteration, or excavation.
   b. Trades who will execute work.
   c. Products proposed to be used.
   d. Extent of refinishing to be done.
   e. Cost proposal when applicable.
6. Alternatives to cutting and patching.

7. Written permission of separate contractor whose work will be affected.

C. Should conditions of Work or schedule indicate change of products from original installation, Contractor shall submit request for substitution as specified in Section 01 25 00.

D. Submit written notice to Architect designating date and time work will be uncovered or altered.

1.3 COORDINATION

A. Where warranties are in force for existing work, coordinate cutting and patching work with manufacturer and installer of warranted product to avoid voiding warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with specifications and standards for each specific product involved.
1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.

B. Should conditions of work or schedule indicate change of products from original installation, submit request for substitution as specified in Section 01 25 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions of Project, including elements subject to damage or to movement during cutting, patching, excavating, and backfilling.

B. After uncovering work, examine conditions affecting installation of Products, or performance of work.

C. Report unsatisfactory or questionable conditions to Architect in writing. Do not proceed with work until Architect has provided further instructions.

3.2 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

B. Provide devices and methods to protect other portions of Project from damage.

C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work.

D. Maintain excavations free from water.

3.3 DUST CONTROL

A. Provide positive methods of dust control and apply dust control materials to minimize raising dust from cutting and patching operations.

B. Conform to requirements for temporary barriers, enclosures and controls described in Section 01 50 00 “Construction Facilities and Temporary Controls.”

3.4 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.

B. Execute fitting and adjustment of products to provide finished installation to comply with specified products, functions, tolerances and finishes.

C. Restore work which has been cut or removed. Install new products to provide Work in accordance with requirements of Contract Documents.

D. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Where fire-rated separations are penetrated, fill space around pipe or insert with material with physical characteristics equivalent to fire-resistance requirement of penetrated surface.

E. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:
   1. For continuous surfaces, refinish to nearest intersection.
   2. For assembly, refinish entire unit.

F. Employ original installer or fabricator of work performed under this Contract to perform cutting and patching for:
   1. Weather-exposed or moisture-resistant elements.
   2. Sight-exposed finished surfaces.

END OF SECTION

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SECTION 01 74 13

CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cleaning and disposal of waste materials, debris, and rubbish during construction.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Hazard Control: Store volatile waste in covered metal containers and remove from premises daily.
   2. Pollution Control: Conduct cleaning and disposal operations to comply with local codes, ordinances, and anti-pollution laws.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Provide acceptable covered containers for deposit of waste materials, debris and rubbish.

B. Use only cleaning materials which will not create hazards to health and property, and which will not damage surfaces.

C. Use only those cleaning materials recommended by manufacturer of surface to be cleaned.

D. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 CLEANING DURING CONSTRUCTION

A. Execute daily "broom-clean" construction cleaning to keep Work, site and adjacent properties free from accumulations of waste materials, rubbish and debris. Maintain site in a clean and orderly condition including the following:
   1. Remove debris and rubbish from pipe chases, plenums, attics, [**crawl spaces**], and other closed or remote spaces, prior to enclosing the space.
   2. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate conditions that could affect final finishing.

3. Provide on-site dump containers for collection of waste materials, rubbish and debris.
4. Do not allow waste materials, rubbish and debris to accumulate and become an unsightly and hazardous condition. Provide additional collection and dispose of debris whenever periodic schedule is inadequate to prevent accumulation.

B. At not less than every week during progress of Work, clean up site and access, and legally dispose of waste materials, rubbish, and debris away from site.

C. Do not overload trucks to prevent spillage on access and haul routes. Periodically examine traffic areas and maintain clear routes.

3.2 DUST CONTROL

A. Sprinkle dusty debris with water.

B. Vacuum clean interior building areas, including floors, ledges, pipes, ducts, and other places where dust can accumulate, in conjunction with gypsum board installation and sanding operations, and when ready to receive finish painting.

C. Continue vacuum cleaning on an as-needed basis until building is ready for acceptance or occupancy.

D. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet and newly painted surfaces.

E. Clean floors prior to installation of final floor coverings.

3.3 DISPOSAL

A. Remove waste materials, debris, and rubbish from site daily and dispose off-site.

B. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary sewer. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly.

C. Do not hold materials more than 7 days during normal weather or 3 days when temperature is expected to rise above 80 degrees F.

D. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in lawful manner.

E. Do not dispose of wastes into streams or waterways. Do not burn or bury rubbish and waste material on Project site.

F. Disposal of waste in Owner's containers on site is not permitted.

END OF SECTION

SECTION 01 74 23

FINAL CLEANING

PART 1 - - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for final cleaning at Substantial Completion.

1.2 PROJECT CONDITIONS

A. Environmental Requirements: Conduct cleaning and waste disposal operations in full compliance with federal and local environmental and anti-pollution regulations, ordinances and laws.

1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
2. Burning or burying of debris, rubbish or other waste material on the premises will not be permitted.

PART 2 - - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents:

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

PART 3 - - EXECUTION

3.1 FINAL CLEANING AT SUBSTANTIAL COMPLETION

A. General:

1. Complying with manufacturer's instructions, clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program using experienced workers or professional cleaners.
2. Complete cleaning operations and conduct an examination of Work areas with Owner and Architect before requesting inspection for Certification of Substantial Completion for the entire Project or a portion of the Project.

B. Remove grease, petro-chemical spills, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

C. Remove debris and surface dust from limited access spaces, including plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.

D. Broom clean concrete floors in unoccupied spaces.

E. Wash and shine glazing and mirrors.

F. Remove labels that are not permanent labels.

G. Clean plumbing fixtures to a sanitary condition, free of stains.

H. Polish glossy surfaces to a clear shine.

I. Clean resilient flooring, paver flooring, ceramic tile flooring, and carpeting as recommended by manufacturers.

J. Repair, patch and touch up marred surfaces to match adjacent surfaces. Replace broken or scratched glass.

K. Broom clean exterior paved surfaces; rake clean other surfaces of grounds.

L. Heating, Ventilating, and Air Conditioning Systems:
   1. Clean permanent filters and replace disposable filters if units were operated during construction.
   2. Clean exposed surfaces of diffusers, registers and grills.
   3. Clean ducts, blowers, and coils if units were operated without filters during construction.
   4. Clean exposed ductwork after other cleaning has been completed.

M. Clean light fixtures, lamps, reflectors and replace burned out bulbs and defective starters.

N. Clean food service equipment to a sanitary condition, ready and acceptable for its intended use.

O. Clean roof areas of debris; flush roof drainage system with water until clear.

P. Leave Project clean and ready for occupancy.

END OF SECTION

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for project closeout, including but not limited to:
   1. Substantial Completion.
   2. Inspection procedures.
   3. Closeout submittals.
   4. Payments and release of liens.
   5. Post construction examinations.

1.2 SUBSTANTIAL COMPLETION

A. When Contractor considers Work is substantially complete, submit to Architect:
   1. Written certification that Work, or designated portion thereof, is substantially complete.
   2. List of items to be completed or corrected, value of incomplete construction and reasons the Work is not complete.

B. Within seven calendar days after receipt of such certificate, Architect will make examination to determine status of completion.

C. Should Architect determine that Work is not substantially complete:
   1. Architect will promptly notify Contractor in writing, giving reasons.
   2. Contractor shall remedy deficiencies in Work, and send second written notice of substantial completion to Architect.
   3. Architect will re-examine Work.

D. When Architect concurs that Work is substantially complete, he will:
   1. Prepare Certificate of Substantial Completion on AIA Form G704, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by Architect.
   2. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.

E. After Work is substantially complete, Contractor shall:
   1. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
   2. Obtain and submit Certificate of Occupancy, operating certificates and similar releases enabling the Owner unrestricted use of the Work.
   3. Complete work listed for completion or correction within designated form.
   4. Advise Owner of pending insurance change-over requirements.
   5. Perform final cleaning in accordance with Section 01 74 23 “Final Cleaning.”
   6. Make final change-over of permanent locks and transmit keys to Owner.

1.3 FINAL INSPECTION

A. When Contractor considers Work is complete, submit written certification that:
   1. Contract Documents have been reviewed.
   2. Work has been examined for compliance and completed in accordance with Contract Documents.
   3. Equipment and systems have been tested in presence of Owner's representative and are operational. Include demonstration and training programs once items are operational as specified in Section 01 79 00.
   4. Work is completed and ready for final examination.

B. Architect will make examination to verify status of completion within seven calendar days after receipt of such certification.

C. Should Architect consider that Work is incomplete or defective:
   1. Architect will promptly notify Contractor in writing, listing incomplete or defective work.
   2. Contractor shall take immediate steps to remedy stated deficiencies, and send second written certification to Architect that Work is complete.
   3. Architect will re-examine Work.

D. When Architect finds that Work is acceptable under Contract Documents, he shall request Contractor to make closeout submittals.

1.4 REINSPECTION FEES

A. Should Architect perform re-examinations due to failure of Work to comply with claims of status of completion made by Contractor:
   1. Owner will compensate Architect for such additional services.
   2. Owner will deduct amount of such compensation from final payment to Contractor.

1.5 CLOSEOUT SUBMITTALS

A. Evidence of compliance with requirements of governing authorities:
   1. Certificate of Occupancy.
   2. Certificates of Inspection: Mechanical and Electrical systems as required by respective sections.

B. Project Record Documents: Comply with Section 01 78 39.

C. Operating and Maintenance Data: Comply with Section 01 78 23.

D. Warranties and Bonds: Comply with Section 01 78 30.

E. Spare Parts and Maintenance Material:
   1. Provide products, spare parts, and maintenance materials in quantities specified in each specification section in addition to that required for completion of Work.
   2. Coordinate with Owner, deliver to Project site, store properly, and obtain receipt prior to final payment.

F. Certificate of Insurance for Products and Completed Operations.

1.6 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

A. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.

B. Contractor's Affidavit of Release of Liens: AIA G706A.

C. Attachment to Contractor's Affidavit of Release of Liens:
   1. Consent of Surety to Final Payment: AIA G707.
   2. Contractor's Release or Waiver of Liens.
   3. Separate releases of waivers of liens from subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.

D. Submittals shall be duly executed before delivery to Owner.

1.7 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit final statement of accounting to Architect.

B. Statement shall reflect adjustments to Contract Sum:
   1. Original Contract Sum.
   2. Additions and deductions resulting from:
      a. Previous Change Orders.
      b. Allowances.
      c. Unit Prices.
      d. Deductions for uncorrected Work.
      e. Penalties and Bonuses.
      f. Deductions for liquidated damages.
      g. Deductions for re-examination payments.
      h. Other adjustments.
   3. Total Contract Sum, as adjusted.
   4. Previous payments.
   5. Sum remaining due.

C. Architect will prepare final Change Order, reflecting approved adjustments to Contract Sum which were not previously made by Change Orders.

1.8 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit final Application for Payment in accordance with procedures and requirements stated in Conditions of the Contract.

1.9 ADDITIONAL ADJUSTMENT

A. No adjustments to Contract requested by Contractor will be allowed if asserted after execution of Final Payment of Contract.

1.10 POST-CONSTRUCTION EXAMINATION

A. Prior to expiration of one year from Date of Substantial Completion, Owner will make visual examination of Project in company of Contractor to determine whether further correction of Work is required in accordance with provisions of Contract.

B. Owner will promptly notify Contractor, in writing, of observed deficiencies.

C. Contractor will contact Owner to arrange time and establish schedule for correction of deficiencies.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements the preparation and submittal for operating and maintenance manuals including the following:
   1. Operating and maintenance manuals for building systems or equipment.
   2. Instruction manual covering the care, preservation and maintenance of architectural products and finishes.
   3. Instruction of Owner's operating personnel in operation and maintenance of building systems and equipment.

1.2 FORM OF SUBMITTALS

A. Prepare electronic instructional manuals and data in linked PDF format using Owner’s Project Management software:
   1. Organize with active bookmarks according to sequence of Specification Sections.
   2. Identify electronic folders with linked titles based on Project Manual Table of Contents or as instructed by Architect.

1.3 CONTENT OF MANUALS

A. Arrange table of contents with electronic links to each subfolder, in systematic order:
   1. List each product included with name, address, and telephone number of:
      a. Subcontractor or installer.
      b. Maintenance contractor, as appropriate.
      c. Local source of supply for parts and replacement.
   2. Identify each product using product name and other identifying symbols.

B. Product Data:
   1. Include only those sheets which are pertinent to specific product with product clearly identified.
   2. Delete references to inapplicable information.
   3. Annotate each sheet to clearly identify specific product or part installed, and data applicable to installation.

C. Drawings:
   1. Supplement product data with drawings to clearly illustrate relations of component parts of equipment and systems and control and flow diagrams.
   2. Coordinate drawings with information in Project Record Documents to ensure correct illustration of completed installation.

D. Written Text: Supplement product data for particular installation to provide logical sequence of instructions for each procedure, organized in a consistent format and in logical sequence of instructions for each procedure.

E. Recommended Spare Parts: Furnish a list of recommended spare parts for each equipment item that will be needed to support that item of equipment for a 12 month period. Spare parts list shall contain the following information:

1. Parts Descriptions.
2. Manufacturer's Part Number.
3. Shelf Life.
4. Recommended Quantity.
5. Unit Price.
6. Name and address of the part manufacturer.
7. Name and address of a local supplier for the part.

1.4 EQUIPMENT AND SYSTEMS MANUAL REQUIREMENTS

A. Submit complete electronic manuals including:

B. Content, for each unit of equipment and system:
1. Description of unit and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
2. Operating procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shutdown and emergency instructions.
   c. Summer and winter operating instructions.
   d. Special operating instructions.
3. Maintenance Procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Alignment, adjusting and checking.
4. Servicing and lubrication schedule, including list of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, price lists, illustrations, assembly drawings and diagrams required for maintenance, predicted life of parts subject to wear and items recommended to be stocked as spare parts.
8. As-installed control diagrams by controls manufacturer.
9. Each subcontractor's coordination drawings including as-installed color coded piping diagrams.
10. Charts of valve tag numbers, with location and function of each valve.
11. Water treatment procedures and tests.
12. Final balancing reports for mechanical systems.
13. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
14. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic system:
1. Description of system and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panelboards.
   a. Electrical service.
   b. Controls.
   c. Communications.
3. As-installed color coded wiring diagrams.

4. Operating procedures:
   a. Routine and normal operating instructions.
   b. Sequences required.
   c. Special operating instructions.
5. Maintenance procedures:
   a. Routine operations.
   b. Guide to "trouble-shooting".
   c. Disassembly, repair and reassembly.
   d. Adjustment and checking.
6. Manufacturer's printed operating and maintenance instructions.
7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
8. Other data as required under pertinent sections of specifications.

D. Include warnings of detrimental maintenance practices.

E. Prepare and include additional data when need for such data becomes apparent during instruction of Owner's personnel or as required under pertinent Specification Section.

F. Refer to individual Sections of Project Manual for additional requirements for operating and maintenance data.

G. Provide complete information for products and equipment specified in:
1. Division 10: Specialties
2. Division 11: Equipment
3. Division 12: Furnishings
4. Division 13: Special Construction
5. Division 14: Conveying Systems.
6. Division 21: Fire Suppression
7. Division 22: Plumbing
8. Division 23: Heating, Ventilating, and Air-Conditioning (HVAC)
9. Division 26: Electrical Systems.
10. Division 27: Communications
11. Division 28: Electronic Safety and Security

1.5 ARCHITECTURAL PRODUCTS MANUAL REQUIREMENTS

A. Submit complete electronic manual in final form.

B. Refer to individual Sections of Project Manual for submittal requirements.

C. Content: Manufacturer's data, giving full information on products, catalog numbers, sizes, and composition; and finish designations.

D. Information required for re-ordering.

E. Instructions for care and maintenance.
1. Manufacturer's recommended lubricants.
2. Manufacturer's recommendations for types of cleaning agents and methods.
3. Cautions against cleaning agents and methods which are detrimental to product.
4. Recommended maintenance and cleaning schedule.

F. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

1.6 ARCHITECTURAL FINISHES MANUAL REQUIREMENTS

A. Submit complete electronic manual in final form.

B. Provide finish information and samples of actual materials installed in Project. Provide separate line item for each type of finish installed.

1. Submit under separate cover small samples of each finish that matches finish installed. Provide information on manufacturer, catalog number, finish designation, or other information necessary for Owner to match finish in the future.

C. Refer to individual Sections of Project Manual for submittal requirements.

D. Provide heavy, cardboard pages printed in required page format, approved by Architect, to attach samples and information for assembly into notebook format.

E. Compile information and samples for Manual on Architectural Finishes throughout construction period to simplify assembly at Project close-out.

1.7 SUBMITTAL SCHEDULE

A. Submit one electronoc copy of completed data in final form 30 days prior to demonstrations of equipment.

B. Copy will be returned approved or with comments for revisions.

C. Submit electronic copies of approved data in final form within 10 days prior to equipment demonstrations and prior to final inspection or acceptance.

1.8 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection, instruct the Owner's personnel in operation, adjustment, and maintenance of products equipment and systems. Provide instruction at mutually agreed upon times.
1. For equipment that requires seasonal operation, provide similar instruction during other seasons.
2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain aspects of operation and maintenance.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 78 30

WARRANTIES AND BONDS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: General administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
   1. Compile specified warranties and bonds.
   2. Compile specified service and maintenance contracts.
   3. Co-execute submittals when so specified.
   4. Review submittals to verify compliance with Contract Documents.
   5. Submit to Architect for review and transmittal to Owner.

1.2 DEFINITIONS

A. Standard Product Warranties: Reprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties: Written warranties required by the Contract Documents, either to extend time limits provided standard product warranties or to provide greater rights for the Owner.

C. Emergency Repairs: Owner reserves right to make emergency repairs as required to keep equipment or materials in operation or to prevent damage to persons or property without voiding Contractor's warranty or bond, or relieving Contractor of his responsibilities during contract, warranty or bond periods.

1.3 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty by written endorsement.
   1. Reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation but not less than 50% of the original warranty period of time.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents.
   1. Cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through its anticipated useful service life is the Contractor's responsibility.

D. Rejection of Warranties: Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

E. Acceptance of Work: Owner reserves the right to refuse to accept Work for the Project where a special warranty is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.4 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds, service contracts and maintenance contracts, executed by each of respective manufacturers, suppliers, and subcontractors.

B. Submit electronic copies of original signed copies of each warranty to Owner’s Project Management software. Submit embossed original hard copies with notarized raised seals under separate cover.

C. Table of Contents: Use Project Manual Table of Contents to establish order of information. Include the following:
   1. Specification Section Name and Number.
   2. Description of Product or Work item.
   3. Firm name of manufacturer or fabricator, with name of principal, address and telephone number.
   4. Description of Work including extent and locations.
   5. Date of beginning of each warranty, bond or service and maintenance contract.
   6. Duration of warranty, bond or service maintenance contract including expiration date.
   7. Provide information for Owner's personnel:
      a. Proper procedure in case of failure.
      b. Instances and actions which might affect validity of warranty or bond.
   8. Contractor, name of responsible principal, address and telephone number.

1.5 FORM OF SUBMITTALS

A. Prepare electronically with bookmarks.

B. Format: Table of Contents shall include links to each folder and subfolder. Provide separate folder for documents from each Specification Section including Section Name and Number. Where Sections include multiple items requiring warranties, create subfolders for each separate product or system/assembly.
   1. Format pages in PDF files based on 8-½ by 11 inch sheet where possible. Utilize larger page formats as appropriate for content.
   2. Cover: Include cover sheet identifying folder as "WARRANTIES AND BONDS" and include:
      a. Title of Project.
      b. Address of Project.
      c. Name of Contractor.
      d. Name of Architect

1.6 TIME OF SUBMITTALS

A. Submit warranties to Architect prior to date certified for Substantial Completion or on date specified in Architect Certificate of Substantial Completion:

1. When a designated portion of the Work is completed and occupied or used by the Owner submit properly executed warranties to Architect within fifteen days of completion of that designated portion of the Work.
2. For items of work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.7 SUBMITTALS REQUIRED

A. Submit warranties, bonds, service contracts and maintenance contracts as specified in each respective Specification Section.

B. Refer to each individual Section of Project Manual for specific warranty and bond submittal requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for Project Record Documents including but not limited to the following:
   1. Marked-up copies of Contract Documents including field records for variable and concealed conditions in PDF format.
   2. Marked-up copies of submittals, shop drawings, product data, and samples in PDF format.
   3. Newly prepared drawings in PDF format.

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. For duration of Project, maintain at job site following:
   1. One record copy of Drawings, Specifications, Addenda, shop drawings, product data, miscellaneous requested submittal data, change orders and other modifications to Contract, field orders, field tests or written instructions.
   2. One copy of transmittal letters.
   3. One set of samples.

B. Store record documents and samples in Contractor's field office apart from Contract Documents and submittals used for construction.
   1. Provide files and racks for storage of record documents.
   2. Provide locked cabinet or secure storage space for storage of samples.
   3. Do not permit record documents to be used for construction purposes.

C. File documents and samples in accordance with Project Manual Table of Contents and CSI MasterFormat.

D. Maintain documents in a clean, dry, legible condition and in good order.

E. Make documents and samples available for examination by Architect.

F. Incomplete or out of order documents and samples will be grounds for not approving application for payment.

G. Provide felt tip marking pens for recording information in color code designated by Architect.

H. Label each document "PROJECT RECORD" in neat large printed letters. Keep record documents current. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
   1. Prior to creation of paper or electronic copies of record documents, remove Architect’s and Engineer’s seals from all documents.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
   1. Transcribe information and content of marked-up record documents to annotated PDF format. Link each file from master Table of Contents for each type of record document such as Drawings, Specifications, Addenda, Contract Modifications, and submittals such as product data, shop drawings, and similar items required to be submitted as part of Record Document package.
      a. Initial Submittal: Submit electronic copy showing full extent of marked-up record documents. Clearly differentiate between original content as issued and changes made by Addenda, Contract Modifications, or other means. Architect will review and indicate whether general extent of changes, additional information recorded, and quality of drafting are acceptable.
      b. Final Submittal: Submit one PDF electronic file of marked-up Record Document. Include entire set whether or not changes and additional information were recorded or required.

B. Record Specifications: Submit annotated PDF electronic file of Project Manual including Specifications, with content of Addenda and Contract Modifications clearly identified.

C. Record Product Data: Submit annotated PDF electronic folder, with each submittal linked from Table of Contents based on Project Manual Table of Contents. Include linked directories for each submittal.
   1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as specified in Section 01 78 23.

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

E. Reports: Submit written report indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated. Submit electronically on Owner’s Project Management software.

1.4 BURDEN OF ACCURACY

A. Contractor shall bear costs of damages incurred by Owner due to inaccuracies or incompleteness of submitted Record Documents for a period of time following Substantial Completion as defined by Conditions of the Contract.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: As Work progresses, maintain marked-up copies of the Contract Drawings and Shop Drawings either on paper or electronically to be used as basis for final Record Documents.

1. Preparation: Mark record Drawings and Specifications to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record documents.
    a. Ensure accuracy of information for concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding archive photographic documentation.
2. Content: Types of items requiring marking include, but are not limited to, the following:
    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations below first floor.
    d. Locations and depths of underground utilities.
    e. Revisions to routing of piping and conduits.
    f. Revisions to electrical circuitry.
    g. Actual equipment locations.
    h. Duct size and routing.
    i. Locations of concealed internal utilities.
    j. Changes made by Change Order or Construction Change Directive.
    k. Changes made following Architect's written orders.
    l. Details not on the original Contract Drawings.
    m. Field records for variable and concealed conditions.
    n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints. Obtain Owner’s permission to use LIDAR and ground penetrating radar. No additional Contract Sum or Time will be awarded for use of these technologies.
4. For paper copies transcribed to create record PDF documents, mark interim record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, other Contract Modifications, and similar identification, where applicable
7. Transcribe contents of paper copies to active PDF files, linked to Table of Contents.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
    1. Formats:
        a. Generate Record Drawings using same software, operating in Microsoft Windows, used to generate Contract Drawings.
        b. Save record Contract Documents and submittals as annotated PDF electronic file.
    2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable to ensure accuracy of information.
    3. Refer instances of uncertainty to Architect for resolution.

4. Architect will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
   a. Refer to Section 01 31 00 “Project Coordination” for requirements related to use of Architect's digital data files.
   b. Architect will provide data file layer information. Record markups in separate layers.

C. Newly Prepared Record Drawings: Prepare new drawings instead of modifying existing Drawings where Architect determines that neither the original Contract Drawings nor approved shop drawings are suitable to show actual installation.
   1. Prepare new drawings when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
   2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record drawings into record drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

D. Format: Identify and date each record drawing; include the designation "PROJECT RECORD DRAWING" in file name including drawing number and title.
   1. Record Prints: Organize record prints and newly prepared record drawings using the same sequence as Contract Drawings. Save each drawing as a separate file and link from Table of Contents. Include drawing name and number for each linkable listing.
   2. Format: Annotated PDF electronic file with comment function enabled.
   3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
   4. Identification: As follows:
      a. Project name.
      b. Date.
      c. Folder Designation "PROJECT RECORD DRAWINGS."
      d. Name of Architect.
      e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installed. Identify when installation varies from that indicated in Specifications, Addenda, and Contract Modifications.
   1. Ensure accuracy of information on concealed products and installations that cannot be readily identified and recorded later.
   2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished and installed, including substitutions and product options selected.
   3. Record the name of manufacturer, brand or model number, supplier, Installer, and other information necessary to provide a record of selections made.
   4. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual products installed. Identify where installation varies substantially from that indicated in Product Data submittal.
   1. Ensure accuracy of information on concealed products and installations that cannot be readily identified and recorded later.
   2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   3. Note related Change Orders, record Specifications, and record Drawings pertaining to each product provided.

B. Format: Submit record Product Data as annotated PDF electronic file to greatest extent possible. Where required, submit scanned PDF electronic files of marked up paper copies of Product Data.
   1. Include record Product Data directory organized by Specification Section Number and Title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

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

B. Format: Submit miscellaneous record submittals as PDF electronic file or as scanned PDF electronic file(s) of marked up hard copy miscellaneous record submittals.
   1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 EXECUTION

3.1 RECORDING

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to the Documents as they occur. Do not wait until the end of the project. Architect will periodically review record documents to assure compliance.

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

END OF SECTION

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SECTION 01 78 46

EXTRA MATERIALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for stocking of extra material.

B. Divisions 02 - 41: Specific quantities of extra material required by individual specifications sections.

1.2 PRODUCTS REQUIRED

A. Provide quantities of extra materials specified in individual specification sections to Owner, in addition to quantities required for completion of Work.

B. Products to be identical to those installed in Work. Include quantities in original purchase from supplier or manufacturer to avoid variations in manufacture.

1.3 STORAGE AND MAINTENANCE

A. Temporarily store extra materials with products to be installed in Work, under provision of Section 01 60 00 “Product Requirements,” or in other location acceptable to Owner.

B. When adequate, secure storage facilities available at Site, capable of maintaining conditions required for storage and not required for Contract Work or storage; extra materials may be stored in available space.

C. Maintain extra materials in manufacturer's unopened original containers with labels intact and legible, until delivery to Owner.

1.4 DELIVERY

A. Coordinate final delivery of extra materials with Owner prior to Substantial Completion.

B. Deliver, unload, store, and account for specified quantities of extra materials in presence of Owner's representative.

C. Owner will indicate final placement in building of extra materials.

D. Obtain written acceptance from Owner's representative of receipt of specified quantities of extra materials.

E. Provide proportional quantity of spare parts and maintenance materials.
1. Owner to review, modify, and approve list prior to purchase of parts.
2. Record quantities delivered with Owner's representative.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 79 00

SYSTEMS DEMONSTRATIONS AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
   1. Demonstration of operation of systems, subsystems, and equipment.
   2. Training in operation and maintenance of systems, subsystems, and equipment.
   3. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Prior to the execution of any demonstrations or training, submit outline of instructional program, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within 15 days of end of each training module.
   1. Identification: On each copy, provide an applied label with the following information:
      a. Name of Project.
      b. Name and contact information for videographer.
      c. Name of Contractor.
      d. Date of video recording.
   2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
   3. At completion of training, submit complete training manual(s) for Owner's in PDF electronic file format on compact disc.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, experienced in operation and maintenance procedures and training.

B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

C. Preinstruction Conference: Conduct conference at Project site with Owner’s personnel. Review methods and procedures related to demonstration and training including, but not limited to, the following:
   1. Inspect and discuss locations and other facilities required for instruction.
   2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to

avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

PART 2 PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
   1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
      a. System, subsystem, and equipment descriptions.
      b. Performance and design criteria if Contractor is delegated design responsibility.
      c. Operating standards.
      d. Regulatory requirements.
      e. Equipment function.
      f. Operating characteristics.
      g. Limiting conditions.
      h. Performance curves.
   2. Documentation: Review the following items in detail:
      a. Emergency manuals.
      b. Operations manuals.
      c. Maintenance manuals.
      d. Project record documents.
      e. Identification systems.
      f. Warranties and bonds.
      g. Maintenance service agreements and similar continuing commitments.
   3. Emergencies: Include the following, as applicable:
      a. Instructions on meaning of warnings, trouble indications, and error messages.
      b. Instructions on stopping.
      c. Shutdown instructions for each type of emergency.
      d. Operating instructions for conditions outside of normal operating limits.

e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:
   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.
5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

PART 3 EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
   1. Schedule training with Owner with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
   1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
   1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
   2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
   3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
   4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
      a. Name of Contractor/Installer.
      b. Business address.
      c. Business phone number.
      d. Point of contact.
      e. E-mail address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
   1. Film training session(s) in segments not to exceed 15 minutes.
      a. Produce segments to present a single significant piece of equipment per segment.

b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by live microphone or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION

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SECTION 01 91 00

BUILDING SYSTEMS COMMISSIONING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Commissioning this project shall include MEP systems installation and operations. The commissioning process shall generally follow the ASHRAE Guideline 0 and ASHRAE Std 90.1 I-P. Commissioning for this project shall be as necessary for full compliance with 2021 IECC commissioning requirements.

B. Commissioning Agent (CA): The owner will engage the CA under separate contract.

C. Mechanical and plumbing commissioning shall be done by the registered design professional or approved agency.

D. For electrical commissioning, the registered design professional shall provide evidence that the system is operating in accordance with the construction documents.

E. Commissioning: Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational requirements. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
1. Observe and document equipment and systems installations and operations.
2. Observe and document proper performance of equipment and systems per the construction documents.
3. Review systems manual and closeout documentation.

F. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product, equipment, or system.

G. Abbreviations: The following are common abbreviations used in the specifications and in the Commissioning Plan.

A/E	Architect & Design Engineers	FT	Functional Performance Test
CA/CxA	Commissioning Agent	GC	General Contractor
CC	Construction Manager	MC	Mechanical Contractor
Cx	Commissioning	PC	Project Checklist
CxP	Commissioning Plan	Subs	Sub Contractors
EC	Electrical Contractor	MC	Mechanical Contractor
PLC	Plumbing Contractor	TAB	Test And Balance Contractor
FC	Fire Alarm Contractor	SC	Security Contractor
CTC	Controls Contractor	TC	Technology Contractor

H. Divisional specifications sections related to commissioning activities are as follows:
1. Division 01 - General Requirements
2. Division 22 - Plumbing

3. Division 23 - HVAC&R
4. Division 26 - Electrical

1.2 COORDINATION

A. Commissioning Team: The members of the commissioning team consist of the Commissioning Agent (CA), the owner's Project Manager (PM), the designated representative of the owner's Construction Management firm (CM), the General Contractor (GC or Contractor), the architect and design engineers (particularly the mechanical engineer), the Mechanical Contractor (MC), the Electrical Contractor (EC), the TAB representative, the Controls Contractor (CC), any other installing subcontractors or suppliers of equipment. If known, the Owner's building or plant operator/engineer is also a member of the commissioning team.

B. Management: The CA will report directly to the Owner for commissioning related functions and copy the Architect and Contractor as required. The CA directs and coordinates the commissioning activities and reports with the CM and PM. All team members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.

C. Scheduling: The CA will work with the CM and GC according to established protocols to schedule the commissioning activities. The CM will notify the CA as to the readiness of systems and equipment for functional testing. The CA will provide sufficient notice to the CM and GC for scheduling commissioning activities for such equipment and systems upon notification from the CM that said systems will be ready for testing and or commissioning. The GC will integrate all commissioning activities into the master project schedule and will provide a copy of the schedule, including all updates, to the CA for his use in commissioning this project. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process. It is understood that the progress for commissioning of systems will be dependent upon the progress of the following:
   1. Response Times: Timelines for delivering information requested, required, or providing responses to the CA are essential to providing the construction product to the owner on time as well as facilitating the commissioning process. The contractor shall adhere to the following to meet this objective:
      a. Written response to Issue Log, Punchlist, Site Observation report, or request for information, clarification, or other documentation necessary to facilitate and carry out the commissioning process: 07 Calendar days from the date request was received by contractor in writing.
      b. Discrepancies identified in record drawings during the construction phase: 15 calendar days.

1.3 COMMISSIONING PROCESS

A. Commissioning Plan: The Commissioning Plan provides guidance in the execution of the commissioning process. The CA will update the plan which is then considered the "final" plan, though it will continue to evolve and expand and be updated on a regular basis for content by the CA as the project progresses. The Specifications will take precedence over the Commissioning Plan.

B. Commissioning Process: The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.

C. Equipment documentation is submitted to the CA during normal submittals and concurrent with the design team submittal submission, including detailed start-up procedures.

D. In general, the check-out and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with CHECKLISTS being completed before functional testing.

E. The Subs, under their own direction, execute and document the CHECKLISTS and perform start-up and initial check-out.

F. The checklist procedures are executed by the contractor responsible for their respective systems and under their respective scope of work. An example of a coordinated procedure would be an AHU that requires Electrical, FA Duct Smoke Detector, DDC Controls, and a VFD for operation. This would require a signature from the Mechanical, Electrical, Fire Alarm, Controls contractor, and TAB sub.

G. Functional Testing of the MEP SYSTEMS shall be scheduled by the CA and GC and shall be conducted by the appropriate sub-contractor. The CA will direct the testing and sub-contractor will carry out the test.

H. Items of non-compliance in material, installation, or setup are corrected and the system is to be retested at the contractor's expense.

I. The CA reviews the O&M documentation for completeness.

J. Commissioning is completed before Substantial Completion.

K. Deferred or seasonal testing is to be conducted as specified and as required.

1.4 RESPONSIBILITIES

A. Commissioning Team: The responsibilities of various parties in the commissioning process are provided in this section and are typically referenced as follows: Division 01 - General Requirements, Division 22 - Plumbing, Division 23 - HVAC & R, and 26 - Electrical. It is noted that the services for the Owner's Project Manager, Construction Manager, Architect, MEP, Special systems design consultants, and Commissioning Agent are not provided for in this contract. That is, the Contractor is not responsible for providing their services except where stated in other divisional specs sections. Their responsibilities are listed here to clarify the commissioning process.
   1. The commissioning team, at a minimum, shall consist of the following:
      a. Owner
      b. Commissioning Authority
      c. Architect
      d. Design Engineer
      e. Prime Contractor
      f. Divisional Contractors and Subcontractors
      g. Vendors or Factory reps where required by the divisional specs

B. All Parties
   1. Follow the Commissioning Plan and specifications.
   2. Attend commissioning scoping meetings and commissioning meetings as necessary.

3. Assist the CA in carrying out commissioning process activities.

C. Architect (A/E)
1. Construction and Acceptance Phase
   a. Owner Manages the CA contract.
   b. Attend the commissioning scoping meeting and selected commissioning team meetings.
   c. Perform normal submittal review, construction observation, as-built drawing preparation, O&M manual preparation, etc., as contracted. Provide submittals for MEP the CA concurrent with the design consultant's submittal review.
   d. Provide all design narrative documentation and updates as requested by the CA for systems to be commissioned.
   e. Coordinate resolution of system and component deficiencies identified during commissioning activities.
   f. Copy the CA on all responses to RFI/RFC/Revisions as issued by the design team related to systems being commissioned.
   g. Furnish a copy of all construction documents, addenda, change orders, RFI's, ASI's, and approved submittals and shop drawings related to commissioned equipment to the CA.
   h. Review and approve O&M documentation.
   i. Warranty Period: Coordinate resolution of design non-conformance issues, design deficiencies, and contractor related deficiencies identified during warranty-period commissioning.

D. MEP & Special Systems Designers/Engineers (of the A/E)
1. Construction and Acceptance Phase
   a. Perform normal submittal review, construction observation, as-built drawing preparation, etc., as contracted. Conduct site observations as contracted and required by the owner and A/E.
   b. Provide an updated design narrative and sequences documentation requested by the CA for functional testing of MEP systems. The designers shall assist (along with the contractors) in clarifying the operation and control of commissioned MEP equipment in areas where the specifications, control drawings, or equipment documentation is not sufficient for writing detailed testing procedures.
   c. Attend commissioning scoping meetings and other selected commissioning team meetings.
   d. Participate in the resolution of system deficiencies identified during commissioning, according to the contract documents.
   e. Prepare and submit the final as-built design intent and operating parameters documentation. Review and approve the O&M manuals.
   f. Review, comment and approve the functional test procedures for sufficiency prior to their use.
   g. Utilizing the sampling method, review and provide comments and recommendations for the checklists for major pieces of equipment for sufficiency prior to their use.
   h. Warranty Period: Participate in the resolution of non-compliance, non-conformance, and design deficiencies identified during warranty-period commissioning.

E. Commissioning Agent (CA)
   1. Construction and Acceptance Phase
      a. The CA is not responsible for design concepts, design criteria, compliance with codes and industry design standards, design or general construction scheduling, cost estimating, test and balance, or construction management. The CA may assist with issue resolution for non-conformance or deficiencies, but ultimately that responsibility resides with the general contractor and the A/E. The primary function of the CA is to develop and coordinate the execution of a testing plan, observe and document and verify using sampling techniques that systems are functioning in accordance with the documented OPR and the Construction Documents. The Contractors will provide all of their own tools to install, start, check out, and functionally test equipment and systems.
      b. Coordinates and directs the commissioning activities in a logical, sequential, and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules, and technical expertise.
      c. Coordinate the commissioning work and, with the GC and CM, ensure that commissioning activities are being scheduled into the master project schedule.
      d. Revise the Commissioning Plan during the construction phase as necessary.
      e. Request and review information required to perform commissioning tasks, including O&M materials, contractor start-up, and check-out procedures as necessary.
      f. Before start-up, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write testing procedures as necessary.
      g. Write and distribute systems functional performance Test requirements.
      h. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions and substitutions relating to the Commissioning process. Assist in resolving discrepancies.
      i. Perform site observations as necessary to observe component and system installations for testing of systems.
      j. Oversee sufficient functional testing of the control system.
      k. With assistance from installing contractors and A/E, write the functional performance test procedures for equipment and systems. This may include energy management control system trending or manual functional testing.
      l. Analyze any functional performance trend logs and monitoring data as required to verify performance.
      m. Coordinate, witness, and approve manual functional performance tests performed by installing contractors. Coordinate retesting with the GC and A/E as necessary or required.
      n. Maintain a master issue and resolution log and a separate testing record. Provide the owner and CM/GC with periodic written progress reports and test results with recommended actions.
      o. Witness performance testing of control systems and document these tests and include this documentation in Commissioning Record in O&M manuals.

p. Compile and maintain a commissioning record and review building systems manual.
q. Review and approve the preparation of the O&M manuals.
r. Provide a final commissioning report.
s. Warranty Period: Coordinate and supervise required seasonal or deferred testing and deficiency corrections.

F. Construction Manager-Owner's Representative (CM) as applicable
1. Construction and Acceptance Phase
a. Facilitate the coordination of the commissioning work by the CA, working with the GC, to ensure that commissioning activities are being scheduled into the master project schedule.
b. Review and be familiar with the commissioning specifications and final Commissioning Plan-Construction Phase.
c. Attend the commissioning scoping meeting and other commissioning team meetings.
d. Perform the normal review of Contractor submittals.
e. Furnish a copy of all construction documents, addenda, change orders, and approved submittals and shop drawings related to commissioned equipment to the CA.
f. Review the functional performance test procedures submitted by the CA, prior to testing.
g. When necessary, observe and witness checklists, start-up, and functional testing of selected equipment.
h. Review commissioning progress and deficiency reports.
i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.
j. Sign-off (final approval) on individual commissioning tests as completed and passing. Recommend completion of the commissioning process to the Project Manager.
k. Assist the GC in coordinating the training of owner personnel.
l. Warranty Period: Assist the CA as necessary in the seasonal or deferred testing and deficiency corrections required by the contract documents.

G. Owner's Project Manager (PM)
1. Construction and Acceptance Phase
2. Assist the CA as necessary to carry out commissioning activities.
3. Manage the contract of the CA, A/E, and GC.
4. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions.
5. Provide final approval for the completion of the commissioning work.
6. Warranty Period: Ensure that any seasonal or deferred testing and any deficiency issues are addressed or that a plan is in place to address issues pending resolution.

H. General Contractor (GC)
1. Contractor and their subcontractors and vendors shall assign capable, skilled, and knowledgeable representatives with expertise and authority to act on their behalf and schedule them to participate in and perform commissioning process activities.
2. Construction and Acceptance Phase

a. Facilitate the coordination of the commissioning work by the CA and ensure that commissioning activities are being addressed in the master construction project schedule.
b. Include the cost of commissioning tasks to be carried out by the contractor and subs, for commissioning of the building systems in the contract price. This will not include the CA's contract. The CA's contract for commissioning services shall be between the owner and CA.
c. In each purchase order or subcontract written, include requirements for submittal data, O&M data, commissioning tasks, and training.
d. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
e. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
f. Coordinate and conduct owner training on building and systems operation for equipment provided and installed.
g. Prepare close-out documents including O&M documents, according to the Contract Documents, including clarifying and updating the original control sequences of operation and As-built drawings.
h. Warranty Period: Ensure that Subs execute seasonal or deferred functional performance testing, to be witnessed by the CA, according to the specifications.
i. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and final as-built drawings and warranty documents for applicable issues identified in any seasonal and deferred testing.

I. Equipment Suppliers
1. Construction and Acceptance Phase
a. Provide all requested submittal data, including detailed start-up procedures, blank start-up docs and checklists, and specific responsibilities of the Owner to keep warranties in force.
b. Assist in equipment start-up, energizing, and pre-testing per agreements with Subs.
c. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CA. Such tools not required for routine maintenance, operation, and service and not required to be turned over to the owner under other divisional spec sections, shall be returned to the user providing such tools. Examples of this intent would be a flow hood used by the TAB contractor would be returned and remain the property of the TAB contractor whereas a special key for unlocking the chiller control cabinet would be turned over to the owner.
d. Provide information requested by CA regarding equipment sequence of operation and testing procedures.
e. Review system start-up and test procedures for equipment installed by factory representatives.

J. Mechanical Contractor
1. Provide start-up for all HVAC equipment.
2. Assist and cooperate with the TAB contractor and CA by:

a. Putting all HVAC equipment and systems into operation and continuing the operation during each working day of TAB and commissioning, as required.
b. Including cost of sheaves and belts that may be required by TAB.
c. Providing test holes in ducts and plenums where directed by TAB to allow air measurements and air balancing. Provide an approved rubber or steel plug to seal traverse holes.
d. Providing temperature and pressure taps according to the Construction Documents for TAB and commissioning testing.

3. Install a P/T plug at each water sensor which is an input point to the control system and both inlet and discharge side of ALL pumps for TAB.
4. List and clearly identify on the as-built drawings the locations of all air-flow stations.
5. Notify the GC or CA depending on protocol, when pipe and duct system testing, flushing, cleaning, start-up of each piece of equipment, and TAB will occur. Be responsible to notify the GC or CA, ahead of time, when commissioning activities not yet performed or not yet scheduled could delay construction. Be proactive in seeing that commissioning processes are executed and that the CA has the scheduling information needed to efficiently execute the commissioning process.

K. Controls Contractor

1. Sequences of Operation Submittals: The Controls Contractor's submittals of control drawings shall include complete detailed sequences of operation for each piece of equipment, regardless of the completeness and clarity of the sequences in the specifications or drawings. The engineer shall be provided written documentation for any revisions to the HVAC&R design documents including engineered approved control sequences. Upon review of the DDC control submittals, the engineer shall provide his approval or rejection in writing to the controls contractor. The Controls Contractor's submittals of control drawings shall include:
   a. An overview narrative of the system (1 or 2 paragraphs) generally describing its purpose, components, and function.
   b. All interactions and interlocks with other systems.
   c. Detailed delineation of control between any packaged controls and the building automation system, listing what points the BAS monitors only and what BAS points are control points and are adjustable.
   d. Written sequences of control for packaged controlled equipment. (Equipment manufacturers' stock sequences may be included but will generally require additional narrative).
   e. Start-up sequences.
   f. Warm-up mode and Optimum Start sequences.
   g. Normal operating mode sequences.
   h. Unoccupied mode sequences.
   i. Shutdown sequences.
   j. Capacity control sequences and equipment staging.
   k. Temperature and pressure control: setbacks, setups, resets, etc.
   l. Detailed sequences for all control strategies, e.g., economizer control, optimum start/stop, staging, optimization, demand limiting, etc.
   m. Effects of power or equipment failure with all standby components including HVAC and Emergency powered systems with VFD's and responses (Restart, Alarm, etc.).
   n. Sequences for all alarms and emergency shutdowns.

o. Seasonal operational differences and recommendations.
p. Initial and recommended values for all adjustable settings, set points parameters that are typically set or adjusted by operating staff; and any other control settings or fixed values, delays, etc. that will be useful during testing and operating the equipment.
q. Schedules, if known and provided by owner.
r. All sequences shall be written in small statements, each with a number for reference. For a given system, numbers will not repeat for different sequence sections, unless the sections are numbered.

2. Control Drawings Submittal
   a. The control drawings shall have a key and legend for all abbreviations and symbols.
   b. The control drawings shall contain graphic schematic depictions of the systems and each component.
   c. The schematics will include the system and component layout of any equipment that the control system monitors, enables, or controls, even if the equipment is primarily controlled by packaged or integral controls.
   d. Provide a full points list with at least the following included for each point:
      1) Controlled system Point abbreviation
      2) Point description
      3) Display unit
      4) Control point or set point (Yes / No)
      5) Monitoring point (Yes / No)
      6) Intermediate point (Yes / No)
      7) Calculated point (Yes / No)
         (a) Key:
            (1) Point Description: DB temp, airflow, etc.
            (2) Control or Setpoint: Point that controls equipment and can have its set points changed (OSA, SAT, etc.)
            (3) Intermediate Point: A Point whose value is used to make a calculation which then controls equipment (space temperatures that are averaged to a virtual point to control reset).
            (4) Monitoring Point: A Point that does not control or contribute to the control of equipment; but is used for the operations, maintenance, or performance verification.
            (5) Calculated Point: “Virtual” point generated from calculations of other point values. The Controls Contractor shall keep the CA informed of all changes to this list during programming and setup in all phases of the project.

3. An updated as-built version of the control drawings and sequences of operation shall be included in the final controls O&M manual submittal.
4. Assist, coordinate, and cooperate with the TAB contractor in the following manner:
   a. Meet with the TAB contractor prior to beginning TAB work and review the TAB plan to determine the capabilities of the control system toward completing TAB. Provide the TAB any needed unique instruments for setting terminal unit boxes and instruct TAB in their use (handheld control system interface for use around the building during TAB, etc.).

b. For a given area, have all required checklists, calibrations, start-up, and selected Pre-commissioning documentation of the system available during TAB activities.
c. Provide a qualified technician to operate the controls, to assist the TAB contractor in performing TAB work, during scheduled TAB activities. Remote operation of control system, during scheduled TAB and Functional Testing, will not be acceptable. The Controls contractor may provide training to the TAB technician for inputting data into the control software and logic. However, the controls contractor shall be ultimately responsible for entering and saving the data, provided by the TAB contractor, into the control system.

5. Assist and cooperate with the CA in the following manner:
   a. Execute the functional testing of the controls system as specified for the controls contractor in Controls Specification Section.
   b. Assist in the functional testing of all equipment specified.
   c. Execute all control system trend logs specified.
6. Provide a signed and dated certification to the CA and GC upon completion of the check-out of each controlled device, equipment, and system prior to TAB and functional testing. This shall be for each piece of equipment or system, Confirmation that all system programming, installation of control components, debugging, pre-testing, checkout is complete, and the control system is made fully operational as to all respects of the Contract Documents. This shall be completed prior to any TAB work or functional testing of the building systems under DDC control.
7. Beyond the control points necessary to execute all documented control sequences provide monitoring, control, and virtual points.
8. List and clearly identify on the as-built duct and piping drawings the locations of ALL: static and differential pressure sensors (air, water, and building pressure), hydronic control valves/actuators, electrical control relays for lighting, and control boards.
9. The Controls Contractor shall be responsible for Pre-commissioning of all control systems and components provided and installed by the controls contractor. See other sections of this specification and divisional specifications for training requirements. During TAB and functional testing, the controls contractor shall produce, at the request of the engineer or commissioning authority, graphic screenshots of the building systems operation as indicated on the building controls graphics.

L. Test and Balance Contractor (TAB)
1. Prior to starting TAB, submit to the CA and GC, the lead TAB technicians contact information.
2. Submit the outline of the TAB plan, to the CA, GC, and Controls Contractor prior to starting the TAB. The TAB contractor will be provided with a set of final approved mechanical and HVAC&R control submittals by the GC, 60 calendar days prior to beginning TAB activities.
3. The submitted TAB plan may include:
   a. Certification that the TAB contractor has reviewed the construction documents and the systems with the design engineers and contractors to sufficiently understand the design intent for each system.
   b. An explanation of the intended use of the building control system. The controls contractor will comment on feasibility of the plan.

c. All field check-out sheets and logs to be used that list each piece of equipment to be tested, adjusted, and balanced with the data cells to be gathered for each.
d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
e. Final test report forms to be used.
f. Detailed step-by-step procedures for TAB work for each system and issue.
g. Terminal flow calibration (for each terminal type), diffuser proportioning, branch and submain proportioning, total flow calculations, rechecking, diversity issues, expected problems and solutions, etc. Criteria for using air flow straighteners or relocating flow stations and sensors will be discussed. Provide analogous explanations for the waterside.
h. List of all airflow, water flow, sound level, system capacity, and efficiency measurements to be performed and a description of specific test procedures, parameters, and formulas to be used.
i. Details of how total flow will be determined (Air: sum of terminal flows via BAS calibrated readings or via hood readings of all terminals, supply (SA), and return air (RA) pitot traverse, SA or RA flow stations. Water: pump curves, circuit setter, flow station, ultrasonic, etc.).
j. The identification and types of measurement instruments to be used and their most recent calibration date.
k. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and provide methods to verify this.
l. Confirmation that TAB understands the outside air ventilation criteria under all operational conditions.
m. Details of whether and how minimum outside air CFM will be verified and set and for what level (total building, zone, etc.).
n. Details of how building static and exhaust fan/relief damper capacity will be checked.
o. Proposed selection points for sound measurements and sound measurement methods.
p. Details of methods for making any specified coil or other system plant capacity measurements.
q. Details of any TAB work to be done in phases (by floor, etc.), or of areas to be built out later.
r. Details regarding specified deferred or seasonal TAB work.
s. Details of any specified false loading of systems to complete TAB work.
t. Details of all exhaust fan balancing and capacity verifications, including any required room pressure differentials.
u. Details of any required interstitial cavity differential pressure measurements and calculations.
v. Plan for hand-written field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests, and lists of completed tests (scope and frequency).
w. Plan for formal progress reports (scope and frequency).
x. Plan for formal deficiency reports (scope, frequency, and distribution).

4. A running log of events and issues shall be kept by the TAB field technicians. Submit hand-written reports of discrepancies, deficient or uncompleted work by others, contract interpretation requests, and lists of completed TAB work. All

issues found during daily TAB activities shall be provided to the GC on-site and prior to leaving the job site for the day.

5. Communicate in writing to the controls contractor all set point and parameter changes made or problems and discrepancies identified during TAB which affect the control system setup and operation.
6. Provide a draft TAB report within five calendar days of starting Functional Testing of the HVAC & R systems. Field notes that are legible shall be allowed to be submitted in place of a full draft TAB report.
7. Provide the CA with requested system data findings, gathered or collected during TAB work, but not shown on the TAB reports.
8. Provide a final and complete TAB report for the CA and A/E within 15 calendar days from end of TAB work and as requested by the CA. Punch list items or issues discovered during scheduled TAB activities, reported to the GC for correction by the GC's subs or vendors, which cause delay in the TAB contractor's ability to complete his work on time per the project schedule, will have the additional time required to complete the TAB work, charged to the GC who may choose to back charge his/her subs. Charges shall be on a Time and Material basis and shall be documented with a line item breakdown for Manpower, time, systems TAB'd, and date of work. Such documentation shall be made available for review by the GC and A/E, prior to any approval by the GC.
9. Assist the CA as needed and required to carry out all HVAC & R functional testing. Conduct functional performance tests and checks on the original TAB as specified for TAB in Division 23 and controls specification section. Make follow-up visits to the site as necessary and required to correct any work deficiencies or variances to contract documents made by the TAB technician.

M. Electrical Contractor
1. Include the cost of commissioning by the electrical sub in the contract price.
2. Include requirements for submittal data, O&M data, and owner training.
3. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
4. Contractor shall provide normal cut sheets and shop drawing submittals to the CA of electrical systems to be commissioned.
5. Provide requested electrical systems documentation to the CA when requested by the CA, for development of functional testing procedures.
    a. Typically, this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and check-out materials that are actually shipped inside the equipment and the actual field check-out sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Agent.
    b. The Commissioning Agent may request further documentation necessary for the commissioning process.
    c. This data request may be made prior to or post normal submittals.
6. Provide a copy of the electrical systems O&M manuals submittals of commissioned equipment, through normal channels, to the CA.
7. Contractors shall assist (along with the design engineers) in clarifying the operation and control of electrical commissioned equipment in areas where the

specifications, control drawings, or equipment documentation is not sufficient for writing detailed electrical testing procedures.

8. Provide assistance to the CA in developing and conducting all CA directed electrical testing. Subs shall review all test procedures to ensure feasibility, safety, and equipment protection and provide necessary written alarm limits to be used during the tests.
9. In a clear and legible format, document all completed installation, start-up, and system operational check-out procedures, providing a copy to the A/E and CA.
10. Address current A/E punch list and Cx Issues Log items before final payment is released.
11. Provide skilled technicians to execute energizing and starting of electrical equipment and to execute all required electrical tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments, and issue resolution.
12. Perform functional performance testing under the direction of the CA or A/E for specified electrical equipment tests. Assist the CA in interpreting any monitoring data, as necessary.
13. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, GC, and A/E and retest the equipment.
14. Prepare O&M manuals and red-line as-built drawings according to the Contract Documents, including updating the electrical as-built conditions.
15. Provide training of the Owner’s operating personnel as specified.
16. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.
17. Warranty Period: Execute and assist the CA in carrying out deferred functional performance testing according to the specifications.
18. Correct deficiencies and make necessary adjustments to electrical systems O&M manuals and electrical as-built drawings for applicable issues identified in any seasonal or deferred testing.

N. Plumbing Contractor
1. Provide installation and operation for all plumbing equipment.
2. Assist and cooperate with the CA by putting all plumbing equipment, fixtures, domestic water systems, water heaters, recirc pumps, etc., into operation as requested by the CA for testing and confirming the operation of such equipment and components installed under the plumbing scope of services.
3. List and clearly identify on the as-built drawings the locations of all plumbing valves installed above ceiling, in building walls, and underground.
4. Be responsible to notify the GC and CA, ahead of time, when commissioning Activities related to plumbing systems not scheduled could delay construction.
5. Include the cost of commissioning by the plumbing sub in the contract price.
6. Include requirements for plumbing submittal data, O&M data, and participation in owner training for plumbing systems.
7. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
8. Contractor shall provide normal cut sheets and shop drawing submittals to the CA for plumbing systems to be commissioned. Submissions shall follow proper protocol for distribution of materials. Typically, from Vendor to Sub to GC to Architect, or CM to CA.

9. Provide requested plumbing systems documentation to the CA when requested by the CA for development of plumbing checklists and testing procedures.
    a. Typically, this will include detailed manufacturer installation and start-up, operating, troubleshooting, and maintenance procedures, full details of any owner-contracted tests and pump curves, factory test reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and check-out materials that are actually shipped inside the plumbing equipment and the actual field check-out sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Agent.
    b. The Commissioning Agent may request further documentation necessary for the commissioning process.
    c. This data request may be made prior to or post normal submittals.
10. Provide a copy of the plumbing systems O&M manuals submittals of commissioned equipment, through normal channels, to the CA.
11. Contractors shall assist (along with the design engineers) in clarifying the operation and control of plumbing systems commissioned, in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
12. Provide assistance to the CA for developing and conducting all CA directed plumbing system and equipment testing. Subs shall review all test procedures to ensure feasibility, safety, and equipment protection and provide necessary written alarm limits to be used during the tests.
13. Develop a full installation check-out plan using manufacturer's installation, start-up procedures, and the checklists from the CA and other requested equipment documentation to CA and A/E for review.
14. During the start-up and initial check-out process for Plumbing systems, equipment requiring electrical power will require coordination with the electrical sub to execute and document the electrical-related portions of the plumbing checklists and likewise for HVAC and Electrical devices where plumbing systems and equipment are installed as part of the complete HVAC or electrical system, the plumbing sub must coordinate with those disciplines for sign off of the checklist documents.
15. In a clear and legible format, document all completed installation, start-up, and system operational check-out procedures, providing a copy to the A/E and CA through the GC.
16. Provide skilled technicians to execute energizing and starting of electrical equipment and to execute all required electrical tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments, and issue resolution.
17. Perform functional performance testing under the direction of the CA or A/E for specified plumbing equipment tests.
18. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, GC, and A/E and retest the equipment.
19. Address current A/E punch list and Cx Issues Log items before final payment is released.
20. Prepare O&M manuals and red-line as-built drawings according to the Contract Documents, including updating the plumbing as-built conditions.
21. Provide training of the Owner's operating personnel for operation and maintenance of plumbing systems.

22. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.
23. Warranty Period: Execute and assist the CA in carrying out deferred testing according to the specifications.
24. Correct deficiencies and make necessary adjustments to plumbing systems O&M manuals and as-built drawings for applicable issues identified in any seasonal or deferred testing.

1.5 DEFINITIONS

A. Acceptance Phase - Phase of construction after start-up and initial check-out when functional performance tests, O&M documentation review, and training occurs.

B. Approval - Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

C. Architect/Engineer (A/E) - The prime consultant (architect) and sub-consultants who comprise the design team; generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

D. Basis of Design (BOD) - The basis of design is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The basis of design describes the systems, components, conditions, and methods chosen to meet the intent. Some reiterating of the design intent may be included.

E. Checklist (PC) - A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment. Checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some Checklist items entail simple testing of the function of a component, a piece of equipment, or system (such as measuring the voltage imbalance on a three phase pump motor of a chiller system). The word pre-functional refers to before functional performance testing. Checklists augment and are combined with the manufacturer’s start-up checklist. Even without a commissioning process, contractors typically perform some checklist items. However, few contractors document in writing the execution of these checklist items. Therefore, for most equipment, the contractors execute the checklists on their own.

F. Commissioning Agent (CA) - An independent agent, not otherwise associated with the A/E team members or the Contractor, though CA may be hired as a subcontractor to them. The CA directs and coordinates the day-to-day commissioning activities. The CA does not take an oversight role like the CM. The CA is part of the Construction Manager (CM) team or shall report directly to the CM.

G. Commissioning Plan - An overall plan, developed before or after bidding that provides the structure, schedule, and coordination planning for the commissioning process.

H. Contract Documents - The documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, Cx Plan, etc.).

I. Contractor - The general contractor or authorized representative.

J. Control System - The central building energy management control system.

K. Construction Manager (CM) - The Owner's representative in the day-to-day activities of construction. In general, the construction management services contractor (CM) is hired by the owner to assist in the overall management of the project including supervising and on-site managing authority over a project's construction. The General Contractor reports to the CM. The CM is the owner's on-site representative.

L. Data Logging - Monitoring flows, currents, status, pressures, etc. of equipment using DDC control system.

M. Deferred Functional Tests - FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.

N. Deficiency - A condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents (it does not perform properly or is not complying with the design intent).

O. Design Intent - A dynamic document that provides the explanation of the ideas, concepts, and criteria that are considered to be very important to the owner. It is initially the outcome of the programming and conceptual design phases.

P. Design Narrative or Design Documentation - Sections of the Design Intent or BOD.

Q. Factory Testing - Testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.

R. Functional Performance Test (FT) - Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure set point). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning agent develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FTs are performed after CHECKLISTS and start-up is complete.

S. General Contractor (GC) - The prime contractor for this project generally refers to all the GC's subcontractors as well. Also is referred to as the Contractor in some contexts.

T. Indirect Indicators - Indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.

U. Manual Test - Using hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

V. Monitoring - The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

W. Non-Compliance - See the definition of Deficiency.

X. Non-Conformance - See the definition of Deficiency.

Y. Over-Written Value - Writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50°F to 75°F to verify economizer operation). See also “Simulated Signal.”

Z. Owner-Contracted Tests - Tests paid for by the Owner outside the GC’s contract and for which the CA does not oversee. These tests will not be repeated during functional tests if properly documented.

AA. Phased Commissioning - Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order to minimize the total construction time.

BB. Project Manager (PM) - The contracting and managing authority for the owner over the design and/or construction of the project.

CC. Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

DD. Seasonal Performance Tests - FT that are deferred until the system(s) will experience conditions closer to their design conditions.

EE. Simulated Condition - Condition that is created for the purpose of testing the response of a system (e.g., applying heated air to a space sensor using a hair dryer to see the response in the HVAC system).

FF. Simulated Signal - Disconnecting a sensor and using a signal generator to send an amperage, resistance, or pressure to the transducer and DDC system to simulate a sensor value.

GG. Specifications - The construction specifications of the Contract Documents.

HH. Start-up - The initial starting or activating of dynamic equipment, including executing Checklists.

II. Subs - The subcontractors to the GC who provide and install building components and systems.

JJ. Systems/Subsystems/Equipment & Components - Where these terms are used together or separately, they shall mean “As-Built” systems, subsystems, equipment, and component.

KK. Test Procedures - The step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CA.

LL. Test Requirements - Requirements specifying what modes and functions, etc. shall be tested. The test requirements are not detailed test procedures. The test requirements are specified in the Contract Documents.

MM. Trending - Monitoring using the building control system.

NN. Vendor - Supplier of equipment.

OO. Warranty Period - The warranty period for the entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

1.6 SYSTEMS TO BE COMMISSIONED

A. The following systems and their sub-components are anticipated to be commissioned on this project. The actual systems commissioned will be based on the systems listed in the commissioning contract with the owner. Systems included for this project will be confirmed during the CA construction phase.

B. These systems and sub-components will be commissioned using sampling techniques. Percentage of sampling shall be determined by the CA in the field but no less than 20% of like systems shall be sampled for HVAC systems and lighting systems. All chillers, space heat boilers, and cooling towers, (except existing systems), shall be tested. No sampling will be allowed for these major components (chillers, space heat boilers, and cooling towers). Reference the Mechanical, Electrical, and Plumbing systems equipment schedules and sheets contained in the contract drawings for equipment design information.

Cx Systems	**Require Fx Testing**	**Items Tested**
HVAC		
__ Chilled Water Plants	Yes	Controls, Sequence of Operations, Alarms
__ Hot Water Plants	Yes	Controls, Sequence of Operations, Alarms
__ Air Handling Units	Yes	Controls, Sequence of Operations, Alarms, Economizer
__ Packaged Units (RTU and HP)	Yes	Controls, Sequence of Operations, Alarms, Economizer

Cx Systems	Require Fx Testing	Items Tested
__ Terminal Units/VAVs	Yes	Controls, Sequence of Operations, Economizer
__ Exhaust and Relief fans	Yes	Controls, Sequence of Operations, Alarms
__ DDC Control System *(Component Installation and System Operation)*	Yes	System calibration and function
Electrical Systems		
__ Lighting Controls	Yes	Control Software and Hardware Properly Adjusted and Programmed
__ Occupancy Sensors	Yes	Aiming, Status Indicator, Light Staging
__ Time Switch Controls	Yes	Programmed Schedules, Battery Backup, Override Limit, Simulate Occupied and Unoccupied Conditions
__ Daylight Responsive Controls	Yes	Accurate Locations, Calibration, Setpoint, Threshold
Plumbing Systems		
__ Service Water Heating Systems	Yes	Controls, Sequence of Operations, Alarms

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform start-up and initial check-out and required functional performance testing shall be provided by the primary Division contractor for the equipment being tested. For example, the mechanical contractor of

Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC system and controls system in Division 23, except for equipment specific to and used by TAB in their commissioning responsibilities. Two-way radios shall be provided as necessary for communication between the CA and contractors during performance testing, by the Division Contactor.

B. Special equipment, tools, and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and turned over to the owner for his use and shall become the sole property of the owner, except for temporary stand-alone data logging equipment that may be used by the CA and any special testing and inspection equipment used for testing of piping, ductwork, and electrical and special systems unless such equipment is required for such systems to function and operate.

C. Any and all data logging by electronic device shall be by the DDC control system where applicable, and as otherwise contracted by the owner with others.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year and a resolution of + or - 0.3ºF. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer’s recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 REPORTING

A. The CA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.

B. Non-conformance and deficiency issues will be recorded on the commissioning issues log and a copy will be provided to the GC for making corrections. A copy will be provided to the owner and made available to other project team members as directed by the owner. Frequency of these reports will be determined by the progress of construction and issues discovered during the CA and owner-site observations. Issues recorded on the Cx Issues Log will be noted as complete and the CA will initial the date and verified by block only after the CA has confirmed that the item has been corrected by the contractor or noted in writing, by the owner, as accepted as is by the owner.

C. A final summary report (about four to six pages, not including backup documentation) by the CA will be provided to the owner, focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report. As appropriate, checklists, functional tests, and monitoring reports may be included to supplement the summary report. These documents will also be included in the Project Commissioning Record.

3.2 SUBMITTALS

A. Normal submittal: For MEP Systems, submittals will be provided by the GC to the CA through the Architect and concurrently with the A/E consultants review period. At a minimum, the submittal will include the manufacturer and model number, the manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings, and details of owner contracted tests. In addition, the installation and check-out materials that are actually shipped inside the equipment and the actual field check-out sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Agent. All documentation requested by the CA will be included by the Subs in their O&M manual contributions. Where items are uploaded to an FTP or web-based site, the CA will be notified.

B. The CA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

3.3 PHASED COMMISSIONING

A. Where the project requires TAB, start-up, and performance testing to be executed in phases, phasing shall be coordinated with the owner, GC, CA, and A/E and be reflected in the overall project schedule and shall include commissioning activities in the schedule by the contractor. Final performance testing of all systems will be as required by the phasing plan. The performance testing of the "systems as a whole" will be performed before final turnover of the project.

3.4 FUNCTIONAL PERFORMANCE TESTING

A. Requirements. The performance testing shall demonstrate that each system is operating according to the documented design intent and contract documents. Performance testing facilitates bringing the systems from a state of individual substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified, corrected, and the system retested, improving the operation of the systems.

B. Coordination and Scheduling. The contractor shall provide sufficient notice, regarding their completion schedule for the construction checklists and start-up of all equipment and systems to allow the performance testing to be scheduled. The commissioning team shall oversee, witness, and document the performance of all equipment and systems. The contractor in association with the subcontractors shall execute the tests. The CA shall witness and document the results of the test. Performance testing shall be conducted after the construction checklists, and start-up has been satisfactorily completed. The control system shall be sufficiently tested and approved by the CA and engineer of record before it is used, to verify performance of other components or systems. The air side balancing and water side balancing shall be completed before performance testing of air or water-related equipment or systems. Testing proceeds from components to sub-systems to systems. When the proper performance of all interacting individual systems has been achieved, the coordinated response between systems shall be verified.

C. Development of Test Procedures:

1. Before test procedures are finalized, the contractor shall provide to the A/E and the CA all requested documentation including changes affecting equipment or systems, an updated control points list, control schematics, control sequences, and testing parameters. Using the testing parameters and requirements in the technical specifications, the CA shall develop and update specific testing requirements and documentation for the purpose of verifying and documenting the actual performance of the related systems and equipment. Each respective contractor/subcontractor or vendor shall provide assistance to the CA as necessary and required in developing the final equipment and systems test procedures. Should the CA test and the manufacturer test requirement be at variance with one another, the manufacturer operational test requirements shall prevail.
2. Before test procedures are written, the CA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences, and parameters. The CA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Each Sub or vendor responsible to execute a test shall provide assistance to the CA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CA shall provide a copy of the test procedures to the contractor who shall review the tests for feasibility, safety, equipment, and warranty protection. The CA may submit the tests to the A/E for review and comment prior to performing the test.

D. Test Methods:
1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the building DDC control system.
2. Simulated Conditions. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
3. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system shall be allowed, but simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a portable hot air device in lieu of overwriting the set point.
4. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
5. Altering Set points: Rather than overwriting sensor values, and when simulating conditions is difficult, altering set points to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55°F, when the outside air temperature is above 55°F, temporarily change the lockout set point to be 2°F above the current outside air temperature.
6. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during prefunctional testing.

7. Setup: Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Sub executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Sub shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.
8. Sampling: Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. The specific recommended sampling rates are listed in these documents. It is noted that no sampling by Subs is allowed in CHECKLIST execution. A common sampling strategy referenced in the Specifications as the “xx% Sampling-yy% Failure Rule” is defined by the following example:
    a. xx = the percent of the group of identical equipment to be included in each sample.
    b. yy = the percent of the sample that if failing, will require another sample to be tested.
9. The example below describes a 20% Sampling-10% Failure Rule:
    a. Randomly test at least 20% (xx) of each group of identical equipment. In no case test less than three units in each group. This 20%, or three, constitutes the “first sample.”
    b. If 10% (yy) of the units in the first sample fail the functional performance tests, test another 20% of the group (the second sample).
    c. If 10% of the units in the second sample fail, test all remaining units in the whole group.
    d. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CA may stop the testing and require the responsible Sub to perform and document a check-out of the remaining units, prior to continuing with functionally testing the remaining units.

E. Coordination and Scheduling:
1. The Subs shall provide sufficient notice to the CA regarding their completion schedule for the CHECKLISTS and start-up of all equipment and systems. The CA will schedule functional tests through the GC.
2. The CA shall observe and document the results of functional testing if the results shall be provided to the owner and A/E for review and record.
3. The Subs shall execute the tests. In general, functional performance testing is conducted after checklist verification and start-up has been satisfactorily completed and start-up reports and checklists have been reviewed by the A/E. The control system is sufficiently tested for completeness, by the controls contractor and prior to TAB work. The controls sub will provide written notification to the GC, A/E, and CA that the controls have been inspected and pre-Tested prior to beginning TAB and any Functional testing work. The air balancing and water balancing is then completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual

systems has been achieved, the interface or coordinated responses between systems is checked.

a. Test Equipment: All standard testing equipment required to perform start-up and initial check-out and required functional performance testing shall be provided by the Division contractor for the equipment being tested. All testing equipment shall be of sufficient quality and accuracy to test or measure system performance as required by the construction documents and specifications and functional performance testing.
b. Problem Solving: The CA will recommend solutions to issues discovered, however the burden of responsibility to solve, correct and retest problems is with the GC, Subs, and A/E.

3.5 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation: The CA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the A/E and GC for review and approval.

B. Non-Conformance:
1. The CA will record the results of the functional test on the test form. All deficiencies or non-conformance issues shall be documented and reported to the GC for correction and a copy provided to the A/E and owner.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases, the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the PM and CM. Any issue that requires more than 30 minutes to correct or multiple issues with a combined total of 90 minutes in any given day, shall be deemed failed and shall be documented as such by the Cx agent. A copy of the discrepancy shall be provided to the GC for correction and the project team members for record. Upon written notification from the GC, that the issue or issues are corrected and the system is fully operational and ready for retest, the CA will schedule with the GC for a retest of the failed system. Five working days shall be required by the GC in writing to the CA for any retest.
4. As tests progress and a deficiency is identified, the CA discusses the issue with the executing contractor.
5. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
   a. The CA documents the deficiency and the Sub’s response and intentions and they go on to another test or sequence. The CA submits the non-compliance reports to the GC, A/E, and owner. A copy is to be provided to the appropriate Sub by the GC. The Sub corrects the deficiency, signs the statement of correction at the bottom of the form certifying that the equipment is ready to be retested, and sends it back to the GC for verification. The GC provides a copy of the signed form to the A/E and CA for record.
   b. The CA reschedules the test and the test is repeated.
6. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

a. The deficiency shall be documented with the Sub's response and a copy given to the GC, A/E, PM, and CA and to the Sub representative assumed to be responsible.
b. Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is the owner.
c. The CA documents the resolution process.
d. Once the interpretation and resolution have been decided, the GC and CA will reschedule the test and the test is repeated.

7. Cost of Retesting:
   a. If a system scheduled for a Functional Performance Test fails to pass and perform as designed, due to improper installation of start-up by the contractor, the cost for retest including the CA's time and travel, will be charged to the General Contractor who may choose to back charge his subs to recover any losses. Minor corrections will be made on-site and the test will continue where the total time for any given system to be corrected and made fully operational, is less than 15 minutes.
   b. For a deficiency identified, not related to any Checklists or start-up fault, the following shall apply: The CA and GC will direct the retesting of the system once at no "charge" to the sub or vendor for their time. However, the CA's time and expenses, incurred due to additional retests of any system beyond the one retest, will be charged to the GC, who will choose to recover costs from the responsible Sub.
   c. The time for the CA and GC to direct any retesting required because a specific Checklist or start-up test item, reported having been successfully completed, but determined during functional testing to be faulty, will be back charged to the GC, who may choose to recover costs from the party responsible for executing the faulty functional test.
   d. The CxA shall record any deficiencies noted during the testing in the Cx issues log. If significant deficiencies exist, the owner and/or CxA may request that the testing activities be terminated and re-scheduled after proper verification by the Contractor. The Contractor is responsible for all costs and additional compensation resulting from deficiencies and incomplete systems noted during scheduled Functional Performance Testing.
8. The Contractor shall respond in writing to the CA, A/E, and PM at least as often as Commissioning meetings are being scheduled, concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
9. The CA retains the original Cx Issues Log until the end of the project.

C. Approval: The CA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made after review by the CA, A/E, and PM. The CA documents the results of each test.

3.6 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals:
   1. The specific content and format requirements for the Standard O&M manuals are detailed in the A/E's project specifications.
   2. CA Review and Approval: Prior to substantial completion, the CA shall review the O&M manuals, documentation, and redline as-builds for systems that were

commissioned and as otherwise listed in these documents, to verify compliance with the Specifications. The CA will communicate deficiencies in the manuals to the GC, PM, or A/E, as requested. Upon a successful review of the corrections, the CA recommends approval and acceptance of these sections of the O&M manuals to the GC, PM, or A/E. The CA also reviews the MEP and special systems equipment warranty information. This review by the CA does not supersede the A/E's responsibility to review the O&M manuals according to the A/E's contract.

B. Commissioning Record in O&M Manuals:
   1. The CA shall include the commissioning record as part of the close-out documentation or as a supplement to the O&M records. This shall be in electronic format for final deliverables to the owner. The intended format is PDF format provided on electronic medium/discs.

3.7 DEFERRED TESTING

A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the building structure, required occupancy condition, or other deficiencies, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.

B. Seasonal Testing: Where seasonal testing is necessary or required to verify systems performance under designed conditions, these Tests will be scheduled by the GC, in coordination with the Owner and CA, and executed by the responsible Subs. The owner's facilities staff and the CA shall be notified in writing, by the GC, of the dates such testing will be conducted and shall be available for observing the testing. All such tests shall be scheduled no later than 60 days from substantial completion and shall be conducted no later than seven months from substantial completion. The owner shall have final approval for seasonal test dates. Any adjustments required for updating the accuracy of the O&M manuals, warranties, and as-builts due to the testing will be made by the contractor.

3.8 WRITTEN WORK PRODUCTS

A. The commissioning process generates a number of written work products described in various parts of the Specifications. The Commissioning Plan-Construction Phase lists all the formal written work products, describes briefly their contents, who is responsible to create them, their due dates, who receives and approves them, and the location of the specification to create them. In summary, the written products are:

Product		Developed By
1.	Final commissioning plan	CA
2.	Commissioning schedule	GC/CA
3.	Equipment documentation submittals	GC/Subs/A/E
4.	Sequence clarifications	A/E/Vendors
5.	Issues log (deficiencies)	CA/GC
6.	Commissioning Progress Record	CA
7.	Deficiency reports	CA/A/E/PM/GC
8.	Functional test forms	CA/AE
9.	Filled out functional tests	CA/GC/Subs

Product		Developed By
10.	O&M manuals	GC/Subs
11.	Commissioning record book	CA
12.	Final commissioning report	CA
13.	Final TAB report	TAB

END OF SECTION

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SECTION 02 41 20

SELECTIVE DEMOLITION

PART 1 - GENERAL

RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

1. This Section includes the following: Demolition and removal of selected site elements.

DEFINITIONS

1. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

2. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Owner, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

MATERIALS OWNERSHIP

1. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

SUBMITTALS

1. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.

QUALITY ASSURANCE

1. Asbestos: It is not expected that asbestos will be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Owner.

SCHEDULING

1. Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.

PART 2 – PRODUCTS: NOT USED.

PART 3 - EXECUTION

EXAMINATION

1. Verify that utilities have been disconnected and capped.

2. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

UTILITY SERVICES

1. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   A. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.

      I. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.

2. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services to be removed.

   A. Arrange to shut off indicated utilities with utility companies.
   B. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other areas before proceeding with selective demolition.

3. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

PREPARATION

1. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

2. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

   A. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.

   A. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
   B. Protect existing site improvements, appurtenances, and landscaping to remain.

SELECTIVE DEMOLITION

1. Demolish and remove existing construction only to the extent required by new construction and as indicated.

2. Break up and remove concrete slabs on grade, unless otherwise shown to remain.

DISPOSAL OF DEMOLISHED MATERIALS

1. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

2. Burning: Do not burn demolished materials.

3. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 02 41 20

SECTION 03 30 01

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
B. Cast-in-place concrete includes the following:

1. Foundations and footings.
2. Slabs-on-grade.
3. Fill for steel deck.
4. Foundation walls.
5. Shear walls
6. Load-bearing building walls
7. Building frame members.
8. Equipment pads and bases.
9. Fill for steel pan stairs.

1.3 RELATED SECTIONS

A. The following Sections contain requirements that relate to this Section:
1. Division 2 Section "Portland Cement Concrete Paving" for concrete paving and walks.
2. Division 3 Section "Concrete Toppings" for concrete floor toppings.
3. Division 3 Section "Lightweight Concrete" for lightweight concrete.
4. Division 3 Section "Tilt-Up Precast Concrete" for tilt-up precast concrete.
5. Division 5 Section "Steel Floor Deck" for steel floor deck construction.

1.4 SUBMITTALS

A. General
1. Submit the following according to Conditions of the Contract and Division 1 Spec Sections.

B. Product Data

1. For proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect/Engineer.

C. Shop Drawings
1. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures. Include all special reinforcement on elevation drawn at a scale of not less than 1/4" to 1'-0". Original contract drawings shall not be reproduced for use as a portion of the Shop drawing.

2. Shop Drawings; Construction Joints: Submit original shop drawings indicating the proposed construction joint locations to the Architect/Engineer at least 14 days prior to beginning formwork on the portion of the building in question.

D. Concrete Mix Design
1. Submit mix designs and aggregate analysis of each class of concrete. Designs shall be submitted a minimum of 48 hours prior to the placement of any concrete.

2. Mix designs shall include material proportions, material weights, material sources, manufacturer's data on any admixture used, and proof that the design meets the requirements of this specification. Proof shall include the water/cement ratio, slump, and the compressive strengths from concrete test cylinders. Substantiative data may be taken from historical records or independent laboratory tests. Manufacturer's data shall include recommended dosages. Aggregate analysis shall include the sieve analysis, dry rodded unit weight of coarse aggregate, and the specific gravities of both fine and coarse aggregates.

E. Material Certificates
1. Material certificates in lieu of material laboratory test reports when permitted by Architect/Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

F. Testing Reports
1. The independent testing laboratory shall submit laboratory test reports for concrete materials directly to the Architect/Engineer with copy to others in accordance with the provisions of section 01400 "Quality Control Services." State in each report whether or not the test specimens comply to the specified requirements and indicate any deviations therefrom.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
2. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, & Placing Concrete"
3. ACI 305 "Hot Weather Concreting".
4. ACI 306 "Recommended Practice for Cold Weather Concreting"
5. ACI 311 "Recommended Practice for Concrete Inspection"
6. ACI 318, "Building Code Requirements for Reinforced Concrete."
7. ACI 347 "Recommended Practice for Concrete Formwork".
8. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."

B. Mix designs
1. Test in accordance with the requirements of PART 2 - PRODUCTS, article "PROPORTIONING AND MIX DESIGNS".

C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 – PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete

1. Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

2. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I.

3. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete
1. Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns and Supports
1. Metal, glass-fiber-reinforced plastic, or paper or fiber tubes that will produce smooth surfaces without joint indications. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.

D. Pan-Type Forms
1. Glass-fiber-reinforced plastic or formed steel, stiffened to support weight of placed concrete without deformation.

E. Form Release Agent
1. Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

F. Form Ties
1. Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.

2. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed. Provide Grade 40 for #3 bars, column ties, and beam stirrups.

B. Steel Wire: ASTM A 82, plain, cold-drawn steel.

C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

D. Deformed-Steel Welded Wire Fabric: ASTM A 497.

E. Deformed Bar Anchors: ASTM A 706.

F. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

G. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

H. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Portland Cement
1. ASTM C 150, Type I. Type III cement may be used in lieu of Type I at contractor's option, when acceptable to the Architect/Engineer.

2. Use one brand of cement throughout Project unless otherwise acceptable to Architect.

B. Normal-Weight Aggregates
1. ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.

2. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling. Do not use aggregates containing soluble salts or other substrates such as iron sulfides, pyrite, marcasite or ocher which can cause stains on exposed concrete surfaces.

3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect/Engineer.

C. Water: Potable.

D. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Air-Tite, Cormix Construction Chemicals.
Air-Mix or Perma-Air, Euclid Chemical Co.
Darex AEA or Daravair, W.R. Grace & Co.
MB-VR or Micro-Air, Master Builders, Inc.
Sealtight AEA, W.R. Meadows, Inc.
Sika AER, Sika Corp.

F. Water-Reducing Admixture: ASTM C 494, Type A.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Chemtard, ChemMasters Corp.
PSI N, Cormix Construction Chemicals.
Eucon WR-75, Euclid Chemical Co.
WRDA, W.R. Grace & Co.
Pozzolith Normal or Polyheed, Master Builders, Inc.
Metco W.R., Metalcrete Industries.
Prokrete-N, Prokrete Industries.
Plastocrete 161, Sika Corp.

G. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   Super P, Anti-Hydro Co., Inc.
   Cormix 200, Cormix Construction Chemicals.
   Eucon 37, Euclid Chemical Co.
   WRDA 19 or Daracem, W.R. Grace & Co.
   Rheobuild or Polyheed, Master Builders, Inc.
   Superslump, Metalcrete Industries.
   PSPL, Prokrete Industries.
   Sikament 300, Sika Corp.

H. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   Q-Set, Conspec Marketing & Manufacturing Co.
   Lubricon NCA, Cormix Construction Chemicals.
   Accelguard 80, Euclid Chemical Co.
   Daraset, W.R. Grace & Co.
   Pozzutec 20, Master Builders, Inc.
   Accel-Set, Metalcrete Industries.

I. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   PSI-R Plus, Cormix Construction Chemicals.
   Eucon Retarder 75, Euclid Chemical Co.
   Daratard-17, W.R. Grace & Co.
   Pozzolith R, Master Builders, Inc.
   Protard, Prokrete Industries.
   Plastiment, Sika Corporation.

2.4 RELATED MATERIALS

A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.

C. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.

1. For Expansion joints: Provide 6"x3/8"x3/4" split flange center bulb type waterstops, minimum.

2. For Cold joints: Provide 4"x3/16"x1/2" dumbbell type, endbell style, minimum.

3. Rubber Waterstops: Corps of Engineers CRD-C 513.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

The Burke Co.
Progress Unlimited.
Williams Products, Inc.

4. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

      The Burke Co.
      Greenstreak Plastic Products Co.
      W.R. Meadows, Inc.
      Progress Unlimited.
      Schlegel Corp.
      Vinylex Corp.

5. Preformed Plastic Adhesive Waterstops: Federal Specification SS-S-210A. It shall be supplied in extruded form of suitable cross-section and of a size to seal the joint areas of concrete sections. The plastic waterstop shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half, to facilitate application of the sealing compound.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include; but are not limited to, the following:

      "Synko-Flex"; Synko-Flex Products, Inc.
      "Ram-Nex"; K.T. Snyder Company, Inc.
      "Waterstop-RX"; American Colloid Company.

D. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:

   1. Polyethylene sheet not less than 6 mils thick.

E. Vapor Barrier: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic antistick sheet. Water vapor transmission rate of 0.00 grains per sq. ft. per hr. when tested according to ASTM E 96, Method B. Provide manufacturer's recommended mastics and gusset tape.

   1. Product: Subject to compliance with requirements, provide Sealtight Premoulded Membrane by W.R. Meadows, Inc.

F. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lbs. of fluosilicates per gal.

   1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

      "Surfhard"; Euclid Chemical Co.
      "Lapidolith"; Sonneborne-Rexnord.
      "Saniseal"; Master Builders.
      "Burk-O-Lith"; The Burke Co.
      "Penalith"; W.R. Meadows, Inc.

G. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

H. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

Waterproof paper.
Polyethylene film.
Polyethylene-coated burlap.

I. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I-D, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.

2. Do not use curing compound on recessed slab areas which receive paver tile, quarry tile, ceramic tile or terrazzo finish floor material. These areas shall be water cured only.

a. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

A-H 3 Way Sealer, Anti-Hydro Co., Inc.
Spartan-Cote, The Burke Co.
Conspec #1, Conspec Marketing & Mfg. Co.
Sealco 309, Cormix Construction Chemicals.
Day-Chem Cure and Seal, Dayton Superior Corp.
Eucocure, Euclid Chemical Co.
Horn Clear Seal, A.C. Horn, Inc.
L&M Cure R, L&M Construction Chemicals, Inc.
Masterkure, Master Builders, Inc.
CS-309, W.R. Meadows, Inc.
Seal N Kure, Metalcrete Industries.
Kure-N-Seal, Sonneborn-Chemrex.
Stontop CS2, Stonhard, Inc.

J. Water-Based Acrylic Membrane Curing Compound: ASTM C 309, Type I, Class B.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Highseal, Conspec Marketing and Mfg. Co.
Sealco - VOC, Cormix Construction Chemicals.
Safe Cure and Seal, Dayton Superior Corp.
Aqua-Cure, Euclid Chemical Co.
Dress & Seal WB, L&M Construction Chemicals, Inc.
Masterkure 100W, Master Builders, Inc.
Vocomp-20, W.R. Meadows, Inc.
Metcure, Metalcrete Industries.
Stontop CS1, Stonhard, Inc.

K. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Aquafilm, Conspec Marketing and Mfg. Co.

Eucobar, Euclid Chemical Co.
E-Con, L&M Construction Chemicals, Inc.
Confilm, Master Builders, Inc.
Waterhold, Metalcrete Industries.

L. Underlayment Compound: Free-flowing, self-leveling, pumpable, cement-based compound for applications from 1 inch thick to feathered edges.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

K-15, Ardex, Inc.
Self-Leveling Wear Topping, W.R. Bonsal Co.
Conflow, Conspec Marketing and Mfg. Co.
Corlevel, Cormix Construction Chemicals.
LevelLayer II, Dayton Superior Corp.
Flo-Top, Euclid Chemical Co.
Gyp-Crete, Gyp-Crete Corp.
Levelex, L&M Construction Chemicals, Inc.
Underlayment 110, Master Builders, Inc.
Stoncrete UL1, Stonhard, Inc.
Concrete Top, Symons Corp.
Thoro Underlayment Self-Leveling, Thoro System Products.

M. Bonding Agent: Polyvinyl acetate or acrylic base.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Polyvinyl Acetate (Interior Only):

Superior Concrete Bonder, Dayton Superior Corp.
Euco Weld, Euclid Chemical Co.
Weld-Crete, Larsen Products Corp.
Everweld, L&M Construction Chemicals, Inc.
Herculox, Metalcrete Industries.
Ready Bond, Symons Corp.
Intralok, W.R. Meadows, Inc.

2. Acrylic or Styrene Butadiene:

Acrylic Bondcrete, The Burke Co.
Strongbond, Conspec Marketing and Mfg. Co.
Day-Chem Ad Bond, Dayton Superior Corp.
SBR Latex, Euclid Chemical Co.
Daraweld C, W.R. Grace & Co.
Hornweld, A.C. Horn, Inc.
Everbond, L&M Construction Chemicals, Inc.
Acryl-Set, Master Builders Inc.
Intralok, W.R. Meadows, Inc.
Acrylpave, Metalcrete Industries.
Sonocrete, Sonneborn-Chemrex.
Stonlock LB2, Stonhard, Inc.
Strong Bond, Symons Corp.

N. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

   Burke Epoxy M.V., The Burke Co.
   Spec-Bond 100, Conspec Marketing and Mfg. Co.
   Resi-Bond (J-58), Dayton Superior.
   Euco Epoxy System #452 or #620, Euclid Chemical Co.
   Epoxtite Binder 2390, A.C. Horn, Inc.
   Epabond, L&M Construction Chemicals, Inc.
   Concresive Standard Liquid, Master Builders, Inc.
   Rezi-Weld 1000, W.R. Meadows, Inc.
   Metco Hi-Mod Epoxy, Metalcrete Industries.
   Sikadur 32 Hi-Mod, Sika Corp.
   Stonset LV5, Stonhard, Inc.
   R-600 Series, Symons Corp.

2.5 PROPORTIONING AND DESIGNING MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

B. The testing laboratory shall perform an aggregate analysis for each type of aggregate used. The aggregate analysis shall be performed on current stockpiles, and shall include sieve analysis, specific gravities, and the dry rodded unit weight of absorption on coarse aggregates. Sieve analysis for coarse aggregate shall include all sieve sizes for each class of coarse aggregate. An additional test shall be performed for every 300 yards of concrete placed, and a new aggregate analysis shall be performed whenever a new source of material is used.

C. Submit written reports to Architect/Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect/Engineer.

D. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:

   1. 4000-psi, 28-day compressive strength
      6.5 sacks of cement per cu. yard of concrete (minimum)

   2. 3600-psi, 28-day compressive strength
      6 sacks of cement per cu. yard of concrete (minimum)

   3. Cement content may be reduced by 1/2-sack per cu. yd. when an approved water reducing admixture or high range water reducing admixture, conforming to the requirements of this specification, is used. This water reducing admixture shall be used in accordance with the manufacturer's recommendations, provided that mix tests yield concrete of not less than the specified strength, and such reduction of cement is accepted in writing by the Architect/Engineer.

E. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

   1. All concrete: W/C 0.50.
   2. Subjected to freezing and thawing: W/C 0.50.
   3. Subjected to deicers/watertight: W/C 0.40.
   4. Subjected to brackish water, salt spray, or deicers: W/C 0.40.

F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps and sloping surfaces: Not more than 3 inches.
2. Reinforced foundation systems: Not less than 1 inch and not more than 5 inches.
3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
4. Drilled Piers: Not less than 5 inch and not more than 6 1/2 inches.
5. Other concrete: Not less than 1 nor more than 5 inches.

G. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect/Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect/Engineer before using in Work.

2.6 ADMIXTURES

A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.

1. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
2. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.

B. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:

1. All concrete: 3 percent to 5 percent.

2. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:

4.5 percent (moderate exposure); 5.5 percent (severe exposure) for 1-1/2-inch maximum aggregate.

4.5 percent (moderate exposure); 6.0 percent (severe exposure) for 1-inch maximum aggregate.

5.0 percent (moderate exposure); 6.0 percent (severe exposure) for 3/4-inch maximum aggregate.

5.5 percent (moderate exposure); 7.0 percent (severe exposure) for 1/2-inch maximum aggregate.

Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.

C. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

A. General: Concrete may be mixed at batch plants or it may be transit-mixed as specified herein. Batch plants must comply with the requirements of ACI 304, with sufficient capacity to produce concrete of the quality specified, in quantities required to meet the construction schedule. All plant facilities are subject to the acceptance of the Architect/Engineer. Plant facilities shall be calibrated by testing agencies specifically qualified for this as frequently as necessary to insure accuracy to plus or minus 0.4% of the total capacity of the components of the plant, but at a frequency not to exceed 6 months.

B. Job-Site Mixing: Mix concrete materials in appropriate drum-type batch machine mixer. For mixers of 1 cu. yd. or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than 1 cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. Do not exceed the catalog rating or nameplate capacity for a total volume of materials used per batch. Equip the mixer with automatic controls, or semi-automatic controls, if acceptable, for proportioning materials and the proper measured quantities. Do not exceed 30 minutes total elapsed time between intermingling of damp aggregates and cement to the discharge of the completed mix.

1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified, provided the quantity and rate of delivery will permit unrestricted progress of the work in accordance with the placement schedule. Discharge of the concrete shall be completed within l-l/2 hours after water is added to the mix or by the time the drum has revolved 300 times, whichever occurs first.

When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.8 FABRICATION OF REINFORCEMENT

A. General: Shop-fabricate reinforcing bars to conform to the required shapes and dimensions, with fabrication tolerances complying with ACI 315. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.

C. Identification: Deliver all reinforcement to the project site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

D. Rejected Materials: Reinforcing with any of the following defects will not be permitted in the work:

1. Bar lengths, depths, and bends exceeding the specified fabrication tolerances. Bends or kinks not indicated on drawings or final shop drawings.

2. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 - EXECUTION

3.1 GENERAL

1. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

Provide Class A tolerances for concrete surfaces exposed to view.

Provide Class C tolerances for other concrete surfaces.

B. Design forms and falsework to include assumed values of live load, dead load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of the structure during construction.

C. Construction loads, including reshoring loads, on in-place construction shall at no time exceed the live load for which the in-place construction was designed. If the contractor is uncertain about the design live loads, it shall be his responsibility to obtain these from the Architect/Engineer.

D. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.

F. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

H. Forms for Exposed Concrete: Drill forms to suit ties used and to prevent leakage of concrete mortar around tie holes. Do not splinter forms by driving ties through improperly prepared holes.

1. Do not use metal cover plates for patching holes or defects in forms.

I. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

J. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.

B. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.

C. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by Architect.

1. Provide sufficient numbers of supports and of strength to carry the reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

E. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Space reinforcing bars to comply with ACI 318-83, Section 7.6. Reinforcing bars may be relocated as necessary to avoid interference with other reinforcement, conduit, or other embedded items. However, if any reinforcing bar is moved a distance exceeding one bar diameter or the specified placing tolerance, the resulting rearrangement of the reinforcement will be subject to acceptance by the Architect/Engineer.

F. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect/Engineer.

B. Locate construction joints, if required, but not shown so as to divide the slab into areas not in excess of 6000 sq. ft.(as close to square in configuration as possible), unless otherwise accepted by the Architect/Engineer. Conform to slab placement, where shown. Before adjacent pour is made, the surface shall be roughened to an amplitude of a minimum of 1/4 inch except at exposed surfaces.

C. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs. Keyways are to be horizontal or vertical as directed by the Architect/Engineer. Install preformed plastic adhesive waterstops in the keyway of all construction joints where vinyl, bulb-type waterstops are not detailed.

D. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.

E. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

F. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.

G. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

H. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated. Where detailed, contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate, but not longer than 12 hours after slab finishing.

1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, at least 7 days remove inserts and clean groove of loose debris.

2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate.

3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

4. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."

3.6 INSTALLING EMBEDDED ITEMS

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Anchor bolts shall be set with securely fastened templates, and the threaded area shall be protected from concrete laitance.

C. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.

D. Where conduit, pipe, or other items are to be embedded in concrete beams, slabs, or columns, they shall be placed not closer than the diameter of the largest of the adjacent items and with a net reduction in the concrete area (of a 12 inch wide strip in slabs) not in excess of 9% without prior approval of the Engineer. The location of such embedded items shall generally be at the middle or centroid of the member.

E. Install dovetail anchor slots in concrete structures as indicated on drawings.

F. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.

B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.8 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work. Notify the Architect/Engineer and Testing Laboratory 24 hours before placing concrete.

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

C. Do not use concrete which becomes non-plastic and unworkable, or does not meet the requirements quality control limits, or which has been contaminated by foreign materials. Do not use retempered concrete. Remove rejected concrete from the project site and dispose of in an acceptable location.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

E. Concrete Conveying: Handle concrete from the point of delivery and transfer to the concrete conveying equipment and to the locations of final deposit as rapidly as practical by methods which will prevent segregation and loss of concrete mix materials.

F. Provide mechanical equipment of such size and design for conveying concrete to insure a continuous flow of concrete at the delivery end. Provide run-ways above top of finished slab in all places for wheeled concrete conveying equipment for the concrete delivery point to the locations of final deposit. Do not wheel concrete directly over steel reinforcement. Keep interior surfaces of conveying equipment, including chutes, free of hardened concrete, debris, water, snow, ice, and other deleterious materials.

G. Pumping Concrete: The Contractor may at his option use pumping machines for placing the concrete subject to the following requirements:

1. If for pumping requirements the mix design is other than specified, the Contractor shall furnish to the Architect/Engineer a mix for approval not less than 15 days prior to the time required for its use. The laboratory will make and test this mix design. After the results of these tests are noted and approval is received, this mix can be used. Cost of this laboratory work shall be paid by the Contractor.

2. Whenever concrete is placed by pumping, it is recommended a second pump complete with sufficient pipes and hose for a complete and independent set up, or other placement equipment, be at the job prior to any placing of concrete. The Contractor shall be responsible for any corrective work which results from equipment breakdown.

H. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

I. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.

J. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

K. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

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

2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position on chairs during concrete placement.

L. Bonding: Roughen surfaces of set concrete at all joints, except where bonding is obtained by use of a concrete bonding agent. Clean surfaces of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner to expose bonded aggregate uniformly and to not leave laitance, loose particles of aggregate, or damaged concrete at the surface.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.

1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.

D. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.

1. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.

2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155 or not exceeding 1/8 inch in 10 feet when tested with a 10 foot straight edge. Grind smooth any surface defects that would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

F. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect/Engineer before application.

G. Chemical-Hardener Finish: On concrete floors which remain exposed and as directed apply chemical-hardener finish to interior concrete floors. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat, and allow 24 hours for drying between coats.

1. Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions.

2. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

3.11 MISCELLANEOUS CONCRETE ITEMS

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

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 72 hours.

B. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.

C. Provide moisture curing by the following methods:

1. Keep concrete surface continuously wet by covering with water.

2. Use continuous water-fog spray.

3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.

D. Provide moisture-retaining cover curing as follows:

Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:

1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions, followed by shading or moist curing adequate to keep temperature of the concrete at 80 degrees F or below during the curing period. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

F. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

1. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

H. Temperature of Concrete During Curing: When the atmospheric temperature is 85 degrees F. and above, or during other climatic conditions which will cause too rapid drying of the concrete, make arrangements before the start of concrete placing for the installation of wind breaks or shading, and for fog spraying, wet sprinkling, or moisture retaining covering. Protect the concrete continuously for the concrete curing period. Provide hot weather protection complying with the requirements of ACI 305.

Maintain concrete temperature as uniformly as possible, and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete which exceed 5 degrees F. in any one hour and 50 degrees F. in any 24 hour period.

I. Protection from Mechanical Injury: During the curing period, protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations. Concrete trucks, cranes, or excessive concentrations of loads will not be permitted on any slab without prior written approval of the Architect/Engineer during the curing period or subsequent construction.

J. Sealer and Dustproofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.13 SHORES AND SUPPORTS

A. General: Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified.

B. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to support work without excessive stress or deflection.

C. Keep reshores in place a minimum of 15 days after placing upper tier, or longer, if required, until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.14 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained at least 70 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.15 REUSING FORMS

A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Architect/Engineer.

3.16 CONCRETE EVALUATIONS

A. Evaluation of Quality Control Tests: The concrete quality control testing as herein before specified will be evaluated by the following criteria:

1. Do not use concrete delivered to the final point of placement which has a slump or total air content outside the values specified.

2. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength and subject to additional testing as herein specified.

B. Formed Concrete Dimensional Tolerances: Formed concrete having any dimension smaller than required, and outside the specified tolerance limits, will be considered deficient in strength and subject to additional testing as herein specified.

Formed concrete having any dimension greater than required will be rejected if the appearance or function of the structure is adversely affected, or if the larger dimensions interfere with other

construction. Repair, or remove and replace rejected concrete as required to meet the construction conditions. When permitted, accomplish the removal of excessive material in a manner to maintain the strength of the section without affecting function and appearance.

C. Strength of Concrete Structures: The strength of the concrete structure in-place will be considered potentially deficient if it fails to comply with any of the requirements which control the strength of structure, including the following conditions:

Failure to meet compressive strength test requirements.

Concrete which differs from the required dimensions or location in such a manner to reduce strength.

Concrete subjected to damaging mechanical disturbances; particularly load stresses, heavy shock, and excessive vibration.

Poor workmanship and quality control likely to result in deficient strength.

3.17 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect/Engineer.

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

C. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

D. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

E. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

F. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.

2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect/Engineer.

4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

G. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

H. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

I. Repair methods not specified above may be used, subject to acceptance of Architect/Engineer. Under no circumstances will "dusting" of wet concrete during finishing operations be allowed.

3.18 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: An independent testing agency shall perform tests and to submit test reports.

The testing laboratory shall monitor concrete properties at time of placement and report to the Contractor any deviation from the project specifications. It shall be the responsibility of the Contractor to control the concrete and comply with the project specifications. If the Contractor cannot adequately control the quality of the concrete, then the Architect/Engineer shall direct the testing laboratory to control the concrete. The cost of this service shall be paid for by the Contractor.

B. Sampling and testing for quality control during concrete placement may include the following, as directed by Architect/Engineer.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

2. Slump: ASTM C 143; one test at point of discharge for each concrete load, and for each set of compression test specimens.

3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each set of compression tests specimens.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

5. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

6. Compressive-Strength Tests: ASTM C 39; for each class of concrete poured in any one day, one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

   When the concrete test cylinders are representing suspended structural members, at the contractor's option, two additional cylinders shall be made for the purposes of determining concrete strength for form removal in accordance with the provisions outlined in this section.

   When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

   Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.

C. Curing of Compression Test Specimens: After preparation of the test cylinders, to prevent evaporation of water from the unhardened concrete, cover the cylinders immediately after finishing with a non-reactive plate or impervious plastic sheeting. Protect the outside surface of cardboard molds from any source of water for the first 24 hours after casting. Field curing procedures for test cylinders for 28 day compressive strengths are not the same as those for determining strength for form removal time.

D. For test cylinders for 28 days compressive strength determination, during the first 24 hours after molding, store all test cylinders under conditions that maintain the temperature immediately adjacent to the cylinders in the range of 60 to 80 degrees F. and prevent loss of moisture from the specimens. If the Architect/Engineer or testing laboratory have questions concerning the storage temperature, they may require that the contractor provide a temperature record of the cylinders by means of maximum-minimum thermometers. At the end of 20 hours plus or minus four hours, cylinders are to be transported to the laboratory, removed from the molds, and placed in a moist condition at 73.4 plus or minus 3 degrees F. until the moment of testing.

   Cure test cylinders to be used for determining strength for form removal time as nearly as practical in the same manner as the concrete in the structure. Cylinders shall be stored in or on the structure as near the point of use as possible, and as far as is practical, with the same exposure to the elements. Remove test cylinders from field storage and store in lime water at 73.4 plus or minus 3 degrees F. for 24 hours plus or minus 4 hours immediately before testing.

   Cylinders shipped from the field to the laboratory shall be packed in sturdy wood boxes or other suitable containers surrounded by wet sawdust or other suitable packing material and shall be protected from freezing during shipment.

E. Concrete Batch Facility: The testing laboratory shall perform inspections of the concrete batching facility at intervals not to exceed one per 1,000 cubic yards of concrete placed or at least one each six months. The inspection shall include verification of the calibration of scales, aggregate analysis of the current stockpiles, verification of batching procedures, and compliance with the original mix design. First inspection shall take place before any concrete is placed. The cost of each inspection shall be paid by the testing allowance.

F. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests. If any breaks are below specified or expected strengths, the Testing Laboratory shall report any visible anomalies.

G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

H. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect/Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION

SECTION 26 00 00

ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide all materials, equipment, labor, and transportation required to install a complete and working electrical system. It is the intent of the drawings and specifications to provide complete installations even though each and every item necessary is not specifically mentioned or shown.

B. Perform all Division 26 work in strict accordance with the requirements and recommendations stated in the latest adopted version of all federal, state, and local codes, ordinances, and standards (NFPA, NEC, IECC, etc.) except when requirements are modified by the Authority Having Jurisdiction.

C. Where local codes or practices exceed or conflict with the NEC, it shall be the Contractor's responsibility to perform the work in accordance with the local code prevailing and local interpretations thereof by the Authority Having Jurisdiction. This Contractor shall bear all costs for correcting any deficiencies due to non-compliance.

1.2 REFERENCES AND STANDARDS

A. All adopted State and Local Building Codes and Facility Standards.

B. All requirements of the local authority having jurisdiction.

1.3 DEFINITIONS

A. Owner's Representative - Indicates the entity designated or hired to represent an owner on a project. This entity could be the owner themselves, an Architect or could be another third party hired to represent the owner. Verify who will be representing the owner on this project before bidding.

B. EMCS - Energy Management Control System (Building Management System / BMS), used to control mechanical systems in the building via hardware and / or software.

C. Or equal - Indicates that the contractor may substitute equipment by another manufacturer if the salient features of the equipment indicated by manufacturer's name and / or described are adequate in the judgment of the Owner's Representative.

D. Provide - Furnish and install all material and labor required for a complete installation ready for operation as required in accordance with the intent of the Contract Documents.

E. Shall - Indicates a mandatory requirement or requirements.

F. Unless otherwise noted, refer to NEC 100 for additional definitions used in these specifications.

1.4 COORDINATION

A. Electrical service to all portions of existing buildings at the construction site not involved with the project shall remain in operation throughout construction. Provide all required temporary electrical service in the base bid to all required areas to satisfy OSHA requirements.

B. All metering and temporary electrical service charges and / or costs of utilities shall be paid by the Contractor.

C. The Drawings are not to be construed as shop drawings but indicate the extent, general locations, arrangement, etc., of conduit systems and equipment. Electrical drawings are diagrammatic and shall not be scaled for exact size. If the contractor has any questions regarding the layout of a particular device or equipment item, he shall contact the Owner's Representative for clarification. This Contractor shall, in laying out their work, refer to other sections of the specifications and other drawings such as air conditioning, structural, plumbing, architectural, civil, etc., to eliminate conflicts and undue delays in the progress of the work. Where items are furnished by other trades require connections by this Contractor, they shall be held responsible for providing rough-in drawings and assistance upon request.

D. Plans, specifications, and other documents have been prepared and developed with reasonable professional care and coordination. It is the intent that all documents are supportive and complimentary, one to the other; and as such what is required by one shall be considered as required and binding as if indicated by all. Work indicated shall include, regardless of whether or not specifically stated, such supportive or required items or work as consistent with what is indicated, is reasonably inferable from what is indicated, and / or is common construction procedure or knowledge with regard to what is indicated.

1.5 SUBMITTALS

A. The submittals required in this Division shall conform to and be submitted in accordance with the General Conditions, Instructions to Bidders, Division 1 and requirements listed in all sections of Division 26.

B. Shop drawings, manufacturer's data materials lists, etc., are required for all equipment and material where submittals are required.

C. Each submittal shall contain data relevant to the particular equipment (including options). The data shall be identified by "highlighting", arrows, underlining, etc. Do not submit pages of non-relevant information. Broad general data is not acceptable. If equipment submitted is not as specified in the Contract Documents, then the submittal shall contain specific details prominently identifying any differences in form, fit or function. If the equipment submitted is not as specified, then the Contractor shall be responsible for any additional costs necessary to install and connect the equipment. This includes, but is not limited to, increased panelboard size, circuit breaker size, disconnect size or circuit size.

D. Submit warranty information on all equipment specified in this division. Warranty shall start at the time of substantial completion, unless otherwise indicated in subsequent sections.

E. Submit dimensional layout of all electrical equipment locations, drawn to scale, with equipment locations shown. Clearances shall be in accordance with NEC and local codes. Panelboard and switchgear submittals will be rejected without dimensioned room or equipment location layouts.

F. Some products require that a color selection be coordinated with the Owner's Representative. Information regarding such products shall be submitted to the Owner's Representative for review.

G. If materials or equipment are installed before being reviewed without comment by the engineer, the contractor shall be liable for the removal and replacement of such unapproved materials and equipment, at no additional expense to the owner. Additionally, if the removal and replacement of unapproved materials or equipment necessitates the removal and replacement of other related materials or equipment, then the contractor shall be liable for the removal and replacement of the related materials and equipment at no additional expense to the owner.

H. Partial submittals for review will not be accepted.

1.6 CLOSEOUT SUBMITTALS

A. This Contractor shall accumulate during the job's progress the below list of data and shall keep it updated during construction as a set of Record Documents:
   1. Exact dimensioned locations of all new and existing switchgear, devices, luminaires, controls, all other equipment and new or existing site utilities.
   2. All warranties, as described in this section and in each subsequent specification section.
   3. All shop drawings, as-built drawings, submittals, operating manuals, maintenance manuals, repair parts lists, etc.
   4. Factory start-up and testing documentation, commissioning documentation, etc.

B. Training Documentation: Provide a letter in the closeout submittals documenting that the end user (determined by the Owner) received training as required in any section in this division. Documentation to include name of person, date, duration, and content of training.

1.7 ADDITIONAL MATERIALS

A. If "Additional Materials" are mentioned anywhere in this division, additional materials to be a dollar cost in the base bid. At the end of the project the contractor shall generate a dollar amount credited back to the owner for any unused items.

B. Include the following cost on a dollar basis in the base bid:
   1. All costs to provide one (1) additional electrical circuit as required for fire alarm system signal power expanders or fire safety control circuits including all required circuit breakers, wiring, conduit, labor, and devices as specified and directed by the Owner's Representative.
   2. All costs to provide three (3) additional electrical circuits, all required circuit breakers, wiring, conduit, labor, and devices as specified and directed by the Owner's Representative. Each circuit to be priced with a rating of 20 amps and a distance of 100 feet to furthermost device. Each circuit to include eight (8) duplex receptacles.

1.8 ATTIC STOCK

A. If "Attic Stock" is mentioned anywhere in this division, furnish actual materials as attic stock to the owner at substantial completion as a part of the base bid.

1.9 QUALITY ASSURANCE

A. This contractor shall be certified / licensed to install the provided products and equipment.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall store and handle in accordance with manufacturer's recommendations to avoid damaging equipment, installed devices, and finish.

1.11 EXISTING FIELD CONDITIONS

A. All proposals shall take these existing conditions and any revisions required into consideration, and the lack of specific site information on the drawings shall not relieve the contractor of any responsibility.

1.12 WARRANTY

A. This Contractor shall guaranty fully all workmanship, material, equipment, systems, etc., provided by them for a period of one (1) year after substantial completion of the project, unless otherwise modified in other specification sections. The use of building equipment for temporary service and testing does not constitute the beginning of the warranty. This guaranty means that this Contractor shall make good to the owner, at no cost, any defects that become apparent during the year following substantial completion. This guaranty is in addition to any other guaranties or warranties and is not intended to limit such other guaranties or warranties.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Unless otherwise noted, products shall be only from manufacturers that have been in business for at least five (5) consecutive years and have been manufacturing proposed products for at least two (2) consecutive years.

2.2 SUBSTITUTION OF PRODUCTS

A. All proposed substitutions are subject to PRIOR APPROVAL and must be received by the Engineer and / or Owner's Representative no less than ten business days prior to the schedule date for opening of bids.

B. Items noted as "No Substitutes" or "No Alternates" shall be as specified only. No substitutions will be accepted.

2.3 PERFORMANCE REQUIREMENTS

A. All materials, components, products, assemblies, equipment, etc. shall be new, free from defects, listed (by an NEC accepted listing agency), and approved / rated for the application, environment and purpose. No Exceptions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment shall be installed in strict compliance with manufacturer's installation instructions and properly torqued using a calibrated torque tool.

B. All panels, enclosures, devices, equipment and associated conduits, whether provided by this Contractor or any other, shall be flush-mounted and cleanly recessed in all finished spaces unless otherwise noted on the Drawings.

C. Unprofessional and incomplete work shall be rejected and corrected at no additional expense. The judgement of professionalism and completeness of work shall be made by the Engineer and / or Owner's Representative and shall be final.

D. All electrical connections shall be made per NEC 110.14 and torqued per manufacturer's instructions.

E. Where existing utilities already exist or where renovation / addition work is to be done, maintain all utility services during construction to existing structures and / or portions of a project that are to remain in place and operational.

F. This Contractor shall be responsible for damage to the project caused by this Contractor's failure to recognize hazards associated with items such as lack of power, scheduling of work (tardiness), inexperienced workmen, excessive cutting, etc. This Contractor shall repair at no expense to the owner any such damage.

3.2 INTERFACE WITH OTHER WORK

A. The Electrical Contractor shall coordinate the installation of the electrical system and all associated electrical connections with the General Contractor, as well as the Mechanical, Plumbing, and Communications Contractors, to ensure proper wire sizes, OCPD sizes, and a complete working system for the Owner.

B. Cooperation with trades of adjacent, related or affected materials or operations, and / or trades performing continuations of this work under subsequent contracts is considered a part of this work in order to affect timely and accurate placing of work and to bring together, in proper and correct sequence, the work of such trades, including under the general contractor Division 1 and Division 23.

C. The Electrical plans are based on equipment schedules shown. Should any mechanical equipment or device be submitted with different electrical properties from those properties shown, all electrical and / or mechanical changes shall be made at the expense of the trade or contractor initiating the change with no expense to the Owner's Representative, Engineer, etc.

D. Make permanent connection to new utilities or existing lines. Determine depth and location, and bid accordingly. Relocate and repair any existing lines cut by general construction work.

3.3 CONTRACTOR COORDINATION - ELECTRICAL / MECHANICAL (DIV 23)

A. Electrical Contractor to provide the following:

1. All line voltage wiring, conduits, back boxes and hook-up to all HVAC equipment including required fused or non-fused safety switches.
2. All boxes and conduit into accessible attic space for all thermostats and sensors. Coordinate with Mechanical Drawings for exact locations and requirements.
3. All contactors and relays shown on the Electrical Drawings only.
4. All conduit and back boxes for control wiring in all mechanical spaces to protect control wiring from damage. Conduit and back boxes to be required from 6” above each piece of equipment or control to a common 12” square NEMA 1 enclosure provided by Electrical Contractor and mounted directly above the EMCS / BMS controls in that space. Coordinate all required conduit paths with mechanical contractor before bidding and again before installing. Mechanical contractor to provide Electrical Contractor with conduit paths required for controls wiring on a drawing with adequate dimensions for bidding.

B. All other equipment and materials, including but not limited to, contactors and relays for mechanical equipment, motor starters (with heaters as required) / VFDs, thermostats, controls and wiring, etc. shall be provided by mechanical contractor.

3.4 CONTRACTOR COORDINATION - ELECTRICAL / PLUMBING (DIV 22)

A. Electrical Contractor to provide the following:
1. All line voltage wiring, conduits, back boxes and hook-up to all plumbing equipment including required fused or non-fused safety switches.

B. All other equipment and materials, including but not limited to, contactors, relays, and switches required to control plumbing equipment, etc. shall be provided by plumbing contractor.

3.5 CONTRACTOR COORDINATION - ELECTRICAL / CONTROLS (DIV 23, 25)

A. Electrical Contractor to provide the following:
1. All junction boxes (standard one or multi-gang) required for controls contractor. Coordinate with controls contractor for exact locations.
2. Various relays, devices, wiring and other equipment for control equipment as indicated or required per details on Electrical Drawings.

B. All other equipment and materials, including but not limited to, relays, hardware, software, sensors, and control wiring, etc. shall be provided by controls contractor.

3.6 CONTRACTOR COORDINATION - ELECTRICAL / COMMUNICATIONS (DIV 27)

A. Electrical Contractor to provide the following:
1. All receptacles and direct connection to all communications systems and equipment as shown and as required.
2. All ground conductors and bonding to the building grounding system for all communications equipment panels and racks. See Section 26 05 26 - Grounding and Bonding, notes and details on Drawings for more information.
3. All required standard back boxes as required for wall-mounted devices furnished by Communications Contractor.
4. All raceway / conduit as required for accessibility of all communications systems cabling as listed below and as indicated on the rawings and details (whether furnished under a Division 01 allowance, by the Owner, Division 26 and / or Division 27).

a. Provide raceway / conduit for cabling in above-ceiling spaces at the following locations:
   1) All wall penetrations.
   2) All HVAC duct penetrations (Per NEC 800).
   3) All cabling traveling through a plenum or other environmental air space (Per NEC 800).
b. Provide raceway / conduit for all cabling from wall-mounted back boxes to accessible spaces per Communications Device Backboxes detail. Coordinate exact size and locations with communications contractor before installation.
c. Provide full raceway / conduit for all cabling in exposed ceilings or when cabling is to be exposed on walls. Coordinate exact size and locations with communications contractor before installation.

5. Installation of all special boxes and equipment cabinets furnished by Owner or Communications, Security, and Safety Contractor(s).

B. Communications Contractor to provide the following:
1. All communications systems complete with equipment, cabling, special backboxes, hardware, and all other required devices.
2. Furnish all special boxes in timely manner to the electrical contractor for installation as required.
3. All attachments for all communications cable above accessible ceilings to be supported from the building structure and bundled.

3.7 CONTRACTOR COORDINATION - ELECTRICAL / ELECTRONIC SAFETY & SECURITY (DIV 28)

A. Electrical Contractor to provide the following:
1. All receptacles and direct connection to all security and safety equipment as shown and as required.
2. All ground conductors and bonding to the building grounding system for all security and safety equipment panels. See Section 26 05 26 - Grounding and Bonding and details for more information.
3. All required standard back boxes as required for wall-mounted devices furnished by security and safety contractors.
4. All raceway / conduit as required for accessibility of all security and safety systems cabling (whether furnished under a Division 01 allowance, by the Owner, Division 26 and / or Division 28) as listed below and as indicated on the Drawings and details.
   a. Provide raceway / conduit for all cabling in above-ceiling spaces at the following locations:
      1) All wall penetrations.
      2) All HVAC duct penetrations (Per NEC 800).
      3) All cabling travelling through a plenum or other environmental air space (Per NEC 800).
   b. Provide raceway / conduit for all cabling from wall-mounted back boxes to accessible spaces per Communications Device Backboxes detail. Coordinate exact size and locations with security and safety contractor before installation.
   c. Provide full raceway / conduit for all cabling in exposed ceilings and when cabling is to be exposed on walls. Coordinate exact size and locations with security and safety contractor before installation.

5. A dedicated circuit for the Fire Alarm Control Panel (FACP). Provide power to all Fire Safety Control Function devices as shown on the drawings. Each circuit breaker shall be labelled as "FIRE ALARM CIRCUIT" in the panel directory and labelled "FIRE ALARM" at the lockout clip on the circuit breaker.

3.8 CONTRACTOR COORDINATION - ELECTRICAL / OTHER

A. Electrical Contractor shall provide required hook-up to line voltage at all electromagnetic door holder / release, fire / smoke dampers, smoke dampers, etc. Provide required relays and wiring to fire alarm panels and coordinate with other specified work.

3.9 INSTALLATION - OTHER WORK

A. Cutting and Patching:
   1. All cutting required for the installation of sleeves, conduit, equipment, etc., shall be coordinated with the General Contractor, but performed by this Contractor. Patching shall be by General Contractor. This Contractor shall not cut any structural element or any finished work without written permission from the Owner's Representative.

B. Concrete Work:
   1. This Contractor shall provide all forming, reinforcing and concrete as indicated or required for equipment bases, transformer pads, etc. Work shall conform to the applicable portion of Division 03 - Concrete.

C. Trenching and Backfill:
   1. This Contractor shall perform all trenching, excavation, shoring, pumping and backfill required in the installation of their work. All trenches shall be maintained dry until all circuits have been satisfactorily tested and then filled in tamped 6" layers immediately after approval of tests by the Owner's Representative. All backfill shall be free of construction debris and any other foreign material which might damage any circuit runs. Stability of backfilled soil shall match adjacent undisturbed soil.

D. Flashing and Waterproofing:
   1. All building penetrations to the outside shall be flashed and counter-flashed as required to eliminate leaks. Provide link-seal fitting on all below grade conduit penetrations greater than 2".

3.10 SYSTEM STARTUP

A. All circuit and operational tests of the electrical systems shall be made by this Contractor and repeated until equipment meets or exceeds testing requirements and all electrical systems are operating properly.

END OF SECTION

SECTION 26 05 05

SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Selective demolition of electrical and lighting systems and equipment and the off-site removal of the portions of those systems and equipment not reused, in a code-compliant and lawful manner.

PART 2 - PRODUCTS

2.1 NOT APPLICABLE.

PART 3 - EXECUTION

3.1 ELECTRICAL EXAMINATION

A. Verify existing field measurements, circuiting arrangements, wiring and equipment served in areas as shown on the Drawings. Adjust all circuiting, wiring and materials to be provided as required by job conditions.

B. The Contractor accepts all existing conditions when beginning demolition, whether or not those conditions are reflected in the Contract Documents.

3.2 LIGHTING EXAMINATION

A. Emergency interior and exterior lighting: If the unswitched phase conductor needed for proper operation does not exist, provide a new unswitched phase conductor to each luminaire as needed for proper operation. The unswitched phase conductor must come from the same branch circuit that powers the luminaire.

3.3 PREPARATION

A. Provide temporary wiring and connections to maintain required existing systems that must remain operational during construction.

3.4 DEMOLITION OF EXISTING ELECTRICAL

A. Where demolition of equipment or materials is required, this Contractor shall minimize cutting and exercise all due caution to leave undamaged surfaces, material and equipment meant to remain.

B. Disconnect and remove all unused or abandoned wiring, devices, conduits, panels and distribution equipment back to source, unless otherwise specified in the drawings. Mark all unused breakers and fused switches as spares and turn them off.

C. Mark all unused breakers and fused switches as spares and turn them off.

D. When luminaires, receptacles, switches, conduits or similar are removed and the location is not reused, patch all unused floor, wall and ceiling back boxes, penetrations or similar openings to match the existing surfaces and maintain existing fire ratings.

3.5 EXTENSION / EDITING OF EXISTING ELECTRICAL

A. Where existing circuits are edited or existing equipment is partially removed, extend / repair existing circuits to ensure all devices and equipment that are not intended to be removed remain in place and are fully operational.

B. Install identification on all existing unmarked equipment to remain in accordance with Section 26 05 53 - Identification for Electrical Systems. Replace all lost nameplates, labels or markers.

3.6 RE-INSTALLATION

A. Install all relocated materials and equipment under the provisions of Divisions 01 and 26.

END OF SECTION

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. This section includes conductors for power circuits, including terminations and connectors.

1.2 SUBMITTALS

A. Submittals required in this section shall conform to and be submitted in accordance with the General Conditions, Division 01, and Division 26.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Conductors shall be manufactured in the United States. Acceptable manufacturers are:
   1. Alan Wire, Cerrowire, Encore Wire, General Cable, Republic Wire, and Southwire

2.2 MATERIALS

A. All feeders to be soft-drawn annealed copper.

B. All branch circuit conductors shall be soft-drawn annealed copper.

C. Aluminum is permissible ONLY where specifically indicated on the Drawings. Aluminum used shall be AA-8xxx rated and compact stranding is preferred.

2.3 MANUFACTURED UNITS

A. Manufactured Power Circuit Conductors:
   1. Conductors for shall be rated for at least 600 volts and 90°C. No exceptions.
   2. Conductor insulation shall be type THHN / THWN-2 or XHHW-2.
   3. All conductors shall be #12 AWG or larger.
   4. Conductors that are #8 AWG and larger shall be stranded. Conductors that are #12 AWG and #10 AWG may be stranded if crimp on fork terminals are used for device terminations. Otherwise, #12 AWG and #10 AWG shall be solid conductors. Never place bare stranded conductors directly under device screws.

B. MC Cable: Unless otherwise noted on the Drawings, MC cable is allowed ONLY for luminaire whips. Total length not to exceed six (6) feet. MC cable must meet all requirements listed in this section including (but not limited to) separate full-size neutrals, conductor material, isolated ground, installation per NEC, etc.
   1. Conductor Insulation: The insulation over the conductors shall be type THHN 90°C dry with an extruded polypropylene protective covering.

2. Armor: A zinc coated galvanized steel armor shall be applied over the cabled wire assembly with an interlock in compliance with UL 1569 Section 13. Armor shall be colored to identify the voltage and number of conductors.
3. Fittings: Fittings shall be listed and identified as MCI-A for such use with metal clad interlocking armor ground. Connectors shall be of steel or malleable iron and shall have saddle clamp to insure a tight termination of MC or MCI-A cable to box.

C. Manufactured Conductor Terminations and Connectors:
1. All accessory materials such as connectors, splice and tap fittings, and terminations shall be of a type designed or intended and suitable for the use. They shall be compatible with the conductor material. Both compression (crimp) and mechanical (screw set) connections are acceptable. Installation, compression, and torque settings shall be per manufacturer's recommendations.
2. Only connection devices that require the complete removal of the conductor jacket or insulation and result in a connection to the complete conductor surface area are suitable for use. Insulation piercing type connectors, press in type connectors or Wago style connectors shall NOT be used.

PART 3 - EXECUTION

3.1 INSTALLATION

A. More than one conductor shall not be installed in any termination unless the termination is marked as suitable for more than one conductor.

B. Wire Sizing: Provide conductors sized as indicated on Drawings. Where sizing is unclear or has been omitted, provide conductors with an ampacity at least as large as the ampacity of the load and provide an overcurrent protection device sized as large as the ampacity of the conductors. In such cases, notify the Engineer before installation for size verification.

C. Voltage Drop: The intent of the drawings is to limit the voltage drop from the service entrance conductors to each branch circuit to less than 5%. The electrician is responsible to ensure proper voltage drop values are maintained as mentioned here and mentioned in the NEC.

D. Neutral Conductors: Provide a separate neutral conductor for each feeder or branch circuit. Multiple circuits shall not share a common neutral. Neutral conductors shall be sized as large as the phase conductors. Neutral conductors shall not be of a reduced size.

E. Equipment Grounding Conductors: Provide equipment grounding conductors in accordance with Section 26 05 26 - Grounding and Bonding for Electrical Systems.

F. Number of Current Carrying Conductors (CCC) per conduit:
1. #12 Wire - no more than six (6) CCCs in a single conduit.
2. #10 Wire - no more than nine (9) CCCs in a single conduit.
3. ELSE - no more than three (3) CCCs in a single conduit.
4. Regarding #12 and #10 wire above (ONLY #1 and #2 above), when more than three (3) CCCs are in a single conduit, the electrician is responsible for derating the available ampacity of the current carrying conductors per NEC and provide calculations to the Engineer, when requested. If any derating results in a conductor

ampacity lower than the load for the circuit, all conductors must be removed and repulled in separate conduits to eliminate the derating. No exceptions.

G. Installation in Raceways:
1. All conductors shall be installed in a raceway.

H. Terminations:
1. Use compression (crimp) or mechanical (screw set) type lugs or connectors for all terminations or splices of stranded conductors. See 26 05 26 Grounding and Bonding where thermal welding may be used.
2. Use ring tongue type terminators on all control wiring.
3. Conductive antioxidant shall be applied on all connections per manufacturer's instructions, regardless of conductor material.

I. Splices:
1. Where splices are required, they shall be in a box or enclosure. Splices within a conduit run are not acceptable.

J. Color Coding:
1. Provide factory colored insulated conductors for #6 AWG and smaller.
2. If existing wiring in renovation or addition work has a consistent color coding, then match the existing and note in record documents. Otherwise, colors shall be as follows:

Line	208/120V	240/208V 1ph	240/120V	480/277V
A	Black	Black	Black	BROWN
B	Red	n/a	Orange	ORANGE
C	Blue	Red	Blue	Yellow
Neutral	White	White	White	Gray
Ground	Green	Green	Green	Green
Isol Grnd	Green +Yellow	Green + Yellow	Green + Yellow	Green + Yellow

K. Identification: All conductors in a panelboard shall be identified by means of tags or tape.

L. MC Cable: Where allowed, install MC cable to meet all NEC requirements.
1. Support: All MC cable shall be supported by dedicated J-cable hangers or cable tray. Where suspended from the ceiling or roof structure, use split-ring hangers or wrought-iron hanger rods.

3.2 SITE TESTS

A. Perform in accordance with manufacturer's printed testing procedures, applicable industry standards, ANSI standards, IEEE standards, and NEMA standards. Provide calibrated testing equipment in good working order and which complies with the above requirements. The below test shall be performed after the conductors have been pulled into the conduit and after terminations have been added, but before final connections are made. Document all readings and testing and make documentation available to Owner upon request.

B. Feeder Insulation Test: The insulation of new service entrance conductors and each new feeder run shall be tested using a megger. Readings must indicate not less than one (1) megohm to be acceptable.

C. Branch Circuit Insulation Test: The insulation of each new branch circuit shall be tested using an ohm meter. Readings must indicate not less than one (1) megohm to be acceptable.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Grounding and bonding shall include the solid grounding of the various electrical systems and equipment and the proper bonding of all electrical system components and equipment to meet NEC 250 and all other applicable NEC sections, codes, and ordinances. These systems shall be provided for the proper protection of life, equipment, circuits, and systems.

B. Permanently ground entire lighting and power systems in accordance with the latest adopted version of the NEC, including service equipment, distribution, panelboards, switch and starter enclosures, motor frames, devices, transformers, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

C. Grounding and bonding requirements specified in this section may be supplemented in other sections of these Specifications.

1.2 COORDINATION

A. On all additions and new construction, complete grounding and bonding of concrete encased electrode system (building reinforcing steel /rebar) to the satisfaction of the local AHJ prior to concrete placement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Apache Grounding, Copperweld, Inc., ILSCO Corporation, nVENT (Cadweld, Critec, Erico), Thermoweld, and Thomas & Betts (T&B)

2.2 PERFORMANCE REQUIREMENTS

A. General:
   1. All grounding and bonding shall be in strict accordance with NEC 250, 517, etc.
   2. Grounding electrode system shall have a resistance to earth of five (5) ohms or less. Where this cannot be met, provide two additional ground rods to form a "triple ground rod" installation. Under no conditions shall the system have a resistance greater than twenty-five (25) ohms to ground, per NEC 250, at any location in the system.

B. Ground Rods:
   1. Copper cladding permanently bonded to a high-strength steel core.
   2. 3/4 inch by 10 feet (19mm by 3m) straight, conform to UL 467.

C. Conductors:

1. Grounding Conductor: Copper, insulated (green) where required or uninsulated where allowed in the Specifications or by code, sized per Drawings or NEC Table 250.66.
2. Bonding Jumpers - Insulated conductor, sized to be minimum cross-sectional area greater than or equal to that of the equivalent grounding conductor as determined from NEC Table 250.102.
3. Grounding Ring around a building - #2 AWG uninsulated copper, otherwise sized per NEC.
4. Grounding Ring around a utility transformer - #2 AWG uninsulated copper (unless sized per drawings), otherwise sized per NEC or by utility requirements.

D. Connections:
1. General: All connectors shall be listed and labeled as grounding connectors for the materials used.
2. Welded Bond - Exothermic welded connection or bond such as "Cadweld". No phosphorous or any other caustic, toxic or explosive substance may be used.
   a. Provide exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.
3. Clamps - Listed bronze connectors, suitable for grounding and bonding applications, in configurations required for a particular installation.

E. Buss Bars:
1. Bare annealed copper bars, 1/4" x 4" x 20" unless otherwise noted on the Drawings.

PART 3 - EXECUTION

3.1 APPLICATION

A. Unless otherwise indicated, the below list of connection styles shall be followed.

B. Outdoor Below Grade Grounding Connections:
1. Welded bond only, no exception.

C. Outdoor Above Grade Grounding Connections:
1. Clamps may be used. Use welded bond where clamping is not accessible or practical.

D. Indoor Grounding and Power Connections:
1. Clamps may be used. Use low-smoke/low emission welded bond where clamping is not accessible or practical.

3.2 INSTALLATION

A. General:
1. Where the Drawings or Specifications exceed NEC requirements, then follow the Drawings or Specifications.
2. Bond all ground electrodes together to form the grounding electrode system including metal underground water pipe, metal frame of the building or structure, concrete encased electrodes, ground ring, rod and pipe electrodes and plate electrodes.
3. At all electrical system components, assemblies, circuits, etc. that are over 120v to ground, provide locknuts and / or listed fittings per NEC 250.97 for bonding of

metal raceways. In case of oversized, concentric or eccentric knockouts, comply with NEC 250.92(B). The use of snap-in, wedge-type, or pivot-type connectors is prohibited.

4. Refer to Drawings for additional special grounding systems or grounding requirements not mentioned here.

B. Concrete Encased Electrode:
   1. Fabricate with twenty (20) feet (6m) of conductor laid lengthwise in excavation for foundation or footings. Install such that conductor is within two (2) inches (50mm) of the bottom of the concrete. Where base of foundation is less than twenty (20) feet (6m) in length, coil excess conductor at base of foundation. Bond conductor to reinforcing steel at four (4) locations, minimum. Extend conductor below grade and connect to building grounding electrode.

C. Main Electrode:
   1. Provide a building ground rod and bond it to the grounding electrode system. Where ohmic values exceed 5 ohms to ground, the building ground rod shall consist of three ground rods, arranged in an equilateral triangular pattern located at least five (5) feet outside an exterior building wall or as otherwise directed. Space fifteen (15) feet apart and drive into the earth to a point two (2) feet below finished grade to top of rods. Grounding electrode conductor shall form a continuous loop around rods, and conductor shall be properly bonded to each rod by a fusion weld similar to "Cadweld".
   2. Extend grounding electrode conductor from ground rod(s) to the grounded service conductor (neutral) in the main switchboard at an accessible point on the ground bus per NEC 250.24.

D. Main Bonding Jumper: Shall be sized in accordance with NEC 250.102, if not indicated on the Drawings, and installed within the same enclosure as the point of bonding of the system neutral service entrance.

E. Equipment Grounding Conductor (EGC):
   1. Comply with NEC 250 for sizes and quantities of equipment grounding conductors, except where larger sizes or more conductors are indicated.
   2. All power circuits shall be provided with a separate copper insulated EGC run in the raceway with the power conductors. The conduit shall not be used as the sole means of grounding. The insulation of the EGC shall be green.
   3. Bonding to the EGC shall be provided at each end of metallic conduit runs and at all boxes and enclosures.
   4. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

F. Exterior Lighting:
   1. All metallic outdoor poles and luminaries on metallic or non-metallic lighting poles shall be grounded by bonding in an approved manner to the circuit grounding conductor. In addition to this, bond pole to a #6 AWG bare copper wire which shall also be bonded to a ground rod. Install the ground rod adjacent to the pole base with the top driven at least two (2) feet below grade.

G. Other Grounding Systems:
   1. Other buildings served from common service:
      a. The main building service is the source for electric service.

b. Bond grounding conductor of building main feeder to grounding electrode system.

3.3 CONNECTIONS

A. General:
1. Make connections in such a manner as to minimize possibility of galvanic action or electrolysis. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
2. Aluminum to steel connections shall be with stainless steel separators and mechanical clamps. Aluminum to galvanized steel connections shall be with tin-plated copper jumpers and mechanical clamps.
3. Coat and seal connections involving dissimilar metals with inert material such as red lead paint to prevent future penetration of moisture to contact surfaces.

B. Exothermic Welded Connections:
1. Use for connections to structural steel and for underground connections except those at test wells. Install at connections to ground rods and plate electrodes. Comply with manufacturer's written recommendations. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
2. Terminate insulated EGCs for feeders and branch circuits with pressure-type grounding lugs. Where metallic raceways terminate at metallic housings without mechanical and electrical connection to the housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to the ground buss in the housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushing and bare grounding conductors.

C. Compression Type Connections:
1. Use hydraulic compression tools to provide the correct circumferential pressure for compression connectors. Use tools and dies recommended by the manufacturer of the connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on the ground conductor.

D. Moisture Protection:
1. Where insulated ground conductors are connected to ground rods or ground busses, insulate the entire area of the connection and seal against moisture penetration of the insulation and cable.

3.4 SITE TESTING

A. Testing:
1. Test the electrical system after installation is complete. Inspect and test for stray currents, unintended ground shorts, and proper physical condition of grounding system. Correct any deficiencies and re-test to verify satisfactory installation.
2. Document all readings and testing and make documentation available to Owner upon request.
3. Perform ground resistance and continuity testing in accordance with IEEE 142.

END OF SECTION

SECTION 26 05 33

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide all raceway and conduits, outlet boxes, pull and splice boxes, wireways, and associated fittings as indicated on the Drawings and as required for feeders, branch circuits, splices, taps, equipment connections, and for compliance with regulatory requirements. All locations shown on the Drawings are approximate unless dimensioned.

B. Provide complete, separate conduit systems for all electrical systems on this project to include, but not limited to service entrance, feeders, branch circuit, control wiring furnished by this contractor, emergency and standby power and lighting circuits, critical power, communication systems, and other electrical systems as required.

C. Provide outlet wiring boxes of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with knockouts or threaded hubs in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Provide outlets as shown and as required per NEC.

1.2 DESIGN REQUIREMENTS

A. Boxes and fittings shall be made of the same material as the conduit material they are installed with, unless modified below or otherwise noted on the Drawings.

1.3 SUBMITTALS

A. Submit on all conduit, raceways, pull boxes, back boxes, hand holes, cover plates, extension rings, fittings, labeling, and supports for conduits inside and on roof.

1.4 COORDINATION

A. Coordinate mounting heights, orientation and locations of back boxes for outlets mounted above counters, benches, back splashes, etc.

B. Conduit systems shall not be covered or otherwise concealed until review has been made and approvals obtained from the AHJ.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Raceways, Wireways, Gutters and Conduits: Aflex, Atkore (AFC, Allied, FRE, Power Strut, TJ Cope), American Conduit, Calbond, Cantex, Champion, Hoffman, Hubbell, KorKap, Nepco, Nucor, Omega, Plasti-Bond, Perma-Cote, Pittsburgh, Prime Conduit, Sedco, Spang, Square-D, Thomas & Betts, Western Tube and Wheatland, Walker and Wiremold.

B. Surface-mount Raceways: Hubbell, Mono-Systems, Panduit, Tehalit and Wiremold.

C. Boxes and Fittings: Appleton, Atkore (AFC, Allied, Power Strut, TJ Cope), Cantex, Eaton, ECN Korns, Hoffman, Hubbell, Keystone, Lew, Madison, nVent Caddy, Orbit Industries, Quazite, Raco, Regal, Stahlin, Steel City, Thomas & Betts and Walker.

D. Others: Where specifically listed on Drawings.

2.2 GENERAL PERFORMANCE REQUIREMENTS

A. Minimum conduit / raceway size shall be 1/2" for all circuits.

B. Fittings may be set-screw or compression style fittings.

C. All fittings shall have an insulated throat bushing, no exceptions.

D. See Section 26 05 19 - Low Voltage Conductors for information on where MC cable is allowed.

E. Aluminum conduit shall not be installed in direct contact with concrete or masonry construction.

2.3 RIGID METAL CONDUIT - STEEL (RMC)(IMC) - PER ANSI C80

A. Steel: Hot-dipped galvanized rigid steel (GRC) and galvanized intermediate metallic conduit (IMC) with zinc-coated threads and an outer coating of zinc chromate.

B. Fittings: Per NEMA FB 1.
1. Malleable iron, either cadmium plated or hot-dipped galvanized. Die cast zinc.
2. Use deflection and expansion couplings with bonding jumpers at all expansion joints where required.

2.4 RIGID METAL CONDUIT - ALUMINUM (RAC) - PER ANSI C80

A. Aluminum: Rigid aluminum conduit shall be threaded only.

B. Fittings: Per NEMA FB 1
1. Aluminum fittings required.
2. Use deflection and expansion couplings with bonding jumpers at all expansion joints where required.

2.5 PVC COATED RIGID METAL CONDUIT - NEMA RN 1

A. Steel: Galvanized rigid steel conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6 and ETL PVC-001.

B. Fittings: Per NEMA FB 1.
1. Malleable iron or steel, PVC coated (40 mils) exterior, urethane coated (2 mils) interior.
2. Use fittings listed and labeled as complying with UL 514B.

C. Conditions: The installer shall be certified by a manufacturer to install coated conduit.

2.6 ELECTRICAL METALLIC TUBING (EMT) - ANSI C80.3

A. Galvanized thin wall steel or aluminum tubing.

B. Fittings: Per NEMA FB 1.
   1. Die cast zinc, pressure cast, malleable iron or steel. Clamps shall be steel. Where aluminum tubing is allowed, aluminum fittings are required unless otherwise noted.

2.7 RIGID NONMETALLIC CONDUIT (RNC)

A. PVC: Schedule 40 PVC, NEMA TC 2, high impact resistant.

B. RTRC: Fiberglass, NEMA TC 14, standard wall.

C. Fittings: Per NEMA TC 3 & 14, solvent weld socket type.

D. Conditions: Do NOT use PVC for elbows in sizes 1-1/2" and larger.

2.8 FLEXIBLE METAL CONDUIT (FMC)

A. Steel: Spiral-wound, square interlocked, hot-dipped galvanized steel.

B. Aluminum: Spiral-wound, square interlocked aluminum.

C. Fittings: Per NEMA FB 1.
   1. Cadmium plated two-screw, double-clamp malleable iron. Hot-dipped galvanized two-screw, double-clamp malleable iron. Pressure cast. Steel cast. Zinc coated, aluminum.

2.9 LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LFC)

A. Steel: Spiral-wound, square interlocked, hot-dipped galvanized steel strip with a bonded outer jacket of PVC.

B. Fittings: Per NEMA FB 1.
   1. Cadmium plated, compression type, malleable iron. Hot-dipped galvanized, compression type, malleable iron. Terminations shall be insulated throat type.
   2. Aluminum: Copper free (1% or less).

2.10 WIREWAYS / GUTTERS

A. Steel: Not less than 16-gauge sheet steel. Size and length shall be as indicated on drawings. Otherwise, provide dimensions per NEC 366 and NEC 376, but never smaller than four (4) inches by four (4) inches. Construction shall be oil-tight, dust-tight and rain-tight with hinged fully gasketed cover. Finish shall be ANSI gray epoxy paint over rust-inhibiting prime coat.

2.11 SURFACE RACEWAYS - SINGLE CHANNEL

A. Steel: Not less than 0.04" thickness sheet steel. One piece for up to seven (7) - #12 AWG wire capacity. Two (2) piece for eight (8) or more - #12 AWG wire capacity. In unfinished spaces, finish shall be enamel over rust-inhibiting prime coat, not less than 0.25 square inch cross section.

B. PVC: Rigid PVC, not less than 0.20 square inch cross section. Two (2) piece construction, minimum five (5) - #12 AWG wire capacity.

C. Finish: In all spaces, coordinate color with Owner's Representative.

D. Fittings: Provide all required manufacturer's standard accessories and fittings for a complete installation.

2.12 SURFACE RACEWAYS - DUAL CHANNEL

A. Aluminum: Two compartment, with receptacles and data devices as noted on electrical and technology drawings.

B. PVC: Wiremold 4320, Panduit T-70 non-metallic raceway or similar, two compartment, with receptacles and data devices as noted on electrical and technology drawings.

C. Finish: In all spaces, coordinate color with Owner's Representative.

D. Fittings: Provide all required manufacturer's standard accessories and fittings for a complete installation.

2.13 GENERAL OUTLET / BACK BOX / JUNCTION BOX

A. All boxes shall meet NEMA OS 1 (metallic) and NEMA OS 2 (nonmetallic).

B. Cast Boxes: NEMA FB 1, Type FS or FD malleable iron or aluminum. Furnish gasketed cover by box manufacturer and provide threaded hubs.

C. Floor-mounted Back Boxes: Shall be adjustable and gasketed.

D. Outlet and Pull Boxes: Single or ganged back boxes.
   1. Interior: Standard box shall be 2-1/8" deep or better. Use 3-1/2" deep boxes as needed and 1-1/2" shallow boxes as required for wall depth.
   2. Exterior: Standard box shall be 3-1/2" deep NEMA 3R or better.
   3. In Ground or Concrete: NEMA 4 cast iron box with external recessed flanged cover. Depth as required.

E. Box Ganging: Gang type boxes shall be used where multiple devices are located adjacent to one another, including ceiling, wall and cast in floor boxes.

F. Box Barriers: In boxes with multiple switches, where the voltage between adjacent switches exceeds 150 volts to ground, provide an enclosure equipped with identified, securely installed barriers between adjacent devices.

2.14 PULL / SPLICE BOXES AND HAND HOLES

A. Surface Mounted Cast Metal Box: NEMA 250, Cast aluminum with ground flange, neoprene gasket and stainless steel cover screws.

B. In-Ground Cast Box: NEMA 250, Type 6, cast aluminum, concrete or fiberglass with flanged (smooth/nonskid) cover, recessed cover box for flush mounting.

C. Handholes: Fiberglass with weatherproof nonskid cover with pre-cut 6 inch x 6 inch (150 mm x 150 mm) cable entrance at center bottom of each side.

PART 3 - EXECUTION

3.1 PREPARATION

A. Place conduit sleeves in the cavities of walls and floor slabs for the free passage of conduits.

B. Apply caulking for all conduit sleeves through floors and through exterior walls.

3.2 GENERAL INSTALLATION

A. The Drawings indicate an approximate location of boxes for switches, lighting outlets, power outlets, raceways, etc. The Drawings may not give complete and accurate information in regard to locations of such items. The exact locations shall be determined by reference to the Drawings and by actual measurements during construction of the building, subject to approval by the Owner's Representative.

B. The Owner's Representative reserves the right to adjust locations of raceway and boxes up to six (6) feet in any direction prior to rough-in to accommodate intended purpose at no additional cost.

C. All installations shall meet NEC requirements for acceptable fill ratings and conductor derating. NO exceptions. Listed partitions are acceptable in gutters or similar for proper partitioning.

3.3 CONDUIT, RACEWAY, FITTING AND BOX APPLICATION

A. General Application:
   1. Conduit Sleeves: Provide RMC sleeves at all locations where conduits pass through beams, outside walls, fire rated walls, or structural members. The size of these sleeves shall be such as to permit readily the subsequent insertion of conduit of the proper size with adequate clearance for movement due to expansion and contraction. Where conduits pass through outside walls, the inside diameter of each pipe sleeve shall be at least 1/2" greater than the outside diameter of the service pipe. After the conduits are installed, fill the annular space between the conduit and its sleeve with a mastic or caulk. Use packing as required to accomplish this. At fire rated wall penetrations, use fire barrier.
   2. Surface-mount Raceway: Not permitted except as noted on the Drawings or in locations where concealing conduit is not possible.
   3. Branch Circuits: Shall not be installed in or under the ground floor slab unless specifically required on the Drawings or pre-approved by the EOR. No exceptions.

B. Underground / In-ground:
   1. Acceptable Conduit: RMC, PVC, and Fiberglass.
   2. Fittings: All elbows shall be long sweep galvanized steel or fiberglass, no PVC. Other fittings shall match the conduit material.
   3. Boxes: Shall be cast metal, concrete or fiberglass. Shall be ANSI 77 traffic rated for the location.
      a. Street / Drive: Vehicle Tier 22 rated.
      b. Sidewalk: Personnel or vehicle Tier 8 rated.
      c. Grass: Personnel Light Duty rated.
   4. Conditions: Conduit risers from elbow to above grade shall be RMC.

C. Imbedded in / Passing through concrete:
   1. Acceptable Conduit: RMC, PVC, and Fiberglass.
   2. Fittings: All elbows shall be long sweep galvanized steel or fiberglass, no PVC. Other fittings shall match the conduit material.

3. Masonry Boxes: Galvanized steel masonry rated box.
4. Conditions:
   a. PVC allowed in concrete filled storm shelter walls or where required by utility provider.
   b. Where allowed, conduit imbedded in concrete shall not be larger than 3/4". Verify with project Structural Engineer prior to placing.

D. Crawlspace:
1. Acceptable Conduit: PVC.
2. Fittings: Shall match the conduit material.
3. Boxes: Shall match the conduit material.

E. Wet and Damp Locations:
1. Acceptable Conduit: RMC.
2. Fittings: Shall be rated for the space and shall match the material of the conduit they are installed with.
3. Boxes: Recessed shall match conduit material. Surface-mount shall be stainless steel.

F. Concealed / Exposed Dry Locations:
1. Acceptable Conduit - EMT.
2. Fittings: Shall match the conduit material.
3. Boxes: Malleable iron or cast aluminum (type FS / FD), with threaded hubs and gasketed covers.
4. Conditions: Do not use aluminum in cinder-fill walls.

G. Existing Walls:
1. Acceptable Conduit:
   a. Concealed: FMC and EMT.
   b. Surface-Mount: Surface-Mount Raceway and EMT.
2. Fittings: Shall match the conduit material.
3. Conditions: Surface-mount raceway shall be used in finished spaces. EMT may be used only in unfinished spaces, unless otherwise directed on the Drawings.

H. Indoor Equipment Connections:
1. Acceptable Conduit: FMC and LFC (Liquid-Tight FMC).
2. Fittings: Shall match the conduit material.
3. Boxes: Shall match the conduit material.
4. Conditions:
   a. Where FMC or FNC are used, total length not to exceed 72” above ceiling, 48” exposed below ceiling.
   b. In kitchen or similar spaces, use LFC unless otherwise directed on the Drawings.
   c. Install flexible conduit to all recessed luminaires in accessible ceilings. Do not use more than four (4) flexible metal conduits per junction box to supply luminaires in a location. Do not supply a luminaire from another with any raceway or FMC. Suspend junction boxes and conduits from high roofs with hangers and trapeze.

I. Outdoor Above Grade:
1. Acceptable Conduit: RMC.

2. Fittings: Shall match the conduit material.
3. Boxes: Weatherproof cast steel or cast aluminum.
4. Conditions: Conduits may be used on a roof ONLY where indicated on the Drawings and shall be supported per the Specifications.

J. Outdoor Equipment Connections:
1. Acceptable Conduit: LFC (Liquid-Tight FMC).
2. Fittings: Shall be rated for the space or environment.
3. Boxes: Shall be rated for the space or environment.
4. Conditions: Flexible conduit types shall not exceed 72" in length.

K. Corrosive Environments:
1. Acceptable Conduit: PVC and LFNC.
2. Fittings & Boxes: Shall be rated for the space or environment.
3. Conditions: Flexible conduit for equipment connections only unless otherwise noted on the Drawings.

L. Hazardous Locations:
1. Acceptable Conduit: RMC.
2. Conditions: All conduit, boxes, fittings, hardware, etc. shall be rated for hazardous location.

M. Passing Through a Firewall:
1. Acceptable Conduit: EMT and RMC.
2. Conditions: Provide fire caulking at all penetrations.

3.4 CONDUIT, RACEWAY, FITTING AND BOX APPLICATION

A. General:
1. Unless otherwise indicated on the Drawings, conduits shall be concealed in walls, partitions and above the ceiling. In rooms where ceilings are not present or scheduled, orient conduit parallel or perpendicular to structure.
2. Conduits shall be continuous between enclosures such as outlet, junction and pull boxes, panels, cabinets, motor control centers, etc. The conduit must enter and be secured to enclosures so that each system is electrically continuous throughout. Where knockouts are used, provide double locknuts, one on each side. At conduit terminations, provide insulated throat fittings. Where conduits terminate in equipment having a ground buss, such as in switchgear, and panelboards, provide conduit with an insulated grounding bushing.
3. Capping
   a. Cap open ends of raceways until conductors are installed to prevent ingress of dirt and moisture.
   b. Cap or close ends and unused openings in wireways and gutters.
4. Sealing
   a. Seal both ends of all conduits that serve as a passageway for control wiring, data, etc. through a rated wall to prevent air / gasses / contaminates from moving from one space to another.
   b. Seal both ends of underground conduits as required to prevent ingress of water and other contaminates from outside.
   c. All Sealant shall be fire caulk, putty packs, etc. to maintain the rating of the wall.
5. Provide insulated ground wire in all PVC conduit and extend to ground buss.

6. Moisture traps: Provide junction box with drain fitting at low points in conduit system to avoid moisture traps.
7. Use expansion-deflection fittings on conduits two (2) inches and larger crossing structural expansion joints and on exposed conduit runs where necessary. Provide bonding jumpers across fittings in metal raceway systems. Provide fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints.

B. Support:
1. Install conduits parallel and supported on unistrut or equal trapezes and anchored with split ring hangers, conduit straps or other devices specifically designed for the purpose. Wire ties are not permitted. Do not attach raceway to ceiling support wires or other piping systems.
2. Securely fasten and support all conduit runs. Provide required clamps, straps, clips, hangers and brackets. Raceways installed in joists shall be secured to joists with clamps at 20'-0" maximum spacing. Raceways installed parallel to joists shall be supported by caddy clips (1 inch or smaller) or in unistrut / threaded rods / beam clamps trapeze at 15'-0" centers. Raceways installed perpendicular to bottom of joists shall be secured with individual conduit hangers at 10'-0" maximum spacing or unistrut / threaded rods / beam clamps at 15'-0" maximum centers. Raceways supported by straps at walls shall be supported per NEC. Support all raceways within one (1) foot of each box, cabinet, disconnect, bend or other raceway termination.
3. Raceways shall be supported with 2-hole straps. Single hole straps are not acceptable.
4. Support raceway using coated steel or malleable iron straps, clevis hangers, and split hangers.
5. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.

C. Raceway Spacing:
1. Maintain twelve (12) inch (300 mm) clearance between raceway and surfaces with temperatures exceeding 104°F (40°C). (Excluding roof mounted conduits.)

D. Raceway Bends:
1. Make bends with standard ells or conduit bent in accordance with the NEC.

E. Concealed Locations:
1. Install concealed conduit as directly and with the largest radius bends as possible. Conceal conduit in finished areas.

F. Pull String:
1. Provide a Greenlee #431 or equal (240 lbs.) nylon pulling line in all conduits that are to be used as spares and all conduits used by other divisions, such as controls, communications, and similar systems. Identify both ends of the line by means of labels or tags reading "Pulling Line".

G. Fire Rated Walls:
1. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping to comply with the latest applicable edition of the UL Fire Resistance Directory, Volumes I and II.

H. Rooftop Installation:
1. RMC installed on the roof shall be securely fastened in place and supported on approved supports at least every ten (10) feet. Additionally, conduit shall be securely fastened and supported within three (3) feet of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination.
2. LFC on the roof shall be securely fastened in place by an approved means within twelve (12) inches of each box, cabinet, conduit body, or other conduit termination, and shall be supported and secured at intervals not to exceed 4.5 feet. Flexible conduit shall not lay on roof.

I. Raceway Assemblies:
1. Bring conduit to shoulder of fittings; fasten securely.
2. Provide conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

J. Surface Raceway:
1. Provide flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.
2. Provide insulating bushings and inserts at connections to outlets and corner fittings.
3. Serve surface-mount raceways from flush outlet boxes mounted behind raceway where possible and as directed.

3.5 WIREWAY AND GUTTER INSTALLATION

A. Install wireways and surface raceways where noted or as required. Field apply a 90% grey zinc paint coating over cuts or scratches before any other finish is applied.

3.6 BACK BOXES, OUTLETS AND FITTINGS APPLICATION

A. Back Boxes: Sizes and configuration shall be as required for the intended service and shall conform to and be applied in accordance with NEC Table 314.16(A). Provide extension rings, expandable bars sets, supports, gaskets for weatherproof type etc., where required.

B. Ceiling-mounted Boxes: Provide supports and attachments to properly support ceiling and bracket-type devices or luminaires. Where the box shall support the device, the box shall be rated for the weight of the device / luminaire supported.

C. Voice & Data Outlet: Provide back boxes at each voice and data outlet. Communications wiring, device and plate to be provided by communications Contractor. See Divisions 27 and 28 for additional requirements.

3.7 BACK BOXES, OUTLETS AND FITTINGS INSTALLATION

A. Do not connect or install outlet boxes back-to-back.

B. Unless otherwise shown or specified, install boxes for switches at 44" and receptacles at 18" AFF. Verify door swings with Drawings and schedules and locate switches and pull stations on the strike side of the door unless otherwise noted.

C. Where back boxes are required for switches, receptacles, data jacks, thermostats, CO_2 sensors, etc. and are shown next to each other, all devices shall be installed at the same height and, where possible, provide a gang back box and cover them with a multi-gang cover plate.

D. Protect boxes in such a manner as to prevent foreign material, such as plaster, from entering boxes. Boxes shall be thoroughly cleaned of foreign materials before pulling conductors.

E. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

F. Accessible Ceilings: Install outlet and junction boxes no more than six (6) inches (150 mm) from ceiling access panel or from removable recessed luminaire. Provide suitable access doors for all boxes mounted above gypsum / hard or otherwise inaccessible ceilings.

G. Do not fasten boxes to ceiling support wires or other piping systems.

H. Support boxes independently of conduit.

I. Install gang box where more than one device is mounted together. Do not use sectional box.

J. Provide plaster rings for all boxes in plastered walls and ceilings.

K. At all ceiling-mounted receptacle and luminaire locations (exit light, pendants, linear direct / indirect, etc.), provide a heavy-duty dual bar hanger with ceiling ties to support the back box. Provide Cooper Industries BA50F or approved equal with appropriate back box for the application.

L. All outlet boxes shall be supported by both adjacent joists / studs using a mounting bracket that stretches the entire length between the joists /studs and is mechanically fastened to joists / studs at both ends. An outlet box fastened to a stud must be supported by both ends as mentioned above, OR a CV style back box shall be used IF it is fastened with at least two mechanical fasteners and IF it has far-side box supports (Morris 18350, Orbit ABS-6, Caddy 766A or approved equal). No other style back box mounting styles shall be used.

M. Plates shall cover any cracks between box and tile. Use oversize plates where necessary.

3.8 FLUSH BOXES

A. Mount all outlet boxes such that finished installation with mud ring is within 1/4 inch of the finished wall or ceiling line unless otherwise indicated. Provide knockout closures to cap unused knock out holes where knock out holes have been removed. Install outlets flush with finish walls or ceiling surfaces for concealed wiring.

B. Provide galvanized steel extension rings where required to extend the box forward in conformance to NEC requirements. Attach ring with at least two machine screws. Install electrical boxes and fittings in compliance with NEC requirements and in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that the boxes and fittings serve the intended purposes. Under no circumstances shall a conduit enter/exit an extension ring. Conduits shall enter / exit the electrical box only.

C. Locate boxes and conduit bodies to ensure accessibility of electrical wiring. Install blank cover plates, painted to match surrounding, at pull boxes, junction boxes and all others to which no luminaire or device is to be attached.

3.9 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with Section 07 84 00 - Firestopping.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

3.10 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused openings in boxes.

END OF SECTION

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SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. All identification for electrical equipment and systems that is required by code or ordinance shall be provided, whether or not shown on Drawings or specified herein.

1.2 SUBMITTALS

A. Submit Electrical Identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Requirements:
   1. All means of identification referenced in this section shall be of sufficient durability to withstand the environment per NEC 110.21. Where plastic is used outdoors, it shall be UV rated or treated.
   2. Lettering shall be Arial font and colors shall conform to FS L-P-387.
   3. Thickness for signs and engraved labels shall be 1/16" thick minimum.

B. Signs: For identifying multiple electrical services.
   1. Provide Aluminum OUTDOORS and provide Plastic INDOORS.
   2. Appearance: White with black lettering, lettering to be 1/4" tall minimum.

C. Equipment Labels: For panelboards, switchboards, switchgear, disconnects, equipment, etc.
   1. Provide UV rated engravable plastic (L-P-387) OUTDOORS and Engravable plastic (L-P-387) INDOORS.
   2. Appearance: Lettering shall be 1/4" tall minimum that is White with black lettering for Non-Emerency and Red with Black lettering for Emergency

D. Electrical Safety Labels: For fault current and arc flash labelling.
   1. Inside building or enclosure to be self-adhesive vinyl.
   2. Appearance: Color, layout and dimensions per city requirement. In the absence of any city requirement, use industry standard colors and layout.

E. Marker Labels / Sleeves: For circuit identification and other labelling.
   1. Marker Label - 2" or wider write-on marker label with white writing portion and clear laminating portion for protection.
   2. Marker Sleeves - 2" or wider sleeve colored to identify electrical systems per requirements in Part 3.

F. Wire Markers: For circuit or voltage identification.
   1. Conductor Marking: Electrical tape.

2. Circuit Marking: Tubing type, cloth tape, split sleeve.
3. Appearance: Colors to match requirements in Part 3.

G. Underground Warning Tape:
1. Four (4) inch wide plastic tape.
2. Appearance: Colored red and yellow with suitable warning legend describing buried electrical lines.

H. Mechanical Fasteners: Stainless steel screws, non-corroding pop rivets.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate with the Owner's Representative to obtain a list of the finalized owner’s room number list before ordering identification tags.

B. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 APPLICATION OF EQUIPMENT LABELLING

A. Main Service Disconnecting Means:
1. Mark the label on the main service disconnecting means with the calculated fault current listed on the panel schedule along with the issue date of the Drawings per NEC 110.24(A). The calculated fault current shall be labelled "Maximum Fault Current" and the date shall be labelled "Date Calculations Performed". Use the seal date on the drawings for the date field.
2. Provide a sign at each service at each structure per NEC 230.2(E).

B. Panelboards, Switchboards, Switchgear:
1. Circuit directory shall be frame mounted inside the door with heat-resistant transparent face and a directory card that is type written and completely filled out.
2. Circuit directory shall coordinate each breaker with the proper load served. Each circuit shall be uniquely identifiable per NEC 408.4(A) including room numbers. Room numbers shall be as directed by Owner.
3. Circuit directory shall indicate all spares and spaces in erasable pencil.
4. Equipment Label shall indicate the high leg per NEC 408.3.

C. Instantaneous Fault Current (AIC): Electrician to field-mark the equipment labels with the calculated instantaneous fault current (as shown on panel boards) per NEC 110.24(A) and use the issue date of the drawings as the calculation date.

D. When series rated panels are specifically allowed, provide a label affixed by the manufacturer indicating the tested and approved series rating combinations per NEC 240.86. Provide an additional label affixed behind the panel door to be field marked in accordance with NEC 110.22(C).

3.3 INSTALLATION OF EQUIPMENT IDENTIFICATION

A. General:
1. Install all labels in an easily visible location and parallel to equipment lines.
2. Provide signs and tags for equipment requiring identification as shown on Drawings and for equipment as required by the NEC.

3. All signs and tags to be mechanically fastened. Double-sided tape or other fastening methods are not acceptable.
4. Provide for each main disconnect not grouped together.
5. Install signs on outside of cover for safety switches and time clocks.
6. Install signs on outside top, not on door, and at each circuit for panelboards, switchboards and motor control centers.
7. All labeling identification shall contain both the owner's and architect's room names and numbers. Coordinate with General Contractor to secure construction room numbers.
8. Provide all additional signage required by the AHJ at no cost to the Owner.

B. Conduit Identification:
   1. Underground Conduits
      a. All primary and secondary service conduits and all other underground conduits (2" and larger) shall be identified using Underground Warning Tape located no more than 12" below finished grade and run the entire length of all underground conduits.
   2. When any of the below systems are required to be run in conduits (per Drawings, Div. 27, Div. 28, AHJ or Owner Requirements), conduits shall be colored with painted band, marker labels or marker sleeves every ten feet (10') maximum and at back box locations using paint or marker labels. All colors shall be by system per the below list:
      a. Fire Alarm System: Red
      b. Voice / Data cabling: Blue
      c. Security System: Green
      d. Intercom, A/V, etc. (Media Mgmt.): Yellow
      e. CATV / MATV: Black
      f. Lighting Controls: Orange

C. Back Box Cover Identification:
   1. When any of the below systems are required to be run in conduits (per Drawings, Div. 27, Div. 28, AHJ or Owner Requirements), identify the back box covers per system. by painting the entire cover or by using marker labels. Marker labels not acceptable for back box covers for Fire Alarm. See below for colors.
   2. Cover Identification: Paint the entire cover or use marker labels. Marker labels not acceptable for back box covers for Fire Alarm. See below for colors.
   3. Back Box Cover Information: Label the back box with the source panel and circuiting using Marker Labels or Sharpie. Label as "Future Use" if there are no conductors pulled.
   4. Back Box Cover Color:
      a. Fire Alarm System: Red
      b. Voice / Data cabling: Blue
      c. Security System: Green
      d. Intercom, A/V, etc. (Media Mgmt.): Yellow
      e. CATV / MATV: Black
      f. Lighting Controls: Orange
      g. Other (unless otherwise specified herein): White

D. Electrical Distribution Nameplates:
   1. Application: Panelboards, Switchboards, Switchgear, Transformers, MCCs, etc.

2. Identification: Sign or Equipment Label with mechanical fasteners, per NEC 408.4(B).
3. Information shall include (Example in parenthesis):
    a. Panel designation (CHAC).
    b. Voltage, phase and wires (277/480v 3ph 4w).
    c. Source of service (Fed from MSB).

E. Electrical Equipment Nameplates:
1. Application: Safety switches, disconnects for HVAC, motors, time clocks, water heaters, etc. and enclosure for controls, relays, contactors, solenoids, other electrical assemblies.
2. Identification: Sign or Equipment Label with mechanical fasteners.
3. Information shall include (Example in parenthesis):
    a. Load served (A/H #C206) or (Parking Lot Lighting).
    b. Voltage and phase (480v 3ph).
    c. Circuits used (CHAC-15,17,19).

END OF SECTION

SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Commissioning:
   1. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
      a. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
      b. Verify and document proper performance of equipment and systems.
      c. Verify that O&M documentation is complete.
      d. Verify that the Owner's operating personnel are adequately trained
   2. The systems to be commissioned include: electrical switchgear and panels, emergency power systems (if included), UPS Systems (if included), Solar Photovoltaic Systems (if included), electrical and lighting controls, fire alarm system, and life safety systems and controls.
   3. Commissioning requires the participation of affected Division contractors to ensure that all systems are operating in a manner consistent with the Contract Documents. All affected Division contractors shall be familiar with all parts of the commissioning plan issued by the CA (Commissioning Authority) and shall execute all commissioning responsibilities assigned to them in the Contract Documents.
   4. Commissioning Team:
      a. The members of the commissioning team consist of the Commissioning Authority (CA), the designated representative of the owner, the General Contractor (GC or Contractor), the Architect and Design Engineers, the Mechanical Contractor (MC), the Electrical Contractor (EC), the Controls Contractor (CC), the Fire Alarm Contractor, and any other installing subcontractors or suppliers of equipment. The Owner's building or plant operator/engineer is also a member of the commissioning team.

1.2 COMMISSIONING AUTHORITY

A. The commissioning authority and/or agency shall be selected and employed by the building owner. The commissioning agent shall be a licensed professional engineer in the State where the work will be performed, and shall be experienced in the commissioning of mechanical and electrical systems of the type installed in this project. Experience in construction process, direct digital control systems, test and balance and ASHRAE Guideline 1 - 1998 is mandatory. The commissioning agent shall not be associated with or employed by a mechanical contractor, or equipment supplier.

1.3 COMMISSIONING PLAN

A. Commissioning Plan:
   1. The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting the CA will provide the plan, which will continue to evolve and expand as the project progresses. The Specifications will take precedence over the Commissioning Plan.

B. Commissioning Process:
   1. The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.
   2. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
   3. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems. Generally, these meetings will be included with or will be sequential with regular subcontractor meetings.
   4. Equipment documentation is submitted to the CA during normal submittals, including detailed start-up procedures.
   5. The CA works with the Subs in developing startup plans and startup documentation formats, including prefunctional checklists to be completed, during the startup process.
   6. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with prefunctional checklists being completed before functional testing.
   7. The Subcontractors, under their own direction, execute and document the prefunctional checklists and perform startup and initial checkout. The CA documents that the checklists and startup were completed according to the approved plans. This may include the CA witnessing start-up of selected equipment and systems.
   8. The installing contractors, suppliers and manufacturers, develops specific equipment and system functional performance test procedures with the assistance of the CA.
   9. The procedures are executed by the Subcontractors, under the direction of, and documented by the CA.
   10. Items of non-compliance in material, installation or setup are corrected at the Subcontractor’s expense and the system retested.
   11. The CA reviews the O&M documentation for completeness. All O&M documentation must be submitted and approved before the start of training.
   12. Commissioning shall be completed before Substantial Completion.
   13. The CA reviews, pre-approves and coordinates the training provided by the Subs and verifies that it was completed.
   14. Deferred testing is conducted, as specified or required.

1.4 RESPONSIBILITIES

A. General Contractor (GC):
   1. Facilitate the coordination of the commissioning work by the CA, and with the CA ensure that commissioning activities are being scheduled into the master schedule.

2. Include the cost of commissioning in the contract price.
3. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CA.
4. In each purchase order or subcontract written, include requirements for submittal data, Systems/O&M data, commissioning tasks and training.
5. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
6. A representative shall attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Commissioning process.
7. Coordinate the training of owner personnel.
8. Prepare Systems/O&M manuals and Systems manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

B. Warranty Period:
1. Ensure that Subcontractors execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
2. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

C. Electrical Contractors and Sub-Contractors:
1. The commissioning responsibilities applicable to each of the subcontractors are generally as follows (all references apply to commissioned equipment only). Specific requirements are shown in the appropriate Divisions.
2. Construction and Acceptance Phases
    a. Include the cost of commissioning in the contract price.
    b. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, Systems/O&M data and training.
    c. Attend a commissioning scoping meeting and other meetings necessary to facilitate the Commissioning process.
    d. Contractors shall provide the CA with normal cut sheets and shop drawing submittals of commissioned equipment as part of the normal submittal process.
    e. Provide additional requested documentation, prior to normal O&M manual submittals, to the CA for development of start-up and functional testing procedures.
        1) Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation, start-up and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority.
        2) The Commissioning Authority may request further documentation necessary for the commissioning process.

f. Provide a copy of the Systems/O&M manuals and submittals of commissioned equipment, through normal channels, to the CA for review and approval.
g. Contractors shall assist (along with the design engineers) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
h. Provide assistance to the CA in preparing the specific functional performance test procedures. Subs shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.
i. Develop a full start-up and initial checkout plan using manufacturer's start-up procedures and the prefunctional checklists from the CA for all commissioned equipment. Submit to CA for review and approval prior to startup.
j. During the startup and initial checkout process, execute the prefunctional checklists for all commissioned equipment.
k. Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.
l. Address current A/E punch list items before functional testing
m. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.
n. Perform functional performance testing under the direction of the CA for specified equipment. Assist the CA in interpreting the monitoring data, as necessary.
o. Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, and A/E and retest the equipment.
p. Prepare Systems/O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
q. Prepare redline as-built drawings for all drawings and final as-builds for contractor-generated coordination drawings.
r. Provide training of the Owner's operating personnel as specified.
s. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

D. Warranty Period:
1. Execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
2. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

E. Equipment Suppliers:
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Subs.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CA.

4. Provide information requested by CA regarding equipment sequence of operation and testing procedures.
5. Review test procedures for equipment installed by factory representatives.

F. Commissioning Authority (CA):
1. The CA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the general contractor and the A/E. The primary role of the CA is to develop and coordinate the execution of a testing plan, observe and document performance - that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, checkout and functionally test equipment and systems, except for specified testing equipment supplied and installed by the CA.
    a. Coordinates and directs the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
    b. Coordinate the commissioning work and, with the GC, ensure that commissioning activities are being scheduled into the master schedule.
    c. Revise, as necessary, Commissioning Plan-Construction Phase.
    d. Plan and conduct a commissioning scoping meeting.
    e. Request and review additional information required to perform commissioning tasks, including Systems/O&M materials, contractor start-up and checkout procedures.
    f. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
    g. Review and approve normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, along with A/E reviews.
    h. Perform site visits, as necessary, to observe component and system installations. Attend selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
    i. Approve pre-functional tests and checklist completion by reviewing prefunctional checklist reports and by selected site observation and spot checking.
    j. Approve systems startup by reviewing start-up reports and by selected site observation.
    k. Review the functional performance test procedures for equipment and systems developed by the subcontractors and suppliers. This may include energy management control system trending, or manual functional testing.
    l. Coordinate, witness and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.

m. Review equipment warranties to ensure that the Owner's responsibilities are clearly defined.
n. Oversee and approve the training of the Owner's operating personnel.
o. Compile and maintain a commissioning record.
p. Review and approve the preparation of the Systems/O&M manuals.
q. Provide a final commissioning report.

1.5 WARRANTY PERIOD

A. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
1. Return to the site at 10 months into the 12-month warranty period and review with facility staff the current building operation and the condition of outstanding issues. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the Systems/O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

B. Scheduling:
1. The CA will work with the GC according to established protocols to schedule the commissioning activities. The CA will provide sufficient notice to the CM and GC for scheduling commissioning activities. The GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications.

PART 3 - EXECUTION

3.1 MEETINGS

A. Scoping Meeting:
1. Within 90 days of commencement of construction, the CA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the GC. Information gathered from this meeting will allow the CA to revise the

Commissioning Plan to its “final” version, which will also be distributed to all parties.

B. Miscellaneous Meetings:
1. Other meetings will be planned and conducted by the CA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular subs. The CA will plan these meetings and will minimize unnecessary time being spent by Subs.

3.2 REPORTING

A. The CA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.

B. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.

C. A final summary report by the CA will be provided focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report.

3.3 SUBMITTALS

A. The CA will provide appropriate contractors with a specific request for the type of submittal documentation the CA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer’s printed installation and detailed start-up procedures, full sequences of operation, Systems/O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority. All documentation requested by the CA will be included by the Subs in their Systems/O&M manual contributions.

B. The Commissioning Authority will review and approve submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning Agent will notify the appropriate persons as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

C. The CA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

3.4 START-UP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment to be commissioned. Some systems that are not comprised so much of actual dynamic machinery may have very simplified PCs and startup.

B. General:
   1. Prefunctional checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout. No sampling strategies are used. The prefunctional testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

C. Start-up and Initial Checkout Plan:
   1. The CA shall assist the commissioning team members responsible for start-up of any equipment in developing detailed start-up plans for all equipment. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for prefunctional checklists and start-up are identified in the commissioning scoping meeting and in the checklist forms. Parties responsible for executing functional performance tests are identified in the testing requirements.
      a. The CA assist in the development of checklists that indicate required procedures to be executed as part of start-up and initial checkout of the systems and the party responsible for their execution.
      b. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form may have more than one trade responsible for its execution.
      c. The subcontractor responsible for the purchase of the equipment develops the full start-up plan by combining (or adding to) the CA's checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.
      d. The full start-up plan could consist of something as simple as:
         1) The contractor and CA prefunctional checklists.
         2) The manufacturer's standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
         3) The manufacturer's normally used field checkout sheets.
      e. The subcontractor submits the full startup plan to the CA for review and approval.
      f. The CA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
      g. The full start-up procedures and the approval form may be provided to the CM for review and approval, depending on management protocol.

D. Execution of Prefunctional Checklists and Startup:
   1. Four weeks prior to startup, the Subs and vendors schedule startup and checkout with the GC and CA. The performance of the prefunctional checklists, startup and

checkout are directed and executed by the Sub or vendor. When checking off prefunctional checklists, signatures may be required of other Subs for verification of completion of their work.

2. The CA shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, (in which case a sampling strategy may be used as approved).
3. For lower-level components of equipment the CA shall observe a sampling of the prefunctional and start-up procedures.
4. The Subs and vendors shall execute startup and provide the CA with a signed and dated copy of the completed start-up and prefunctional tests and checklists.
5. Only individuals that have direct knowledge and witnessed that a line item task on the prefunctional checklist was actually performed shall initial or check that item off.

E. Deficiencies, Non-Conformance and Approval in Checklists and Startup:
1. The Subcontractors shall clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CA within two days of test completion.
2. The CA shall work with the Subcontractors and vendors to correct and retest deficiencies or uncompleted items. The CA will involve the CM or GC and others as necessary. The installing Subcontractors or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the CA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CA recommends approval of the execution of the checklists and startup of each system using a standard form.

3.5 FUNCTIONAL TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.
1. Objectives and Scope:
a. The objective of functional testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.
b. In general, each system should be operated through all modes of operation where there is a specified system response. Verifying each sequence in the sequences of operation is required.
2. Development of Test Procedures:
a. Before test procedures are written, the CA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Each Sub or vendor responsible to execute a test, shall provide assistance to the CA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CA shall provide a copy of the test procedures to the Sub(s) who shall

review the tests for feasibility, safety, equipment and warranty protection. The CA may submit the tests to the A/E for review, if requested.

b. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.

3. Test Methods:
   a. Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results. The CA will determine which method is most appropriate for tests that do not have a method specified.
4. Coordination and Scheduling:
   a. The Subs shall provide sufficient notice to the CA regarding their completion schedule for the prefunctional checklists and startup of all equipment and systems. The CA will schedule functional tests through the GC and affected Subcontractors. The CA shall direct, witness and document the functional testing of all equipment and systems. The Subs shall execute the tests.
   b. In general, functional testing is conducted after prefunctional testing and startup has been satisfactorily completed. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

3.6 DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS

A. Documentation:
1. The CA shall witness and document the results of all functional tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the GC for review and approval and to the Subs for review. The CA will include the filled out forms in the Commissioning Report.

B. Non-Conformance:
1. The CA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported on a standard non-compliance form.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases the deficiency and resolution will be documented on the procedure form.
3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
4. As tests progress and a deficiency is identified, the CA discusses the issue with the executing contractor.
   a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
      1) The CA documents the deficiency and the Sub’s response and intentions and they go on to another test or sequence
   b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:
      1) The deficiency shall be documented on the non-compliance form with the Sub’s response and a copy given to the GC and to the Subcontractor representative assumed to be responsible.

2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Owner.
3) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CA. The CA reschedules the test and the test is repeated until satisfactory performance is achieved.

C. Cost of Retesting:
1. The cost for the Subcontractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the GC.
2. The Contractor shall respond in writing to the CA at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
3. The CA retains the original non-conformance forms until the end of the project.

D. Failure Due to Manufacturer Defect:
1. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable. In such case, the Contractor shall provide the Owner with the following:
a. Within one week of notification, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided within two weeks of the original notice.
b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
c. The Owner will determine whether a replacement of all identical units or a repair is acceptable.
d. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

E. Approval:
1. The CA notes each satisfactorily demonstrated function on the test form. The CA recommends acceptance of each test using a standard form. The Owner gives final approval on each test using the same form, providing a signed copy to the CA and the Contractor.

3.7 SYSTEMS/OPERATION AND MAINTENANCE (O&M) MANUALS

A. The following Systems/O&M manual requirements do not replace O&M manual documentation requirements elsewhere in these specifications.

B. Each Division shall compile and prepare documentation for all equipment and systems covered in that Division and deliver this documentation to the GC for inclusion in the Systems/O&M manuals, according to this section, prior to the training of owner personnel.

C. The CA shall receive a copy of the O&M manuals for review.

D. Field checkout sheets and logs should be provided to the CA for inclusion in the Commissioning Record Book.

E. Review and Approvals:
   1. Review of the commissioning related sections of the Systems/O&M manuals shall be made by the A/E and by the CA.

3.8 TRAINING OF OWNER PERSONNEL

A. The GC shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.

B. The CA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

3.9 WRITTEN WORK PRODUCTS

A. Written work products of Contractors will consist of the start-up and initial checkout plan described and the filled out start-up, initial checkout and prefunctional checklists, manufacturer's factory and field testing and inspection forms, contractors' inspection and functional testing forms, Systems/O&M Manuals, training plans and training records.

B. These work products will be supplied to the CA to be included in the final commissioning report.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide a lighting control system for the proper operation of exterior lighting, except for lighting intended for 24-hour operation.

1.2 DEFINITIONS

A. Motion Sensor - A sensor that detects when an occupant is in a space. This sensor can be wired or configured to be an occupancy sensor or vacancy sensor.

B. Occupancy Sensor - A motion sensor designed or programmed to automatically turn the lighting in a space "on" when an occupant enters the space (based on major motion) and automatically turn the lighting in a space "off" after the occupant is no longer present or detected (based on minor motion) for a predetermined length of time.

C. Vacancy Sensor - A motion sensor designed or programmed to require an occupant to manually turn the lighting in a space "on" and automatically turn the lighting in a space "off" after the occupant is no longer present or detected (based on minor motion) for a predetermined length of time.

D. Dual Technology Sensor - A motion sensor with both infrared and ultrasonic technologies or both infrared and microphonic technologies.

E. Photocell - A light sensitive sensor used to communicate with a room controller to dim the lighting in a daylight zone according to the ambient lighting entering a space via any method other than electric lighting.

F. Room Controller - The local space lighting controller that interfaces with the luminaires, motion sensors, photocells, smart switches, etc. in each space to control on / off, "scenes", dimming, and daylight harvesting. This may include manufacturer verbiage such as power pack, distributed controller, driver interface modules, interface components, etc. Some or all of this function may be an integral part of the luminaires in the space.

G. Smart Switch - Intelligent programmable switch capable of communicating with the lighting control system in the space to trigger on / off, "scenes", dimming, etc.

H. Network Controller - The building-wide controller that connects room controllers together into a central network.

I. Daylight Zone - Markings indicating how far exterior natural lighting can reach into a space. Luminaires in a daylight zone are to be controlled separately from the luminaires in other daylight zones and separately from the rest of the space. We consider the daylight zones in every space. However, to avoid confusion, only daylight zones affecting the controls design will be shown on the Drawings.

J. Functional Testing - Start-up or testing performed by the manufacturer or certified representative to verify the operation of the complete lighting control system.

K. Commissioning Agent - Third-party hired by the Owner or Owner's Representative to verify proper operation of the lighting control system as designed to meet the Energy Code commissioning requirements.

1.3 COORDINATION

A. Coordinate motion sensor and photocell mounting and locations with architectural RCP (ceiling type, ceiling height, baffles, etc.), mechanical (HVAC duct work, grilles, etc.), plumbing (exposed piping, sprinkler heads, etc.), technology (A/V, projectors, etc.) and other trades, as required, before installation.

1.4 PRE-INSTALLATION MEETING

A. Meet with the manufacturer of the lighting control system on-site to review installation, wiring methods and exact equipment locations of all components prior to starting installation. At this meeting the Contractor shall be trained by the manufacturer or vendor on the installation, setup and functionality of the system. Failure to have this meeting will result in the Contractor assuming full responsibility of all costs incurred to move controls and sensors, replace equipment due to product damage, costs due to installation errors or failure to meet the full intent of the design.

1.5 SUBMITTALS

A. Submit from the following list, all items used on this project: Motion sensors, photocells, smart switches, time switches, room controllers, network controller, plug load controller, software, lighting contactors, low voltage wiring, intelligent luminaires, etc.

B. Product data for motion sensors shall clearly indicate coverage areas for major motion and minor motion determined in accordance with the testing procedures of NEMA Guide Publication WD 7 Occupancy Motion Sensors Standard.

1.6 SHOP DRAWINGS

A. Submit shop drawings of each RCP area in the project showing the specific locations of all parts of the lighting control system including motion sensors, photocells, smart switches, room controllers, network controller, plug load controller, enhanced building controls (if required), etc. Motion sensors shown shall include sensor type, sensor mounting, and other pertinent data to allow evaluation of the proposed system.

B. Submit a complete wiring diagram for all motion sensors, photocells, smart switches, room controllers, network controllers, etc. for the project. Typical wiring diagrams will be rejected.

C. Submit a sequence of operations for each unique switch type describing the function of each button on each switch and the effects on the lighting in the space. This sequence of operations should be similar to the Lighting Control Chart with the added information describing how the lighting control system pieces / parts work together.

D. Submit a list of switch types with a list of proposed button labels. This list should be similar to the Button Info in the Lighting Control Chart with added information showing switch button layouts and actual labels for the project.

1.7 WARRANTY

A. Provide a five (5) year parts and one (1) year labor warranty on the entire lighting control system. Warranty coverage shall begin at the time of Project Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. If they comply with these specifications, products of the following manufacturers will be acceptable:
   1. Intelligent Lighting Controls.

B. No other manufacturers will be accepted. Submitting on any brand other than those listed here will be rejected. No exceptions.

2.2 GENERAL REQUIREMENTS

A. Refer to the RCP, Lighting Control Chart and Luminaire Schedule for the switch type, controls and sequence of operation in various areas throughout the building and additional requirements and information. For projects beyond the scope of a single system, multiple systems shall be networked together to accommodate any project size requirements.

B. The lighting control system shall include all required devices for a complete and proper operating system to automatically control the lighting to meet the intent of the Energy Code. The system may include but not be limited to motion sensors, room controllers, network controller, plug load controller, enhanced building controls (if required), low voltage control wiring, photocells, smart switches, intelligent luminaires and all required conduit and back boxes. Not all required components are shown on the Drawings.

C. All parts of the lighting control system shall meet the following requirements:
   1. Shall be warranted by the same company and be from the above list of manufacturers.
   2. Shall be aesthetically compatible. i.e., from the same product line or family of product.
   3. Shall be the same release and most current release generation of the product.
   4. Shall be UL listed as an assembly and shall be plenum rated.
   5. Shall NOT be battery operated devices or controls.

D. Color: Device color and plates shall be coordinated with the Owner's Representative and shall reasonably match across all Divisions. Emergency devices and plates shall be red.

E. All device plates shall be attached with screws. No screwless device plates are allowed.

F. If a FACP exists or shall be installed, then provide fire alarm integration as noted on the Lighting Control Chart. This feature shall be provided via a single contact closure at the FACP as a trigger to the lighting control system. Provide all associated hardware and wiring from the FACP to the lighting control system necessary for a complete and working system.
   1. Fire Alarm Activation: The lighting controls shall turn all interior and exterior building-mounted lights on to meet NFPA 101 Section 7.8.1.2.2 requirements.

2. Fire Alarm Deactivation: The lighting controls shall return all interior and exterior building-mounted lights to the previous state before the fire alarm was activated.

G. If a generator or UPS provides backup / auxiliary power to any luminaires, then power shall be provided for all lighting control system components in those spaces such that all functions of the lighting control system remain operable under any power condition.

H. If a generator or UPS provides emergency power to any emergency luminaires, all emergency luminaires shall turn on to maximum lumen output. If battery packs provide power for emergency lighting, all emergency luminaires shall turn on to maximum lumen rating of the battery pack.

I. Wiring between sensors and control units shall be 18 AWG minimum (stranded preferred) or CAT5/5e/6. Pre-terminated low voltage wiring from the lighting controls manufacturer is preferred.

J. A networked distributed lighting control system is required. Relay panels are not acceptable unless noted in the Lighting Control Chart.

K. Integration with existing lighting control systems:
1. A networked distributed lighting control system currently exists in the existing building. Components need to be compatible with the existing system and installed to tie into the existing networked lighting control system.
2. If an existing lighting control system exists in areas that are to remain, then the new system shall work with the existing system.
3. When the fire alarm activates an alarm, the existing lighting control system shall turn on all new luminaires controlled by the lighting control system in addition to all of the existing lighting that it currently controls.

2.3 MOTION SENSORS

A. Sensor Design and Layout: Provide the quantity of motion sensors required for complete and proper coverage without gaps within the range of coverage of controlled areas. Rooms shall have 100% coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room. The locations and quantities of sensors shown on the Drawings are diagrammatic and indicate only rooms that are to be provided with sensors. Provide additional sensors if required to properly and completely cover the respective room. Proper judgment must be exercised in executing the work so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.

B. Coverage and Orientation: Select the appropriate type of sensor for complete coverage of each space. All motion sensors are to be in the best location to avoid false triggers from movement outside an open doorway.

C. All motion sensors shall be dual technology.

D. All motion sensors to be set to the timeout indicated in the Lighting Control Chart and adjusted to maximum sensitivity. Motion sensors must be capable of being set down to five (5) minutes and one (1) minute for testing.

E. Coverage areas for major motion and minor motion shall be determined in accordance with NEMA WD 7 Guide Section 3.

F. Ultrasonic technology shall utilize a frequency that does not interfere with other sensors, hearing aids, smartboards, etc.

G. All motion sensors shall have masking or internal shielding available to control coverage pattern in the field. Stickers or other external adhesive masking will not be accepted.

2.4 SMART SWITCHES

A. Shall control the luminaires in the space for all on / off, dimming, "scene" controls, manual override, etc. as indicated in the Lighting Control Chart and as required by the Energy Code.

B. All smart switches are to be engraved or internally labeled so that the function of each button is clearly identified. All labeling or engraving must be of high quality and be provided by the lighting control system manufacturer.

C. Timer Switches, where indicated on the Drawings, shall have an override not exceeding the maximum time allowed by the Energy Code.

2.5 ROOM CONTROLLER

A. Shall operate all lighting in the space based on input from the smart switch(es), motion sensors, photocells, etc. via low-voltage control output and relays / contactors using zero-cross technology.

B. In the event of a hardware, software or component failure, the lighting in the space shall default to the "ON" position.

C. Provide room controllers, as required, for complete control of all lighting in the space to meet the Energy Code requirements and design intent shown on the Drawings.

2.6 NETWORK CONTROLLER

A. Shall be capable of being programmed / reprogrammed via PC (via software) or mobile device (via app). It shall be capable of receiving input via contact closure, user PC software, FACP, etc. and issuing building-wide commands to enable / disable a "scene" at all luminaires controlled by the lighting control system.

B. Shall include astronomical time clock feature capable of seven (7) different day types per week, automatic holiday "shut-off" feature for 24-hours, 12-hour minimum program backup capabilities to meet the Energy Code.

C. Shall be BTL BACNET / IP listed for use to communicate with EMCS.

2.7 MAINTENANCE SERVICE

A. Provide a three (3) year manufacturer Software Service Agreement with the lighting control system. The agreement shall cover all minor updates, bug fixes and maintenance to the software of the system to maintain all original functionality. The Software Service Agreement shall start at the time of Project Substantial Completion.

2.8 SYSTEM SUPPORT

A. Provide five (5) year complete system support starting from Project Substantial Completion. The entire lighting control system (hardware and software) shall be included in the support. The support shall include phone and email communication (as a minimum) for the duration of the support. The system support shall include all technical support, hardware and software questions, warranty help, etc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Where work is to be performed in an existing facility, visit the site of the proposed work and observe its conditions so that you may be fully informed as to the materials, labor, workmanship and conditions under which the work is to be done.

3.2 INSTALLATION

A. General:
   1. Provide all lighting controls, as required and where indicated, in accordance with manufacturer's written instructions and project shop drawings, applicable requirements of the NEC, and recognized industry practices to ensure that products serve the intended function.
   2. Provide the room controller, as required, located above the ceiling above the switches near the exit door. Provide a permanent label on the ceiling to identify its location. The label material shall be as described in Section 26 05 53 - Identification for Electrical Systems. The label shall say "Lighting Controller". It is acceptable for a room controller to serve more than one space.
   3. Provide the network controller, as required, located on the wall of the main electrical room near any EMCS, contactors, etc. It is acceptable for a single network controller to serve an entire building if supported by the controller.
   4. Provide conduit and wiring in accordance with Section 26 05 33 - Raceways and Boxes for Electrical Systems and Section 26 05 19 - Low Voltage Electrical Power Conductors and Cables.
   5. All motion sensors and switches located in gyms, play areas, multipurpose spaces, etc. shall have a wire guard.
   6. Exact locations of all equipment shall be based on observing good installation practice and shall be coordinated with other elements of the RCP.

B. Existing Conditions:
   1. Field verify location of existing network controller(s) in the existing building. If an additional network controller is needed to control the lighting in the new portion of the building, then the new and existing network controllers must be connected and operate as one network controller.

C. Lighting Control System Integration with EMCS:
   1. Exterior lighting shall be integrated into the lighting control system or EMCS through BACnet interface.
   2. Provide BACnet object list to EMCS Contractor.
   3. Contractor to expose BACnet objects related to footcandle levels, motion sensor status and commanded light levels for each space.
   4. BACnet objects need to be labeled or mapped to the room number they are serving.

D. Lighting Control Cable Routing and Installation:

1. Cable routing and installation shall be per the EIA (Electronic Industries Association) recommendations, manufacturers recommendations and per the NEC.
2. All wiring shall be bundled with hook and loop (Velcro, no cable ties) and supported from the building structure via j-hooks (60" spacing max), not fastened to any other building system. Wiring shall not be in contact with the ceiling or ceiling supports.
3. All conduit ends, box openings and pathways shall be de-burred, cleaned, and secure prior to installation of cable.
4. Provide a plastic snap-in bushing at each box opening (T&B 3210 series or similar), passage through a metal stud (T&B SB12160SC or similar), and at the end of all open conduit stubs or sleeves (T&B Series 390 / 442 or similar) prior to lighting control cable installation to protect the cabling from damage.
5. Do not route cables through fire doors, ventilation shafts, grates, or parallel with line voltage electrical conductors.
6. Lighting control cable shall not be installed in the same conduit, raceway, tray, duct, or track with line voltage electrical cable without a metallic barrier meeting NEC requirements.
7. No terminations or splices shall be installed in or above ceilings, other than in designated end point housings.
8. Conduit, duct, or track shall be used for lighting control cable in exposed areas.

3.3 SEQUENCES OF OPERATION

A. Lighting Controls:
1. The smart switch shall be required to be pressed to turn the lights "on" in all spaces where a vacancy sensor is required. Otherwise, an occupancy sensor may automatically turn the luminaires "on". Two minutes prior to turning the lights "off", the lighting control system shall dim the luminaires in the space to 50% of their previous output as a notification to the occupants that the controls will soon turn the lighting off. A momentary "blink" is allowed if luminaires are not dimmable. If the motion sensor is not triggered within the two minutes, the lighting in the space shall turn "off". If the motion sensor is triggered, the lighting control system shall dim the lighting back up to the previous lighting level and timeout is restarted. In spaces with timer switches, the system shall accept an override signal at any time either before or after the lighting is turned off. The occupant shall not be required to wait for the lights to go out before issuing the override.
2. Where shown on the Drawings, a photocell is to be used to measure the light level and signal to the room controller to dim the luminaires continuously (from 100% to 15% or lower, including off) in the daylight zone to maintain a consistent (within +10% and -0%) lighting level in the space.

3.4 FUNCTIONAL TESTING

A. Coordinate the below requirements with the manufacturer representative.
1. Certified factory representative shall provide all initial field programming of the system as part of the system startup process.
2. Certified factory representative shall inspect the finished installation against the shop drawings and installation instructions.
3. Certified factory representative shall do functional testing of the finished installation. Submit documentation of the functional testing in accordance with closeout submittal requirements.

3.5 ADJUSTING

A. Motion sensors may be affected by various conditions in the room. It may be necessary for the Contractor to make adjustments, change the location or type of sensor to obtain proper operation in a specific room. The Contractor / equipment manufacturer shall have final responsibility for proper operation and coverage of the system in each room and should therefore make labor allowance for such changes and adjustments. The Contractor is also responsible for acquiring approval from the Engineer for any changes or deviations from project specifications.

B. Contractor shall work with the manufacturer to correct all findings from manufacturer functional testing.

C. Contractor shall work with the manufacturer to correct all findings made by the Commissioning Agent or registered design professional, whichever entity performs the commissioning service. This Contractor is responsible for the entire lighting control system and luminaires to pass the commissioning inspection and reporting.

3.6 SYSTEM STARTUP

A. Provide the initial programming, aiming and start-up of the system.

B. After system startup, the manufacturer or manufacturer's representative shall test the operation of the complete system (all components, every space) to ensure the proper operation throughout the range of building operating conditions. Provide documentation of such functional testing in the closeout submittals. Testing individual components, third-party commissioning, etc. shall not be a replacement for complete system testing.

3.7 THIRD-PARTY COMMISSIONING

A. In addition to functional testing by the Contractor and the manufacturer, additional third-party commissioning is required to meet the Energy Code requirements. The manufacturer shall be present during the third-party commissioning process. See Section 26 08 00 - Commissioning of Electrical Systems for more information.

3.8 OWNER TRAINING

A. After functional testing and commissioning are complete, the manufacturer shall provide a minimum of four (4) hours of on-site training to the Owner’s personnel in the operation, adjustment, and maintenance of the system. The length of the training session shall be at the discretion of Owner. Do this training in a location where it can be recorded by the Owner. (With prior approval of the Owner, the Contractor can arrange to record the training and present it to the Owner.) Coordinate date, time and location of training one (1) week prior to meeting and provide documentation of such training in the closeout submittals. The training shall cover the following items in detail:
   1. Scope of system: Review the as-built documentation with the Owner to detail extent of system. Identify locations of all wall stations, wiring, and panels that fall within the scope of the lighting control system. Define clear lines of scope between lighting control system and EMCS functions, if applicable.
   2. Operation of system: Cover normal operation of switches, push-buttons, LCD interfaces and software (if provided). Provide documentation to the Owner showing the operational zoning of controlled circuits and all time clock events

programmed into the lighting control System. Show the Owner how to change and add / delete events.

3. Maintenance and troubleshooting of system: Detail any required or optional preventive maintenance actions required of the Owner. Review step-by-step procedures to troubleshoot all possible failure modes of each component type of the lighting control system. Cover procedure to get lights turned on in any space containing a lighting control system in the event the control system fails. Identify any specialized equipment necessary to support all the above actions.
4. Service and support of system: Identify nearest direct support contact for the manufacturer and provide both telephone and email contact details.

END OF SECTION

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SECTION 26 20 00

LOW VOLTAGE ELECTRICAL DISTRIBUTION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Electrical service including underground primary requirements, transformer and secondary enclosure requirements, overhead and underground service entrance requirements, metering, and final connections.

B. Provide and install all components of the low voltage distribution system(s) including all switchboards, panelboards, transformers, fuses, circuit breakers, disconnects, MCCs, etc. as shown on the Drawings and as required for a complete and working system. All equipment shall be sized to meet the latest adopted version of NEC 220 requirements as a minimum.

1.2 COORDINATION

A. Prior to ordering disconnects and fuses or fuse holders, coordinate fuse ratings with the Mechanical Contractor to verify that fuses for all mechanical equipment matches the Maximum Over-Current Protection (MOCP) values of the mechanical equipment being provided. This Contractor to adjust upstream breaker sizes, branch circuit conductor sizes, whip sizes and disconnect sizes to accommodate the fuse (Over-Current Protection Device, OCPD) requirements for the supplied equipment.

1.3 SUBMITTALS

A. Provide scaled shop drawings for each electrical equipment room showing the placement of all panelboards, transformers, and other equipment such as mechanical equipment, drawn to scale and dimensioned. Such shop drawings will be reviewed for compliance with the intent of the Drawings and the spaces available for all electrical equipment.

B. Clearly indicate on the submittals whether equipment is fully-rated or series-rated and arrange the submittals in order the panelboards appear on the Drawings.

C. Include the following parameters as applicable in the submittal: equipment name, description, voltage, phase, ampacity, kVA rating, K-rating, control voltage, impedance, etc.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. All panelboards, switchboards, disconnects, OCPDs, etc. shall be from the same manufacturer to ensure proper breaker coordination.

B. All equipment on this project shall be new. Refurbished or used equipment will not be acceptable.

C. Approved Manufacturers: Eaton (Cutler Hammer) and Square-D.

D. All other manufacturers shall require pre-approval in accordance with Section 26 00 00 - Electrical.

2.2 GENERAL REQUIREMENTS

A. Unless specifically noted otherwise on the Drawings, all equipment in these Specifications shall meet the the requirements outlined below.

B. Conductor material for switchboards, panelboards, disconnects, etc. shall be copper.

C. Transformer coils shall be continuous wound and conductor material shall be copper.

D. Unless otherwise indicated on the Drawings, provide the following enclosures for all panelboards, switchboards, switchgear, disconnects, transformers, etc.:
1. NEMA 1 - All equipment located in interior dry locations.
2. NEMA 3R - All equipment located in damp, wet or exterior locations.
3. NEMA 4X - All equipment located in corrosive environments.

E. All panelboards, switchboards, disconnects, etc. shall have weatherproof threaded hubs for top / bottom / side conduit entries.

F. All equipment shall have a factory applied gray finish applied over a rust inhibiting treatment. Any items which have the finish marred shall be touched up or refinished to like new condition before final acceptance. This shall include, but shall not be limited to, sanding and properly removing rust or other contaminants and completely repainting equipment if damage is extensive. Overall acceptance is subject to approval of the Owner's Representative.

G. Provide all labeling / identification per Section 26 05 53 - Identification of Electrical Systems.

H. Provide, at each main switchboard and all downstream distribution, a complete (time-current) coordination study and an arc flash study with all required labels. Contractor may use the equipment manufacturer to provide both the required studies and the required labels. Contractor to adjust all settings for electronic-trip circuit breakers. See Section 26 05 73 - Power System Studies for more details.

2.3 PANELBOARD / SWITCHBOARD COMMON REQUIREMENTS

A. Construction: NEMA PB 1, UL 67, interiors shall be completely factory assembled. See General Requirements above for NEMA enclosure rating requirements.

B. Enclosure Properties: Door in door construction, standard conduit knockouts in ends and sides of cabinet. Provide flush type combination catch and key door locks on all panelboards and load centers. Key all locks alike, provide two keys with each panelboard.

C. Bus Information:
1. Ground Bus: Full length, 25% phase rated, bonded to each bus, additional isolated bus in computer and communication panels.
2. Neutral Bus: Full length
   a. 200% of phase rated for all non-linear, computer or isolated ground (IG) panels.

b. 100% of phase rated for all lighting and power panels.

D. OCPDs: Provide bolt-on circuit breakers unless otherwise indicated on the Drawings.

E. Fault Withstandability: Suitable for operation and able to withstand the symmetrical short circuit current as indicated on the Drawings or available at the location, whichever is larger.

F. Spaces: Install all allotted or indicated spaces so that future OCPDs can be added without additional machining, drilling, tapping or bus extensions.

G. Circuit Identification:
1. Frame-mounted directory with a heat-resistant transparent face for identifying circuits. Mount inside the panelboard door. Use equipment names as reflected by panelboard schedules on the Drawings. Use room names and numbers selected by the Owner's Representative, which may differ from those shown on Drawings.
2. Provide on all new and revised existing panelboards per Division 26 with new information. See Section 26 05 53 - Identification for Electrical Systems for more information.

H. Features and Accessories:
1. Provide metering and instrumentation per Section 26 09 13 - Electrical Power Monitoring and per Division 23 Energy Management Control System requirements.
2. Provide GFCI and GFPE protection as indicated here, as shown on the Drawings and where required per NEC.
3. Provide SPDs at each main switchgear per Section 26 43 00 - Surge Protective Devices.

2.4 PANELBOARDS

A. Construction:
1. Flush-mounted panelboards: Trims shall fasten to permit both horizontal and vertical adjustment. Provide barriers per NEC 215.15.
2. Surface-mounted panelboards: Trims shall fasten to insure no overhang.

2.5 SWITCHBOARDS (> 1200A AMPS)

A. Construction:
1. Provide the required number of sections of the required size to fit in the space provided.
2. Connect sections with busing. Cabled connections are not allowed.
3. Switchboards rated 2,000 amps or greater shall have a minimum depth of 30 inches.

B. Overcurrent Protection Devices:
1. Circuit breakers: Shall be capable of field-installable shunt trip, all shall be capable of being locked in the OFF position.
2. Fused switches: Provide fused switches and fuses as indicated on the Drawings.
3. Clearly indicate size of breaker or fused switch and ON / OFF positions for all OCPDs.

2.6 TRANSFORMERS

A. Construction:
   1. UL 1561, UL 5085, factory-assembled, enclosed, ventilated, air-cooled, dry-type, with lifting brackets, sized as indicated on Drawings.
   2. Transformers shall be rated for continuous operation at rated kVA, 24 hours per day, 365 days per year with normal life expectancy as defined in IEEE 65.
   3. Minimum transformer efficiency shall meet Title 10 CFR Part 431.
   4. K-13 and K-20 rated transformers shall have a 200% neutral bar.

B. Enclosure Properties:
   1. Enclosed, with vent openings (to meet NEC 450.21), UL 1561 listed.
   2. Audible sound levels shall be in accordance with NEMA ST-20.
   3. Capable of operating at 115% on 115°C rise, with ambient temperature rise not exceeding 40°C.

C. Insulation: Unless otherwise noted on the Drawings, provide the following:
   1. Class 155 or higher, no exceptions.
   2. 1-15 kVA: Class 185 with 115°C rise.
   3. 16-500 kVA: Class 220 with 115°C rise.

D. Tap arrangement: Use in the high voltage winding unless noted otherwise on the Drawings. Provide taps at 2.5% each, at least two (2) above and at least two (2) below nominal voltage.

E. Mounting Options:
   1. 1-15 kVA: Suitable for wall mounting.
   2. 16-75 kVA: Suitable for wall, floor stand, or trapeze mounting.
   3. Larger than 75 kVA: Suitable for floor stand or trapeze mounting.
   4. Floor mounting shall be bolted to a four (4) inch raised concrete pad.

2.7 SAFETY SWITCHES AND ENCLOSED CIRCUIT BREAKERS

A. Product Description:
   1. Provide single-throw, horsepower rated, 100% load break and make rated, designed for locking in "ON" or "OFF" position, steel cabinets, as required by the application and required per the NEC.
   2. Provide equipment rated for the required voltage and with the number of poles required, dependent on the equipment requirements.
   3. Provide SPDs at equipment in accordance with Section 26 43 00 - Surge Protection Devices.

B. Construction:
   1. All safety switches and enclosed circuit breakers shall be Heavy Duty (HD) type and built per NEMA KS 1 and UL 98.

C. Disconnect / Safety Switches:
   1. Safety switches shall be fused, unless indicated as non-fused on the Drawings.
   2. All disconnects / safety switches shall be lockable in the OFF position.
   3. Use fuse clips which are rejecting type to accept Class RK or L fuses only.
   4. Size fused safety switches and upstream conductors serving motor loads at 175% of motor nameplate or per NEC values, whichever is larger, and round to the next standard size.

D. Enclosed Circuit Breakers: Provide where indicated on Drawings, otherwise provide a disconnect / safety switch.

2.8 CIRCUIT BREAKERS

A. Product Description: Bolt-on, quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers; listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the Drawings.

B. Interrupting Ratings: Provide size (ampacity) and withstand (AIC) rating as indicated on the Drawings. Series rated panels are NOT allowed. All panels shall be FULLY RATED.

C. Thermal Magnetic Circuit Breaker: Bi-metallic overload elements, magnetic trip, common trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.

D. Electronic-Trip Circuit Breaker: Solid-state, microprocessor-based, true RMS sensing trip units with the following field-adjustable trip response settings:
   1. Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
   2. Long time delay.
   3. Short time pickup and delay.
   4. Instantaneous pickup.

E. Features and Accessories: Provide as required by NEC, as indicated in the Specifications and as shown on the Drawings.
   1. AFCI: Arc fault sensing where arc fault protection is indicated or required.
   2. GFCI / GFPE: Ground fault pickup and delay where ground fault protection is indicated or required by NEC.
   3. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
   4. Lock-Out Provision: For locking the circuit breaker in the off position.

F. Provide number of poles indicated for the specified equipment or service, with common trip handle for all poles.

G. Independently mount so that a single unit can be removed from the front of the panelboard without disturbing or removing main bus, other units or other branch circuit connections.

H. All circuit breakers that have an overcurrent trip setting fixed or adjustable at 1200a or higher shall have an Energy-Reducing Maintenance Switch or similar approved method for arc energy reduction and shall meet all requirements of NEC 240.67 and NEC 240.87. No exceptions.

2.9 FUSES

A. Performance Requirements:
   1. All fuses shall be from the same manufacturer.
   2. Provide ampacity rating as indicated on the Drawings or required by NEC.
   3. Unless otherwise indicated on the Drawings, size fuses serving all motor loads at 175% of motor nameplate FLA or NEC motor table ampacity, whichever is larger.

B. 600-amp and less: UL Class RK-1 dual element, time delay.

C. 601-amp and larger: UL Class L time delay.

2.10 GROUND FAULT PROTECTION

A. Ground Fault Protection System:
1. Ground sensor relay (GSR) system with ground break components, solid state construction, adjustable current pick-up and time delay settings.
2. Coordinate ground sensor (CT) with integral test winding of sufficient size to encircle all phase and neutral conductors, for zero-sequence monitoring and a solid-state relay to operate the trip circuit on the main switches.
3. Provide required transformer to supply power for tripping switches and connect phase to phase.

B. Accessories Included:
1. Ground fault relaying system for main switches to be zero-sequence type.
2. Ground fault current-detection range to be 100a to 1,200a.
3. Time delay range to be instantaneous to 60 cycles.
4. Derive tripping and control power from control power transformers in switchboard.
5. Components shall include static ground fault sensor, current monitor, and test panel.

C. Where ground fault protection is required per NEC or indicated in the Specifications or the Drawings, coordinate with the equipment manufacturer to provide all proper GFCI / GFPE requirements for personnel (5ma) and equipment (30ma).

2.11 CONTACTORS AND RELAYS

A. General:
1. NEMA ICS 2, magnetically operated contactor with poles and contacts to match the circuit function and load. All contactors used for lighting shall be "lighting-rated".
2. Coordinate coil voltage with controls system. 120v preferred. Provide fused control circuit transformers as required.
3. Provide an enclosure to house all contactors and relays. See General Requirements above for NEMA enclosure rating requirements.
4. All contactors to be rated for the load type, voltage and continuously rated current.
5. Provide sufficient contactors and/or poles to accommodate quantity of circuits required to be switched plus an additional 25% for future growth.
6. Mechanically-held contactors are required except where electrically-held contactors are specifically noted in the Drawings or Specifications.

B. Mechanically-Held Contactors:
1. Mechanism electrically operated by solenoids and mechanically latched.
2. Coil clearing contacts to de-energized coils when device is held closed.
3. Required remote control relay and controls for proper latching and unlatching.

C. Electrically-Held Contactors:
1. Mechanism electrically-held by a solenoid.
2. Required relays and controls for proper operation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify mounting supports are properly sized and located including concealed bracing in walls.

3.2 PREPARATION

A. Coordinate with the power utility company to obtain information regarding the available short circuit current at the service point. Provide this information to the electrical gear manufacturer for use in the overcurrent protective device coordination study required by Section 26 05 73 - Power System Studies.

B. Coordinate all requirements with the power utility company and include in the base bid, including but not limited to the following:
   1. Whether the service will be overhead or underground.
   2. The extent of any underground primary.
   3. The need for a secondary enclosure. Provide in bid if required.
   4. Any charges from the power utility company for providing service.
   5. The need for a transocket for utility metering.

3.3 APPLICATION

A. Panelboards and Switchboards: Provide a complete isolated ground system including isolated ground panelboard with 200% neutral, SPD and separate isolated ground bus where indicated on the Drawings.

B. Transformers:
   1. Provide K-1 transformers when serving panelboards, unless altered by below items.
   2. Provide K-13 transformers when serving isolated ground panelboards.
   3. Provide K-20 transformers when serving panelboards in network operations centers (NOC).

C. Circuit Breakers:
   1. Provide ground fault circuit breakers (GFCI) where indicated on the Drawings, panelboard schedules and / or as required by NEC 210.8(B), 422.5, etc. For example, provide protection at all EWCs, hand dryers, kitchen equipment, concessions equipment, etc. Pull separate neutrals with each circuit to ensure correct GFCI operation.
   2. Provide combination AFCI / GFCI circuit breakers where AFCI protection is required per NEC and as indicated on the Drawings.

D. GFCI Protection:
   1. Provide ground fault protection at all service entrance equipment in accordance with NEC 230.95.
   2. Provide ground fault sensing and indication on emergency systems in accordance with NEC 700.27.
   3. Provide ground fault protection at any additional locations indicated on the Drawings.

E. Motor Disconnecting Means:
   1. Provide a motor-rated switch as a disconnecting means at all motors powered by 120v, 277v and 208v 1ph 20A circuits, unless otherwise indicated on the Drawings.

2. Provide a fused disconnect at all motors not listed above, unless otherwise indicated on the Drawings.

3.4 INSTALLATION

A. General:
   1. Set all equipment plumb, straight and level.
   2. Provide and install all equipment, including electrical connections, in accordance with the manufacturer's written instructions, the applicable requirements of NEC and the NECA "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve the intended function.

B. Electrical Service:
   1. Underground primary: Unless otherwise noted on the Drawings, provide two 4" conduits from the power utility company service point to pad-mounted transformers. Primary conductors will be provided by the power utility company. Coordinate exact location of service point with the power utility company.
   2. Pad-mounted transformer: Construct the transformer pad in accordance with the power utility company specifications. Coordinate with the power utility company before installation of concrete for exact size, location and all requirements. The transformer will be provided by the power utility company, unless otherwise noted.
   3. Secondary enclosure: Coordinate with the power utility company and provide a secondary enclosure where required to transition from the transformer output to the service entrance feeder. Provide the pad for the secondary enclosure. Provide all conduit, wire, and terminations between the transformer and the secondary enclosure.
   4. Underground service entrance: Provide all trenching, conduit, conductors and electrical equipment from the secondary terminals of the transformer / secondary enclosure to the main service disconnects.
   5. Overhead service entrance: Provide all conduit, conductors, supports, weatherheads, and sleeving from the electric service point to the main service disconnects.
   6. Metering: Provide conduits, conductors, cabinets, racks, transocket, and supports as required by the power utility company for service metering. All utility metering equipment will be provided by the power utility company.
   7. Final connection: Coordinate final connection with the power utility company.

C. Panelboards and Switchboards:
   1. Install in the locations as shown and as recommended in NEMA PB1.1. Mount the panelboards such that the top of the switch or circuit breaker in the highest position will not be more than 6-1/2 feet above the floor or working platform. Space all panelboards and switchboards to meet the requirements of NEC 110 and 408. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secured.
   2. Provide required SPD breaker for each panelboard/ switchboard as indicated on the Drawings.
   3. Coordinate installation of panelboards and enclosures with other trades, including Mechanical and Plumbing to avoid clearance issues with dedicated equipment space and working clearances.
   4. Place all free standing or floor mounted equipment on four (4) inch housekeeping pads.

D. Transformers:
   1. Mount transformers on additional vibration isolators and / or on neoprene and spring isolators at floor or other mounting points to meet sound ratings. Install per manufacturer's recommendations.
   2. Exterior weatherproof transformers: Mount on six (6) inch thick minimum steel reinforced concrete slab. Extend slab one (1) foot beyond transformer on each side. Provide weather shields from the manufacturer.
   3. Use flexible conduit, six (6) feet maximum length, for connections to transformer. Make conduit connections to side panelboard of enclosure.
   4. Check for damage and tight connections prior to energizing transformer. Measure primary and secondary voltages and make appropriate tap adjustments.
   5. At all floor-mounted transformers, installation shall be level and equipment shall be bolted to a raised four (4) inch concrete pad.
   6. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by the manufacturer.

E. Fuses:
   1. Check fasteners on fuse clips for tightness when installing fuses.
   2. Install fuses so label is in an upright, readable position. Fuses without labels are not acceptable.
   3. Do not install fuses until equipment is ready to be energized.

F. Safety Switches and Enclosed Circuit Breakers:
   1. Mount switches within six (6) feet of the equipment served, so that operating handle is easily accessible. Align tops of switches when grouped together.
   2. Provide a four (4) inch housekeeping pad for all free standing / floor mounted safety switches whether they are mounted inside or outside.
   3. Mount vertically on required separate support system hardware with switch easily accessible (door to open 90 degrees minimum).
   4. Permanently mount safety switches from inside with plated or stainless bolts, toggle bolts or anchors. Exposed mounting bolts, screws, etc. are not acceptable.
   5. Permanently install fusible switches with Class R fuse kits so that fuses are readable when looking at open switch.
   6. Do not mount switches / disconnects to access panels or on nameplate data on equipment per NEC.
   7. Installation of conductors: Switches shall not be used as “junction boxes” between HVAC units (splicing or “pig tailing” is not permitted). The maximum number of conductors allowed per termination is determined by the manufacturer’s approved rating for each terminal or lug.

G. Contactors and Relays:
   1. Unless otherwise indicated on the Drawings, mount contactors in electrical enclosures in the electrical room, mechanical room or designated area on Drawings in accordance with manufacturer's instructions and recommendations.
   2. Provide an override toggle switch for maintenance and testing located beside each contactor used for lighting.
      a. Provide relay with integral override switch per Exterior Lighting Controls details on the Drawings.

3.5 ELECTRICAL SERVICE AND METERING PROVISIONS

A. The Contractor shall provide all materials and labor shown on the Drawings and / or required for the complete installation except as specifically indicated to be by the serving power utility company. The Contractor shall meet all requirements as directed by the serving power utility company at the cost to the Contractor.

3.6 ADJUSTING

A. Electrical Load Balancing: Balance panelboards by checking each phase of all panels under full load and arrange so that all phases carry the same load as near as possible by moving individual branch circuits. After load balancing is complete, correct panelboard schedule directories to reflect all breakers and loads correctly.

B. Transformer Voltage Adjustments: Measure primary and secondary voltages and make appropriate tap adjustments.

C. GFCI Protection: Initial adjustments at service entrance equipment:
   1. Initial settings: At the time of installation, adjust the settings of the ground fault protection device as follows:
      a. Time delay: Adjust the time delay to 0.3 seconds.
      b. Pick-up: In no case can the setting exceed 1,200a. Observing this absolute maximum, adjust the ground fault trip setting to the greater of the following two options:
         1) 15% of the trip rating of the main breaker in the service entrance equipment.
         2) At least as large as the trip rating of the largest downstream overcurrent device that serves a single piece of equipment.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Provide factory fabricated wiring devices of the type and electrical rating for the service indicated. Provide proper selection to fulfill the wiring requirements. All wiring devices and associated wall plates shall be colored to match each other, unless indicated otherwise on the Drawings or changed by owner requirements, code requirements or these specifications.

B. Provide switch, receptacle, outlet, conduit, and special purpose wall plates for wiring devices, with ganging and cutouts as indicated, provided with metal screws for securing plates to devices with screw heads colored to match finish of plate.

C. Provide a compatible receptacle for the cap or plug and cord of all other equipment installed in this project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following, unless specific manufacturers are listed or restricted elsewhere in this specification section:
   1. Arrow Hart, Bell, Bryant, Cooper Industries, Eaton Corp., GE, Gleason, Graco, Hubbell, Kellems, KH Industries, Legrand, Leviton, Pass & Seymour, PerfectLine, ReelCraft, Wattstopper, and Wiremold

2.2 GENERAL REQUIREMENTS

A. Unless otherwise specified herein or indicated on the Drawings, all devices shall be specification grade, heavy duty, 20a rated (at equipment rated voltage with the required number of poles), back and side-wired with grounding terminals. Screw terminals or plugtail (P&S PTx series or similar) devices only, no push-in terminals. These devices shall comply with NEMA WD 1 and WD 6 Standards and shall all be listed.

B. Color:
   1. Device color shall be coordinated with Owner's Representative and shall reasonably match across all divisions. Emergency devices and plates shall be red.
   2. Device plate material shall be as follows: In gang toilets, mechanical spaces, kitchens and gyms, use stainless steel device plates and covers. In other finished spaces use smooth nylon device plates and covers.

C. All devices shall be properly labelled and identified per NEC, NFPA and IECC requirements. Additionally, all emergency device coverplates shall be labelled with the panelboard name and circuit number.

2.3 AC / TOGGLE SWITCHES

A. Unless otherwise specified herein or indicated on the Drawings, all switches to be quiet-type, complying with UL 20 and Federal Specification WC 896.

B. Key-operated switches shall be single pole, with factory-supplied key in lieu of switch handle. Corbin-style or barrel lock and key. Single-hump key not acceptable.

C. Wall Switches:

	Single Pole	Double Pole	Three-Way	Four-Way	Pilot Light
Eaton / Arrow	AH1221	AH1222	AH1223	AH1224	equal
Leviton	1221-2	1222-2	1223-2	1224-2	1221-PLR
Hubbell	HBL1221	HBL1222	HBL1223	HBL1224	HBL1221-PL
P & S	PS20AC1	PS20AC2	PS20AC3	PS20AC4	PS20AC1-RPL

D. Slotted Key-operated Switches:

	Single Pole	Double Pole	Three-Way	Four-Way
Eaton / Arrow	AH1221L	AH1222L	AH1223L	AH1224L
Leviton	1221-2L	1222-2L	1223-2L	1224-2L
Hubbell	HBL 1221L	HBL 1222L	HBL 1223L	HBL 1224L
P & S	PS20AC1L	PS20AC2L	PS20AC3L	PS20AC4L

E. Captive Twist Key-operated Switches:

	Single Pole	Double Pole	Three-Way	Four-Way
Eaton / Arrow	AH1191N	AH1192N	AH1193N	equal
Leviton	1221-2KL w/WS-35 key	1222-2KL w/WS-35 key	1223-2KL w/WS-35 key	1224-2KL w/WS-35 key
Hubbell	HBL 1221-RKL	HBL 1222-RKL	HBL 1223-RKL	HBL 1224-RKL
P & S	PS20AC1KL	PS20AC2KL	PS20AC3KL	PS20AC4KL

F. Motor-rated Switches:

	20A 2-Pole	20A 3-Pole	30A 3-Pole
Eaton / Arrow	AH6810U	equal	AH7810UD
Leviton	MS302-DS	MS303-DS	MS303-DS
Hubbell	HBL7832D	HBL7810D	HBL7810D
P & S	7802MD	7803MD	7803MD

2.4 RECEPTACLES

A. Unless otherwise specified herein or indicated on the Drawings, all receptacles to be NEMA 5-20R duplex, complying with NEMA WD 6 Standards, UL 498 and UL 943, Federal Specification WC 596F and WC 596.

B. Isolated Ground (IG) Receptacles: All IG receptacles to be four wire with self-ground strap. Place these receptacles at all computer and communications / technology locations if IG panelboards are provided.

C. GFCI Receptacles: GFCI receptacles to be NEMA 5-20R duplex, self-test, auto monitoring, complying with UL 498 and UL 943.

D. SPD Receptacles: NEMA 5-20R duplex, Type 3 SPD, >200 Joules, >6kA Surge, 3-mode, with indicator light.

E. Specification Grade, Heavy Duty Receptacles:

	20A Duplex	20A GFCI	20A IG	20A SPD	20A Tamper
Eaton / Arr	5362	GF20	IG5362	5362S	TR5362
Leviton	5362	GFNT2	5362-IG	7380	5362-SG
Hubbell	5362	GFRST20	IG5352	HBL5362-SA	5362TR
P & S	5362	P2097	IG5362	5362-SP	TR5362

F. Weatherproof Receptacles:
1. All weatherproof receptacles shall have GFCI protection at the device or at the breaker.

G. Controlled Receptacles:
1. Provide Leviton 5362-S1 series or equivalent by Eaton, Hubbell or P & S.
2. All controlled receptacles required to meet the Energy Code shall be duplex receptacles with the top receptacle controlled and the bottom receptacle non-controlled, unless otherwise noted on the Drawings.
3. All controlled receptacles shall meet NEC 406.3 marking requirements.
4. When controlled receptacles are required refer to Section 26 09 23 - Lighting Control Devices for plug load controllers and Sequence of Operations.

H. USB Charger Receptacles: 125V, 20A; comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, UL 498, UL 1310, and Federal Specification WC 596.
1. Provide Leviton T5833 series or equivalent by Eaton, Hubbell or P & S.
2. Single-piece, rivetless, nickel-plated, all-brass grounding.
3. USB Receptacles: Dual, Type A and C.
4. Line Voltage Receptacles: Dual, two-pole, three-wire, self-grounding.

2.5 VOICE / DATA OUTLETS

A. Refer to Division 27 for additional device and device plate requirements.

2.6 DEVICE PLATES

A. Both standard and oversized (jumbo / mid-size) device plates are allowed.

B. All device plates shall be attached with screws. No screwless device plates are allowed.

C. Weatherproof Cover Plates:
1. Provide cast metal weatherproof device plates with hinged cover with self-closing lid for all exterior receptacles and where noted on the Drawings. Leviton WM1D series or equivalent by Eaton, Hubbell or P & S.
2. When any outdoor receptacle is permanently in use (heat tape, etc.) provide a cover listed as "While In Use". Leviton IUM1x series or equivalent by Eaton, Hubbell or P & S.

PART 3 - EXECUTION

3.1 APPLICATION

A. All devices shall have GFCI and AFCI protection where required per NEC 210.

B. All receptacles shall meet tamper-resistant requirements where required per NEC 406 for the location installed.

3.2 INSTALLATION

A. All Devices:
1. Install devices plumb and level and mount all devices per ADA.
2. Install switches with OFF position down.
3. The Owner's Representative can move any device, before installation, up to six (6) feet in any direction at no additional cost to the Owner.
4. Install 302 / 304 stainless steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
5. Do not install behind markerboards, millwork, permanent mounted equipment, etc. Verify on Architectural drawings before installation. Where installed in unsuitable location, the Contractor will move as directed at no cost to the Owner.

B. GFCI Receptacles:
1. Install separate GFCI device at each location. Do not use feed through feature for any GFCI receptacle unless specifically noted on the Drawings.

C. Device Plates:
1. Use a single one-piece device plate for ganged devices (switches & receptacle).
2. Device plates shall be flush, level and completely cover all openings per NEC. Provide oversized plates where required. Where oversized plates are used, all plates in the space shall be oversized for consistency.

D. Cord Reels:
1. Install cord reels per notes on Drawings and cord reel detail.
2. Where a cord reel is required to be installed above a ceiling, mount cord reel such that roller assembly protrudes slightly through the ceiling. Provide trim plate at ceiling cutout.

3.3 QUALITY CONTROL

A. Verify outlet boxes are installed at proper height and covers properly attached.

B. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

C. Operate each wall switch with circuit energized and verify proper operation.

D. Verify each receptacle device is energized and test each for proper polarity.

E. Test each GFCI receptacle device for proper operation.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Interior and exterior lighting systems including, but not limited to, luminaires, drivers, emergency drivers, emergency lighting, power transfer devices, poles and pole bases, etc.

B. Exceptions include Section 26 55 61 - Theatrical Lighting and Section 26 56 68 - Exterior Athletic Lighting.

1.2 COORDINATION

A. Coordinate the location, mounting height and mounting style of luminaires with architectural RCP, mechanical (HVAC duct work, grilles, etc.), plumbing (exposed piping, sprinkler heads, etc.), technology (A/V, projectors, etc.) and other trades, as required, before installation.

B. In any space with a ceiling other than gypsum, T-grid or exposed, the Contractor shall install 3-4 luminiares and make the installation available for review by the Owner's Representative before installing the remaining luminiaires in the space.

C. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.

1.3 SUBMITTALS

A. Submit luminaires shown on the Luminaire Schedule on the Drawings and those noted on the Drawings but not on the schedule.

B. Product Data: In addition to the above requirements, submit complete product information for the following:
   1. Luminaires - complete manufacturer part number, delivered lumens, L70 rating, LM-80 testing hours, CCT (Correlated Color Temperature), CRI (Color Rendering Index), input wattage, finish, EPA (Effective Projected Area).
   2. Drivers - controls / dimming, power factor, THD (Total Harmonic Distortion).
   3. Emergency LED drivers - run time, battery chemistry, wattage.
   4. Power transfer devices for emergency lighting - manufacturer part number, wiring diagram.
   5. Poles - pole height, material, thickness, finish.

C. Indicate if DLC (DesignLights® Consortium) listing applies only to certain color temperatures, beam spreads, or other luminaire options. Indicate if any luminaire options void the DLC listing.

1.4 SAMPLES

A. Submit non-returnable samples of luminaires upon request. Include all components necessary for a working product.

1.5 WARRANTY

A. Provide a five (5) year manufacturer's warranty for all luminaires and emergency LED drivers. The warranty shall include all luminaire components including, but not limited to, LED arrays, drivers, luminaire body and hardware. LED arrays will be considered defective if a total of 15% or more of the individual diodes fail to illuminate.

B. Provide a one (1) year factory warranty on the pole and five (5) year extended warranty on pole finishes.

C. The warranty period shall cover the cost of equipment, materials, mobilization and labor for repair and replacement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Only those manufacturers of luminaires and poles listed on the Luminaire Schedule are acceptable.

2.2 PERFORMANCE / DESIGN CRITERIA

A. All luminaires shall be compatible with lighting controls shown on the Drawings or specified in Section 26 09 16 - Electrical Control Components and / or Section 26 09 23 - Lighting Control Devices.

B. Pole assemblies shall meet wind loading requirements for the area in which they are installed or 100 mph, whichever is greater. Pole assemblies include the pole, the pole base, pole-mounted luminaires, and any other component that would affect wind loading. Pole bases shall be designed by a Structural Engineer licensed to work in the state.

C. Exterior lighting shall meet all current city ordinances for light levels, light trespass and specific shielding requirements.

2.3 EXISTING PRODUCTS

A. New luminaires must match existing luminaires in all areas including but not limited to style, finish, orientation, mounting height, CCT, voltage, etc. The new luminaires shall meet the switching, dimming and control requirements of all current adopted codes and standards.

B. New poles must match existing poles in all areas including but not limited to style, finish, height, quality, etc. The new poles shall meet all current adopted codes and standards.

2.4 LUMINAIRES

A. All luminaires shall have the following listings based on usage:
   1. LED luminaires shall comply with UL 8750 and UL 1598 requirements.
   2. Emergency luminaires, including exit signs, shall be UL 924 listed.

3. Luminaires in hazardous locations shall comply with UL 844 requirements and be suitable for the environment.

B. See the Luminaire Schedule for CCT, THD, CRI, lumen output tolerance, wattage tolerance, L70 rating. When these values are not listed on the schedule, use the following values:
   1. CCT - 4000K, minimum 80 CRI (interior) and 70 CRI (exterior), THD 10% max, life expectancy - L70 at 50,000 hours per LM-80 test data using TM-21 procedures.
   2. Tolerance for Lumen Output shall be + / - 8% and Wattage (VA) shall be +5% / -10%.

C. CCT: Color Temperature shall be within a 3-step Standard Deviation Color Matching (SCDM) or MacAdam ellipse in accordance with ANSI C78.377.

D. Expected Life: The estimated L70 of LED luminaires shall be derived from LM-80 test data in accordance with TM-21 procedures. LM-80 test data shall be measured in accordance with LM-79 procedures.

E. Efficacy: All general purpose LED luminaires shall have a minimum efficacy of 90 lumens / watt.

F. Finishes: Unless otherwise noted, consult Owner's Representative for factory luminaire finish.

2.5 INTERIOR LUMINAIRES

A. All luminaires in gyms, play areas, multipurpose spaces, etc. shall have a hinged wire guard and retainer latches for tool-less maintenance.

2.6 EMERGENCY LIGHTING AND EXIT SIGNS

A. All emergency lighting and exit signs shall be provided with status indicator lamp and test switch. Integral test switch is preferred.

B. See Emergency LED Drivers part below for emergency driver information.

2.7 EXTERIOR LUMINAIRES

A. Pole mounted luminaires shall have an option for internal glare control or external glare shield.

2.8 POLES & POLE BASE HARDWARE

A. Pole Height: Poles shall be of the height and with brackets, etc. as indicated on the Luminaire Schedule. Where pole height has not been given, provide twenty-five (25) feet minimum length poles for parking lot and driveway lighting, and twelve (12) feet minimum length poles for walkway lighting.

B. Wind Load: All poles shall rated for 100 miles per hour wind speed with gust factor of 1.3. Provide all windstorm certificates as required.

C. Steel and Aluminum Poles: Shall be one piece, ground smooth.

D. Concrete Poles: Concrete poles shall conform to ASTM C150, Type I or III, or other types for special conditions.

E. Pole Base Hardware: Provide hot-dipped galvanized anchor bolts, pole base cover (no exposed hardware acceptable), templates, ground rods, rigid metal conduit elbows, concrete base, etc., for the installation of concrete bases as detailed on the Drawings.

F. Finishes: Unless otherwise noted, consult Owner's Representative for factory UV rated powder coat finish or clear anodized finish on all poles and associated hardware.

2.9 LED DRIVERS

A. Shall be factory installed, unless otherwise indicated on the Drawings or prior approval is given by the Engineer.

B. Drivers shall comply with UL 8750, be UL Type TL or UL Class P listed and bear such labels.

C. Voltage: Drivers shall be 60hz, universal input voltage (120v thru 277v) + / - 10% unless otherwise indicated on the Luminaire Schedule. Drivers shall demonstrate no visible change in light output with a variation of + / - 10% change in line voltage input.

D. Remote Drivers: Unless otherwise dictated on the Drawings, remote drivers shall have remote wiring capability of fifty (50) feet minimum.

E. Sensor Compatibility: Drivers shall be compatible with and not cause interference with the operation of motion sensors or other infrared control systems.

F. Performance: Drivers shall have a power factor of 0.9 or greater, have an efficiency of 85% or greater and have an audible noise rating of 27dB Class A or less.

G. Case Temperature: Interior drivers shall have a maximum case temperature rating of 75ºC. Exterior drivers shall have a maximum case temperature rating of 85ºC.

H. Operating Ambient Temperature Range: Drivers shall be rated for a temperature range of 32ºF - 122ºF when mounted inside and rated to 0ºF when outside or above an outside ceiling.

I. Electromagnetic Compliance: Drivers shall comply with CFR Title 47 Part 15 Class A.

2.10 EMERGENCY LED DRIVERS

A. In addition to the above driver requirements, Emergency drivers shall also meet the following:
   1. Shall be rated for at least ninety (90) minutes at full light output (120 minutes in storm shelters) unless otherwise noted on the Drawings.
   2. Shall operate with constant output power to maintain the output wattage to the LED array even as the system voltage diminishes.
   3. Shall be maintenance-free, nickel-cadmium battery technology.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide all luminaires of the types indicated, in accordance with NEMA standards, manufacturer’s recommendations, and NEC requirements.

B. Install indoor lighting systems in accordance with NECA / IESNA 500 and all exterior lighting systems in accordance with NECA / IESNA 501.

C. Install all interior and exterior luminaires as shown on the Drawings. Where the layout needs to be altered, coordinate with the Owner's Representative for direction before installing luminaires to ensure even illumination and proper light levels.

D. Provide support for all interior luminaires by means of bar hangers extended across the main ceiling support members. See lighting details on the Drawings for more information.

E. All interior luminaires shall be independently supported from the building structure.

F. Provide luminaires complete with LED arrays, LED drivers, and other accessories necessary for proper installation in the building construction and listed for fire rated ceilings where required by code or shown on the Drawings.

G. Provide all exterior parking lot, area, site and walkway poles complete with luminaires, any required mounting hardware, wiring, controls, etc. required for a complete system.

H. Lighting Control: Provide switches with matching technology (line voltage dimming, 0-10V dimming, etc.) for dimming drivers in the locations shown on the Drawings. Provide lighting controls in accordance with Section 26 09 16 - Electrical Control Components, Section 26 09 23 - Lighting Control Devices and / or Section 26 55 61 - Theatrical Lighting.

I. Emergency Lighting: Provide an emergency LED driver, power transfer switch, internal wiring etc. in each luminaire that is indicated on the Drawings as an emergency luminaire or night light.

J. Emergency Lighting Power: For all emergency lighting powered by a generator or UPS, provide an emergency power circuit to every power transfer device.

K. Mount recessed luminaires in the center of a ceiling tile or as shown on the Drawings.

L. Provide luminaire whips (flex conduit / metal clad cable) from a junction box to each luminaire (not to exceed four luminaires per junction box) access plate. Luminaire whips between luminaires will not be accepted. Refer to luminaire installation details on the Drawings for more information.

M. Locate all remote LED drivers and / or emergency LED drivers as noted on the Drawings. Otherwise, install above the ceiling above each luminaire or in an adjacent room with a low ceiling for easy access. Provide a permanent label on the ceiling t-grid to identify locations of all remote drivers. Mount drivers on rubber insulators.

N. All exit signs and night lights shall not be switched. Provide a constant hot tied back to the panelboard serving the lighting in the space.

3.2 SITE QUALITY CONTROL

A. Prior to final inspection, check all luminaires for damage during construction and replace damaged luminaires at no additional expense to the Owner. Test all emergency luminaires for proper operation, including exercising all transfer switching, emergency

LED drivers, generator, etc. All luminaires shall be cleaned and completely operational at the time of final acceptance of the building.

B. Where specific light levels are mentioned on the Drawings and the luminaire type, quantity, locations or lumen output is changed, the Contractor shall ensure light levels are met. Re-aim or add lighting as necessary.

C. The design intent shown on the Drawings meets the city ordinances for outdoor lighting trespass and minimum light level requirements. It is the responsibility of this Contractor to ensure that the lighting is installed to meet the design intent and city ordinances. Where required, re-aim or add shields to meet these requirements.

3.3 ADJUSTING

A. The Contractor shall move any luminaire up to six feet in any direction as directed at no additional cost.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

i) Protection of existing trees.

ii) Removal of trees and other vegetation.

iii) Topsoil stripping.

iv) Clearing and grubbing.

v) Removing above-grade improvements.

vi) Removing below-grade improvements.

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

i) Protect improvements on adjoining properties and on Owner's property.

ii) Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation:_Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

i) Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

ii) Provide protection for_roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

iii) Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ a licensed arborist to repair damages to trees and shrubs.

iv) Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

D. Improvements on Adjoining Property: Authority for performing removal and alteration work on property adjoining Owner's property will be obtained by Owner prior to award of contract.

i) Extent of work on adjacent Property is indicated on Drawings.

E. Savable Improvements: Carefully remove items indicated to be salvaged, and store on Owner's premises where indicated or directed.

PART 2 – PRODUCTS

Not applicable to this Section.

PART 3 - EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar Items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Topsoil: Topsoil is defined as friable day loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, day lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

a. Remove heavy growths of grass from areas before stripping.

b. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

i) Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.

ii) Dispose of unsuitable or excess topsoil same as specified for disposal of waste material.

C. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.

i) Completely remove stumps, roots, and other debris protruding through ground surface.

ii) Use only hand methods for grubbing inside drip line of trees indicated to remain.

iii) Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

(1) Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

D. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

i) Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings, and is included under work of related Division 15 and 16 sections. Removal of abandoned underground piping or conduit interfering with construction is included under this Section.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not permitted on Owner's property.

1. Removal from Owner's Property: Remove waste materials and unsuitable or excess topsoil from Owner's property.

END OF SECTION 31 10 00

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31 23 00

EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Preparing of sub-grade for building slab, walks, and pavements.

2. Excavating and backfilling of trenches within building lines.

3. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances within building lines.

4. Final Grading, together with placement and preparation of topsoil for lawns and planting, is specified in Division 2 Section, "Landscape Work."

1.3 SUBMITTALS

A. Test Reports: The independent testing laboratory shall submit the following reports directly to Architect/Engineer with copy to others as designated in accordance with the provisions of section 01400 "Quality Control Services." State in each report whether or not the test specimens comply with the specified requirements, and indicate any deviations.

1. Test reports on soil material properties.

2. Verification of suitability of each pier bearing material, in accordance with specified requirements.

3. Field reports; in-place soil density tests.

4. 'One optimum moisture-maximum density curve for each type of soil encountered.

B. Testing Laboratory Qualifications: To qualify for acceptance, the geo-technical testing laboratory must demonstrate to Architect/Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the Work.

1.4 DEFINITIONS

A. Borrow consists of off-site material.

B. Excavation consists of removal of all materials encountered to obtain the required subgrade elevations indicated and subsequent disposal of materials removed.

C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.

D. Additional Excavation: When excavation has reached required subgrade elevations, notify Architect/Engineer, who will make an inspection of conditions. If Architect/Engineer determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Architect/Engineer. The Contract Sum may be adjusted by an appropriate Contract Modification.

Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

E. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase or topsoil materials.
Structure: Buildings, foundations, slabs, curbs, or other man-made stationary features occurring above or below ground surface.

1.5 QUALITY ASSURANCE

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

B. Soil properties: Test in accordance with the requirements of Part 2 - Products, article "Soil Materials."

1.6 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

1. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities indicated to remain in place, provide adequate means of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for direction. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Architect/Engineer and then only after acceptable temporary utility services have been provided.

3. Provide minimum of 48-hour notice to Architect/Engineer, and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

5. Use of Explosives: Use of explosives is not permitted.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP, and meeting the requirements of the General Notes on the structural drawings.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.

C. Subbase Material: Clean naturally or artificially graded mixture of natural or crushed gravel, crushed stone, crushed slag or crushed sand.

D. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter. Refer to the general notes on the drawings for acceptable soil properties as determined by ASTM D4318.

E. Other Materials: All other materials not specifically described, but required for the proper completion of the work of this section, shall be as selected by the Contractor subject to the approval of the Architect/Engineer.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. STABILITY OF EXCAVATIONS

C. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
D. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion *of* backfilling.

E. Shoring and Bracing: Provide materials for shoring and bracing, such as, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

3.2 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

B. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches. Do not allow water to stand near the foundation of any structure at any time.

3.3 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.

B. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

C. Dispose *of* excess excavated soil material and materials not acceptable for use as backfill or fill.

3.4 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

B. When excavation exceeds five (5) foot in depth, the soil on all sides of the excavation shall be laid back at a slope not to exceed two (2) horizontal to one (1) vertical.

C. Removal of Unsatisfactory Soil Materials: Excavate unsatisfactory soil materials encountered that extend below the required elevations, to the additional depth directed by the Architect/Engineer. Such additional excavation, provided it is not due to the fault or neglect of the Contractor, will be measured as directed by the Architect/Engineer and paid for by the Owner as a change in the work. Where the removal of unsatisfactory soil materials, is due to the fault or negligence of the Contractor in his performance of earthwork and site grading operations, excavate the resulting unsatisfactory soil material and replace with compacted satisfactory soil material as required.

3.5 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit. When excavation exceeds five (5) foot in depth, the soil on all sides of the excavation shall be laid back at a slope not to exceed two (2) horizontal to one (1) vertical.

B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or co it on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

C. For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

D. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads. Ensure continuous bearing of pipe barrel on bearing surface.

3.6 COLD WEATHER PROTECTION

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

3.7 BACKFILL AND FILL

A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.

1. Under grassed areas, use satisfactory excavated or borrow material.

2. Under walks and pavements, use subbase material, satisfactory excavated or borrow material, or a combination.

3. Under steps, use subbase material.

4. Under building slab , use fill material.

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

6. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Architect/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing and waterproofing.

2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.

5. Removal of trash and debris from excavation.

3.8 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than I vertical to 4 horizontals so that fill material will bond with existing surface.

1. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

B. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

C. Before compaction, moisten or aerate each lave as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

E. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated.

F. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 698:

G. Under building slabs on joists. compact top 6 inches of subgrade and each layer of backfill or fill material at a minimum of 90 percent maximum density, and a maximum of 100 percent maximum density.

H. Under Pavements, compact top 12 inches of subgrade and each layer of backfill or fill material at a minimum of 95 percent maximum density, and a maximum of 100 percent maximum density.

I. Under lawn or unpaved areas, compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent maximum density.

J. Under walkways, compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

K. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations. Acceptable moisture content shall be from optimum to plus 5% from optimum as determined by ASTM D 698.

L. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

M. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.9 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades. Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross section as shown on the drawings.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0. 10 foot above or below required subgrade elevations.

2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

3. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 1 0-foot straightedge.

4. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification

3.10 PAVEMENT SUBBASE COURSE

A. General: Subbase course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement base course.

1. Refer to other Division 2 sections for paving specifications.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-inch width of shoulder simultaneous with the compaction and rolling of each layer of subbase course.

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

1. When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.11 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Independent testing laboratory shall inspect and approve each subgrade and fill layer before further backfill or construction work is performed. The testing laboratory will be responsible for verbally informing the Contractor of the test results immediately upon completion, so unnecessary delay is eliminated and unsatisfactory work is not covered up. Continued progress of the work shall not relieve the Contractor of the responsibility of complying with specification requirements.

B. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

C. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

D. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect/Engineer.

E. Paved Area and Building Slab Subgrade: Perform at least one field density test of subgrade per the frequency listed below, but in no case fewer that three tests. In each compacted fill layer, perform one field density test per the frequency listed below, but in no case fewer than three tests.

1. Structures and building slabs: 7500 sq. ft.

2. Pavements: 10,000 sq ft for the subgrade and layer of fill, and 5000 sq ft for the top layer of fill.

3. Site Utilities: Every 300 lineal foot of trench, or in accordance with the local governing authority.

F. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.

G. If in opinion of Architect/Engineer, , based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.12 EROSION CONTROL

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction.

B. Use all means necessary to control dust on and near the work and on and near all off-site borrow areas if such dust is caused by the Contractor's operations during performance of the work or if resulting from the condition in which the Contractor leaves the site.

C. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

3.13 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

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

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

3.14 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

B. Remove excess excavated material, trash, debris, and waste materials and dispose of it off Owner's property.

END OF SECTION 31 00 00

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SECTION 31 23 12

SELECT MATERIAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section consists of required excavation, removal and proper utilization of materials secured from sources provided by the Contractor.

PART 2 - PRODUCTS

2.01 SELECT MATERIAL

A. Select Material shall consist of a poor grade sand or other suitable free draining granular material, free from vegetation or other objectionable matter, reasonably free from lumps of earth, and shall meet the following requirements.

1. The Liquid Limit shall not exceed 45.
2. The Plasticity Index shall not be less than 4 nor more than 15.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

A. Use selected material in the installation of backfill material as indicated on the Drawings. The completed work shall conform to the established alignment, grades and cross sections.

B. The required density of the select material is 95 percent of maximum density at approximately optimum moisture content as determined by ASTM D-698.

END OF SECTION 31 23 12

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SECTION 31 23 14

SUBGRADE PREPARATION

PART 1 – GENERAL

1.1. DESCRIPTION

A. The work as specified in this section shall consist of preparing the top 6 or 8 inches of the finished grade for pavement and/or curb and gutters. Sub grade preparation will be considered for that portion of sub grade under pavements and 2 feet outside the back of curbs, and under concrete channel sections.

B. Sub grade soils shall be classed for this purpose under three classifications; namely inert, active, and very active. Inert soils shall be those soils having a plasticity index of 10 or less. Active soils shall be those soils have a plasticity index of 10 to 20. Very active soils shall be those soils having a plasticity index of 20 or more.

1.2. MEASUREMENT AND PAYMENT

A. Preparation, manipulation and compaction of sub grade either with no additions, with lime, or with cement will be measured by the square yard complete in place and will be required 2 feet outside of the back of curbs. Payment for sub grade preparation shall be paid for at the unit price as shown in the bid proposal for the applicable bid item.

B. If cement or lime is required, it will be measured by the ton (2000 lbs.) based on the actual delivered and incorporated material complete in place. Payment for cement or lime for sub grade shall be paid for at the unit price shown in the bid proposal for the applicable bid item.

PART 2 - MATERIALS AND EXECUTION

2.1. SUBGRADE PREPARATION FOR INERT SOILS

This item shall consist of preparing the 6 inch sub grade in those soils having a plasticity index of 10 or less.

A. When the excavation or fill has been constructed to sub grade elevation, the City will have the laboratory take samples and determine the characteristics of the soil and the density requirements at optimum moisture.

B. The sub grade shall then be scarified and wetted to optimum moisture or above. The moisture shall be thoroughly mixed into the 6 inch sub grade by discing, blading or other methods approved by the Engineer.

C. The Contractor shall then proceed to compact the 6 inch sub grade by means of sheep foot, pneumatic or other type of compaction equipment to 95 percent of Standard Proctor.

D. When density tests have been made and it is determined that the sub grade is to the proper required density, the Contractor will smooth the sub grade by means of motor grader or other approved blading equipment and rolled with a 10 ton flat wheel roller to obtain smooth densely compacted finish at grade + 1/4 inch.

E. The Contractor may now proceed to set forms for concrete pavement, curb and gutter, or concrete channel, whichever has been previously agreed upon with the City of Irving.

2.2. SUBGRADE PREPARATION FOR ACTIVE SOILS

This item shall consist of preparing the 6 inch sub grade in those soils having a plasticity index between 10 and 20.

A. If the Contractor and the Owner do so desire, the existing 6 inch sub grade may be removed and replaced by suitable soils of inert characteristics having a plasticity index of 10 or less.

B. If the Contractor and Owner so desire, soil admixture may be used such as the addition of sand or friable material which when mixed with existing soils will reduce the plasticity index to 10 or less.

C. If the Contractor and Owner so desire, hydrated lime or lime slurry may be added to the existing soils which when thoroughly mixed will result in a sub grade with a plasticity index of 10 or less.

1. Hydrated lime and lime slurry shall meet the requirements of THD Specification No. Item 264.

2. When the laboratory has decided the optimum percentage of lime, the Contractor shall scarify the sub grade and spread the required amount of lime or lime slurry thereon. He shall then thoroughly mix and

blade the lime uniformly throughout the 6 inch sub grade with the addition of water to insure thorough mixing.

Next, the Contractor shall begin mixing operations with approved pulvimixers which are in good working condition. This operation shall continue until lime is thoroughly incorporated in the sub grade, water being added as required.

3. The sub grade thus prepared shall be left to cure a minimum of 3 days while moisture is being added as needed and directed. After the 3 day curing period the Contractor will be required to mix the sub grade soil again until it is thoroughly fluffed and of uniform consistency.
4. After the sub grade has been left to cure and removed, the Contractor shall begin compacting the sub grade, being sure that at least optimum moisture is incorporated, by means of sheep foot, pneumatic or other approved compaction equipment to 95 percent Standard Proctor density at optimum moisture or above.
5. When the sub grade has been thoroughly stabilized and compacted, the finished sub grade shall be carefully bladed to within 1/4 inch of finished grade and compacted and rolled with a 10 ton flat wheel roller.
6. The sub grade now having been prepared, the Contractor may proceed with setting the pavement or curb and gutter forms.

2.3. SUBGRADE PREPARATION FOR VERY ACTIVE SOILS

This item shall consist of preparing the 8 inch sub grade in those soils having a plasticity index of 20 or more.

A. Sub grade shall be prepared by mixing Portland cement, 8% by weight, thoroughly into the top eight inches of soil.

B. Portland cement shall meet the requirements of THD specification NO. Item 272.

C. When the laboratory has decided the optimum percentage of cement, the Contractor shall scarify the sub grade and spread the required amount of cement in slurry form thereon. The slurry shall be agitated to prevent the cement from settling, and shall be distributed evenly across the site.

D. The Contractor shall then thoroughly mix and blade the cement uniformly throughout the 8 inch sub grade. The Contractor shall begin mixing operations with approve pulvimixers which are in good working condition.

E. Add water as necessary to achieve optimum moisture and for ease of pulverization. Continue processing until the gradation requirements have been met.

F. Compact the cement modified sub grade to 95% Standard Proctor Density at optimum moisture by means of sheep foot, pneumatic or other approved compaction equipment.

G. The sub grade thus prepared shall be left to cure a minimum of 7 days while moisture is being added as needed.

H. After 7 day curing has been achieved, carefully blade the sub grade to within 1/4 inch of finished grade and compacted and rolled with a 10 ton flat wheel roller.

I. The sub grade now having been prepared, the Contractor may proceed with setting the pavement or curb and gutter forms.

END OF SECTION 31 23 14

SECTION 31 32 00

LIME SOIL STABILIZATION

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 SUMMARY

A. This section includes the materials, mixing, placement, and compaction required for the stabilization of soils by pulverizing, adding lime, and finishing to the lines and grades shown on the drawings. Scope of the work shall be as described in the contract drawings.

1.3 SUBMITTALS

A. Test Reports: The independent testing laboratory shall submit the following reports directly to Architect/Engineer with copy to others as designated in accordance with the provisions of section 01400" Quality Control Services." State in each report whether or not the test specimens comply with the specified requirements, and indicate any deviations.

i. Field reports; in-place soil density and moisture content tests.

ii. Field reports; pulverized soil gradation tests.

1.4 QUALITY ASSURANCE

A. Coordination: If separate contractors are involved with the lime stabilization and the general fill operations, the General Contractor shall be responsible for the proper coordination of the work to insure full compliance with all portions of the specifications, and shall be the single source of responsibility.

B. Existing Conditions: If conditions are other than shown on the drawings or contract documents, notify the Architect/Engineer immediately.

C. Precautions Extreme precautions shall be taken to prevent contamination of areas of the site where existing trees or other vegetation is to remain and where future planting is to be placed which is not sufficiently covered with additional topsoil material to prevent contamination. Similar precautions shall be taken to protect adjacent property and traffic.

D. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

i. Texas State Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets, and Bridges (SDHPT).

1. Item 260 - Lime Treatment for Materials in Place
2. Item 264 - Hydrated lime and Lime Slurry

PART 2-PRODUCTS

2.1 MATERIAL

A. Hydrated Lime: SDHPT, Item 264, Commercial Lime, Type B, Grade 1.

B. Hydrated lime shall be a dry powder obtained by treating quick-lime with enough water to satisfy its chemical affinity for water under the conditions of Its hydration. This material should consist essentially of calcium hydroxide, magnesium oxide, and magnesium hydroxide, which are the active constituents of lime.

C. Lime Concentration Two alternative requirements based on different tests are permissible:

i. Total Oxides: For either high calcium or dolomitic hydrated lime, a minimum of 95% total oxide content (CaO + MgO) on a non-volatile basis is required.

ii. If this test is elected, the hydrate must contain no more than 5% carbon dioxide content, if sampled at lime plant, or no more than 7%, if sampled at destination. Determination of total oxide and carbon dioxide contents shall conform to ASTM Specification C 25, "Chemical Analysis of Limestone, Quicklime, and Hydrated Lime."

iii. Available Lime: For high calcium hydrated lime a minimum available lime (CaO) content of 90% is required, on a non-volatile basis (corresponding to a minimum of 68.1 % on a volatile basis).

iv. Determination of available lime shall conform to either the "Rapid Sugar" test in ASTM Specification C 25 or any equivalent test, such as AASHO T219-72, "Testing Lime for Chemical Constituents and Particle Size."

D. Particle Size: All hydrated lime shall conform to the following gradation requirement: At least 85% passing a #200 sieve. Determination of particle size shall conform to the provision for wet sieving in ASTM C 110, "Methods of Physical Testing for Quicklime and Hydrated Lime."

E. Water: Clean, potable, and free of impurities.

F. Other Materials: All other materials not specifically described but required for the proper completion of the work in this section, shall be as selected by the Contractor, subject to the approval of the Architect/Engineer.

PART 3 - EXECUTION

3.1 GENERAL

A. Under drives and parking areas the top six inches of subgrade shall be stabilized to a distance of two feet beyond the edge of the paving.

B. The hydrated lime shall be applied only in the area where the first mixing operations can be completed during the same working day.

C. The hydrated lime shall be placed by the slurry method.

D. Construction methods shall conform to the applicable sections of the SDHPT specification, Item 260, Lime treatment for Materials in Place."

3.2 APPLICATION

A. The percent of hydrated lime to the dry weight of the soil shall be seven percent (7%). The Contractor shall be responsible for calculating the number of square yards in each area and the amounts (pounds) per truck load, so that the rate of application can be checked very closely.

B. The distribution of lime shall be uniformly placed in such quantity that all soil to be treated receives the minimum percentage of lime and successive passes made until the proper moisture and lime content is obtained.

C. Slurry Method: The hydrated lime shall be mixed with water in trucks or in tanks and applied as a thin water suspension or slurry. The distributor truck or tank shall be equipped with an agitator which will keep the lime and water in a uniform mixture.

3.3 MIXING

A. The soil material and hydrated lime shall be thoroughly mixed by a rotary mixer or other device to obtain a homogeneous, friable mixture of soil material and lime, free from all clods or lumps.

B. Immediately after the first mixing operation, the mixture shall be sealed with a light pneumatic rubber tire roller and left to cure 48 to 72 hours, as directed by the Architect/Engineer. During the curing period the material shall be kept moist.

3.4 FINAL MIXING:

A. After the required curing time, the material shall be uniformly mixed with a rotary mixer capable of reducing the size of the particles so that when all non-slaking aggregates (asphalt particles) retained on the No. 4 sieve are removed, the remainder of the material shall meet the following requirements when tested dry by laboratory sieves:

   i. minimum passing 1 3/4" sieve -100%
   ii. minimum passing No. 4 sieve -60%

B. During the interval of time between application and mixing, the hydrated lime should not be exposed to the open air for a period of over six (6) hours.

3.5 COMPACTION:

A. General Compaction of the mixture shall begin immediately after final mixing, and in no case later than 3 calendar days after final mixing. The material should be aerated or sprinkled as necessary to provide the optimum moisture. Compaction shall begin at the bottom and continue until the entire depth of mixture is uniformly compacted. All irregularities, depressions, or weak spots which develop must be corrected immediately by scarifying the areas affected, adding or removing material, and reshaping and recompacting by sprinkling and rolling. The surface should be maintained in a smooth condition - free from undulations and ruts.

B. Control soil compaction, providing minimum percentage of density specified for each area classification indicated.

   i. Percentage of Maximum Density Requirement Compact soil to not less than 95 percents of maximum density, in accordance with ASTM D 698.

   ii. Moisture Control: The percentage of moisture in the mixture based on oven-dry weights, shall not be below or more than three percentage points above its optimum moisture content as determined by ASTM D 698.

3.6 FINISHED GRADING:

A. After the required compaction is reached, the subgrade should be brought to the required lines and grades and finished by rolling with a pneumatic tire or other suitable roller sufficiently light to prevent hairline cracking.

B. Surface of the subgrade shall not show any deviation in excess of 1/8 inch above or one inch below established subgrade elevation.

3.7 CURING:

A. The compacted section shall be moist-cured for a minimum of three (3) days. To prevent damage from traffic, the completed section shall not be opened to traffic for two (10) days after compaction.

3.8 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction Independent testing laboratory shall inspect and approve each subgrade and fill layer before further backfill or construction work is performed. The testing laboratory will be responsible for verbally informing the Contractor of the test results immediately upon completion, so unnecessary delay is eliminated and unsatisfactory work is not covered up. Continued progress of the work shall not relieve the Contractor of the responsibility of complying with specification requirements.

B. Subgrade Density Tests: Perform at least one field density test of the subgrade for every 5,000 sq ft for the subgrade and each layer of fill, and 5000 sq ft for the top layer of fill, but in no case fewer that three tests. Perform tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

   i. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

ii. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect/Engineer.

C. Subgrade Pulverization Sieve Tests: Perform at least one sieve test of the subgrade for every 10,000 sq ft for the subgrade and each layer of fill, and 5000 sq ft for the top layer of fill, but in no case fewer than three tests.

i. Provide standard ASTM No. 4 and 1 inch sieves, and select sample size in accordance with ASTM C 136. The percent of passing shall be determined by weight.

END OF SECTION 31 32 00

SECTION 32 01 90

LANDSCAPE GROUNDS MAINTENANCE

The Contractor is to render the following Landscape Maintenance Services during the term of the initial construction contract for all areas of the site that are disturbed by construction or utilized for construction purposes. Maintenance shall continue per the schedule until all landscape and irrigation is completed and accepted.

PART 1 - GENERAL

1.1 SCOPE

A. Work included in project: Perform all work necessary utilizing acceptable horticultural practices for the exterior landscape maintenance of the project as required herein. Such work includes, but is not limited to the following:

1. Monitoring adjustment and minor repair of the landscape irrigation system.
2. Protection of vacuum breakers against freeze damage.
3. Mowing, edging and trimming of lawn areas.
4. Pruning and trimming of trees and shrubs.
5. Restaking and adjustment of stakes and guying if required.
6. Application of fertilizers, insecticides and herbicides.
7. Replacement of plant material (extra service if not under warranty).
8. General site clean up; removal of trash, and products of maintenance.

B. Extra Services: The intent of the contract is to provide a comprehensive maintenance program to include all required services, except those services specifically excluded, to perform the work for the stated time period.

1. All services not included in the base bid shall be considered “extra services” and will be charge for separately according to the nature of the item of work. The written consent and authorization of the Owner or their authorized representative must be obtained prior to the performance or installation of such “extra service” items and prior to purchase of any chargeable materials.

2. Such work may include replacement of dead plant materials or major repairs of irrigation system created by acts of vandalism or other contractors working on other site related work.

3. The Owner is not bound by the specification or contract to utilize the landscape maintenance contractor in the performance of “extra services work”.

4. The landscape maintenance contractor shall coordinate his activities with other contractors on the site so as to not hinder the performance of any work.

1.2 SCHEDULE

All work under this Contractor shall be performed in accordance with the Schedule included.

1.3 CONTRACTOR'S PERFORMANCE

A. The Contractor's workmen shall be neat in appearance, perform their work in a professional manner, keep noise to a minimum and stage their work from a location on the site out of the way of the mainstream of the users.

1.4 NEGLECT AND VANDALISM

A. Turf, trees or plants that are damaged or killed due to Contractor's operations, negligence or chemicals shall be replaced at no expense to the Owner. If plant damage or death is caused by conditions beyond the Contractor's control, replacement shall be at the Owner's expense.

B. Sprinklers or structures that are damaged due to the Contractor's operations must be replaced by the Contractor promptly.

C. All water damage, either natural or man-made, resulting from Contractor's neglect shall be corrected at the Contractor's expense.

D. All damage to or thefts of landscaping and irrigation installations not caused or allowed by the Contractor shall be corrected by the Contractor.

1.5 JOB CONDITIONS

A. Contractor shall acquaint himself with all site conditions. Should excavation be required the Contractor shall promptly notify the utility coordination committed for utility locations. Failure to do so will make Contractor liable for any and all damage thereto arising from his operations.

B. Contractor shall take necessary precautions to protect site conditions, irrigation and plants. Should damage be incurred, this Contractor shall repair damage to its original condition or furnish and install equal replacement at this expense.

1.6 EMERGENCIES

A. The Contractor shall answer emergency or complaint calls within twelve (12) hours and corrective action shall be complete within 24 hours.

B. The Contractor shall answer emergency calls regarding the landscape irrigation system failure or need of repair and take corrective action within eight (8) hours. Such work, unless caused due t neglect on the part of the Landscape Maintenance Contractor, shall be considered "Extra Services".

1.7 RESTRICTION

A. Do not use growth regulators or growth retardants on this job.

PART 2 - MATERIALS AND MACHINERY

2.1 IRRIGATION SYSTEM MATERIALS

Replacement materials throughout the system shall be as specified and/or noted on the "Contract Documents", new and in perfect condition.

2.2 MATERIALS

Materials listed under this Section are expressly specified for use but does not prohibit or restrict the Contractor from providing other approved materials not listed in order to complete the work required herein. All materials shall be new and in perfect condition.

A. Pre-Emergence Weed Control: Contractor option (granular).

B. Post-Emergence Weed Control: Contractor option.

C. Herbicide, Insecticide, Fungicide: Contractor option.

D. Fungicide: Contractor option.

E. Fire Ant Control: Shall be slow release applied at six (6) week intervals. Spot treat weekly with a contact product where mounds appear. Alternate products for effective control.

F. Shrub Bed Fertilizer: Apply at manufacturer's recommended rates for each plant used. Shall be Osmacote Slow Release.

G. Lawn Fertilizer: 15-5-10 with 50% sulphur coated urea and 4% iron.

H. Tree Fertilizer: Davey Arborgreen: apply using the maximum manufacturer's recommended rate and procedures.

I. Mulch: Shredded Hardwood mulch.

J. Tree Stakes and Guys: Shall match those in use at the site.

PART 3 - EXECUTION

3.1 LANDSCAPE IRRIGATION SYSTEM

The Contractor shall monitor and program the automatic controlling device a total of 18 times a year to provide optimum moisture levels in all planted areas. The contractor is only responsible for this until final acceptance.

A. Irrigation cycles shall be set to take place prior to sunrise (usually 4:00 - 5:00 am unless otherwise instructed by the Owner.

B. Do not program controllers operating on the same water meter to water during the same time period so as to prevent over-draft of water meters. Do not switch controller to "off" at any time, except as required for testing and for maintenance operations.

C. Complete sprinkler system servicing shall be performed as required to maintain sprinklers in correct operating condition, including all required labor. April through September the operation of sprinklers shall be inspected and monitored on a twice-per-month basis to assure proper cover and operation. October through March monitor and inspect sprinklers once per month or upon the request of the Owner. This check shall include visual “inspection” of all accessible components of the irrigation system including but not limited to controllers, remote control valves, quick couplers and heads.

D. Adjust sprinklers to avoid damage to windows, buildings and sign walls, also adjust heads to keep water off the street. Make repairs and alterations to the sprinkling system and water lines. All sprinkler repairs such as cleaning of heads or breaks caused by the Contractor shall be the Contractor’s responsibility.

3.2 TREE MAINTENANCE

A. Trees that may require guys, stakes or special care during the winter winds and rains shall received the required care prior to the time of rains and high winds to insure that no damage results to the plant material.

B. Contractor shall maintain staking and guying of trees at all times and shall be responsible for any damage to trees or plant materials caused by chafing or breakage of foliage or limbs coming in contact with stakes or guys. Replace broken plant stakes and ties as needed. If ties are too tight, they must be replaced or adjusted.

C. All suckers shall be continually removed from trees. Grass shall be trimmed at the base of trees in a manner that shall protect tree trunks from cutting of bark.

D. Annual tree pruning and/or shaping as needed. Always prune out dead wood. Refer to schedule. CONTACT OWNER PRIOR TO COMMENCING ANY PRUNING OR SHAPING WORK.

E. Mulch trees only when so directed by the Owner.

F. Spray all trees four times per years to control foliar feeding insects. The spray shall consist of alternately spraying 2 time (s) with an insecticide spray and 2 time (s) with a fungicide beginning in March, with the last spray in September.

3.3 GUIDELINES FOR CREPE MYRTLE TREES

A. Prune crepe myrtles in February to remove dead branches and to shape head for spring/summer growth.

B. Fertilize in February each year with super phosphate applied per manufacturer’s recommendations for flowering trees.

C. Continually remove suckers.

D. Monitor for aphids, powdery mildew and other common ailments and treat immediately to eliminate these problems.

3.4 SHRUB AND GROUNDCOVER BED MAINTENANCE

A. Weeding of all shrub, groundcover beds and seasonal color beds shall be performed twice monthly (total 24 times).

B. All shrub and groundcover beds shall be pruned 8 times a year March - October in an attempt to develop the natural form of the plant.

C. Pre-emergent weed control shall be applied 1 time in early spring and 1 time in late fall in planter beds only after careful thought of what is to occur in planters during the growing season.

D. All shrub, groundcover beds and seasonal color areas shall be fertilized 3 times per year at a rate of 2 pounds of fertilizer per 1,000 square feet.

April 1 - 22-0-6 / July 1 - 15-5-10 / October 1 - 22-0-6

3.5 TURF MAINTENANCE

A. Mowing: All common Bermuda and/or St. Augustine grass shall be mowed approximately every seven days March - October. During periods of mild weather the cut should not be lower than two (2") inches from the soil. Never scalp the lawn or cut more than one-half (½) the existing top growth in one mowing. On irrigated areas, remove the clippings, never allowing visible clippings to remain on lawn surface more than four (4) hours. All sidewalks and curbs shall be edged as well as other objects (non-living) in the grass zone.

Allow grass to grow up to but not over sprinkler heads. Trim grass around heads with a circular sprinkler head trimmer. DO NOT USE “WEED-EATERS” TO TRIM AROUND SPRINKLER HEADS.

B. Watering: Provide a regular, deep watering program. The established turf should not be kept wet but should dry out somewhat between waterings. A twice weekly watering is good under regular conditions, but if it is hot or windy, water more often. In very hot weather, a fast watering with fine spray will cool the turf zone and can supplement the regular, deeper watering program. In shaded areas caused by trees, water more frequently because of the competition for soil moisture. If lawn wilts (shows grey-brown) water more frequently.

C. Lawn Fertilizer:

April 1 — 22-0-6 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.

May 15 — 24-6-12 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron. (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.

July 1 15-5-10 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron. (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.

August 15 15-5-10 analysis at rate of 10 pounds fertilizer per 1,000 square feet, nitrogen content shall consist of 50% sulphur coated urea. Analysis shall include 4% iron. (10# per 1,000 equals 2.1# actual nitrogen per 1,000 square feet.

October 1 22-0-06 analysis applied at rate of 10# per 1,000 square feet. No sulphur coated urea, no iron.

D. Fertilizer: Trace elements in fertilizer shall be based on the recommendations of the soil laboratory.

The fertilization program will be closely monitored by the Owner. The Contractor shall prepare submittals prior to each application showing the area to be covered. The quantity of fertilizer to be applied and the rates of application.

E. Weed Control and Undesirable Grass - General:

1. Contractor shall use extreme care in the use of chemicals for weed control. Before such applications are made, the turf should be well established and in a vigorous conditions. All chemical applications shall be properly licensed with the proper governing authorities.

3. The contractor shall carry the insurance required by the governing authority.

4. Apply chemicals at the manufacturer's recommended rate to achieve complete control of weeds and undesirable grasses.

5. All products utilized on this project must be labeled for turf use. Spot treatment of weeds and undesirable grasses shall be achieved without damaging the surrounding turf.

F. Weed and Undesirable Grass Control Schedule:

All Bermuda grass turf shall be sprayed 2 time(s) in early spring for preemergent control of crabgrass, dallasgrass, and other broadleaf grasses, and 2 time(s) in June-August for pre emergent control of winter weeds, for a total of 4 cycles.

NOTE: IF PERMANENT TURF ESTABLISHMENT IS NOT COMPLETE, DO NOT APPLY PRE-
EMERGENT HERBICIDE.

Summer/Fall Spot treat turf areas to achieve a minimum 98% pure stand of turf.

G. Insects: Control insects with regular applications of commercial insecticides at the manufacturer's recommended rate.

H. Diseases: When they first appear, spray for diseases with an approved commercial fungicide strictly according to the manufacturer's recommendations.

I. Maintain mulched saucers around all trees until establishment. Trim grass as required to prevent grass from encroaching into the saucer area. No "Weedeaters" shall be used around the trunk of any tree now, or at any time in the future.

J. If initial installation (any or all) of the project site is in winter rye, the Contractor will at that time change the mowing and trimming rate to 45 times a year. Contractor shall also during the 1 year maintenance period and at the appropriate season, chemically kill out Winter Rye and Hydromulch Bermuda.

K. One application of herbicide will be applied to overseeded turf to aid in the eradication of Rye Grass.

3.6 USE OF HERBICIDES, INSECTICIDES, STERILANTS, POISON, AND ANIMAL TRAPS

A. The Contractor is hereby granted permission to use such herbicides, insecticides, poison, and animal traps as it may find necessary and advantageous in its grounds maintenance activities. Herbicides, insecticides, sterilants, and animal traps must be used responsibly and in conformance with Federal, State and Local laws and regulations. The Contractor assumes all liability for damage and/or injury resulting from accident or misuse of these products and/or equipment.

B. Product leaving an undesirable residue or odor (i.e., weed oil shall not be used.

C. The Owner shall be notified prior to application and advised of any danger associated with the use of these product (i.e., to avoid personal contact with sprayed areas, etc.

D. Apply insecticides as needed to protect all plant materials from damage. The insect control program shall include slugs and snails and advance preventive spraying for twip borers. The Contractors shall be responsible for the choosing of chemicals and insecticides he uses and shall be accountable for any misuse of same.

E. Apply the proper fungicide, herbicide and pesticides for the control of pests, weeds and plant diseases or treat cuts on turf, plants and trees.

3.5 GENERAL CLEAN UP

A. The Contractor shall dispose of all waste materials or refuse from his operations off the property.

B. All plant growth shall be prevented in any cracks in walks or within paved areas. Leaves, papers, grass clippings or other debris shall be removed at least weekly or at each visit from all areas.

C. Sweep site for refuse, dirt and other materials which may be deposited as a result of the maintenance operation.

D. Contractor will evaluate mulch 4 after installation. Mulch must be per specification at acceptance.

PART 4 - SCHEDULE

The Schedule as included herein shall govern the Work. Should the Contractor require an alteration of the Schedule, contact the Owner.

PART 5 - MAINTENANCE SCHEDULE

ITEM	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
Mow			2	4	4	5	5	5	5	4	2		36
Edge/Trim			2	4	4	5	5	5	5	4	2		36
Clean/Weed beds/Trash	2	2	2	2	2	2	2	2	2	2	2	2	24
Sprinkler	1	1	1	2	2	2	2	2	2	1	1	1	18
Fertilize (lawn)				1	1		1	1		1			5
Post-Emergent (lawn)			1	1		1		1					4
			Post emergent of winter weeds						Post emergent of crabgrass and other broadleaf grasses				
Fertilize (beds, Incl. ground cover			1		1		1						
Cultivate beds			1			1	1	1	1				
Prune (shrubs)			1	1	1	1	1	1	1	1			
Prune (ground cover)			1	1	1	1	1	1	1	1			
Insect/Disease control (lawn and beds)													As needed
Trees (insecticide)			1			1							
Trees (fungicide)				1					1				

END OF SECTION

SECTION 32 13 13

PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

SUMMARY

1. Extent of portland cement concrete paving is shown on drawings, including curbs, gutters, walkways, and pavement.

2. Prepared subgrade is specified in "Lime Stabilization" Section 02241.

3. Concrete and related materials are specified in Division 3.

4. Joint fillers and sealers are specified in Division 7.

SUBMITTALS

1. Provide samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

2. Pavement marking plan indicating lane separations and defined parking spaces. Note dedicated handicapped sapces with international graphics symbols in accordance with requirements of Article 601b, Vernon’s Texas Civil Statues, Article 7.

QUALITY ASSURANCE

1. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

JOB CONDITIONS

1. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

MATERIALS

1. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

2. Use flexible spring steel forms or laminated boards to form radius bends as required.

3. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.

4. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.

5. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

6. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.

7. Expansion Joint Materials: Comply with requirements of applicable Division 7 sections for preformed expansion joint fillers and sealers.

8. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

9. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.

10. Epoxy Adhesive: ASTM 881, 2-componenet material suitable for use on dry or damp surfaces. Provide material “Type”, “Grade”, and “Class” to suit project requirements.

11. Lane Marking Paint: Alkyd-resin type, ready-mixed complying with AASHto M 248, Type I.

CONCRETE MIX, DESIGN, AND TESTING

1. Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control and as herein specified.

2. Design mix to produce normal-weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:

    a. Compressive Strength: 3000 psi, minimum at 28 days, unless otherwise indicated.

    b. Slump Limit: 8 inches minimum for concrete containing high- range water-reducing admixture (superplasticizer); 3 inches for other concrete.

    c. Air Content: 5 to 8 percent.

PART 3 - EXECUTION

SURFACE PREPARATION

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

2. The top 6-inches of subgrade shall be treated with six percent (6%) lime (THD Item 260). Mixture to be uniformly compacted to a minimum of ninety-five percent (95%) of its maximum standard Proctor dry density (ASTM D-698) near its optimum moisture content. Lime treated subgrade shall extend 1’-0” minimum beyond back of curb.

FORM CONSTRUCTION

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

2. Check completed formwork for grade and alignment to following tolerances:

3. Top of forms not more than 1/8 inch in 10 feet.

4. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

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

6. Slope step treads at 1/4 inch per foot to drain.

REINFORCEMENT

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

CONCRETE PLACEMENT

1. General: Comply with requirements of Division 3 sections for mixing and placing concrete, and as herein specified.

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

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

4. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

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

6. When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.

JOINTS

1. General: Construct expansion, and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

2. When joining existing structures place transverse joints to align with previously placed joints, unless otherwise indicated.

3. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas at 25 foot on centers. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

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

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

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

    a. Construct joints as shown or, if not shown, use standard metal keywaysection forms.

    b. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

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

    a. Locate expansion joints at 50 feet o.c. for each pavement lane unless otherwise indicated.

    b. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface.

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

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

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

CONCRETE FINISHING

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

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

3. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

4. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

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

6. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.

7. Burlap finish by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic. Repeat operation to provide a gritty texture acceptable to Architect.

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

CURING

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

2. Antispalling Treatment: Apply treatment to concrete surfaces no sooner than 28 days after placement, to clean, dry concrete free of oil, dirt, and other foreign material. Apply curing and sealing compound at a maximum coverage rate of 300 s.f. per gallon. Apply antispalling compound in two (2) sprayed applications. The first application shall be at a rate of 40 sq. yds. per gallon; second application, 60 sq. yds. per gallon. Allow complete drying between applications.

REPAIRS AND PROTECTIONS

1. Repair or replace broken or defective concrete, as directed by Architect.

2. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with

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

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

END OF SECTION 32 13 13

SECTION 32 13 14

WHEELCHAIR RAMP

PART 1 - GENERAL

1.1. DESCRIPTION

The work as specified in this section includes all labor, materials, and equipment necessary to complete the wheel chair ramp installation as shown on the plans, directed by the Engineer and specified herein. Refer to City of Rockwall standard details provided in the construction plans.

1.2. MEASUREMENT AND PAYMENT

The installation of wheel chair ramps shall be measured per each and shall be paid for at the unit price shown in the proposal for the specified item. The bid price for each wheel chair ramp shall be full compensation for all materials, equipment, labor, and incidental work, including excavation and backfill, necessary to complete the work.

Wheel chair ramps as completed for payment shall conform to the details as shown on the plans and in the specifications and shall meet the requirements of the City

PART 2 - MATERIALS

2.1. MATERIALS

The concrete for this section shall be Class "A" as defined in Item 530, "Concrete Curb, Gutter Sidewalks and Driveways", of the 1982 Standard Specifications for Construction of Highways, Streets, and Bridges, adopted by the State Highway Department of Texas of September 1, 1982.

PART 3 - EXECUTION

3.1. EXECUTION

Wheel chair ramps shall be constructed as shown on the plans or as directed by the Engineer. All wheel chair ramps shall be constructed in accordance with the details and shall match adjacent surfaces with respect to materials, finished elevations and grades, and depth as shown on the plans or as directed by the Engineer.

END OF SECTION 32 13 14

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SECTION 32 13 15

CONCRETE CURB AND GUTTER

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work, as specified in this section, includes all labor, equipment, materials and incidentals necessary to remove existing curb and gutter and to construct reinforced concrete curb and gutter to the size, shape, lines and grade as shown on the plans or as directed by the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The concrete for this section shall be Class "A" as defined in Item 421, "Concrete for Structures", of the *1982 Standard Specifications for Construction of Highways, Streets, and Bridges*, adopted by the State Highway Department of Texas on September 1, 1982.

PART 3 - EXECUTION

3.1 EXCAVATION

A. The subgrade shall be excavated and shaped to line, grade and cross section, and, if considered necessary in the opinion of the Engineer, hand tamped and sprinkled. If dry, the subgrade material shall be sprinkled lightly immediately before concrete is deposited thereon. Curb and Gutter construction shall not begin until the subgrade has been prepared in accordance with the City's Specifications, and has been accepted by the Engineer.

3.2 REINFORCING STEEL

A. All steel reinforcement shall be accurately placed as shown on the plans and held in place during progress of concreting by such effective means that it shall not be moved out of true position. All bars shall be wired at their intersections and at all laps or splices. All bars at splices shall be lapped a minimum of 20 diameters of the bar or 12 inches, whichever is greater.

B. All reinforcement necessary for a section of concrete shall be placed and approved by the Owner before any concrete is deposited in the section. All steel must be free from paint and oil; and all loose scale, rust, dirt and other foreign substances shall be completely removed before using.

3.3 FORMS

A. All forms shall be made of wood or steel and framed, braced or staked in a substantial and approved manner so as to insure true alignment and grade. All forms shall be clean and shall be oiled immediately before concreting. Care shall be taken in removing forms to prevent marring or spalling of the concrete. Forms shall extend the full depth of the concrete and be a minimum of 1-5/8 inches in thickness or equivalent when wooden frames are used or be of a gauge that shall provide equivalent rigidity and strength when metal forms are used.

3.4 EXPANSION JOINTS

A. Expansion joints shall be constructed using expansion joint material of an approved type. Expansion joints shall be placed in the curb and gutter, at 40 feet intervals or as specified by the Owner. Tooled joints shall also be placed at five-foot intervals or matching abutting sidewalk joints. Expansion joints shall be placed at all intersections with concrete driveways, curbs and

other curb and gutter. All expansion joints shall be a minimum of 1/2 inch in thickness, extending the full depth of the concrete; and shall be perpendicular and at right angles to the face of the curb. Any expansion joint material extending above the finished work shall be neatly trimmed to the surface of the finished work. Longitudinal dowels, across the expansion joints in the curb and gutter shall be required. Dowels shall be supported by an approved method to provide true horizontal and longitudinal alignment. All joints shall be constructed in a neat and workmanlike manner, with edges rounded, in conformity with the plans and specifications; and at locations as shown on the plans or as directed by the Engineer.

3.5 CONCRETE PLACEMENT

A. No concrete shall be placed when the air temperature is less than 35 degrees Fahrenheit unless permission is granted by the Engineer. Concrete shall be deposited so as to maintain a horizontal surface and shall be

B. thoroughly and continuously worked into all spaces and around all reinforcement so as to form a dense voidless mass. The coarse aggeregate shall be worked away from contact with the forms so as to form a smooth, hard exposed concrete surface. The concrete for curb and gutter shall preferably be placed continuously between expansion joints.

3.6 FINISHING

A. After the concrete has been struck off and while it is still plastic, the exposed surfaces may be plastered with a 1/4 inch mortar topping. The mortar topping shall be applied with a steel "mule", or finishing tool or method which produces results equivalent to that obtained with the mule. All exposed surfaces shall then be floated or troweled and lightly brushed as required by the Owner to produce a smooth and uniform finish. Excess working of the surfaces shall be avoided. Excess water, laitance and inert materials shall be removed from the surface. All honeycombed areas disclosed by removal of forms shall be immediately chipped out and patched with portland cement mortar.

3.7 CURING

A. After finishing operations are completed, the concrete surface shall be sprayed with concrete curing compound. The surface of the concrete shall be kept thoroughly damp between the completion of the finishing operations and the application of the curing compound. The curing compound shall be applied under pressure, by means of a spray nozzle, at a rate not to exceed 200 square feet per gallon.

B. A minimum of 72 hours curing time shall be required. Should the Contractor elect to remove the forms before the minimum curing time has elapsed, he shall apply curing compound to the newly exposed vertical surfaces. Forms shall remain in place at least 24 hours after completion of the concrete placement for the curb and gutter. The curb and gutter shall be backfilled to the full height of the concrete, tamped and sloped as directed.

END SECTION 32 13 15

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 SCOPE: Provide pavement markings and signs as described on the plans and as detailed in this section.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

PORTLAND CEMENT CONCRETE PAVING	SECTION 32 13 13

1.03 SUBMITTALS: Submit complete manufacturer's product data sheets for marking paint.

PART 2 - PRODUCTS

2.01 MATERIAL: Reflectorized Pavement Marking Paint: Traffic marking paint TXDOT Specifications Item 666, Type II, white, yellow, blue or red in color as called for:

2.02 EQUIPMENT: Equipment shall be pressurized, self-contained paint machine capable of applying a straight line from tow (2") to six (6") inches wide, with consistent coverage of a minimum of one hundred (100) square feet per gallon.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Locate markings and signs as required by drawings and details in this section. Provide qualified technician to supervise equipment and application of markings. Lay out markings using guide lines, template, and forms.

B. Thoroughly clean surfaces free of dirt, sand, gravel, oil, and other foreign matter prior to application of paint.

3.02 APPLICATION OF PAINT:

A. Surfaces shall be dry. Application shall not be made when weather if foggy or rainy, or ambient or pavement temperatures are below 50 degrees Fahrenheit, nor when such conditions are anticipated during eight hours after application.

B. Apply marking paint at a rate of one gallon per 100 square feet, apply markings straight and even in accordance with approved layout. Stripes shall be four (4") inches wide, except where noted otherwise.

C. Refer to TxDOT Specification Item No. 666 for application of Glass Beads.

3.03 FIRE LANE STRIPING: Stripe fire lane as shown on the plans and as required meeting city requirements.

3.04 FIRE HYDRANTS: A blue Stimsonite, Fire-Life reflector, or approved equal, shall be placed in the center of streets opposite all fire hydrants upon completion of paving operations per requirements of the city.

END OF SECTION 32 17 23

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SECTION 32 17 33

JOINT SEALERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this Section.

1.2 SUMMARY:

A. Extent of each form and type of joint sealer is indicated below and supplemental information shall be found on the drawings.

B. This Section includes joint sealers for the following locations:

1. Exterior joints in horizontal traffic surfaces as indicated below:

i. Control, expansion, and isolation joints in cast-in-place concrete paving.
ii. Joints between different materials listed above.
iii. Other joints as indicated.

1.3 SYSTEM PERFORMANCES:

A. Provide joints sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.4 SUBMITTALS:

A. Product Data from manufacturer's for each joint sealer product required, including instructions for joint preparation and joint sealer application.

B. Samples for Initial Selection Purposes: Manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view.

C. Samples for verification purposes of each type and color of joint sealer required. Install joint sealer samples in 1/2 inch wide joints formed between two 6 inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealers.

D. Certificates from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

E. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project name, addresses, names of Architects and Owners, plus other information specified.

F. Product test reports for each type of joint sealers indicated, evidencing compliance with requirements specified.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an Installer who has successfully completed within the last 3 years at least 3 joint sealer applications similar in type and size to that of this Project.

B. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

C. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division-1 section covering this activity.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi component materials.
B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS:

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40 deg F (4.4 deg C).

2. When joint substrates are wet due to rain, frost, condensation or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.8 SEQUENCING AND SCHEDULING:

A. Sequence installation of joint sealers to occur not less than 21 nor more than 30 days after completion of waterproofing, unless otherwise indicated.

1.9 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

C. Warranty Period: Two years from date of Substantial Completion.

D. Special Manufacturer's Warranty: Written warranty, signed by elastomeric sealant manufacturer agreeing to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

E. Warranty Period: 5 years from date of Substantial Completion for urethanes and 20 years for exterior silicones.

F. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

G. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.

H. Disintegration of joint substrates from natural causes exceeding design specifications.

I. Mechanical damage caused by individuals, tools, or other outside agents.

J. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide a color of exposed joint sealer as selected by Architect from manufacturer's standard colors.

2.2 ELASTOMERIC JOINT SEALANTS:

A. One-Part Nonsag Urethane Sealant for Use T: Type S; Grade NS; Class 25, and complying with the following requirements for Uses:

1. Uses T, NT, A, and, as applicable to joint substrates indicated, O.

2. Application: Exterior horizontal joints subject to vehicular and pedestrian traffic. Interior horizontal joints subject to vehicular and pedestrian traffic and not indicated to receive expansion control assemblies.

B. Single Part Pourable Urethane Sealant for Use T (at exterior paving): Type S; Grade P; Class 25, and complying with the following requirements for Uses:

1. Uses T, A, and, as applicable to joint substrates indicated, O.

2. Application: Exterior horizontal joints subject to vehicular and pedestrian traffic.

C. Available Products: Subject to compliance with requirements, elastomeric sealants which may be incorporated in the Work include, but are not limited to, the following:

1. One-Part Nonsag Urethane Sealant for Use T:

"Chem-Calk 900"; Bostik Construction Products Div. 800-523-2678 www.bostik.com/bostikusa.com
"Permapol RC-1"; Products Research & Chemical Corp.
"Sikaflex-1a"; Sika Corp. 800-933-7452 www.sika.com
"Sikaflex-15LM";Sika Corp. 800-933-7452 www.sika.com
“NP 1”; Sonneborn Building Products Div., Chemrex Inc. 800-243-6739 www.chemrex.com
“Vulkem 116”; Tremco, Inc. 800-321-7906 www.tremcosealants.com

2. One Part Pourable Urethane Sealant for Use T (at exterior paving):

"Vulkem 45, Vulkem 45SSL"; Tremco, Inc. 800-321-7906 www.tremcosealants.com
"NR-201 Urexpan"; Pecora Corp. 800-523-6688 www.pecora.com
"SL 2"; Sonneborn Building Products Div., Chemrex Inc. 800-243-6739 www.chemrex.com
"Stonflex SN6"; Stonhard, Inc. 800-257-7953

3. Multicomponent Pourable Urethane Sealant for Use T:

"THC 900-901"; Tremco, Inc. 800-321-7906 www.tremcosealants.com

2.3 COMPRESSION SEALS:

A. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellant agent; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:

1. Properties: Permanently elastic, mildew- resistant, non-migratory, non-staining, compatible with joint substrates and other joint sealers.

    a. Impregnating Agent: Manufacturer's standard.
    b. Density: Manufacturer's standard.

2. Backing: Where required, provide backings suitable for intended use, compatible with joint substrates and other joint sealers, designed to work in conjunction with primary sealants in dual- sealant systems.

3. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

    "Emseal"; Emseal Corp. 800-972-3677 www.emseal.com
    "Emseal Greyflex"; Emseal Corp. 800-972-3677 www.emseal.com
    "Polytite R"; Polytite Manufacturing Co., Inc. 800-776-0930 www.polytite.com
    "Polytite Standard"; Polytite Manufacturing Co., Inc. 800-776-0930 www.polytite.com
    "Will-Seal 150"; Will-Seal Construction Foams Div., Illbruck. +49-2171-391-258
    "Will-Seal 250"; Will-Seal Construction Foams Div., Illbruck. +49-2171-391-258
    "York-Seal 100"; York Manufacturing, Inc. 800-551-2828 www.yorkflashings.com
    "York-Seal 200"; York Manufacturing, Inc. 800-551-2828 www.yorkflashings,com

B. Preformed Hollow Neoprene Gasket: Manufacturer's standard preformed polychloroprene elastomeric joint seal of the open-cell compression type complying with ASTM D 2628 and with requirements indicated for size, profile and cross-sectional design.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

    a. The D.S. Brown Co. 419-257-3561 www.dsbrown.com
    b. Watson-Bowman & Acme Corp. 770-509-1460 www.watsonbowman.com

2.4 JOINT SEALANT BACKING:

A. General: Provide sealant backings of material and type which are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonwaxing, nonextruding strips of flexible, nongassing plastic foam of material indicated below; nonabsorbent to water and gas; and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

1. Install only closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer, for cold-applied sealants only.

C. Elastomeric Tubing Joint-Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, capable of remaining resilient at temperatures down to -26

deg F (-15 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS:

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Provide nonstaining, chemical cleaners of type which are acceptable to manufacturer of sealants and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.

C. Masking Tape: Provide nonstaining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

2.6 JOINT FILLERS FOR CONCRETE PAVING:

A. General: Provide joint fillers of thickness and widths indicated.

B. Bituminous Fiber Joint Filler: Preformed strips of composition below, complying with ASTM D 1751: Asphalt saturated fiberboard.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine joints indicated to receive joint sealers, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt and frost.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALERS:

A. General: Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint-fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

2. Do not leave gaps between ends of joint-fillers.

3. Do not stretch, twist, puncture or tear joint fillers.

i. Remove absorbent joint fillers which have become wet prior to sealant application and replace with dry material.

4. Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

5. Install compressible seals serving as sealant backings to comply with requirements indicated above for joint fillers.

D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.

2. Provide flush joint configuration per Figure 6B in ASTM C 962, where indicated.

F. Use masking tape to protect adjacent surfaces of recessed tooled joints.

1. Provide Recessed joint configuration per Figure 6C in ASTM C 962, of recess depth and at locations indicated.

G. Installation of Preformed Foam Sealants **(use at expansion joints, joints larger than 1/2" and as indicated in drawings)**: Install each length of sealant immediately after removing protective wrappings, taking care not to pull or stretch material, and complying with sealant manufacturer's directions for installation methods, materials and tools which produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

H. Installation of Preformed Hollow Neoprene Gaskets: Install gaskets, with minimum number of end joints, in joint recesses with edges free of spalls and sides straight and parallel, both within tolerances specified by gasket manufacturer. Apply manufacturer's recommended adhesive to joint substrates immediately prior to installing gaskets. For straight sections provide gaskets in continuous lengths; where changes in direction occur, adhesively splice gaskets together to provide watertight joint. Recess gasket below adjoining joint surfaces by 1/8 inch to 1/4"inch.

3.4 CLEANING:

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

3.5 PROTECTION:

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION 32 17 33

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SECTION 32 31 14

PREMANUFACTURED STEEL FENCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This section includes the following:

1. Pre manufactured Fencing.

B. Related Sections include the following:

2. Division 2 Section "Site Grading" for filling and for grading work.
3. Division 3 Section "Cast-in-Place Concrete" for concrete equipment bases/pads for gate operators, drives, and controls post footings.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural Performance: Design, engineer, fabricate, and install the following metal fencing to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.

1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:

a. Concentrated load of 250 lbf applied at any point non concurrently, vertically downward, or horizontally.

b. Uniform load of 50 lbf per linear ft. Applied non concurrently, vertically downward or horizontally.

c. Concentrated and uniform loads above need not be assumed to act concurrently.

B. Infill Area of Guardrail Systems: Capable of withstanding a horizontal concentrated load of 200 lbf applied to one sq. ft. at any point in the system including panels, intermediate rails balusters, or other elements composing the infill area.

1. Above load need not be assumed to act concurrently with uniform horizontal loads on top rails of railing systems in determining stress on guard.

1.4 SUBMITTALS

A. Product data for each type of fencing specified, with installation instructions for each unit built-in or connected to other construction. Include methods of installation for each type of substrate.

B. Shop drawings showing installation details of fencing, including full scale installation details of special conditions.

C. Where installed metal fencing is indicated to comply with certain design loadings, include structural computations, material properties, and other information presenting the complete structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.

D. Samples for initial selection purposes consisting of manufacturer's standard size samples showing full range of colors, textures, and patterns available for each type of fencing and accessory required.

E. Samples representative of materials and finished products as may be requested by Architect.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firm (material producer) with not less than 3 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.

B. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fencing similar in material, design, and extent to that indicated for this Project.

C. Single Source Responsibility: Provide material produced by a single manufacturer.

1.6 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction to which metal fencing must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

B. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping.

B. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

1.8 SEQUENCE AND SCHEDULING

A. Inserts and Anchorages: Furnish inserts and anchoring devices that must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

B. Sequence outdoor metal fencing installation with other work to minimize possibility of damage and soiling during remainder of construction period.

1.9 MAINTENANCE

A. Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use conditions. Include precautions against materials and method which may be detrimental to finishes and performance.

1.10 WARRANTY

A. Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace units that fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to:

1. Structural failures, including excessive deflection.

2. Faulty operation.

3. Deterioration of metals, metal finishes and other materials beyond normal weathering.

B. Warranty Period: 10 years after the date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURER: Ameristar. 1-800-321-8724 www.ameristarfenceproducts.com

2.2 MATERIALS:

2.3 FERROUS METALS

A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.

B. Steel Tubing shall be manufactured from coil steel having yield strength of 42,000 psi and tensile strength of 58,000 psi.
1. Provide tubing with hot-dip galvanized coating per ASTM A 526.

C. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

D. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.

E. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

2.4 GROUT AND ANCHORING CEMENT

A. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include but are not limited to the following:

2. Nonshrink Nonmetallic Grouts:

"Bonsal Construction Grout"; W.R. Bonsal Co.
"Diamond-Crete Grout"; Concrete Service Materials Co.
"Euco N-S Grout"; Euclid Chemical Co. 1-800-321-7628 www.euclidchemical.com
"Kemset"; Chem-Masters Corp.
"Crystex"; L & M Construction Chemicals, Inc.
"Masterflow 713"; Master Builders. 1-800-628-9990 www.masterbuilders.com
"Sealtight 588 Grout"; W.R. Meadows, Inc. (817) 834-1969 www.wrmeadows.com
"Sonogrout"; Sonneborn Building Products Div., Rexnord Chemical Products, Inc.952-496-6000 www.chemrex.com/sonneborn/so_abo.htm
"Stoncrete NM1"; Stonhard, Inc. (856) 779-7500 www.stonhard.com
"Five Star Grout"; U.S. Grout Corp.
"Vibropruf #11"; Lambert Corp. 800-432-4746

2.5 PAINT:

A. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing damaged surfaces in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.

2.6 FASTENERS

B. General: Provide zinc-coated fasteners with polymer coating to match the fencing system. Select fasteners for the type, grade, and class required. Equip items with theft-proof fasteners where accessible to tampering.

1. Pop-rivets shall not be used.

2.7 METAL FENCING, GUARDRAIL, AND GATES:

A. Design Criteria: The drawings indicate the size, profile, and dimensional requirements of metal fencing work required and are based on the specific types and models indicated. Metal fencing by other manufacturers may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. The burden of proof of equality is on the proposer.

B. Design Basis: "Majestic" Commercial Class ornamental fencing, Ameristar. 1-800-321-8724 www.ameristarfenceproducts.com

1. Pattern: Quadrail, #205.

2. Provide Class 2-A fencing with 3/4-inch square 18 gauge pickets, 1-1/2-inch square 15 gauge rails, and 2-1/2-inch square 14 gauge posts.

3. Provide "Monarch" style fittings unless otherwise indicated.

4. Post Cap: Provide ball-top post caps, typical.

a. Provide pressed steel post cap where indicated.

5. Gate: Provide manufacturer's standard fully welded gate construction with wrap-around frame hinges, fully pad-lockable fork latch, and cane bolt.

2.8 FABRICATION, GENERAL

A. Provide metal fencing and accessory items, both free standing and permanently installed, equipped with functions as specified. Fabricate units with tight seams and joints, exposed metal edges rolled. Manufacturer or product identification on exposed surfaces is unacceptable. Provide

products with smooth welds, consistent finish with no evidence of wrinkling, chipping, uneven coloration, dents, or other imperfections.

1. Pickets, rails, and posts shall be pre-cut to specified lengths. Posts shall be pre-punched to accept rails and fasteners; rails shall be pre-punched and pre-drilled to accept pickets and fasteners.

2. Gates shall be fabricated using the same materials as for the complete fencing system. Gate frames shall be made from tubing having the same cross-section as that for the fence rails. Provide number of hinges as recommended by the manufacturer, but in no case less than three hinges per gate.

2.9 FINISHES

A. Galvanizing: All iron and steel fencing components shall be galvanized. Apply zinc-coating by the hot-dip process in compliance with the following requirements:

1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 526 for galvanizing all other iron and steel products, with minimum zinc coating weight of 0.60 oz. per square foot (Coating Designation G-60)

B. Provide manufacturer's polyester powder coating on all metal exposed to view. The coating material shall be thermoset glycidal-polyester supplied as a homogeneous free-flowing powder applied by electrostatic spray. Cured coating shall be capable of withstanding 500 hours of salt spray without creep when tested according to ASTM B117. Coating shall achieve a dry film thickness of 2 to 4 mils.

1. Color: As selected by Architect from manufacturer's standard and custom colors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

B. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing premanufactured fencing to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of premanufactured fencing. Set fencing accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not

weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

   a. Obtain fusion without undercut or overlap.
   b. Remove welding flux immediately.

2. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

3.3 INSTALLATION OF PREMANUFACTURED FENCING

A. Adjust fencing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

1. Anchor posts in concrete by means of tube sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.

   a. Nonshrink, nonmetallic grout.

   b. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8 inch build-up, sloped away from post. Seal anchoring material to comply with grout manufacturer's directions.

3.4 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.

1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 32 31 14

SECTION 32 31 15
CHAIN LINK FENCE
PVC COLOR COATED CHAIN LINK FABRIC ON GALVANIZED FRAMEWORK

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Poly Vinyl Chloride (PVC) coated chain link fabric with galvanized steel framework and accessories for commercial or industrial applications.

1.02 RELATED SECTIONS

01 33 13 Certifications
01 33 23 Shop drawings, product data
01 43 13 Manufacturers Qualifications
01 43 13 Installer qualifications
01 45 00 Quality control
01 65 00 Product delivery requirements
03 30 00 Cast-In-Place Concrete
25 50 00 Integrated automation, gate operators/access control
32 31 13.23 Recreational Court Fences and Gates
32 31 13.26 Tennis Court Fences and Gates
32 31 13.33 Chain Link Backstops
32 1 13.53 High-Security Chain Link Fences and Gates

1.03 REFERENCES [delete references not applicable to project]

A. ASTM A36 Standard Specification for Carbon Structural Steel

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings

C. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, Wire Profiles and Tubes

D. ASTM F552 Standard Terminology Relating to Chain Link Fencing

E. ASTM F567 Standard Practice for Installation of Chain Link Fence

F. ASTM F626 Standard Specification for Fence Fittings

G. ASTM F668 Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric

H. ASTM F900 Standard Specification for Industrial and Commercial Swing Gates

I. ASTM F934 Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials

J. ASTM F1043 Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework

K. ASTM F1083 Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

L. ASTM F1184 Standard Specification for Industrial and Commercial Horizontal Slide Gates

M. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence

N. ASTM F1665 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used With Chain Link Fence

O. ASTM F1910 Standard Specification for Long Barbed Tape Obstacles

P. ASTM F1911 Standard Practice for Installation of Barbed Tape

Q. ASTM F2200 Standard Specification for Automated Vehicular Gate Construction

R. UL 325 Door, Drapery, Gate, Louver and Window Operators

S. WLG2445 Chain Link Fence Manufacturers Institute, Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing

1.04 SUBMITTALS

A. Changes in specifications may not be made after the bid date.

B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.

D. Samples: If requested, samples of materials (e.g., fabric, wires, color, and accessories).

1.05 QUALITY ASSURANCE

A. Manufacturer: Company having manufacturing facilities in the United States with 5 years experience specializing in manufacturing of chain link fence products.

B. Fence contractor: Contractor having 5 years experience installing similar projects in accordance with ASTM F567.

C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.

D. Substitutions: Alternate chain link products may be acceptable by the architect as equal if approved in writing ten days prior to bidding provided that the items submitted meet the specifications contained in this document.

E. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

PART 2 - PRODUCTS

2.01 MANUFACTURER

Approved Manufacturer: Master Halco, Inc.
One City Blvd., Suite 900
Orange, CA 92868
Phone (800) 229-5615 Fax (714) 385-0107
www.masterhalco.com, E-mail: spec@fenceonline.com

2.02 CHAIN LINK FENCE FABRIC

A. Poly Vinyl Chloride (PVC) color coated steel chain link fabric per ASTM F668 Class _____
[Class 1 Extruded over metallic coated steel wire]
[Class 2a Extruded and adhered to metallic coated steel wire]
[Class 2b Fused and adhered to metallic coated steel wire]

[see Fabric Selection Table for mesh size, wire gauge, break load and selvage, knuckle (K) or twist (T), to fit application]

B. Size and height: Chain link fabric (in.) (mm) mesh, ( ) gauge, (in.) (mm) diameter steel core wire having a break load of ( ) lbf (N), height (in.) (mm).

C. Selvage of fabric _____at top and _____ at bottom.

D. Color of chain link fabric per ASTM F934 [Dark Green] [Brown] [Black]

2.03 STEEL FENCE FRAMEWORK

[select post specification that best fits application]

A. Steel pipe Type I: ASTM F1043 Group IA, ASTM F1083 standard weight schedule 40 hot-dip galvanized pipe having a zinc coating of 1.8 oz/ft² (550 g/m²) on the outside and 1.8 oz/ft² (550 g/m²) on the inside surface.
Regular Grade: Minimum steel yield strength of 30,000 psi (205 MPa) [all sizes]
Intermediate Strength Grade: Minimum steel yield strength of 50,000 psi (344 MPa) [in sizes 6.625" and 8.625" (168.3, 219.1 mm) OD only]
High Strength 83000 Grade: Minimum steel yield strength 83,000 psi (572 MPa) [all sizes up to and including 4.00" OD (101.6mm)] [special order]

B. Steel pipe Type II: Cold formed electric resistance welded steel pipe complying with ASTM F1043 Group IC having minimum steel yield strength of 50,000 psi (344 MPa). External protective coating F1043 Type B, 0.9 oz/ft² (270 g/m²) minimum hot-dip zinc coating plus a chromate conversion and a clear polymer coating. Internal coating F1043 Type D, 81% nominal zinc pigmented coating minimum 3 mils (0.0076 mm) thick or Type B, minimum 0.9 oz/ft² (275 g/m²) zinc.

C. Formed steel "C" sections: Roll formed steel shapes complying with ASTM F1043, Group II, 50,000 psi (344 MPa) minimum steel yield strength. External coating, ASTM F1043 Type A, minimum average zinc coating of 2.0 oz/ft² (610 g/m²) in accordance with ASTM A 123.

Wind load caution: Fences containing windscreens or privacy slats, all fences greater than 12 ft. (3.7 m) in height and fences 8 feet (2.4 m) in height using 1 in. (25 mm) or smaller mesh require a wind load force analysis for post size and post spacing. A fence post wind load calculator is available at www.chainlinkinfo.org or www.wheatland.com.

[select post size and spacing from Framework Selection Table or as calculated to withstand wind load]

D. Pipe End and Corner Post _____ OD (_____ mm) _____ lbs/ft (_____ kg/m)

E. Pipe Line Post _____ OD (_____ mm) _____ lbs/ft (_____ kg/m)

[Alternate Line Post:]
[Rolled Formed _____C" (_____ mm) _____ lbs/ft (_____ kg/m)]

F. Pipe Rail and Braces, 1.660 in. OD (42.2 mm) _____ lbs/ft (_____ kg/m)

2.04 FITTINGS

A. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. "C" shaped line post without top rail do not require post caps. When top rail is specified provide line post loop tops to secure top rail.

B. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.

C. Top rail sleeves: 7” (178 mm) galvanized steel sleeve per ASTM F626. [If expansion and contraction of the rail is of concern add a 0.137” (3.48 mm) wire diameter by 1.80” (45.72 mm) long expansion spring between the adjourning rails]

D. Wire ties: 9 gauge (0.148”) (3.76 mm) galvanized steel wire for attachment of fabric to line posts and rails. [Alternate double wrap 13 gauge (0.092”) (2.324 mm) galvanized steel wire for rails and braces] Pre-formed hog ring ties to be 9 gauge (0.148”) (3.76 mm) galvanized steel or aluminum for attachment of fabric to tension wire. Tie wire and hog rings PVC coated and in compliance with ASTM F626. Color to match fabric color.

E. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105”) (2.67mm) pressed steel by 3/4” (19mm) formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16” (7.94 mm) galvanized carriage bolt and nut.

F. Tension (stretcher) galvanized steel bars: One piece lengths equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16” x 3/4” (4.76 mm x 19 mm) per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.

G. Truss rod assembly: Galvanized steel minimum 5/16” (7.9mm) diameter truss rod with pressed steel tightener, in accordance with ASTM F626

H. Barbed wire supporting arms: Galvanized pressed steel barb arm per ASTM F626 with provisions for attaching barbed wire. Provide arms with loop hole for applications using top rail. Arms shall withstand 250 lb. (113.5 kg) downward pull at outermost end of arm without failure. Arms add an additional of 13 in (330 mm) in height. [Type I, 45° 3 strand single arm] [Type III, 6 strand “V” arms].

I. Carriage bolts and nuts: Galvanized of commercial quality

2.05 TENSION WIRE

A. Tension wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM F 1664 [7 gauge steel core wire, 0.177” (4.50 mm)] [9 gauge steel core wire, 0.148” (3.76 mm)] PVC coating class and color to match chain link fabric

2.06 BARBED WIRE AND BARBED TAPE [add when application requires additional security]

A. Barbed wire: PVC coated barbed wire in compliance with ASTM F1665, coating class and color to match chain link fabric. Double strand twisted 14 gauge 0.80” (2.03 mm) PVC coated strand wire, 14 gauge 0.80” (2.03 mm) zinc coated or aluminum alloy 4 point barbs spaced [Type I standard 5” (127 mm) on center] [Type II High Security 3” (76mm) on center].

B. Barbed tape: Stainless steel barbed tape shall comply with ASTM F1910.

2.07 CHAIN LINK SWING GATES

A. Swing gates [double leaf] [single leaf] _____ opening by ____ high [plus 1’ 0” (304.8 mm) - 3 strands barbed wire]. Fabricate chain link swing gates in accordance with ASTM F900. Gate frame to be of welded construction. Weld areas to be protected with zinc-rich paint per ASTM A780. The gate frame members are to be spaced no greater than 8’ 0” (2.44 m) apart horizontally or vertically. Exterior members to be 1.900” (48.3 mm) OD pipe, interior members when required shall be 1.660” (42.2 mm) OD pipe. Pipe to be [Grade 1 ASTM F1083] [Grade 2 ASTM F1043 Group IC] per section 2.03. Chain link fabric to match specification of fence system. Fabric to be stretched tightly and secured to vertical outer frame members using tension bar and tension bands spaced 12” (304.8 mm) on center and tied to the horizontal and interior members 12” (304.8 mm) on center using 9 gauge galvanized steel ties per section 2.04.

B. Hinges, hot dip galvanized pressed steel or malleable iron, structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° (3.14 rad)

C. Latch: Galvanized forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate.

D. Double gates: Provide galvanized drop rod with center gate stop pipe or receiver to secure inactive leaf in the closed position. Provide galvanized pressed steel locking latch, requiring one padlock for locking both gate leaves, accessible from either side.

E. Keeper to secure open leafs: Provide galvanized gate hold back keeper for each gate leaf over 5' (1524 mm) wide. Gate keeper shall consist of mechanical device for securing free end of gate when in full open position.

F. Gate posts: [Grade 1 pipe ASTM F1083] [Grade 2 pipe ASTM F1043 Group IC] per section 2.03, _____OD [select gate post from table below]

Gate fabric height up to and including 6 ft. (1.2m)

Gate leaf width		Outside Diameter
up to 4 ft.	(1.2 m)	2.375 in. (60.3 mm)
over 4 ft. to 10 ft.	(1.2 to 3.05 m)	2.875 in. (73.0 mm)
over 10 ft. to 18 ft.	(3.05 to 5.5 m)	4.000 in. (101.6 mm)

Gate fabric height over 6 ft. to 12 ft. (1.2 to 2.4m)

Gate leaf width		
up to 6 ft.	(1.8 m)	2.875 in. (73.0 mm)
over 6 ft. to 12 ft.	(1.8 to 3.7 m)	4.000 in. (101.6 mm)
over 12 ft. to 18 ft.	(2.4 to 5.5 m)	6.625 in. (168.3 mm)
over 18 ft. to 24 ft.	(5.5 to 7.3 m)	8.625 in. (219.1 mm)

2.08 CHAIN LINK INTERNAL TRACK ALUMINUM CANTILEVER SLIDE GATE

A. Aluminum cantilever slide gate [double leaf] [single leaf] _____ opening by ____ high [plus 1' 0" (304.8 mm) 3 strands of barbed wire] shall be of the internal roller design per ASTM F1184 Type II Class 2. Cantilever slide gate to be constructed of ASTM B221 aluminum members welded and designed for maximum structural integrity. Vertical external and internal members minimum 2" (50 mm) square spaced maximum 8' 0" (2.44 m) on center. Gates having fabric greater than 8' 0" (2.44 m) in height require a horizontal member. The top horizontal member shall be a one-piece precision extruded structural framing member having an integral enclosed track. Bottom horizontal member to be minimum 2" x 4" (50 x 100 mm). Adjustable diagonal X trusses shall be installed in each gate panel to transfer the alternating forces as the gate slides. The gate opening portion shall be filled with chain link fabric stretched taut and secured to the frame members. Chain link fabric shall match the fence system specification. The overall gate structure shall be a minimum of 40% larger than the gate opening to support the cantilevered portion of the gate in the closed position with minimum deflection per ASTM F1184. The minimum 40% back frame does not require the installation of chain link fabric for those gates not to be electrically operated. [Electrically operated gates per ASTM F2200 and UL 325 required the back frame to be filled with fabric.] Single leaf cantilever design for openings larger than 30' 0" (9.15 m) up to 40' 0" (12.2 m) shall be fabricated by welding together two horizontal top structural/track members creating a dual track system. Single track gates up to 30' 0" (9.15 m) opening require two support posts and two internal truck assemblies. Dual track gates over 30' 0" (9.15 m) up to 40' 0" (12.2 m) require two sets of dual posts and four internal truck assemblies.

B. Internal truck assemblies shall be capable of swiveling to accommodate gate movement and ensure full contact of the four support wheels and two guide wheels to the internal track surface. The galvanized steel truck assembly post bracket, truck assembly vertical support axle as well as the support wheels shall be designed to handle static and dynamic forces required to support and operate the gate. The truck assembly, support axle and internal wheels shall be comprised of stainless steel or galvanized steel components.

C. Galvanized steel bottom guide roller brackets containing two 3" (75 mm) rubber wheels shall be supplied to keep the bottom of the gate plumb and in proper alignment.

D. Single gates shall be supplied with a galvanized steel latch mechanism capable of securing the gate with a padlock accessible from either side. Double gates to have galvanized drop rod to hold inactive leaf and a

latch mechanism capable of securing the gate with a padlock accessible from either side. Provide drop rod pipe or receiver to engage center drop rod. [Electrically operated gates per ASTM F2200 and UL325 shall not contain any latch or locking mechanism]

E. Cantilever gate posts shall be 4.00" (101.6 mm) OD [Grade 1 pipe ASTM F1083] [Grade 2 pipe ASTM F1043 Group IC] per section 2.03. Single leaf cantilevers up to 30' 0" (9.15 m) require three 4" (101.6 mm) OD posts, dual track single leaf cantilevers over 30' 0" (9.15 m) up to 40' 0" (12.2 m) require two sets of pre fabricated dual 4.00" (101.6 mm) OD support posts and a 4" (10.6 mm) latch post.. Gate is supported in the center of the dual posts.

SAFETY ALERT! Electrically operated cantilever slide gates are for use in controlling vehicular traffic only and are not intended to be used by pedestrians or control pedestrian traffic. Always specify a separate swing walk gate for pedestrian use. The design of electrically operated slide gates must comply with ASTM F2200 and UL 325.

2.09 POST SETTING MATERIALS

A. Concrete: Minimum 28 day compressive strength of 3,000 psi (20 MPa).

B. Drive Anchors: Galvanized ASTM A36 steel drive anchor angle blades, [1" x 1" (25 mm x 25 mm)] [1.25" x1.25" (31.8 mm x 31.8 mm)] x 30 " (762 mm) long secured to post with a pressed steel galvanized shoe clamp. [drive anchors are limited to post size 2.785" (73.0 mm) OD or less]

2.10 ACCESSORIES

A. Privacy Slats: Slats to be manufactured from a combination of color pigments, quality high density virgin polyethylene and ultraviolet inhibitors, having a 25 year limited warranty against either color fading or breakage of slats and locking-channel used under normal climactic extremes experienced In North America and Hawaii. Color: [Beige] [Rustic Brown] [Snow White] [Black] [Redwood] [Sky Blue] [Forest Green] or [Cape Cod Gray]. [Select design] [Standard PDS self- locking using horizontal bottom channel locking system] [FIN/SLAT '1000' (self-locking slats) (see fence detail)]

PART 3 EXECUTION

3.01 SITE EXAMINATION

A. Ensure property lines and legal boundaries of work are clearly established.

B. Survey of fence location to be provided by [general contractor] [fence contractor] [owner]

C. Verify areas to receive fencing are completed to final grade.

3.02 CHAIN LINK FRAMEWORK INSTALLATION

A. Install chain link fence system in accordance with ASTM F567 and manufacturer's instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Space line posts uniformly [8' (2438 mm) on center] [maximum 10' (3048 mm) on center] [maximum _____ ft. (_____mm) on center, as determined by wind load post selection calculations]

D. Concrete set posts: Dig holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6" (152 mm) deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" (914 mm) below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post and slope to direct water away from posts.

Drive Anchor set line posts: With protective cap, drive post 36” (914 mm) into ground. Excavate a 6” (152.4 mm) diameter by 6” (152.4 mm) deep section around post to accommodate the drive anchor shoe clamp. Drive the 2 diagonal drive anchor angle blades into the soil and securely tighten the angle blades to post using the shoe clamp, bury shoe clamp. [post setting can be a combination of both, drive anchors for line posts, concrete for terminal posts, delete reference to drive anchors if not specified]

E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

F. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6’ (1829 mm) and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.

G. Tension wire: Install tension wires so that it will be located 4” (101.6 m) up from bottom the fabric. If top rail is not specified, install the tension wire so that it will be located 4” (101.6 mm) down from the top of the fabric. Stretch and Install tension wire before installing the chain link fabric and attach it to each post using wire ties.

H. Top rail: Install in lengths of 21’ (6.4 m). Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.

I. Center Rails: Install mid rails between line posts and attach to post using rail end or line rail clamps. [A center rail is required for fabric height 12’ (3658 mm) and over.]

J. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.

3.03 BARBED WIRE AND BARBED TAPE INSTALLATION [include when specified]

A. Uniformly space and stretch barbed wire between terminal posts. Attach barbed wire to the terminal posts using brace bands and snap and secure barbed wire into each line post barb arm slot.

B. Install barbed tape in accordance with ASTM F1911.

3.04 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15” (381 mm) on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is 2” (50 mm) +/- 1” (25 mm) above finish grade.

B. Secure fabric using wire ties to line posts at 15” (381 mm) on center and to rails and braces 24” (610 mm) on center, and to the tension wire using hog rings 24” (610 mm) on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.05 **CHAIN LINK GATE INSTALLATION**
[add applicable gate installation section when specifying chain link gates]

A. Swing gates: Installation of swing gates and gate posts shall be per ASTM F567. Direction of swing shall be [inward] [outward] [as shown on drawings] Gates shall be hung plumb in the closed position with minimal space from grade to bottom of gate leaf. Double gate drop bar receiver shall be set in a minimum concrete footing 6” (152 mm) diameter by 24” (610 mm) deep. Gate leaf holdbacks shall be installed on all double gates and all gate leafs greater than 5’ (1524 mm) in width. [Electrically operated gates shall comply with ASTM F2200 and UL 325].

B. Horizontal slide gates: Install cantilever and overhead horizontal slide gates and gate posts in accordance with ASTM F567. Horizontal sliding gates shall be plumb in the closed position with minimal ground clearance and slide with an initial force of 40 lbs. (18.14 kg). Double gate drop bar receiver shall be set in a minimum concrete

footing 6” (152 mm) diameter by 24” (610 mm) deep. Install top and bottom safety roller covers and adjacent safety guide posts on ASTM F1184 Type II Class 2 external roller cantilever.

SAFETY ALERT! Electrically operated cantilever slide gates are for use in controlling vehicular traffic only and are not intended to be used by pedestrians or control pedestrian traffic. Always specify a separate swing walk gate for pedestrian use. The design of electrically operated slide gates must comply with ASTM F2200 and UL 325.

3.06 ACCESSORIES [include when applicable]

A. Privacy slats: Install and lock in privacy slats in the fabric in accordance with manufacturer’s instructions.

3.07 ELECTRICAL GROUNDING

A. Grounding when required shall be the responsibility of a licensed electrical contractor and included in Contract Section 33 79 00.

3.08 SITE CLEAN UP

A. Clean up area adjacent to fence line from debris and unused material created by fence installation.

END OF SECTION 32 31 14

SECTION 32 80 00

IRRIGATION

PART 1 - GENERAL

1.1 SCOPE

A. Installation of the irrigation system shall be by a Texas Licensed Landscape Irrigation contractor. It is intended that the cost of all work incidental to the completion of the system as shown or indicated on the plans or in these specifications, be included in the bid except as specifically noted herein.

B. This is an existing 2-Wire system. There are separate irrigation loops. Each loop shall function separately from the others with no cross connections. Each system loop shall remain separate after irrigation is complete for the new parking lot. Each loop has a separate meter.

1.2 CODES AND PERMITS

All work shall be done in accordance with all applicable ordinances of the City. The contractor shall take out all required permits, arrange for all necessary inspections, and shall pay all fees and expenses in connection with same as part of the work under this contract.

1.3 WORK BY OTHERS

A. Electric power: (115 VAC) to be furnished by the G.C. to supply power for the automatic controller unless noted otherwise on the plans. “Complete” electric service, (if called for on the plans) shall include a new electric meter, disconnect, breaker, and all required coordination with the electric utility company.
Final hard-wire connection to the controller shall be the responsibility of the irrigation contractor and shall be performed by a licensed electrician.

B. Sleeves shall be installed by the general contractor. The irrigation contractor shall be responsible for locating sleeves as they are shown on the plans or directed by the owner.

C. Water meters, and all associated costs shall be as called for on the plans.

1.4 LAY OUT

The contractor shall lay out and stake the system according to the plans provided, making minor adjustments as required by the site to provide a complete system with uniform coverage. Any discrepancies, including required static water pressure, unanticipated obstructions, or site conflicts shall be brought to the attention of the owner’s representative before authorization can be given to proceed with corrective measures.

PART 2 – MATERIALS

2.1 MATERIALS

A. Plastic PVC Pipe: All lateral pipe and mainline pipe shall be class 200, SDR-21 solvent weld type. All pipe shall conform to National Sanitation Foundation Standard 14 for Thermoplastic pipe and shall bear the NSF seal. ASTM standard D2241 shall apply. Pipe shall be free from visible cracks, holes, foreign materials, blisters or dents. 3" AND LARGER TO HAVE THRUST BLOCKS.

B. PVC Pipe Fittings: All solvent weld pvc fittings shall be type I, medium weight Schedule 40, as manufactured by LASCO Manufacturing Company, or equal. Swing joint assemblies for rotary heads and quick coupling valves shall be as manufactured by LASCO.

C. Solvents: Pvc solvent cement shall be clear and primer shall be purple.

D. Valve Boxes: Valve box enclosures for electric valves shall be rectangular. Use rectangular box for all remote and ball valves. All boxes to be made of polypropylene with a snap lid as manufactured by Highline (Formerly Brooks or Armor) and shall be a minimum of 12" x 17". Box lids shall be green except for quick couplers.

E. Wire: Wiring from the electric controller to the control valves shall be type UF 600 volt solid copper single conductor with 4/64" insulation which is Underwriters Laboratory approved for direct underground burial when used in National Electric Code Class II Circuits, (30 Volts AC, or less). Wire connections shall be encased in a water-proof compound or gel. 3-M or Weathermatic dry splice.

F. Automatic Controller: Existing, to be used for all existing and new zones.

G. Electric Valves: Shall be as shown on the plans. All electric valves shall have a ball valve upstream from electric valve in the same valve box.

H. Ball Valves: Shall be of PVC construction. Use LASCO (COLONIAL) or SPEARS.

I. Spray Heads: Shall be as shown on the plans. Reference legend on irrigation note sheet.

J. Quick Coupling Valves: Shall be as shown on the plans. All quick coupling valves shall have a ball valve upstream from quick coupler valve in the same 12" x 17" valve box. Box lids shall be purple.

K. Backflow Preventor: Shall be as shown on the plans.

2.2 MATERIALS AND WORKMANSHIP

All materials shall be new and without flaws or defects and shall be the best of their class and kind. All materials and equipment shall be installed in a neat and workmanlike manner. The architect or the owner's representative reserves the right to direct the

removal and replacement of any items, which in their opinion shall not present an orderly and reasonably neat appearance. Such removal and replacement shall be done, when directed, at the contractor's expense without additional cost to the owner. The contractor shall be responsible for full and complete coverage of all irrigated areas and shall make any necessary minor adjustments at no additional cost to the owner. The contractor shall visit the site prior to bidding to acquaint himself with all conditions requiring consideration to provide a complete system.

2.3 SUBSTITUTIONS

A. Contractors desiring to substitute materials shall submit to the landscape architect the following:

1. actual samples of each equipment item

2. manufacturer's catalog sheet showing complete specifications

3. detailed pressure loss computations based upon use of the proposed item

The decision of approval will be based on the comparative ability of the equipment to perform fully all purposes and functions of mechanics and general design. Approval of a substitute must be obtained before the bid is submitted. Approval shall not relieve the contractor of his responsibility to demonstrate that the final installed system will operate according to the intent of the original design.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Plastic Pipe and Fittings: Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by the manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent with a non-synthetic bristle brush. Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench to allow for expansion and contraction. Make all connections between plastic and metal items with threaded plastic male adapters. Teflon tape or other non-oil based thread sealant shall be used to seal threads. Oil based sealants will not be allowed.

B. Mainline pipe shall be solvent welded installed at a minimum depth of 18" and a maximum depth of 24". Lateral pipe shall be installed between 12" and 18". Multiple pipes in the same trench shall not rest directly against each other. Crosses shall not be allowed. Use multiple tees. A 4" minimum wide trench is required for pipe up to 2" size. A 6" trench is required for pipe up to 3"size. All mainline pipe 3" and larger to have thrust blocks at all direction changes.

C. Thrust Block: (For 3" size pipe and large) Quantity of concrete may vary due to amount of soil removed at fitting location. A minimum of one sack shall be used. Form thrust block so as not to prevent removal of fitting or wiring. Shall be place

at fitting where a change of direction occurs, i.e., 45 and 90 degree fittings, tee, ball valves, and at reduction of pipe size. Place non-porous material between concrete and pipe to prevent concrete from sticking to pipe. Thrust blocks must be shaped so as to not encase pipe or electrical wiring for ease of maintenance. Thrust block shall be installed against pipe and non-disturbed soil. All debris shall be removed prior to installation.

D. Trenching and Backfill: All excavation in this contract shall be unclassified and is to include earth, loose rock, solid rock, or any combination thereof, in a wet or dry state. All trenches shall be backfilled with the material removed except for rocks larger than 1". Backfill shall be flooded and tamped to prevent settling. Should solid rock be encountered, contractor shall remove such rock within 4" of contact with pipe and bed trenches with clean sand fill. Removal of excavated rock shall be included in the cost of this contract.

E. Wire: All wiring shall be installed under lateral pipes and to the side of mainline piping. Expansion coils shall be provided every 100', and at all changes in direction. Wires shall be bundled and taped together, by controller, every 20'. All splices shall be located in a valve box. No field splices shall be allowed. Label each wire at the controller terminal strip.

F. Valves: Valves shall be installed as per detail shown. Valves shall be grouped in orderly arrangement. No valves shall be within 36" of another, or within 5' of a curb or 3' of a sidewalk. Valve boxes shall be grouped in straight lines at the same grade. Hand tamp and fill if necessary around all valve boxes. Valve boxes shall be flush with grade or no final acceptance will be given. All remote valves shall have a ball valve installed upstream in same valve box.

G. Heads: Install all spray heads and rotary heads as per detail. Allow a 4" space between all spray heads and any hardscape edge. Thoroughly flush all debris from lines before installing spray head nozzles or rotary internal assemblies. Filters are required as supplied by the manufacturer on all spray heads. Hand tamp and fill if necessary around all heads after nozzle installation. All heads shall be plumb, level, and flush with grade unless noted otherwise.

H. Controllers: Automatic controller is existing to remain. This shall be utilized for all new and existing zones. Assign zone numbers in a logical sequence around the site. Each valve wire end shall be labeled within the controller with zone number tape markers.

3.2 COORDINATION

The irrigation contractor shall coordinate and cooperate with other contractors to enable the work to proceed as rapidly and efficiently as possible.

3.3 "AS-BUILT DRAWINGS"

Prepare an "as-built" drawing on a reproducible print which shall show deviations from the bid documents made during construction affecting the mainline pipe, controller location, remote control valves, quick coupling valves and all sprinkler heads. The drawing shall include dimensions from two separate landmarks to locate all electric,

manual, and quick coupling valves. The drawing shall be delivered to the owner before final acceptance will be given.

3.4 FINALIZATION:

Contractor to complete the following before requesting a final acceptance inspection.

A. Clean Up: Contractor shall remove from the site all debris resulting from work of this section.

B. Adjustment: Contractor shall test entire system for proper operation of all functions. Adjust all spray nozzles and rotary arcs for complete coverage with minimum overspray onto walls, walks, and streets. Repair any leaks. Refill and compact any settled areas.

C. Submittals: Contractor to deliver “as-built” drawings, quick coupler keys, and any required additional materials to the owner’s representative along with a detailed list of such material items. A typed zone chart shall be included within the controller cabinet with a description of the location of each section. A colored zone map is required showing all zones.

3.5 ACCEPTANCE:

The date of final acceptance shall be the date when any “punch items” are completed to the satisfaction of the owner’s representative. Until the date of final acceptance, it shall be the responsibility of the contractor to maintain and protect the system by all means within his control.

3.6 WARRANTY:

The contractor shall guarantee for a period one full year from substantial completion date, that the entire system shall be free from defects in materials and workmanship. Any such defects shall promptly be repaired or replaced at no cost to the owner. Any after-settling of trenches shall be refilled and compacted within the warranty period at no additional cost to the owner. Repairs required due to abuse, misuse, or neglect of the system are not included in this warranty.

END OF SECTION

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SECTION 32 80 01 - TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SUMMARY

A. This Section includes the protection and trimming of trees that interfere with, or are affected by, execution of the Work, whether temporary or new construction.

B. Related Sections include the following:

1. Division 1 Section "Summary of Work" for limits placed on Contractor's use of the site.
2. Division 1 Section "Construction Facilities and Temporary Controls" for temporary tree protection.
3. Division 2 Section "Site Clearing" for removal limits of trees, shrubs, and other plantings affected by new construction.
4. Division 2 Section "Earthwork" for building and utility trench excavation, backfilling, compacting and grading requirements, and soil materials.

1.2 SUBMITTALS

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

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Certification: From a qualified arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

D. Maintenance Recommendations: From a qualified arborist for care and protection of trees affected by construction during and after completing the Work.

1.3 QUALITY ASSURANCE

A. Tree Service Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site on a full-time basis during execution of the Work.

B. Arborist Qualifications: An arborist certified by the International Society of Arboriculture or licensed in the jurisdiction where Project is located.

C. Tree Pruning Standards: Comply with ANSI A300, "Trees, Shrubs, and Other Woody Plant Maintenance--Standard Practices," unless more stringent requirements are indicated.

D. Pre installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

E. Before starting tree protection and trimming, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, and other concerned entities. Review tree protection and trimming procedures and responsibilities. Notify participants at least three working days before convening conference. Record discussions and agreements and furnish a copy to each participant.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

B. Topsoil: Fertile, friable, surface soil, containing natural loam and complying with ASTM D 5268. Provide topsoil that is free of stones larger than 1 inch in any dimension and free of other extraneous or toxic matter harmful to plant growth. Obtain topsoil only from well-drained sites where soil occurs in depth of 4 inches or more; do not obtain from bogs or marshes.

C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

D. Chain Link Fence: Metallic-coated steel chain link fence fabric, 0.120-inch diameter wire size; 48 inches high, minimum; line posts, 1.9 inches in diameter; terminal and corner posts, 2-3/8 inches in diameter; top rail, 1-5/8 inches in diameter; bottom tension wire, 0.177 inch in diameter; with tie wires, hog ring ties, and other accessories for a complete fence system.

PART 3 - EXECUTION

3.0 PREPARATION

A. Temporary Fencing: Install temporary fencing located as indicated, but no less than a minimum of 5’ outside the drip line of trees to protect remaining vegetation from construction damage.

B. Install chain link fence according to ASTM F 567 and manufacturer's written instructions.

C. Protect tree root systems from damage due to noxious materials caused by runoff or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, or excessive wetting caused by dewatering operations.

D. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line; prevent soil compaction over root systems.

E. Do not allow fires under or adjacent to remaining trees or other plants.

3.1 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

D. Relocate roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and relocate them without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.

E. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

F. Where utility trenches are required within drip line of trees, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

G. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.2 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond drip line of trees. Maintain existing grades within drip line of trees.

B. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by qualified arborist, unless otherwise indicated.

C. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.

D. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

F. Moderate Fill: Where existing grade is more than 6 inches, but less than 12 inches, below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade as follows:

1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6 inches below elevation of grade.

2. Place filter fabric with edges overlapping 6 inches minimum.

3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.3 TREE PRUNING

A. Prune remaining trees affected by temporary and new construction.

B. Prune remaining trees to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by qualified arborist.

C. Pruning Standards: Prune trees according to ANSI A300 as follows:

1. Type of Pruning: Crown cleaning.
2. Type of Pruning: Crown restoration.

D. Cut branches with sharp pruning instruments; do not break or chop.

E. Chip branches removed from trees. Spread chips where indicated or as directed by Architect.

3.4 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to written instructions of the qualified arborist.

B. Remove and replace dead and damaged trees that the qualified arborist determines to be incapable of restoring to a normal growth pattern.

C. Provide, plant, and maintain new trees of the same size and species as those being replaced.

E. Provide new trees of 6-inch (150-mm) caliper size and of a species selected by Architect when trees more than 6 inches in caliper size, measured 12 inches above grade, are required to be replaced.

F. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.5 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material, displaced trees, and excess chips from Owner's property.

END OF SECTION 32 80 01

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SECTION 32 92 00

LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SCOPE

Furnish all labor, tools, transportation, materials, equipment, supervision, etc., required to adequately establish a dense lawn of permanent grasses, free from lumps and depressions as indicated by plans and specifications.

Redo any part of the area failing to show uniform cover until a dense lawn is established. The cost of miscellaneous labor and materials for topsoil, weeding, tilling, pest control, fertilizing, etc., are not separate pay items and shall be includes in the bid price for grassing.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Irrigation System

B. Landscaping

1.3 MAINTENANCE OF GRASS

The Contractor shall maintain the grass until final acceptance. Such maintenance shall include spraying, weeding, cultivation, fertilizing, watering, disease and insect control, top dressing low spots, plus any procedures consistent with horticultural practice necessary to insure normal, vigorous, and healthy grass.

1.4 JOB CONDITIONS

A. Water: Will be available on site. Provide necessary hoses and other watering equipment required to complete work. Not all areas shown to have grass will be receiving automatic irrigation

B. Lawn areas will be left within 1/10 of a foot of finish grade by other trades. Fine grading, raking and smoothing will be the responsibility of the contractor.

1.5 SCHEDULE

A. Sodding: Sod Bermuda year-round under favorable conditions.

B. Seeding/hydromulching - Bermuda grass: Complete only between May 1 to August 31 under favorable conditions. (warm season)

1.6 ACCEPTANCE

The work will be accepted when a completed, undamaged stand of grass is achieved, as approved by the Owner's Representative. A stand of grass is defined as full, thick, vigorously growing grass in all turf areas. Any given square foot of grass shall have no

more than one square inch of area where soil is visible. If there are any large areas of bare soil or areas where grass is just starting to emerge the entire job will be considered as not having a stand of grass. Soil should not be readily visible in any areas of turf.

PART 2 - MATERIALS

2.1 TOPSOIL (Verify 6” in all landscape areas with existing topsoil):

A. No topsoil shall be removed from the site. General contractor shall excavate and stockpile topsoil on site if the soil is of good quality. The soil shall be tested at a lab and the results, including suggested treatments for soil, sent to the landscape architect. A minimum of two soil samples shall be taken on site. These shall be spread out evenly throughout the site. These samples shall be tested by a certified institution and the institution shall provide recommendations (for the turf specified for this project) for any adjustment in the soils condition. The landscape contractor shall be responsible for any soil amendments as recommended. The contractor shall forward two copies of all the soil reports, recommendations, and a list of soil amendments to the owner and architect.

B. General contractor shall be responsible for distributing the stockpiled soil back to all areas of the site if the top soil is of good quality. The general contractor shall be responsible for providing 6” of top soil in all landscape areas. If there is not enough topsoil stockpiled on site the general contractor shall be responsible for purchasing and transporting quality top soil to the site including the distribution throughout the site.

C. In the event that there is more stockpiled top soil than was required to provide the specified topsoil the top soil shall be retained for the school district. No topsoil shall be hauled off of the site unless directed by the owner.

D. Topsoil should be friable, fertile, dark, loamy soil, free of clay lumps, sub-soil stones, and other extraneous material and reasonable free of weeds and foreign grasses. Topsoil containing dallisgrass, nutgrass or weeds shall be rejected.

E. The soil shall be tested at a lab at contractor’s expense and the results, including suggested soil treatments, sent to the landscape architect. Samples may be requested from both stockpiled soil and imported soil.

F. Physical properties of topsoil should be as follows:
Clay - between 7-27 percent
Silt - between 28-50 percent
Sand - less than 52 percent

G. Landscape contractor shall be responsible for verifying positive flow of water away from building in all areas.

H. General contractor shall be responsible for placing top soil on site within twenty days of the completion of rough grading and utilities.

2.2 GRASS

A. Bermuda Sod: Solid rolled sod, live, rich, dark green in color, free of foreign grasses, weeds, nutgrass, cut with a full ¾" min. layer of soil covering roots. Deliver to site in standard rolls (min. 24" wide). Do not stack for more than 24 hours between time of cutting and time of delivery. Top dress and roll until all joints and undulations have been removed. Tolerances shall be one inch in ten feet of run. Remove sod netting during installation.

B. Bermuda Grass: Extra fancy, hulled and treated, lawn type seed, delivered to site in original, unopened containers meeting requirements of Texas State Seed Law. Minimum purity germination 90 percent.

2.3 FERTILIZER

Fertilizer shall be organic base, uniform in composition, dry and free flowing. Deliver fertilizer to site in original, unopened containers, each bearing manufacturer's guaranteed statement of analysis.

A. First application: 12-12-12 element percentage with minimum 8% sulfur and 4% iron, plus micro-nutrients.

B. Second application: 3:1:2 element ratio. Nitrogen source to be a minimum 50% slow release organic nitrogen (SCU or UF) plus minimum 8% sulfur and 4% iron plus micro-nutrients.

PART 3 - EXECUTION

3.1 PREPARATION

A. Scarify lawn areas where excessive compaction is greater than 85% Standard Proctor to a depth of 4-inches by discing or rototilling. Repeat cultivation as required to thoroughly loosen soil.

B. Leave areas free of weeds and ready for final grading.

C. Provide barricades around scarified areas to prevent compaction by construction vehicles.

3.2 FINAL GRADING

A. Remove from site and legally dispose of stones ¾-inch and larger, clods 1-inch or larger, sticks, and other debris exposed during this operation. (continue to remove stones as they appear until a stand of grass is accepted.)

B. Provide finish grading leaving surface uniform without depressions and undulations. Grade should be approximately 1-inch below paving on low side of concrete and flush on the high side of concrete to facilitate water flowing across walks and drives and to avoid standing water on concrete surfaces.

3.3 HERBICIDE

Apply herbicide to remove any remaining weeds. This work is to be performed by a licensed applicator following the manufacturer's recommendations.

3.4 FERTILIZER

A. Place first application with hydromulch at rate of 12 pounds per 1,000 square feet.

B. Uniformly distribute second application using a rotary type fertilizer spreader 3-4 weeks after first application at 12 pounds per 1,000 square feet.

3.5 SOLID SOD

A. Solid Rolled Sod: Plant grass edge to edge with staggered joints. Topdress with sharp sand raked in carefully to fill joints. Roll to eliminate undulations and provide complete soil contact. Continue topdressing and rolling until all seams and undulations have been eliminated and levels are within tolerances of 1 inch in ten feet of run. ALL SOD NETTING SHALL BE REMOVED DURING INSTALLATION.

B. All sod areas shall be rolled and top dressed multiple times until all areas are level.

C. Sod shall be top dressed prior to rolling as indicated above. After 2 weeks, landscape contractor shall review all sod areas again and top dress any remaining open or uneven joints. Grass will be required to have a very smooth finish in all surfaces. No grass area with undulations or uneven joints will be accepted until leveled and finished out to the owner's satisfaction.

D. Fertilizing: Fertilize immediately after grass is planted at rate of 4 lbs. Per 1,000 square foot. Repeat fertilizing at the same rate 3-4 weeks later.

3.6 HYDROMULCH/SEEDING

A. At the time of hydromulch/seeding, soil shall be moist but not muddy, and wind velocity shall not exceed ten (10) miles per hour. Add water if required to moisten soil.

B. Hydromulch seed uniformly at the rate of 2 pounds of Bermuda grass seed per 1,000 square feet.

C. Add tackifier to hydromulch mix for slopes 5:1 or greater at the rate of 1 lb. Per bag of mulch. Use a 4' x 8' batter board against bed areas.

3.7 ESTABLISHMENT AND MAINTENANCE OF LAWN AREAS

A. Watering

1. Water lawn areas immediately after grassing operation.

Continue watering as required to keep soil uniformly moist to a minimum depth of 4-inches. Be alert to over-watering newly planted grass, particularly in heavy clay soils.

2. Some areas may require hand watering or temporary irrigation.

B. Replanting/Erosion Control

1. Correct any erosion that may occur during the establishment of grass.

2. Reseed (sod) any areas not showing sufficient growth within 3 weeks after initial grassing. Continue seeding (sodding) until a stand of grass is achieved.

3. A stand of grass will be defined as a uniform cover of activity growing turf.

C. Mowing/Weed Control

1. Mow lawn areas weekly until a stand of grass is achieved. Begin mowing when the lawn reaches a height of 3-inches; set mower to cut at 2-inches. Reduce over 2 cuts to final cut of 1.5-inches.

2. Weed lawn areas until acceptance, removing all foreign vegetation, either by hoeing or pulling. If approved, herbicide spot treatments may be used.

3.8 CLEANUP

During work, keep premises neat and orderly, including organization of storage areas. Remove trash, including debris resulting from removing weeds and rocks from site daily as work progresses. Keep paved areas clean by sweeping or hosing.

END OF SECTION

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SECTION 32 93 00

PLANTING

PART 1 - GENERAL

1.1 SCOPE

Provide all labor, materials, and equipment for complete installation of landscaping, as indicated on the drawings, and specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Irrigation System
B. Lawns
C. Earthwork
D. General Requirements

1.3 QUALITY ASSURANCE

A. Provide plant materials in compliance with applicable State and Federal laws relating to inspection for diseases and inset infestation at growing site.

B. Plants are subject to inspection and approval by the Landscape Architect.

C. Employ only qualified personnel familiar with required work.

D. Off-site topsoil and on-site topsoil testing (paid by Landscape Contractor):

1. Provide off-site and on-site soil testing (paid by landscape contractor) to the Owners representative for the purpose of soil investigation.

2. Take random representative soil samples and test samples from each source for ph, alkalinity, total soluble salts, porosity, sodium content and organic matter. Provide test results and recommendations for plants and grasses shown on the plans to the owner and landscape architect.

E. File certificate of Inspection of plant material by State and Federal authorities with Landscape Architect, if required by State.

1.4 REFERENCED STANDARDS

A. American Standard for Nursery Stock, approved 1986 by American National Standards Institute, Inc. - Plant materials.

B. Hortus Third, 1976 - Cornell University - Plant nomenclature.

C. ASTM - American Standard Testing Material - Sharp sand.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver packaged materials in sealed containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

B. Do not deliver more plant materials than can be planted in one day unless adequate storage and watering facilities are available on job site. Storage of materials and equipment at the job site will be at the risk of the landscape contractor. The owner will not be held responsible for theft or damage.

C. If balled plants cannot be planted within 24 hours after delivery to site, protect root balls by heeling in with saw dust or other approved material.

D. Protect during delivery to prevent damage to root ball or desiccation of leaves.

E. Remove rejected plant material immediately from site.

1.6 JOB CONDITIONS

A. Planting Restrictions:

Perform actual planting only when weather and soil conditions are suitable in accordance with locally accepted practice. In no way shall any trees, plants, ground cover or seasonal color obstruct drainage or block a 2% minimum positive slope away from buildings.

B. Utilities:

1. Determine locations of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, if required, to minimize possibility of damage to underground utilities.

2. Maintain grade stakes until removal is mutually agreed upon by parties concerned.

3. Coordinate work with irrigation contractor to prevent damage to underground sprinkler system.

1.7 WARRANTY

A. Warranty for plants and trees shall be for one year after final acceptance. Replace dead materials and materials not in vigorous, thriving condition as soon as weather permits and on notification by Owners Rep. Replace plants, including trees, which in opinion of Landscape Architect have partially died thereby damaging shape, size, or symmetry.

B. Replace plants and trees with same kind and size as originally planted, at no cost to the Owner. Provide one-year warranty on replacement plants. These should be replaced at start of next planting or digging season. In such cases, removed dead trees immediately. Protect irrigation system and other piping conduit or

other work during replacement. Repair any damage immediately.

C. Warranty excludes replacement of plants after final acceptance because of injury by storm, drought drowning, hail, freeze, insects or diseases.

D. At the end of the warranty period, staking and guying materials if required shall be removed from the site.

1.8 MAINTENANCE

A. Water: Will be available on site. Provide necessary hoses and other watering equipment required to complete work. Some proposed grass areas will not have automatic irrigation and some temporary irrigation or hand watering will be required for establishing grass.

B. Until final acceptance, maintain plantings and trees by watering, cultivating, mowing, weeding, spraying, cleaning and replacing as necessary to keep landscape in a vigorous, health condition and rake bed areas as required.

C. A written notice requesting final inspection and acceptance should be submitted to Landscape Architect or owner's representative within seven (7) days prior to completion. At that time owner and Landscape Architect will prepare a final punch list to be reviewed with the landscape contractor.

D. Following final acceptance, maintenance of plant material will become the Owner's responsibility. The Contractor shall provide Owner with a recommended maintenance program.

E. All dead wood and suckers shall be removed from all existing trees on this property. Any branch lower than eight feet from vehicular or pedestrian pavement shall be pruned up to a minimum of eight feet.

PART 2 - PRODUCTS

2.1 PLANTS

A. Quantities: The drawings and specifications are complementary: anything called for on one and not the other is as binding as if shown and called for on both. The plant schedule is an aid to bidders only. Confirm all quantities on plan.

B. Plants shall be equal to well formed No. 1 grade of better; symmetrical, heavily branched with an even branch distribution, densely foliated and/or budded, and a strong, straight, distinct leader where this is characteristic of species. Plants shall possess a normal balance between height and spread. The Landscape Architect will be the final arbiter of acceptability of plant form, either before or after planting and shall be removed at the expense of the Landscape Contractor and replaced with acceptable plants as specified.

C. Plants shall be healthy, free of disease, insect pests and their eggs, and larvae.

D. Plants shall have a well-developed fibrous root system.

E. Plants shall be free of physical damage such as scrapes, broken or split branches, scars, bark abrasions, sun scalds, fresh limb cuts, disfiguring knots, or other defects.

F. Pruning of all trees and shrubs, as directed by Landscape Architect, shall be executed by Landscape Contractor at no additional cost to the Owner.

G. Plants shall meet the sizes indicated on the Plant List. Where a size or caliper range is stated, at least 50% of the material shall be closer in size to the top of the range stated.

H. Plants indicated “B&B” shall be balled and burlapped. Plants shall be nursery grown unless otherwise specified in plant list. Balls shall be firm, neat, slightly tapered and well burlapped. Non-biodegradable ball wrapping material will not be accepted. Any tree loose in the ball or with broken ball at time of planting will be rejected. Balls shall be ten(10") inches in diameter for each one (1") inch of trunk diameter, measured six (6") inches above ball.

I. Container grown plants shall be well rooted and established in the container in which they are growing. They shall have grown in the container for a sufficient length of time for the root system to hold the planting medium when taken from the container, but not long enough to become root bound.

2.2 SOIL PREPARATION MATERIALS

A. Peat Moss: Commercial sphagnum moss or hyphum peat.

B. Pre-mixed soils can be used as long as samples are submitted with manufacturer’s data and laboratory test reports.

C. Sandy Loam:

1. Friable, fertile, dark, loamy soil, free of clay lumps, subsoil, stones, and other extraneous material and reasonably free of weeds and foreign grasses. Soil containing Dallisgrass or Nutgrass shall be rejected.
2. Physical properties as follows:
   Clay - between 7-27 percent
   Silt - between 28-50 percent
   Sand - less than 52 percent

D. Sharp Sand: Clean, washed sand, (fine aggregate) ASTM C-33.

2.3 COMMERCIAL FERTILIZER

A. Fertilizer shall be delivered in manufacturer’s standard container printed with manufacturer’s name, material weight, and guaranteed analysis. Fertilizers with N-P-K analysis other than that specified may be used provided that the application rate per square foot of nitrogen, phosphorus, and potassium is equal to that specified.

B. Commercial Fertilizer for Planting Beds: Complete fertilizer 5-10-5 element ratio

with minimum 8% sulfur and 4% iron plus micro-nutrients.

C. Controlled-Release fertilizer planting tablets for tree planting pits, shall be equal to Agriform 20-10-15 planting tablets as manufactured by Sierra Chemical Co., Milpitas, California 95035 or approved equal.

2.4 MULCH

Mulch shall be coarse texture hardwood mulch chips, ranging in size from 2-inches to 4-inches..

PART 3 - EXECUTION

3.1 CONDITION OF SURFACES

A. New bed areas will be left within one tenth of a foot of finish grade by other trades. Contractor will be responsible for raking and smoothing of grade. Remove from site and legally dispose of stones ¾-inch and larger, clods 1-inch or larger, sticks, and other debris exposed during this operation.

B. Examine subgrade upon which work is to be performed. Notify the Landscape Architect or owners representative of unsatisfactory conditions.

3.2 TREE PLANTING

A. Plant ornamental trees in pits 12-inches larger than the root ball. Plant shade trees in pits two feet greater in diameter than root ball and equal to depth of root ball.

B. After excavation of tree pits, review water percolation. If tree pit does not drain adequately prepare hole for use with a tree sump. Paint PVC stand pipe and cover dark green. After tree is installed, pump water out on a daily basis.

C. In the event rock or underground construction work or obstructions are encountered in any plant pit excavation work to be done under this section, alternate locations may be selected by the Landscape Architect. Where locations cannot be changed the obstructions shall be removed to a depth of not less than six (6") inches below bottom of ball when plant is properly set at the required grade. The work of this section shall include the removal from the site of such rock or underground obstructions encountered at the cost of the Landscape Contractor.

D. Prepare soil for planting by thoroughly mixing two parts sandy loam and one part peatmoss or other approved organic matter. If planting soil does not fall within the ph range of 5.5 to 7.0 add limestone or aluminum sulphate to bring soil into the specified ph range.

E. Backfill tree pits with a mixture of ½ prepared soil and ½ existing site soil. Lightly tamp every 6-inches to fill all voids and pockets. When pit is 2/3 full, water thoroughly and leave water to soak in. Place fertilizer planting tablets per manufacturer’s recommendations. Complete backfilling and form a saucer

around the tree.

F. Completely fill each tree saucer with mulch to a depth of three inches.

G. Contractor shall keep trees plumb until established. Guying and/or staking to maintain that plumb condition shall be at the Contractor's discretion. However, if trees are not plumb, the Contractor will be required to guy and/or stake those trees in a method acceptable to the Landscape Architect at no additional cost to the Owner.

H. Pruning: Prune trees to preserve the natural character of the plant in a manner appropriate to its particular requirements in the landscape design as directed by the Landscape Architect. In general, remove at least one-third of wood by thinning and pruning. DO NOT cut back terminal branches. Remove sucker growth and broken or badly bruised branches.

3.3 SHRUB PLANTING

A. Any existing grass area to receive shrubs or ground cover must have grass properly killed and removed to a depth of four inches to ensure that no existing grass will come back in the bed area. Soil mix shall be used to replace the four inches removed in this area.

B. All shrub areas shall have weed barrier mat below the mulch. If a bed only has shrubs in it then the whole bed area shall be covered with weed barrier mat. If there are shrubs and ground cover then there shall be not weed barrier mat beneath the ground cover portion.

C. Till 12 inches min. of thoroughly mixed prepared soil in all planting bed areas as follows:
1 part sandy loam
1 part peat moss
1 part sharp sand
Add 4 pounds commercial fertilizer per 100 SF of bed area and mix thoroughly.

D. Some soil may need to be removed after soil mix has been added and tilling has been completed. Crown bed do drain from center of bed. The bed edges should generally be flush with or slightly above adjacent grade or paving so water does not pond in the bed area.

E. Plant where shown on plans, setting plants with tops of balls even with tops of beds, and compact soil carefully around each plant ball.

F. Excavate planting hole 3" larger than the width and height of the root ball. Backfill with 1/3 (soil mix and/or peatmoss), 1/3 native soil and 1/3 sandloam.

G. Water each plant thoroughly with hoses to eliminate air pockets.

H. Carefully prune plants to remove dead or broken branches, various tags, and hand-rake bed areas to smooth even surfaces. Mulch bed areas as shown on plans and details as some beds have rock cover and some have wood mulch.

Top of mulch shall generally be flush with surrounding pavement and turf. Wood mulch to be installed in shrubs in parking islands.

3.4 CLEANUP

During work, keep premises neat and orderly including organization of storage area. Remove trash, including debris resulting from removing weeds or rocks from planting areas, preparing beds, or planting plants from site daily as work progresses. Keep walk and driveway area clean by sweeping or hosing.

END OF SECTION

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Rockwall Independent School District

CORGAN

Proposed Change Request

22286.000, ROCKWALL ISD MIDDLE SCHOOL #4

Date and Time: 06/04/2025

PCR: 068R1 Prepared By: Brittney Freeman

Please submit a written proposal for modifications to the work as identified here and on referenced attachments. Submit proposal within seven (7) days, or notify the architect in writing of the date on which you anticipate submitting your proposal.

Description of Change

Per district request, this change is to include an additional parking lot south of the football field.

CIVIL

SHEET C03.04 – SOUTHEAST DETAILED SITE PLAN

- Added parking lot south of football field.

SHEET C04.02 – MIDDLE GRADING PLAN

- Updating grading to accommodate added parking lot.

SHEET C06.01 – SOUTH PAVING PLAN

- Added paving for parking lot south of football field.

LANDSCAPE

SHEET L1 – OVERALL LANDSCAPE PLAN

- **New parking lot added south of track.**
- **Adjust sod and reduce sod by +/-29,500 sf.**
- **Add trees and grasses.**

SHEET L2 – LANDSCAPE PLAN AREA A

Rc

Corgan Internal File Location: \\corganone.com\Projects\Dallas\22286\0000\D-Contract Admin\05-Change Orders\Proposed\PCR 068 - Additional Parking\PCR 068R1\PCR 068R1 - Additional Parking.docx

Rockwall INDEPENDENT SCHOOL DISTRICT

CORGAN

- New parking lot added south of track.
- Adjust sod and reduce sod by +/-29,500 sf.
- Add trees and grasses.

SHEET L5 – LANDSCAPE PLAN AREA D

- New parking lot added south of track.
- Adjust sod and reduce sod by +/-29,500 sf.
- Add trees and grasses.

SHEET L9 – LANDSCAPE DETAILS

- Increase trees and shrubs in the plant legend for new parking lot.
- Add 2 Pistache and 5 Lacebark trees.
- Add 62 Blue Gramma grasses.

SHEET LI1 – OVERALL IRRIGATION PLAN

- New parking lot added south of track.
- Adjust irrigation for new parking lot, including grass and shrub irrigation.

SHEET LI2 – IRRIGATION PLAN AREA A

- New parking lot added south of track.
- Adjust irrigation for new parking lot, including grass and shrub irrigation.

SHEET LI5 – IRRIGATION PLAN AREA D

- New parking lot added south of track.
- Adjust irrigation for new parking lot, including grass and shrub irrigation.

ARCHITECTURAL

SHEET A01-01 – SITE PLAN

- Added parking lot south of football field.

SHEET A01-01.1 – SITE PLAN – SEGMENT 01

- Added parking lot south of football field.
- Changed single 3' man gate to a double 10' vehicular gate.

SHEET A01-01.2 – SITE PLAN – SEGMENT 02

- Added parking lot south of football field.

ELECTRICAL

SHEET ES01-03 - ELECTRICAL SITE PLAN

- Added luminaire Type "Z4" area lighting for added parking lot.

Roc

Rockwall INDEPENDENT SCHOOL DISTRICT

CORGAN

- **See sheet ES01-03 for changes.**

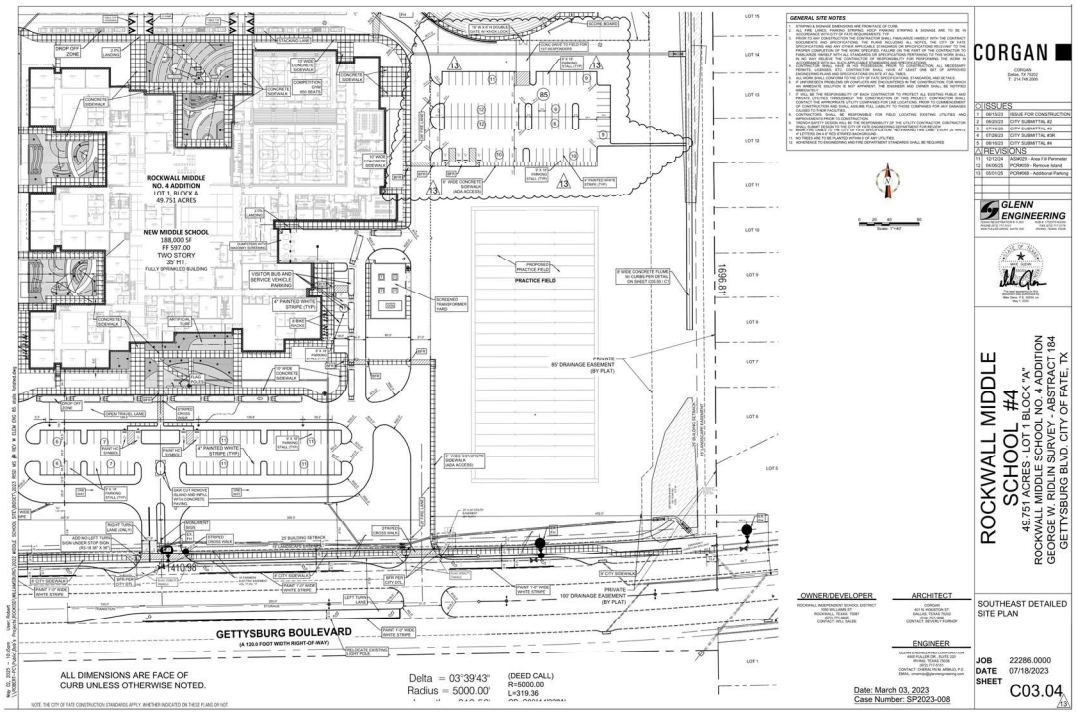
SHEET ES01-05 - PHOTOMETRIC SITE PLAN

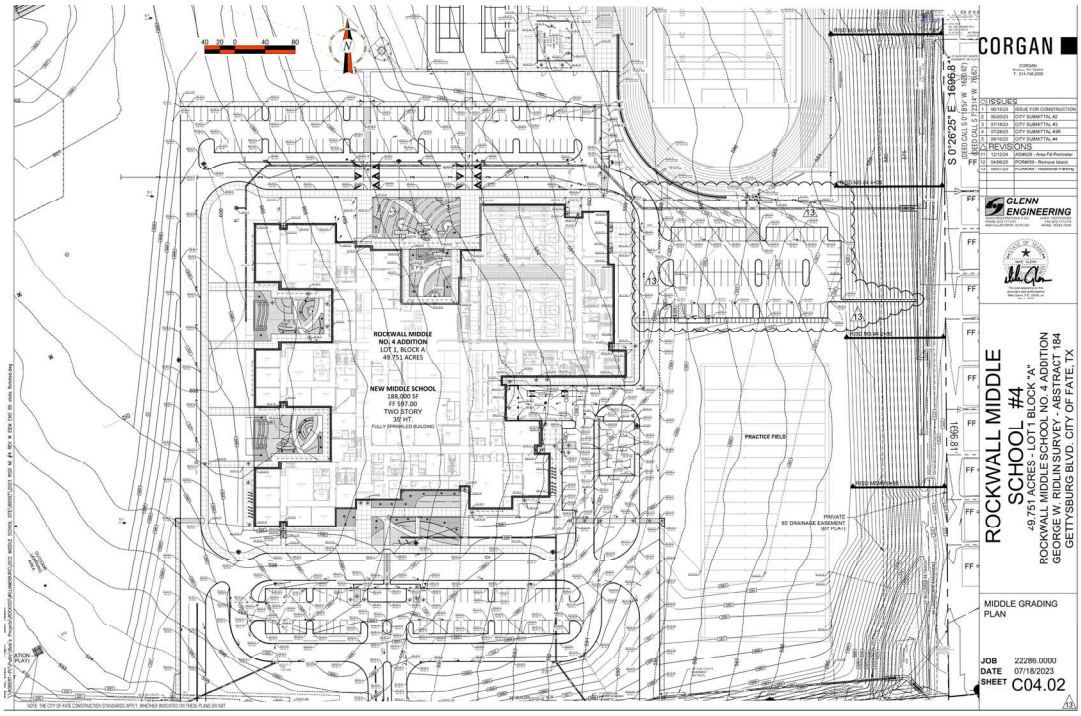
- **Updated photometric site plan for added parking lot.**
- **See sheet ES01-05 for changes.**

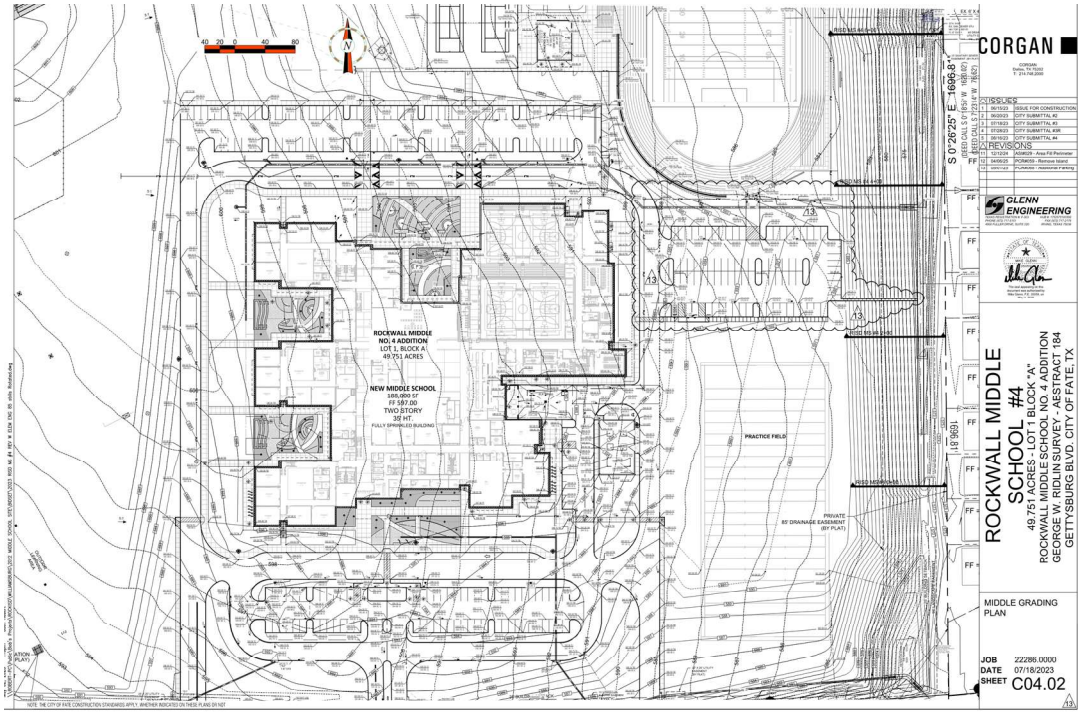
End of Proposed Change Request
CC: Tim Lyssy, Will Salee, Beverly Fornof, Paige Russell

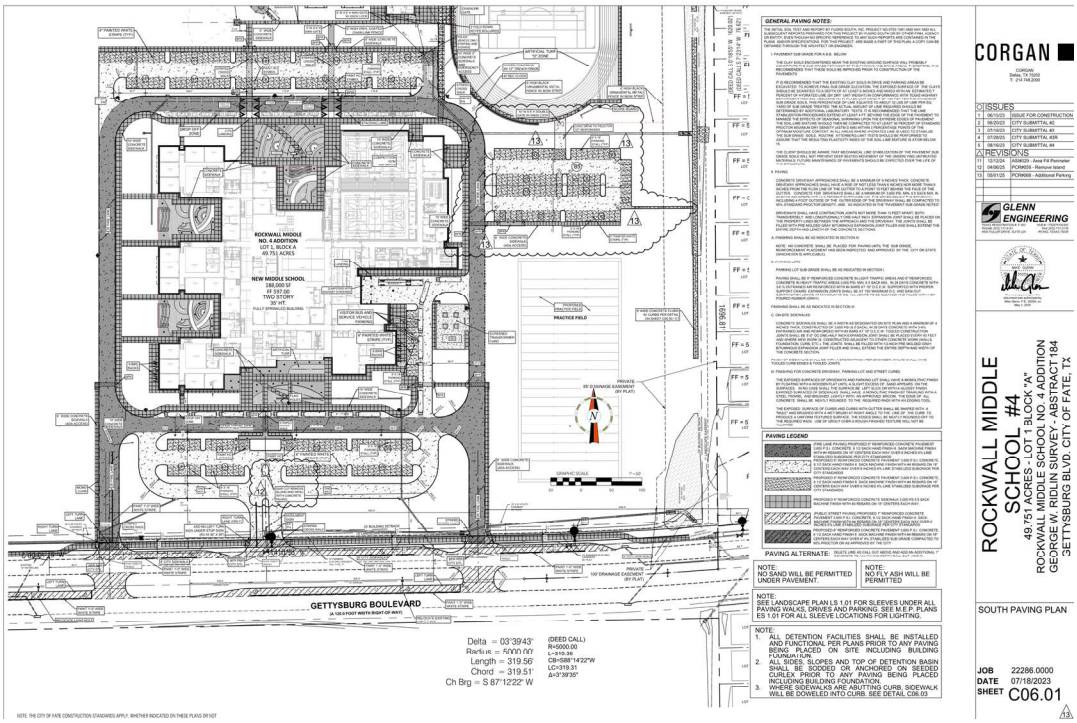
Please review this information and advise writer of any corrections, misunderstandings, or additions within 3 business days.

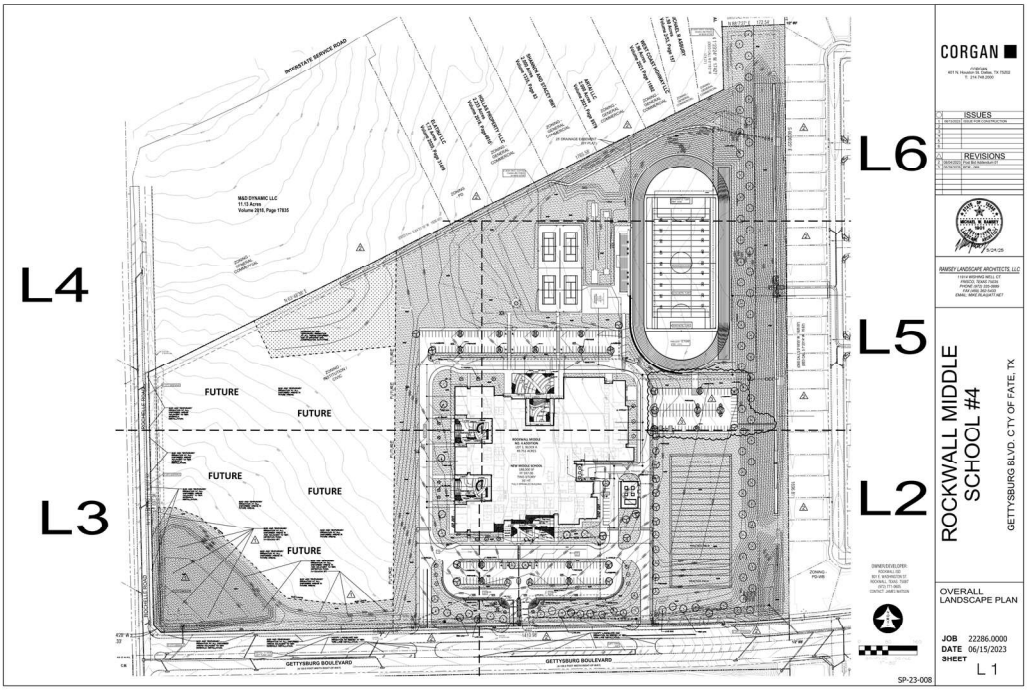
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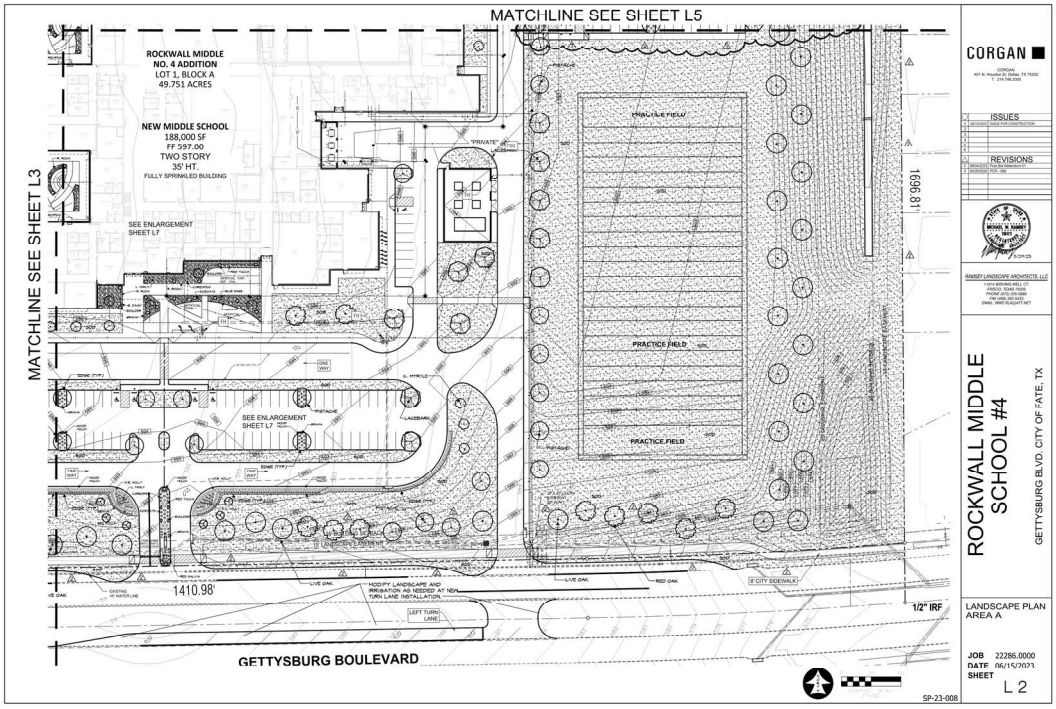

ROCKWALL MIDDLE NO. 4 ADDITION
LOT 1, BLOCK A
49.751 ACRES
NEW MIDDLE SCHOOL
188,000 SF
FF 597.00
TWO STORY
35' FT
FULLY SPRINKLED BUILDING
PROPOSED PRACTICE FIELD
PRACTICE FIELD
89' DRAINAGE EASEMENT (BY PLAT)
100' DRAINAGE EASEMENT (BY PLAT)
GETTYSBURG BOULEVARD
(A 120.0 FOOT WIDTH RIGHT-OF-WAY)
ALL DIMENSIONS ARE FACE OF CURB UNLESS OTHERWISE NOTED.
Delta = 03°39'43"
Radius = 5000.00'
(DEED CALL)
R=5000.00
L=319.36
GENERAL SITE NOTES
CORGAN
GLENN ENGINEERING
ISSUES
REVISIONS
ROCKWALL MIDDLE SCHOOL #4
49.751 ACRES - LOT 1 BLOCK "A"
ROCKWALL MIDDLE SCHOOL NO. 4 ADDITION
GEORGE W. RIDLIN SURVEY - ABSTRACT 184
GETTYSBURG BLVD, CITY OF FATE, TX
OWNER/DEVELOPER
ROCKWALL INDEPENDENT SCHOOL DISTRICT
ARCHITECT
ENGINEER
SOUTHEAST DETAILED SITE PLAN
JOB 22286.0000
DATE 07/18/2023
SHEET C03.04
Date: March 03, 2023
Case Number: SP2023-008

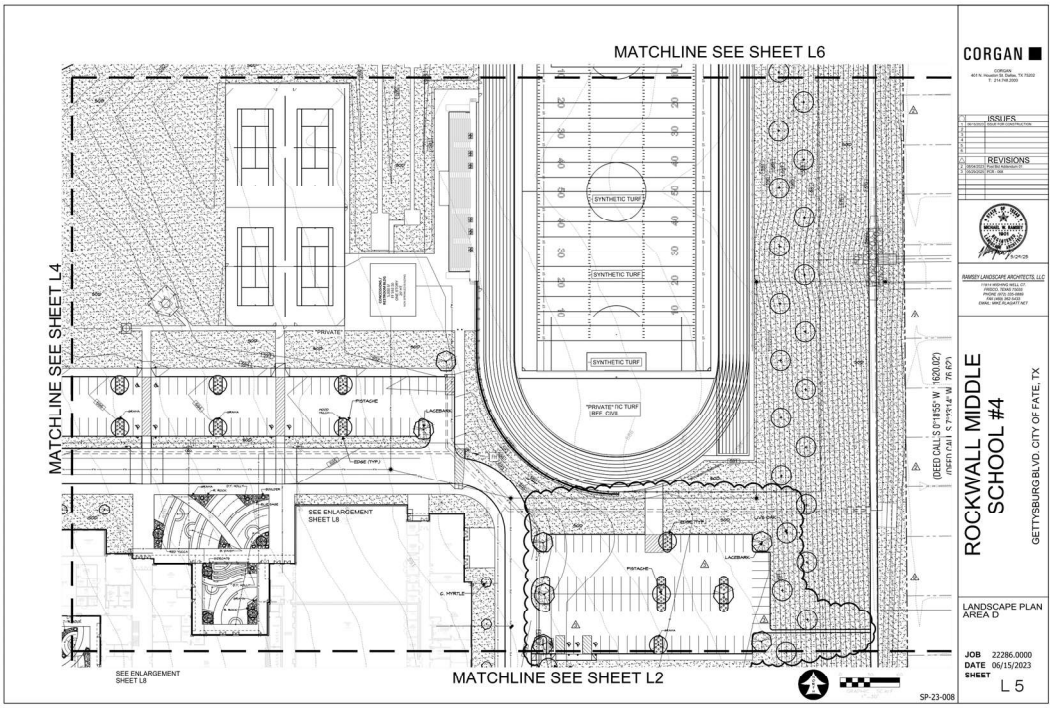

CORGAN
GLENN ENGINEERING
ROCKWALL MIDDLE SCHOOL #4
49.751 ACRES - LOT 1 BLOCK "A"
ROCKWALL MIDDLE SCHOOL NO. 4 ADDITION
GEORGE W. RIDLIN SURVEY - ABSTRACT 184
GETTYSBURG BLVD, CITY OF FATE, TX
MIDDLE GRADING PLAN
JOB 22286.0000
DATE 07/18/2023
SHEET C04.02
ROCKWALL MIDDLE NO. 4 ADDITION LOT 1, BLOCK A 49.751 ACRES
NEW MIDDLE SCHOOL 188,000 SF FF 587.00 TWO STORY 35' HT. FULLY SPRINKLED BUILDING
PRACTICE FIELD
PRIVATE 65' DRAINAGE EASEMENT (BY PLAT)
S 0°26'25" E 1696.5'
1696.91'

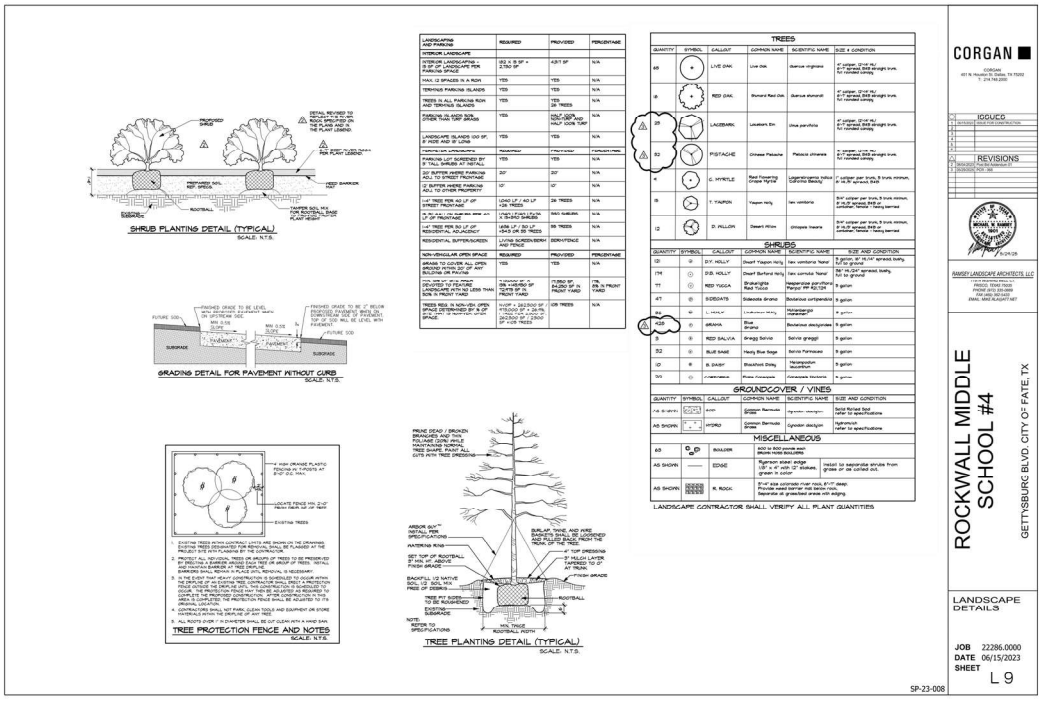

CORGAN
ISSUED
1 07/15/23 ISSUE FOR CONSTRUCTION
2 09/20/23 CITY SUBMITTAL #2
3 07/18/23 CITY SUBMITTAL #3
4 07/28/23 CITY SUBMITTAL #3R
5 08/18/23 CITY SUBMITTAL #4
REVISIONS
11 12/12/24 240829 - Area Fill Perimeter
12 04/09/25 PCR#09 - Remove Island
GLENN ENGINEERING
ROCKWALL MIDDLE SCHOOL #4
49.751 ACRES - LOT 1 BLOCK "A"
ROCKWALL MIDDLE SCHOOL NO. 4 ADDITION
GEORGE W. RIDLIN SURVEY - ABSTRACT 184
GETTYSBURG BLVD. CITY OF FATE, TX
MIDDLE GRADING PLAN
JOB 222286.0000
DATE 07/18/2023
SHEET C04.02
ROCKWALL MIDDLE NO. 4 ADDITION
LOT 1, BLOCK A
49.751 ACRES
NEW MIDDLE SCHOOL
166,600 SF
FF 597.00
TWO STORY
35' HT.
FULLY SPRINKLED BUILDING
PRACTICE FIELD
PRIVATE 85' DRAINAGE EASEMENT (BY PLAT)
S 0°26'25" E 1696.84'
1696.81'


GENERAL PAVING NOTES:
PAVING LEGEND
GETTYSBURG BOULEVARD
(A 120.0 FOOT WIDTH RIGHT-OF-WAY)
ROCKWALL MIDDLE NO. 4 ADDITION LOT 1, BLOCK A 49.751 ACRES
NEW MIDDLE SCHOOL 180,000 SF FF 597.00 TWO STORY 35' HT.
PRACTICE FIELD
PRIVATE 60' D DRAINAGE EASEMENT (BY PLAT)
100' DRAINAGE EASEMENT (BY PLAT)
PROPOSED 20' WIDE CONCRETE PAVED ACCESS DRIVE
PROPOSED 24' WIDE CONCRETE PAVED ACCESS DRIVE
PROPOSED 6' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 8' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 10' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 12' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 4' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 5' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 6' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 8' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 10' WIDE CONCRETE PAVED SIDEWALK
PROPOSED 12' WIDE CONCRETE PAVED SIDEWALK
PAVING ALTERNATE:
NOTE: NO SAND WILL BE PERMITTED UNDER PAVEMENT.
NOTE: NO FLY ASH WILL BE PERMITTED
NOTE: SEE LANDSCAPE PLAN LS 1.01 FOR SLEEVES UNDER ALL PAVING WALKS, DRIVES AND PARKING. SEE M.E.P. PLANS E1.01 FOR ALL SLEEVE LOCATIONS FOR LIGHTING.
NOTE:
1. ALL DETENTION FACILITIES SHALL BE INSTALLED AND FUNCTIONAL PER PLANS PRIOR TO ANY PAVING BEING PLACED ON SITE INCLUDING BUILDING FOUNDATIONS.
2. ALL SIDES, SLOPES AND TOP OF DETENTION BASIN SHALL BE SODDED OR ANCHORED ON SEEDED CURLEX PRIOR TO ANY PAVING BEING PLACED INCLUDING BUILDING FOUNDATIONS.
3. WHERE SIDEWALK ABUTS CURB, THE CURB, SIDEWALK WILL BE DOWELED INTO CURB. SEE DETAIL C06.03
Delta = 03°39'43" (DEED CALL)
Radius = 5000.00' R=5000.00
Length = 319.56' L=319.39'
Chord = 319.51' CB=S86°14'22"W
Ch Brg = S 87°12'22" W LC=319.31'
Δ=3°39'35"
CORGAN
ISSUES
1 08/15/25 ISSUE FOR CONSTRUCTION
2 09/29/25 CITY SUBMITTAL #2
3 07/16/25 CITY SUBMITTAL #3
4 07/28/25 CITY SUBMITTAL #3R
5 08/16/25 CITY SUBMITTAL #4
REVISIONS
11 10/10/25 0404R25 - Area Fill Perimeter
12 04/06/25 PCR#035 - Remove Island
13 03/01/25 PCR#058 - Additional Parking
GLENN ENGINEERING
ROCKWALL MIDDLE SCHOOL #4
49.751 ACRES - LOT 1 BLOCK "A"
ROCKWALL MIDDLE SCHOOL NO. 4 ADDITION
GEORGE W. RIDLIN SURVEY - ABSTRACT 184
3 GETTYSBURG BLVD, CITY OF FATE, TX
SOUTH PAVING PLAN
JOB 22286.0000
DATE 07/18/2023
SHEET C06.01


L4
L6
L5
L3
L2
FUTURE
FUTURE
FUTURE
FUTURE
FUTURE
GETTYSBURG BOULEVARD
GETTYSBURG BOULEVARD
SP-23-008
CORGAN
ISSUES
REVISIONS
RAMSEY LANDSCAPE ARCHITECTS, LLC
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD. CITY OF FATE, TX
OVERALL LANDSCAPE PLAN
JOB 22286.0000
DATE 06/15/2023
SHEET L 1


MATCHLINE SEE SHEET L5
MATCHLINE SEE SHEET L3
ROCKWALL MIDDLE NO. 4 ADDITION
LOT 1, BLOCK A
49.751 ACRES
NEW MIDDLE SCHOOL
188,000 SF
FF 597.00
TWO STORY
35' HT.
FULLY SPRINKLED BUILDING
SEE ENLARGEMENT SHEET L7
PRACTICE FIELD
PRACTICE FIELD
1696.81'
1410.98'
GETTYSBURG BOULEVARD
1/2" IRF
CORGAN
ISSUES
REVISIONS
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD, CITY OF FATE, TX
LANDSCAPE PLAN AREA A
JOB 22286.0000
SHEET L 2


MATCHLINE SEE SHEET L6
MATCHLINE SEE SHEET L4
MATCHLINE SEE SHEET L2
SYNTHETIC TURF
SYNTHETIC TURF
SYNTHETIC TURF
"PRIVATE"
PISTACHE
LACEBARK
EDGE (TYP.)
SEE ENLARGEMENT SHEET L8
SEE ENLARGEMENT SHEET L8
CRAPE MYRTLE
(DEED CALL S 0°11'55" W 1620.02')
CORGAN
ISSUES
REVISIONS
RAMSEY LANDSCAPE ARCHITECTS, LLC
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD, CITY OF FATE, TX
LANDSCAPE PLAN AREA D
JOB 22286.0000
DATE 06/15/2023
SHEET L 5
SP-23-008



SHRUB PLANTING DETAIL (TYPICAL)
SCALE: N.T.S.

GRADING DETAIL FOR PAVEMENT WITHOUT CURB
SCALE: N.T.S.

TREE PROTECTION FENCE AND NOTES
SCALE: N.T.S.

TREE PLANTING DETAIL (TYPICAL)
SCALE: N.T.S.

LANDSCAPING AND PARKING	REQUIRED	PROVIDED	PERCENTAGE
INTERIOR LANDSCAPE			
INTERIOR LANDSCAPING = 5 SF OF LANDSCAPE PER PARKING SPACE	352 X 5 SF = 2,150 SF	4,317 SF	N/A
MAX. 12 SPACES IN A ROW	YES	YES	N/A
TERMINUS PARKING ISLANDS	YES	YES	N/A
TREES IN ALL PARKING ROW AND TERMINUS ISLANDS	YES	YES 26 TREES	N/A
PARKING AS ASSIGNED SUN, OTHER THAN TURF GRASS	YES	NON-TURF AND HALF LOOK TURF	N/A
LANDSCAPE ISLANDS 200 SF, 8' WIDE AND 9' LONG	YES	YES	N/A
PARKING LOT SCREENED BY EVERGREEN SHRUBS	YES	YES	N/A
20' BUFFER WHERE PARKING ADJ. TO STREET FRONTAGE	20'	20'	N/A
10' BUFFER WHERE PARKING ADJ. TO OTHER PROPERTY	10'	10'	N/A
1/4" TREE PER 40 LF OF STREET FRONTAGE	1,040 LF / 40 LF =26 TREES	26 TREES	N/A
1" TREE PER 40 LF OF LF OF FRONTAGE	1 INCH=2 FEET/20 X 35 SHRUBS SHRUBS	SHRUBS	N/A
1/4" TREE PER 40 LF OF RESIDENTIAL ADJACENCY	1636 LF / 40 LF =41 (AS 26 TREES	55 TREES	N/A
RESIDENTIAL BUFFER/SCREEN	LIVING SCREEN/BERM AND FENCE	BERM+FENCE	N/A
NON-VEHICULAR OPEN SPACE	REQUIRED	PROVIDED	PERCENTAGE
GRASS TO COVER ALL OPEN SPACE NOT OCCUPIED BY ANY BUILDING OR PAVING	YES	YES	N/A
NON-VEHICULAR OPEN SPACE DEVOTED TO FEATURE WITH DIMENSION LESS THAN 50ft IN FRONT YARD	15% =5,670 SF ONLY COUNTED ONCE	7,850 SF BALDO SF IN FRONT YARD	15% 8% IS FRONT YARD
TREES REQ. IS NON-VEH. OPEN SPACE / 1,000 SF OF OPEN SPACE = 1 TREE OR SHRUB PER 1,000 SF OF OPEN SPACE	N=OF = 353,500 SF 1 TREE OR SHRUB PER 1,000 SF OF OPEN SPACE =353 TREES OR SHRUBS OF 1,000 SF = 106 TREES	106 TREES	N/A

TREES					
QUANTITY	SYMBOL	CALLOUT	COMMON NAME	SCIENTIFIC NAME	SIZE & CONDITION
69		LIVE OAK	Live Oak	Quercus virginiana	4" caliper, 12'-14' HT, 6'-7' spread, B&B straight trunk, full rounded canopy
9		RED OAK	Monarch Red Oak	Quercus shumardii	4" caliper, 12'-14' HT, 6'-7' spread, B&B straight trunk, full rounded canopy
25		LACEBARK	Lacebark Elm	Ulmus parvifolia	4" caliper, 12'-14' HT, 6'-7' spread, B&B straight trunk, full rounded canopy
82		PISTACHE	Chinese Pistache	Pistacia chinensis	4" caliper, 12'-14' HT, 6'-7' spread, B&B straight trunk, full rounded canopy
4		C. MYRTLE	Red Flowering Crape Myrtle	Lagerstroemia indica x fauriei 'Natchez' (Natchez)	3" caliper per trunk, 3 trunk minimum, 8' HT, 6' spread, B&B
19		T. YAUPON	Yaupon Holly	Ilex vomitoria	3" caliper per trunk, 3 trunk minimum, 8' HT, 6' spread, B&B or container, full & tightly bermed
12		D. WILLOW	Desert Willow	Chilopsis linearis	3" caliper per trunk, 3 trunk minimum, 8' HT, 6' spread, B&B or container, full & tightly bermed

SHRUBS					
QUANTITY	SYMBOL	CALLOUT	COMMON NAME	SCIENTIFIC NAME	SIZE AND CONDITION
22		D.Y. HOLLY	Dwarf Yaupon Holly	Ilex vomitoria 'Nana'	5 gallon, 30" HT, 24" spread, bushy, full to ground
174		D.B. HOLLY	Dwarf Burford Holly	Ilex cornuta 'Nana'	30" HT, 24" spread, bushy, full to ground
77		RED YUCCA	Brakelights Red Yucca	Hesperaloe parviflora 'Perpa' PP #21,124	5 gallon
47		SIDEOATS	Sideoats Grama	Bouteloua curtipendula	5 gallon
14		L. MUHLY	Lindheimer Muhly	Muhlenbergia lindheimeri	5 gallon
428		BRAMA	Blue Grama	Bouteloua gracilis/aristidoides	5 gallon
5		RED SALVIA	Greggi Salvia	Salvia greggii	5 gallon
52		BLUE SAGE	Hardy Blue Sage	Salvia farinacea	5 gallon
10		B. DASY	Bleakfoot Dasy	Hesperaloe nocturnflora	5 gallon
5/5		AGAVE/ALOE	Blue Flowering Agave/Aloe	Agave/Aloe Vaotoria	5 gallon

GROUNDCOVER / VINES					
QUANTITY	SYMBOL	CALLOUT	COMMON NAME	SCIENTIFIC NAME	SIZE AND CONDITION
AS SHOWN		SOD	Common Bermuda Grass	Cynodon dactylon	Solid Rolled Sod refer to specifications
AS SHOWN		HYDRO	Common Bermuda Grass	Cynodon dactylon	Hydromulch refer to specifications

MISCELLANEOUS			
65	BOULDER	600 to 800 pounds each Minimum three boulders	
AS SHOWN	EDGE	Ryerson steel edge 1/8" x 4" with 12" stakes, green in color	install to separate shrubs from grass or as called out.
AS SHOWN	R. ROCK	5"-6" size colorado river rock, 6"-7" deep Provide weed barrier mat below rock. Separate at gravelled areas with edging	

LANDSCAPE CONTRACTOR SHALL VERIFY ALL PLANT QUANTITIES

CORGAN
CORGAN
401 N. Houston St. Dallas, TX 75202
T: 214.748.2000

NO	DATE	ISSUE
1	10/24/2025	Pre-Bid Addendum #1
2	11/07/2025	RFP 26R

REVISIONS

NO	DATE	ISSUE
1	10/24/2025	Pre-Bid Addendum #1
2	11/07/2025	RFP 26R

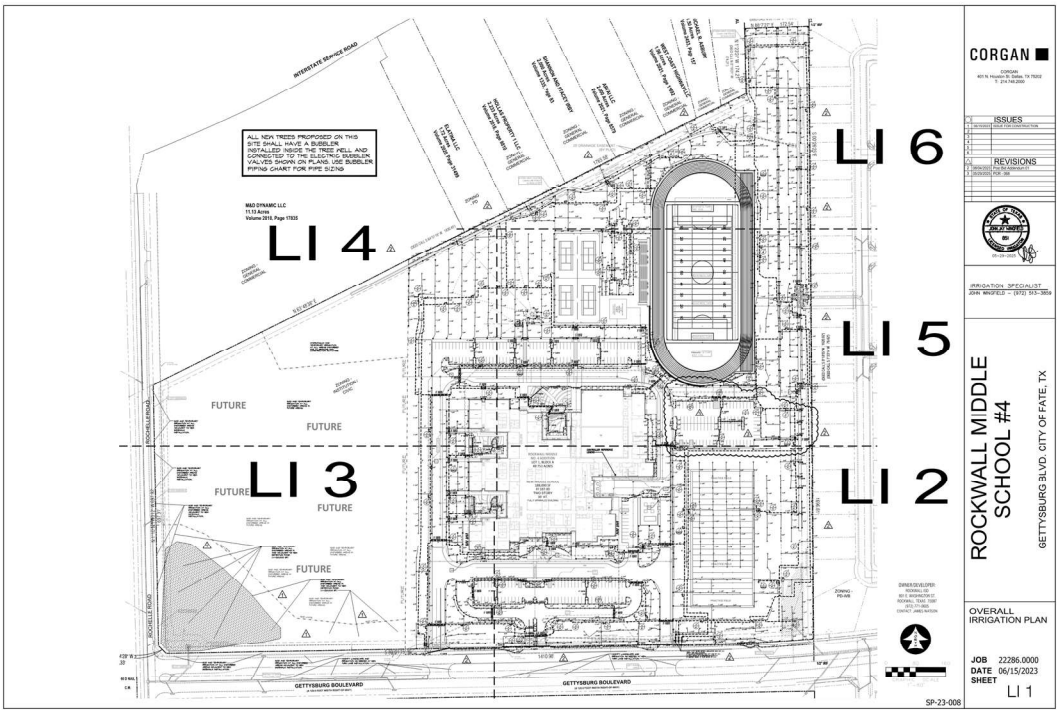
RAMSEY LANDSCAPE ARCHITECTS, LLC
PRISCILLA RAMSEY RARE
PHONE: 214.507.5100
EMAIL: MAIL@LAGRIT.NET

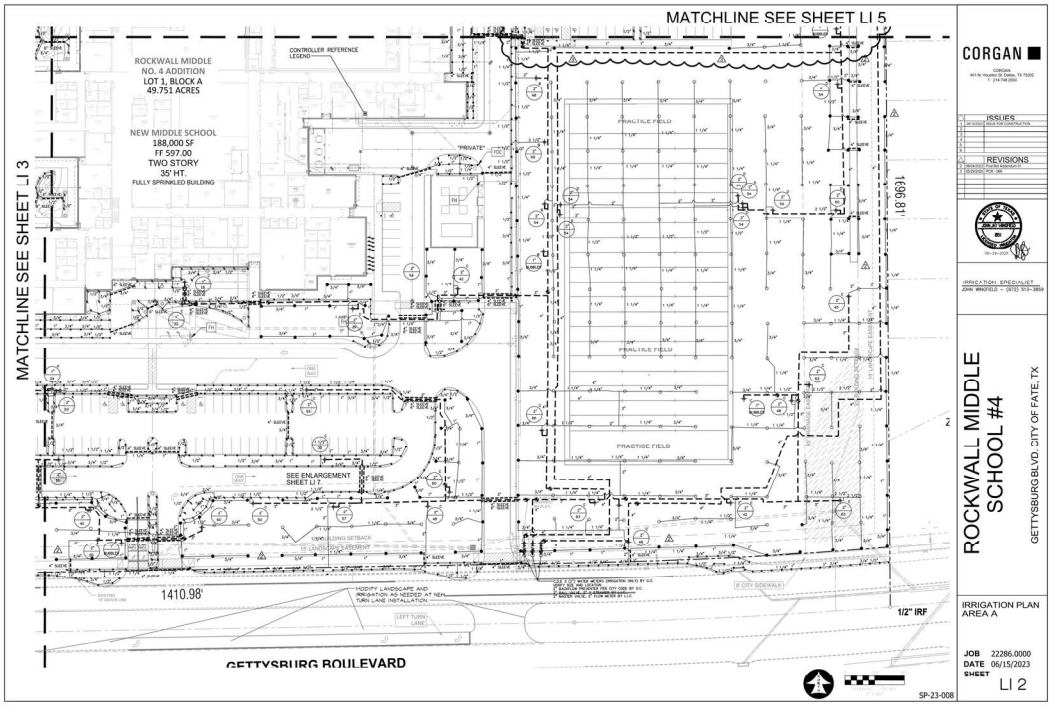
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD, CITY OF FATE, TX

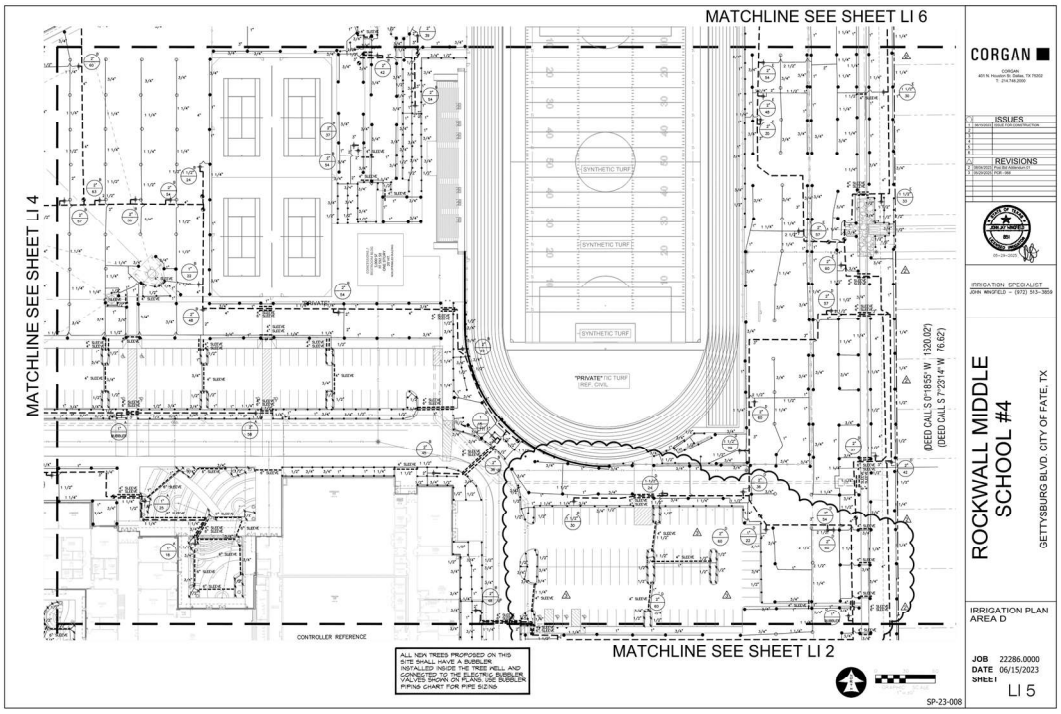
LANDSCAPE DETAILS

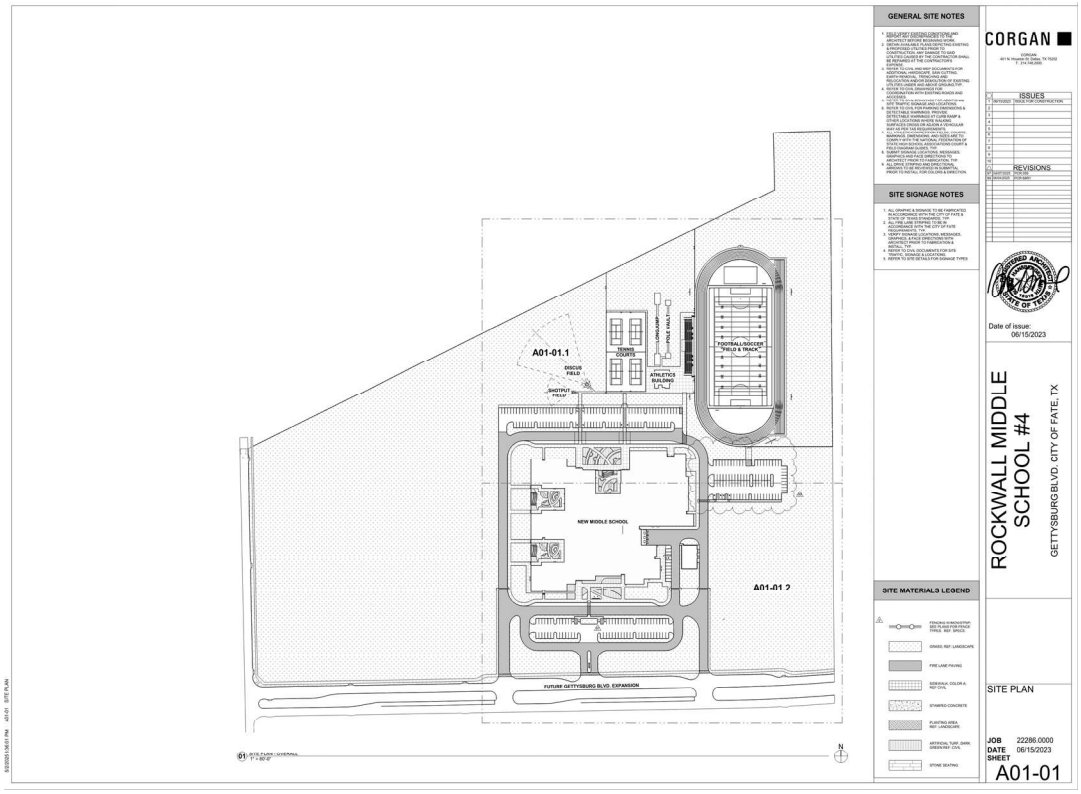
JOB 22286.0000
DATE 06/15/2023
SHEET L 9

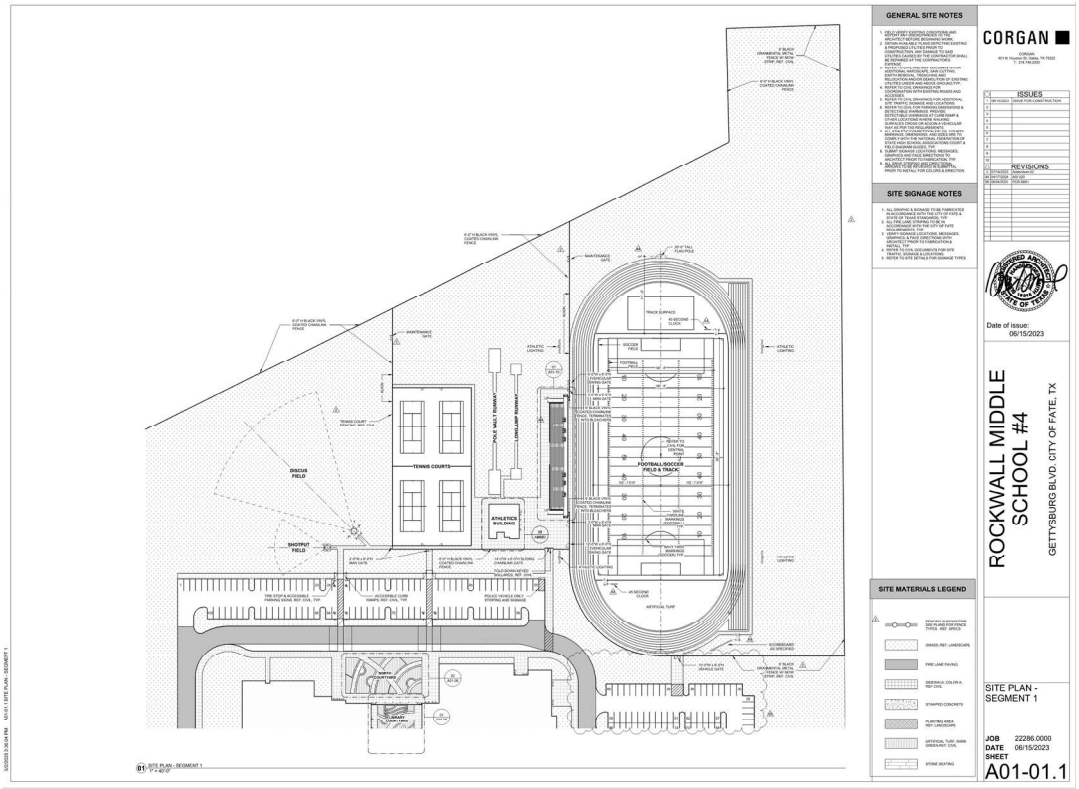
SP-23-008

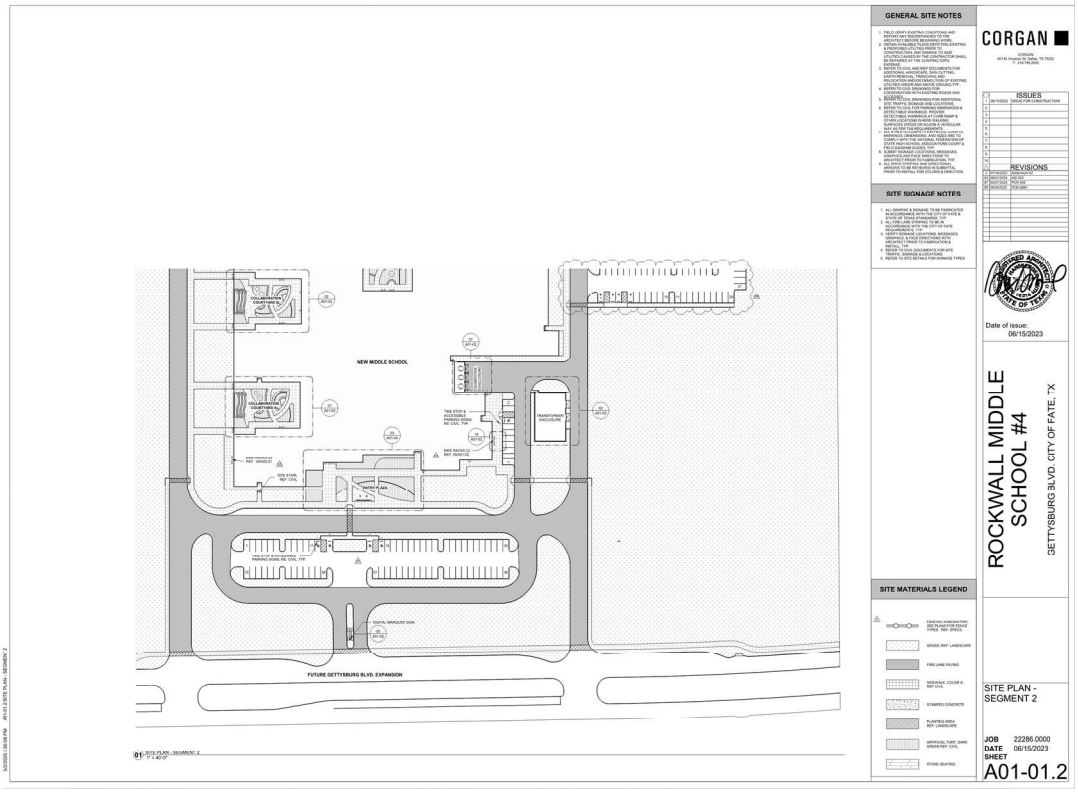

LI 6
LI 4
LI 5
LI 3
LI 2
FUTURE
ALL NEW TREES PROPOSED ON THIS SITE SHALL HAVE A BUBBLER INSTALLED INSIDE THE TREE WELL AND CONNECTED TO THE ELECTRIC BUBBLER VALVES SHOWN ON PLANS. USE BUBBLER PIPING CHART FOR PIPE SIZING
GETTYSBURG BOULEVARD
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD, CITY OF FATE, TX
OVERALL IRRIGATION PLAN
JOB 22286.0000
DATE 06/15/2023
SHEET LI 1
SP-23-008

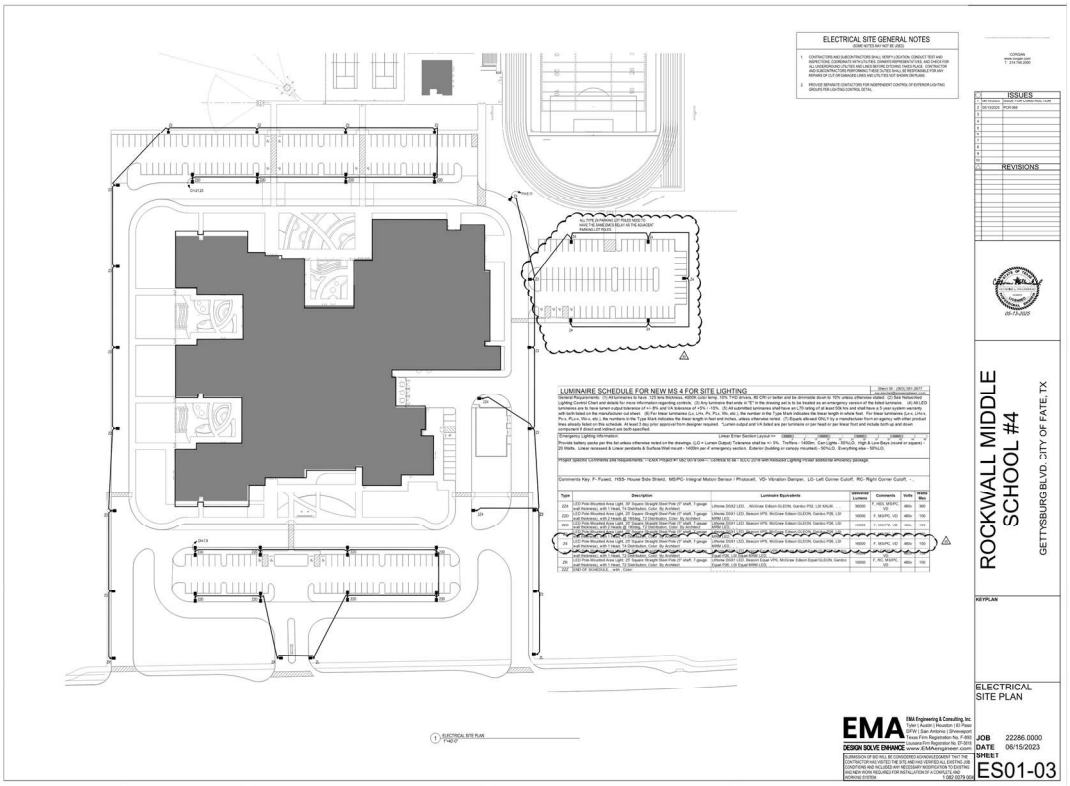

MATCHLINE SEE SHEET LI 5
MATCHLINE SEE SHEET LI 3
ROCKWALL MIDDLE NO. 4 ADDITION LOT 1, BLOCK A 49.751 ACRES
NEW MIDDLE SCHOOL 188,000 SF FF 597.00 TWO STORY 35' HT. FULLY SPRINKLED BUILDING
CONTROLLER REFERENCE LEGEND
PRACTICE FIELD
PRACTICE FIELD
PRACTICE FIELD
"PRIVATE"
SEE ENLARGEMENT SHEET LI 7
1410.98'
1698.18'
1/2" IRF
GETTYSBURG BOULEVARD
CORGAN
ISSUES
REVISIONS
IRRIGATION SPECIALIST
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD, CITY OF FATE, TX
IRRIGATION PLAN AREA A
JOB 22286.0000
DATE 06/15/2023
SHEET LI 2
SP-23-008

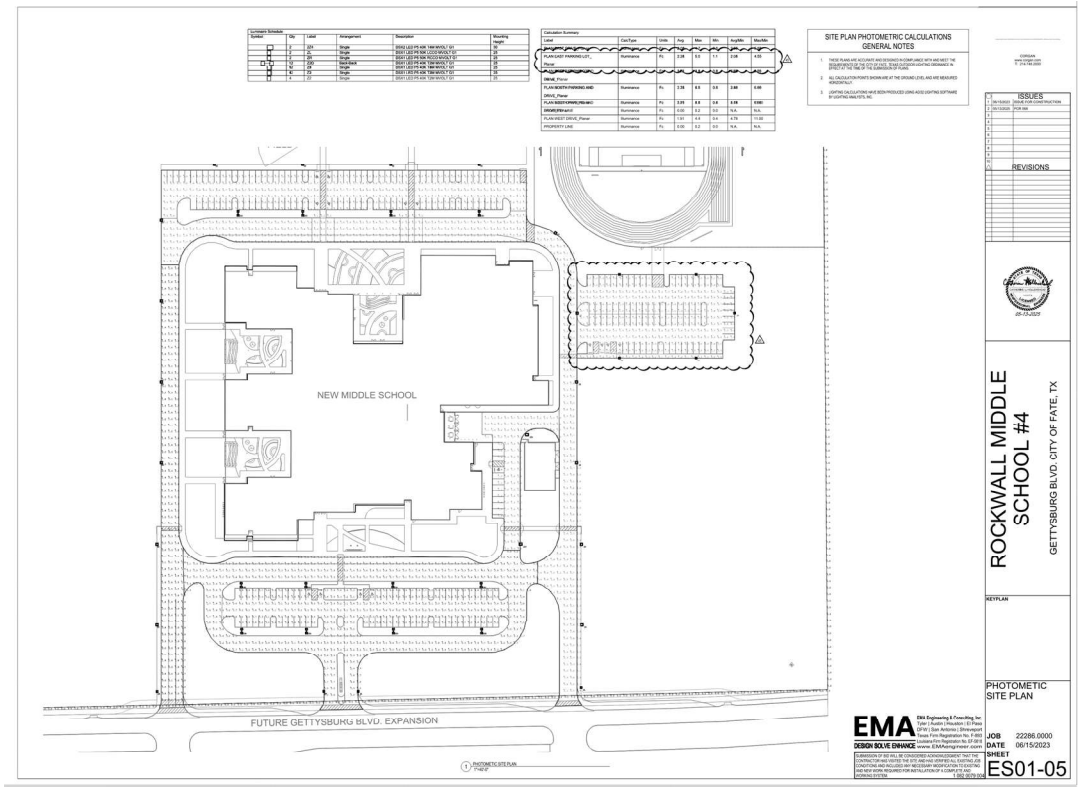

MATCHLINE SEE SHEET LI 6
MATCHLINE SEE SHEET LI 4
MATCHLINE SEE SHEET LI 2
SYNTHETIC TURF
"PRIVATE" SYNTHETIC TURF (REF. CIVIL)
(DEED CALLS S 0°19'55" W 1220.02')
(DEED CALLS S 7°23'14" W 16.62')
CONTROLLER REFERENCE
ALL NEW TREES PROPOSED ON THIS SITE SHALL HAVE A BUBBLER INSTALLED INSIDE THE TREE WELL AND CONNECTED TO THE ELECTRIC BUBBLER VALVES SHOWN ON PLANS. USE BUBBLER PIPING CHART FOR PIPE SIZING
SP-23-008
CORGAN
ISSUES
REVISIONS
IRRIGATION SPECIALIST
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD. CITY OF FATE, TX
IRRIGATION PLAN AREA D
JOB 22286.0000
DATE 06/15/2023
SHEET
LI 5


GENERAL SITE NOTES
SITE SIGNAGE NOTES
SITE MATERIALS LEGEND
CORGAN
ISSUES
REVISIONS
Date of issue:
06/15/2023
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD. CITY OF FATE, TX
SITE PLAN
JOB 22286.0000
DATE 06/15/2023
SHEET A01-01
A01-01.1
A01-01.2
NEW MIDDLE SCHOOL
FUTURE GETTYSBURG BLVD. EXPANSION
DISCUS FIELD
SHOTPUT PRACTICE
TENNIS COURTS
ATHLETICS BUILDING
FOOTBALL/SOCCER FIELD & TRACK
LONG JUMP
POLE VAULT
N


GENERAL SITE NOTES
SITE SIGNAGE NOTES
SITE MATERIALS LEGEND
CORGAN
ISSUES
REVISIONS
Date of issue:
06/15/2023
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD. CITY OF FATE, TX
SITE PLAN - SEGMENT 1
JOB 22286.0000
DATE 06/15/2023
SHEET
A01-01.1
TENNIS COURTS
FOOTBALL/SOCCER FIELD & TRACK
ATHLETICS BUILDING
DISCUS FIELD
SHOTPUT FIELD
POLE VAULT RUNWAY
LONG JUMP RUNWAY
01 SITE PLAN - SEGMENT 1


NEW MIDDLE SCHOOL
FUTURE GETTYSBURG BLVD. EXPANSION
GENERAL SITE NOTES
SITE SIGNAGE NOTES
SITE MATERIALS LEGEND
CORGAN
ISSUES
REVISIONS
Date of issue:
06/15/2023
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD, CITY OF FATE, TX
SITE PLAN - SEGMENT 2
JOB 22286.0000
DATE 06/15/2023
SHEET
A01-01.2


ELECTRICAL SITE GENERAL NOTES
ISSUES
REVISIONS
LUMINAIRE SCHEDULE FOR NEW MS 4 FOR SITE LIGHTING
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD. CITY OF FATE, TX
KEYPLAN
ELECTRICAL SITE PLAN
EMA
JOB 22286.0000
DATE 06/15/2023
SHEET ES01-03


SITE PLAN PHOTOMETRIC CALCULATIONS
GENERAL NOTES
NEW MIDDLE SCHOOL
FUTURE GETTYSBURG BLVD. EXPANSION
ISSUES
REVISIONS
ROCKWALL MIDDLE SCHOOL #4
GETTYSBURG BLVD. CITY OF FATE, TX
KEYPLAN
PHOTOMETIC SITE PLAN
EMA
JOB 22286.0000
DATE 06/15/2023
SHEET ES01-05

SHIPPING LABEL

This label should be affixed to the outside of the package when submitted in response to this request.

FROM: _____

_____

Package _____ of _____

SHIP TO: Rockwall Independent School District
Attn: Jana Hunter, Director of Purchasing
1050 Williams Street
Rockwall, TX 75087

CONTENTS: BID RESPONSE
BID NUMBER: RFCSP 2526.11-002
BID TITLE: Rakow MS Parking Lot Addition
BID DUE DATE: December 4, 2025
TIME DUE: 2:00 P.M. (CST)

----------FOLD OR CUT HERE----------

FROM: _____

_____

Package _____ of _____

SHIP TO: Rockwall Independent School District
Attn: Jana Hunter, Director of Purchasing
1050 Williams Street
Rockwall, TX 75087

CONTENTS: BID RESPONSE
BID NUMBER: RFCSP 2526.11-002
BID TITLE: Rakow MS Parking Lot Addition
BID DUE DATE: December 4, 2025
TIME DUE: 2:00 P.M. (CST)

----------FOLD OR CUT HERE----------

Rockwall Independent School District – RFCSP 2526.11-002
Rakow Middle School Parking Lot Addition

OFFER FORM

This form should serve as the cover to all responses; failure to sign may result in disqualification.

The undersigned authorized representative of the responding company indicated below hereby acknowledges;

- They are authorized to enter into contractual relationship on behalf of the responding company;
- They have carefully examined this document in its entirety;
- They propose to supply any products/services submitted under this solicitation at the prices quoted and in strict compliance with all terms, policies and procedures, unless any exceptions are noted;
- They understand verbal orders are not authorized and no order should be initiated without an authorized purchase order signed by the Director of Purchasing and that non-compliance may result in non-payment;
- Any and all exceptions have been noted in writing in the response and that no other exception will be claimed;
- The accuracy of all certifications which accompany this offer;
- The stated organization is an equal opportunity employer;
- The organization has not been a party to any collusion among offer/vendors in restraint of freedom of competition by agreement to offer at a fixed price or to refrain from offering; or with any RISD employee, Board Trustee, or consultant as to quantity, quality, or price in the prospective contract, or in any terms of the prospective contract except in any authorized discussion(s) with RISD's Purchasing personnel; or in any discussions or actions between offer/vendors and any RISD employee, Board Trustee, or consultant concerning exchange of money or other things of value for special consideration in the award of this contract.
- The prices in this offer have been determined independently, without consultation, communication, or agreement for the purpose of restricting competition, as to any matter related to such prices, with any other vendor or with any competitor;
- Notice of award and/or any communication regarding an award will be submitted via RISD and not by any consultant, contractor or other party involved in this solicitation.

- Receipt of Addenda, or lack thereof:

None: _____ (initial)

1: _____ (initial) # 2: _____ (initial)

3: _____ (initial) # 4: _____ (initial)

Name of Company:	Date:
Signature of Authorized Rep:	Printed Name:
Position or Title:	Phone:
Email:	Fax:

RESPONDENT'S PROPOSAL

I have received plans, and specifications for the project listed above as prepared by Corgan Architects. I have also received Addenda Nos. _____ and have included their provisions in my proposal. I have examined these documents, all of the existing site, and plans/specifications and submit the following proposal. In submitting the proposal, I agree:

1. To hold my bid open for 60 days after bid receiving date.

2. To accept the provisions of the Instructions to Bidders regarding disposition of bid security.

3. To enter into and execute a contract, if awarded on the basis of this bid.

4. To accomplish the work in accordance with the Contract Documents.

5. To start work on receipt of contract and to furnish all requirements. To coordinate with the on-going school programs. I will substantially complete all work by the following schedule and complete all work by the following schedule.

   I will substantially complete all work by **July 27, 2026** and complete all work by **August 1st, 2026**. Work may begin on site after contract is executed, provided that classes and school activities are not disrupted. It is the intent of the Owner to complete work as soon as possible. Contractor to begin work as soon as contract is awarded.

6. To deliver within five days of receipt of contract all required submittals, list of all suppliers and a schedule of work.

7. I will perform all work as described within these Contract Documents for the prices presented on this page and the following page. Bids shall be entered in appropriate spaces of this Proposal Form. I understand that Rockwall ISD reserves the right to accept or reject any and all bids and has the right to accept or reject parts of the bid package.

Base Proposal I will provide complete turn-key work (including all related work) that includes, but is not limited to the parking lot addition, for the total lump sum price of:

_____ ($_____)

Alternate #1

_____ ($_____)

The above Base Bid lump sum shall include an ***allowance of $65,000.00, for construction contingency.***

1. Base Bid and qualifications shall be used to select the successful contractor.
2. I understand a Performance and Payment Bond is required and a Bid Bond is required.
3. I also certify that I have visited the existing buildings and site where work is to be performed and understand the site conditions and work required. I will provide all work turn-key. Contractor shall provide a person whose primary job is to supervise and coordinate this work.
4. The cost of all bonds, insurance and guarantees are included in my bid prices.
5. I understand liquidated damages apply from date of substantial completion and from date of completion until all work is complete for the scheduled project and acceptable by Architect, Engineer and Owner (See General Conditions and Specification Section 00 80 00 - Supplementary Conditions, Article 17 including but not limited to Paragraph 17.9.1).
6. Enclosed with this bid is a complete list of subcontractors that I will use on this project.
7. I am enclosing with the bid, the qualification form as specified in 00 32 00 - 1.

Representations: by execution and submission of this Bid, the Bidder hereby represents and warrants to Owner as follows: The Bidder has read and understands the Bid Documents and the contract documents and this Bid is made in accordance with the Bid Documents. Any questions or clarifications on the contract must be communicated at bid time. Request to clarify/alter contract may result in disqualification of bidder/contractor.

Date:	
Company Name:	
Company Address:	
Company Phone:	
Name of Authorized Representative:	
Signature of Authorized Representative:	
Texas License No., if applicable:	

LIST OF SUBCONTRACTORS/SUPPLIERS

THIS FORM SHALL BE COMPLETED BY THE GENERAL CONTRACTOR AND SUBMITTED IN SEPARATE ENVELOPE WITH PROPOSAL. A complete list of proposed subcontractors, material suppliers and proprietary items will be required from the successful Bidder, not later than fifteen (15) days from the contract date. The bid submittals required on bid form shall be provided in separate package at time of bid.

TO: ROCKWALL INDEPENDENT SCHOOL DISTRICT
1050 Williams St.
Rockwall, Texas 75087
Attention: Purchasing Director

The undersigned submits the following names of subcontractors to be used in performing the contract. Where blanks are provided for the listing of Contractor and subcontractors, Bidders are advised that each blank shall be filled in with name of a legitimate Contractor or subcontractor now engaged in an established business in that category. Failure to do so may be cause for rejection of proposal.

Subcontractors

General Contractor (Bidder):	
Concrete:	
Demo:	
Electrical:	
Landscaping:	
Irrigation:	
Fencing:	

Date:	
Bidder/Company Name:	
Company Address:	
Signature:	
Title:	

VENDOR DATA

FOR PURCHASE ORDER: ORDERING ADDRESS INFORMATION		
Company Name:		
Address:		
City, State, Zip:		
Contact Person:		
Title:		
Phone | Fax:		
Email address:		
May we submit orders via email:		
Email address, if different:		

FOR PAYMENTS: REMITTANCE ADDRESS INFORMATION		
Company Name:		
Address:		
City, State, Zip:		
Contact Person:		
Title:		
Phone | Fax:		
Email address:		

FOR BID NOTIFICATIONS	
Contact Email:	

COOPERATIVE AGREEMENTS

If the vendor holds a contract with any of the following, please circle and provide contract number(s) as applicable.

Allied States	Choice Partners	CTPA	DIR	E&I	EPIC6	EPCNT	HGAC	Omnia Partners	PACE	Tarrant County	TASB Buy Board	TIPS

Contract Number(s):

REFERENCE SHEET
DO NOT LEAVE BLANK

REFERENCE 1

School District Name:		
Contact Name:		
Address:		
Phone | Fax:		
Email Address:		

REFERENCE 2

School District Name:		
Contact Name:		
Address:		
Phone | Fax:		
Email Address:		

REFERENCE 3

School District Name:		
Contact Name:		
Address:		
Phone | Fax:		
Email Address:		

**Please note: Some projects may require more attention to be given to historical projects of like scope, type, location, institute, etc. While it is not a requirement, the District prefers references be given for school districts of similar size to Rockwall ISD and the district may evaluate responses as a whole, based on references provided.*

VENDOR ACKNOWLEDGEMENTS

RESIDENT BIDDER

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident bidder underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the great of the following (1) the amount by which a resident bidder would be required to underbid the resident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located; or (2) the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which a majority of the manufacturing relating to the contract will be performed.

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in (1) the state in which the nonresident's principal place of business is located; or (2) a state in which the nonresident is a resident manufacturer.

This subchapter does not apply to a contact involving federal funds.

FELONY CONVICTION AND CRIMINAL HISTORY NOTICE

Texas Education Code, Section 44.034, Notification of Criminal History, Subsection (a), states, "a person or business entity that enters into a contract with a school district must give advance notice to the District if the person or owner or operator of the business entity has been convicted of a felony." The notice must include a general description of the conduct resulting in the conviction of a felony. Subsection (b) states, "a school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction." The district must compensate the person or business entity for services performed before the termination of the contract. Vendor is responsible for the performance of the persons, employees and/or sub-contractors. Vendor assigns to provide services for Rockwall ISD pursuant to this proposal on any and all Rockwall ISD campus or facilities. Vendor will not assign individuals to provide services at a Rockwall ISD campus or facility who have a history of violent, unacceptable, or grossly negligent behavior or who have a felony conviction, without the prior written consent of the Rockwall ISD Purchasing Department.

CONFIDENTIALITY DECLARATION

Any portion of the response considered to be confidential or contain proprietary information, or to contain trade secrets, must be marked accordingly. This designation may not necessarily guarantee the non-release of the information under the Public Information Act or as otherwise required by law, but does provide the District with a means to review the issues thoroughly and, if justified, request an opinion by the Attorney General's office prior to releasing any information requested under the Public Information Act.

INTER-LOCAL AGREMEENTS WITH OTHER SCHOOL DISTRICTS

Rockwall ISD is a member of the Central Texas Purchasing Alliance (CTPA) and the Education Purchasing Cooperative of North Texas (EPCNT), each serving as an alliance of over 100 school districts in Texas representing millions of students, sharing information, services and contractual opportunities. A list of member districts can be found on the RISD Purchasing webpage.

In support of this collaborative effort, all awards made by Rockwall ISD may be adopted by other active member districts in either (or both) of the identified entities. By adopting a contract from another member district, the adopting district has met the competitive bidding requirements established by the Texas Education Code, Section 44.031 (a)(4). While there is no obligation to participate, doing so will streamline the public purchasing process and cut costs to the public. It will also keep vendors from having to answer multiple bids for many school districts for the same product(s) or services, thereby saving the vendors resources.

All purchases by members and participants other than Rockwall ISD will be billed directly to that entity and paid by that entity. Rockwall ISD will not be responsible for another entity's debts. Each governmental entity will order its own materials/services as necessary and according their policies.

COMMITMENT TO PROVIDE INSURANCE

Bidder will be able to furnish a valid insurance certificate reflecting as Certificate Holder: Rockwall ISD, 1050 Williams Street, Rockwall TX 75087. The vendor shall provide and maintain insurance in a company rated no less than an "A" by A.M. Best Company.

Vendor is aware of all costs to provide insurance, will do so pending contract award, and will provide a valid insurance certificate as describe within this solicitation.

DEBARMENT OR SUSPENSION CERTIFICATION

Non-Federal entities are prohibited from contracting with or making sub-awards under covered transaction to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement of goods or services equal to or in excess of $100,000. Vendors receiving individual awards of $100,000 or more and all sub-recipients must certify that the organizations and its principals are not suspended or debarred.

INDEMNIFICATION AND HOLD HARMLESS

Except as otherwise expressly provided, respondent shall defend, indemnify and hold RISD harmless from and against all claims, liability, loss and expenses, including reasonable costs, collection expenses, and attorney's fees incurred, which arise by reason of the acts or omissions of respondent, its agents or employees in the performance of its obligation under this contract.

STATEMENT OF COMPLIANCE/DEVIATION

Unless otherwise stated, this proposal complies with all specifications and/or scope of work contained in the solicitation document. Any deviations from any part of this solicitation shall be listed on a separate page as provided by the respondent with detailed conditions and information. RISD will consider any deviations in its evaluation, and reserves the right to accept or reject any bid based upon any deviations.

CONTRACTOR CERTIFICATION

If an employee of a contractor is covered under SB 9 the contractor must bear the burden of obtaining a national, fingerprint-based criminal history check. Under Section 22.0834 of the Education Code, the contractor is then required to certify to the district that the criminal history check has been performed. Under the statute SB 9, a contractor is required to conduct a criminal history review on an employee only when the following criteria has been met: 1) The employer has contracted with the district to provide services. 2) The particular employee will have continuing duties relating to the contract with the district. 3) The particular employee will have contact with students.

TOXIC CONTROL COMPLIANCE

Rockwall Independent School District has established Management Plans for ensuring a high level of environmental air quality through its Operations Department. All contractors performing construction projects for RISD must familiarize themselves with these Management Plans and comply prior to the beginning of any awarded construction project. RISD employees are available to review such plans and assist in interpretation and understanding its Asbestos Management Plans at any time prior to beginning construction.

Certification of non-use of Asbestos and Lead Containing Materials is required by all General and Sub-Contractors for all construction projects, by State and Federal regulations which RISD is subject to. Completion of this Affidavit is mandatory before final payment on a project will be made. Complete this certificate, have it notarized and submit it with your application for final payment, certifying that no materials used in conjunction with this project contain asbestos or lead in any form and that all Material Safety Data Sheets (MSDS) have been supplied to Owner before submitting application for final payment.

MWBE/HUB CERTIFICATION

A bidder/proposer that has been certified as a Minority/Women Business Enterprise (also known as "Historically Underutilized Business" or "HUB") is encouraged to indicate its MWBE certification status when responding to this Bid/Proposal. If so, please provide the Certificate Number and Name of Certifying Agency.

CERTIFICATION OF EQUAL EMPLOYMENT STATEMENT

It is the policy of the District not to discriminate on the basis of race, color, national origin, gender, limited English proficiency or handicapping conditions in its programs. Vendor agrees not to discriminate against any employee orapplicant for employment to be employed in the performance of this Contract, with respect to hire, tenure, terms, conditions and privileges of employment, or a matter directly or indirectly related to employment, because of age (except where based on a bona fide occupational qualification), sex (except where based on a bona fide occupationalqualification) or race, color, religion, national origin, or ancestry. Vendor further agrees that every subcontract entered into for the performance of this Contract shall contain a provision requiring non-discrimination inemployment herein specified, binding upon each subcontractor. Breach of this covenant may be regarded as a material breach of the Contract.

CERTIFICATION OF SECTION 2271.002 TEXAS GOVERNMENT CODE

This section applies to a contract that: (1) is between a governmental entity and a company with 10 or more full-time employees; and (2) has a value of $100,000 or more that is to be paid wholly or partly from public funds of the governmental entity. A governmental entity may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that it: (1) does not boycott Israel; and (2) will not boycott Israel during the term of the contract.

CERTIFICATION OF SECTION 2252 TEXAS GOVERNMENT CODE

This section applies to contracts with companies engaged in business with Iran, Sudan, or foreign terrorist organization is prohibited. A governmental entity may not enter into a governmental contract with a company that is identified on a list prepared and maintained under Section 806.051, 807.051 or 2252.153. The comptroller shall prepare and maintain, and make available to each governmental entity, a list of companies known to have contracts with or provide supplies and services to a foreign terrorist organization.

CERTIFICATION OF SECTION 2276 TEXAS GOVERNMENT CODE

This section applies only to a contract that (1) is between a governmental entity and a company with 10 or more full-time employees; and (2) had a value of $100,000 or more that is to be paid wholly or partly from public funds of the governmental entity. Except as provided by Subsection (c), a governmental entity may not enter into a contract with a company for goods or services unless the contract contains a written verification from the company that (1) does not boycott energy companies; and (2) will not boycott energy companies during the term of the contract.

CERTIFICATION OF SECTION 2274 TEXAS GOVERNMENT CODE

This section applies only to a contract that: (1) is between a governmental entity and a company with at least 10 full-time employees: and (2) has a value of at least $100,000 that is paid wholly or partly from public funds of the governmental entity. Except as provided by Subsection (c) and Section 2274.003, a governmental entity may not enter into a contract with a company for the purchase of goods or services unless the contract contains a written verification from the company that it: (1) does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and (2) will not discriminate during the term of the contract against a firearm entity or firearm trade association. Subsection (b) does not apply to a governmental entity that (1) contracts with a sole-source provider; or (2) does not receive any bids from a company that is able to provide the written verification required by that subsection.

CERTIFICATION OF SECTION 2273 TEXAS GOVERNMENT CODE

A governmental entity may not enter into a taxpayer resource transaction with an abortion provider or an affiliate of an abortion provider. This subsection does not apply to a taxpayer resource transaction that is subject to a federal law in conflict with Subsection (a) as determined b by the executive commissioner of the Health and Human Services Commission and confirmed in writing by the Attorney General.

CERTIFICATION OF SECTION 2274 TEXAS GOVERNMENT CODE

A governmental entity may not enter into a contract or other agreement relating to critical infrastructure in this state with a company that is (1) owned by or the majority of stock or other ownership interest of the company is held or controlled by (a) individuals who are citizens of China, Iran, North Korea, Russia, or a designated country; (b) a company or other entity, including governmental entity, that is owned or controlled by citizens of or is directly controlled by the government of China, Iran, North Korea, Russia, or a designated country; or (2) headquartered in China, Iran, North Korea, Russia, or a designated country.

CONFLICT OF INTEREST

Effective January 1, 2006, any person or entity who contracts or seeks to contract with RISD for the sale or purchase of property, goods, or services (as well as agents of such persons) (hereafter referred to as Vendors) are required to file a Conflict of Interest Questionnaire with the District. Each covered person or entity who seeks to or who contracts with RISD is responsible for complying with any applicable disclosure requirements. Forms received by the District become public records immediately and the law requires school districts that maintain web sites to place these records on the District's web site.

The Conflict of Questionnaire must be filed no later than the seventh business day after the date that the vendor begins contract discussions or negotiations with the government entity, or submits to the entity an application, response to a request for proposal or bid, correspondence, or other writing related to a potential agreement with the entity.

The vendor also shall file an updated questionnaire not later than September 1 of each year in which a covered transaction is pending, and the seventh day after the date of an event that would make a statement in the questionnaire incomplete and inaccurate.

Note: A vendor is not required to file an updated questionnaire if the person had filed an updated statement on or after June 1, but before September 1 of the year.

Completed forms should be sent to Rockwall Independent School District Purchasing Department, 1050 Williams Street, Rockwall, Texas 75087. Forms are available from the Texas Ethics Commission website.

The Rockwall ISD website provides a list of Local Government Officers, Superintendent and other Personnel

IRS FORM W9

This is a required form by the IRS for government entities that pay vendors in excess of $600.00 annually in order to issue a 1099 form and is required in conjunction with the reporting requirements by the Internal Revenue Service.

Please include a current W9 with vendor's response.

Vendor affirms they have read all certifications as described in this section and agrees to comply with all federal, state, and local laws, rules, regulations and ordinances, as applicable. It is further acknowledged the vendor certifies compliance with all provisions, laws, acts, regulations, etc. as specifically noted.

Company Name:	
Federal Tax ID #:	
City, State, Zip:	
Phone Number:	
Printed Name of Authorized Representative:	
Title of Authorized Representative:	
Email Address:	
Signature of Authorized Representative:	
Date Signed:	

ROCKWALL INDEPENDENT SCHOOL DISTRICT
STANDARD FORM OWNER/CONTRACTOR AGREEMENT

ROCKWALL INDEPENDENT SCHOOL DISTRICT
STANDARD FORM OWNER/CONTRACTOR AGREEMENT

THIS AGREEMENT made and entered into on <Month> ____, <Year> by and between the **Rockwall Independent School District** called **"District,"** and (Insert Name)**,** herein called **"Contractor."**

The Owner's authorized representative is:

David Carter, CPA
Senior Chief Financial Officer
Rockwall Independent School District
1050 Williams Street
Rockwall, TX 75087
Phone number: (469) 698-7149

The term "Owner" means the Rockwall Independent School District or the Owner's authorized representative.

And the Contractor is: (Insert Name)

(Insert Address)

(Insert Address)

The Contractor's authorized representative is: (Insert Name and Title)

Phone number: (Insert Contact Number)

The Project is:

(Insert brief project description. Always include CSP/RFP reference number in every project description).

W I T N E S E T H:

The Owner and Contractor agree as follows:

I. THE CONTRACT DOCUMENTS.

The Contract Documents consist of this Standard form Owner/Contractor Agreement (the "Agreement"), all sections of the Project Manual, including Drawings, Specifications, and Addenda issued prior to execution of this Agreement, the Owner's Request for Proposals and Contractor's Proposal documents submitted in response to such Request, modifications to the Agreement issued and agreed to by the parties subsequent to the execution of this Agreement, and other documents as may be listed in this Agreement. A Modification is (1) a written amendment to the Agreement signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the work issued by the Owner, Architect or Owner's Consultant, all of which must be signed by the parties. The Project Manual is a volume assembled for the work that is to be done on or relating to the Project (the "Work") which includes the bidding requirements, sample forms, Conditions of the Contract and Specifications.

In the event of conflict, terms and conditions contained in this Agreement shall take precedence over terms and conditions contained in the Project Manual, and the terms and conditions in the Project Manual, shall take precedence over all other terms and conditions contained in the other Contract Documents, unless specifically agreed otherwise herein.

The Contract Documents form the Contract for Construction (the "Contract"). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a written Modification signed by Contractor, approved by Owner's Board of Trustees, and signed by the representative of Owner's Board of Trustees who is authorized to sign contracts. As a material consideration for the making of the Contract, modifications to the Contract shall not be construed against the maker of said modifications. The Contract Documents shall not be construed to create a contractual relationship of any kind (l) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor.

II. DATE OF COMMENCEMENT, FINAL COMPLETION, AND LIQUIDATED DAMAGES.

A. The date of commencement is the date to be fixed in a written Notice to Proceed (NTP) issued by the Owner, which shall be not later than (12/18/2025) The NTP date is dependent upon the awarded contractor returning executed contracts and insurance/bonds, if required, prior to this date.

B. The Contractor shall achieve Final Completion of the entire Project not later than (05/18/2026), subject to adjustments as provided in the Contract.

C. The Contractor and his surety or sureties shall be liable for and shall pay to the Owner the sum of ($1500.00) per day as fixed, agreed and liquidated damages for each calendar day after the date specified in Paragraph 2(b), as adjusted by written amendment, until Final Completion of the Project. The amount of damage to the Owner for delay in completion of the Project is difficult to ascertain and the amount of liquidated damages per calendar day is reasonable anticipated pecuniary damages for such delay and is not a

penalty. Neither an extension of time nor the collection of liquidated damages shall limit or exclude any other right or remedy of the Owner under provisions of the Contract.

III. CONTRACT SUM.

The Owner shall pay the Contractor for the Contractor's full performance of the Contract, the Contract Sum of (Insert Contract Amount) (the "Contract Sum") subject to additions, deductions and/or liquidated damages as provided in the Contract.

The Contract Sum contains an Owner's Contingency in the amount of ($75,000.00). This contingency is for the sole use of the Owner to be used for changes in the scope of the Work and for the betterment of the Project. Owner's authorized representative may approve any expenditure from Owner's Contingency without further Board of Trustees approval. If the Owner's Contingency is not expended or not fully expended, then any unused portion shall belong to the Owner and shall be credited to the Owner in calculating final payment.

IV. PROGRESS PAYMENTS.

A. Based upon Applications for Payment submitted to the Owner by the Contractor, the Owner will make progress payments as provided below.

B. Provided an Application for Payment is received and approved by the Owner not later than the twentieth (20th) day of a month, the Owner will make payment of the amount due, less five percent (10%) retainage, to the Contractor not later than the tenth (10th) day of the following month. If an Application for Payment is received by the Owner after the application date fixed above, payment in such amount as determined by Owner will be made by the Owner not later than fifty-one (51) days after the Owner receives and approves the Application for Payment.

C. Based on the Owner's observations and evaluations of the Project and the Contractor's Applications for Payment, the Owner will determine the amounts due to Contractor. If Owner determines, in Owner's reasonable discretion, that Contractor's Application for Payment contains discrepancies and/or errors, then Contractor shall resubmit said Application for Payment and the timeframe set forth in Section IV(B) above shall restart and apply from the date of resubmittal.

D. Any payment for undisputed amounts not paid in the time specified in paragraph 4.b. above shall be overdue. An overdue payment bears interest at the legal rate established by the Texas Government Code, §2251.025.

V. FINAL PAYMENT.

A. Final payment, constituting the entire unpaid balance of the Contract Sum (less any offsets or damages as provided in the Contract Documents), will be made by the Owner when:

1. the Contract has been fully performed by the Contractor as determined by Owner and Owner's Architect or Owner's Consultant, and
2. the completed Project has been accepted by the Rockwall ISD Board of Trustees or its designee.

B. Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner:

1. an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Project have been paid or otherwise satisfied,

2. a certificate evidencing that the required insurance will remain in force after final payment and will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Owner,

3. a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Owner,

4. consent of surety to final payment,

5. other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner, and

6. written warranties and other documents required by the Contract and submitted to the Owner's Superintendent of Schools.

C. Acceptance of final payment by the Contractor shall constitute a waiver of all claims by the Contractor, except those previously made in writing and identified by the Contractor as unsettled at the time of final Application for Payment.

VI. OBLIGATIONS OF CONTRACTOR.

A. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR.

Before ordering materials or equipment or commencing the Project, the contractor shall carefully:

1. study and compare the Contract Documents with each other and with other information furnished by Owner,

2. verify all indicated dimensions,

3. take field measurements,

4. verify field conditions, and

5. compare the field measurements and conditions and other information known to the Contractor with the Contract Documents, and verify that there are no impediments to the Project being constructed at the proposed site.

Errors, inconsistencies or omissions discovered shall be reported in writing to the Architect or Owner's Consultant and Owner at once. In the event that discrepancies occur between ordered material and actual conditions, of which the Architect or Owner's Consultant and Owner were not notified beforehand, costs to correct such discrepancies shall be borne by Contractor.

B. **SUPERVISION AND CONSTRUCTION PROCEDURES.**

1. The Contractor shall supervise and direct the Project, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Project under the Contract, unless the Contract gives other specific instructions concerning these matters.

2. The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Project under a contract with the Contractor.

3. On trench excavations in excess of five feet in depth, Contractor shall bear sole responsibility for design and execution of acceptable trenching and shoring procedures as may be required by law, including but not limited to Texas Government Code §2166.303, Texas Health & Safety Code, Subchapter C, §756.021, *et seq*., and OSHA 1926.652-.653. Contractor shall pay a qualified engineer to prepare detailed plans and specifications directing Contractor in safe execution of trenching and shoring.

C. **LABOR AND MATERIALS.**

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

2. The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. As part of that responsibility, Contractor shall enforce the Owner's alcohol-free, drug-free, tobacco-free, and weapon-free policies and zones, which will require compliance with those policies and zones by Contractor's employees, Subcontractors, and all other persons carrying out the Contract. Contractor shall also require adequate and appropriate dress of Contractor's employees, Subcontractors, and all other persons carrying out the Contract.

Contractor further agrees to submit any of its employees, agents, subcontractors or sub-subcontractors or their respective employees and agents, who meet the requirements of a covered employee under Texas Education Code §22.0834, to national criminal history checks or, alternatively, agrees to keep such employees and agents from having any direct contact with students of Owner. Failure to comply with the requirements of Texas Education Code §22.0834 shall constitute an immediate event of default by

Contractor. Further, Contractor shall complete the "Contractor Certification" attached hereto as Exhibit "A" before beginning any Work that is the subject of this Agreement.

3. Contractor shall at all times maintain job records, including, but not limited to, invoices, payment records, payroll records, daily reports, logs, diaries, and job meeting minutes, applicable to the Project. Owner reserves the right to audit contractor's books and records relevant to all services provided under the Contract Documents. In the event such audit reveals any errors resulting in overpayments by the Owner, Contractor shall refund Owner the full amount of such overpayment within thirty (30) days of such audit findings, or the Owner, at its option, reserves the right to withhold such amounts owing the Owner from any payments due the Contractor. Contractor shall make such reports and records available to inspection or audit by the Owner and/or its agents within five (5) working days of request by Owner or its agent. Such records shall be maintained by Contractor for at least four (4) years.

D. **WARRANTY.**

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract, that work on the Project shall be performed in a good and workmanlike manner, that the Project will be free from defects not inherent in the quality required or permitted, and that the Project will conform with the requirements of the Contract. The contractor shall furnish the Contractor's warranty covering material and workmanship for a period of one year (confirm) from the commencement date of the substantial completion. Manufacturer's material warranties shall be as issued by each manufacturer and provided in the close-out documentation.

E. **TAXES.**

The Owner qualifies for exemption from State and Local Sales Tax pursuant to the provisions of Chapter 151 of the Tax Code of the State of Texas. The Contractor may claim exemption from payment of applicable State and Local Sales Taxes by complying with such procedures as may be prescribed by the State Comptroller of Public Accounts. However, the Contractor shall pay all necessary local, county and state taxes, compensation tax, social security and withholding payments as required by law. **THE CONTRACTOR SHALL INDEMNIFY AND SAVE HARMLESS THE OWNER OF AND FROM ALL CLAIMS AND DEMANDS MADE BY FAILURE OF THE CONTRACTOR OR SUBCONTRACTORS TO COMPLY WITH THE PROVISIONS OF ANY OR ALL SAID LAWS AND AMENDMENTS.**

F. **PERMITS, FEES AND NOTICES.**

1. The Contractor shall secure and pay for the building permit and other permits, governmental fees and licenses necessary for proper execution and completion of the Project which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.

2. The Contractor shall comply with, give notices and provide certifications as may be required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Project including, but not limited to, 19 T.A.C. §61.1036.

G. **USE OF SITE.**

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract, as designated by the Owner, and shall not unreasonably encumber the site with materials or equipment. Upon completion ow work and in some occurrences during the construction the surrounding areas must be returned to original conditions prior to construction.

H. **CLEANING UP.**

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Project the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. If the Contractor fails to clean up as provided in the Contract, the Owner may do so and the cost thereof shall be charged to the Contractor and may be offset against any amounts still owed to the Contractor. The contractor must provide their own dumpster and haul off use of the Owners dumpsters is strictly prohibited and use of them may incur fines to the constrictor and their subcontractors.

I. **INDEMNIFICATION.**

TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER, ITS TRUSTEES, AGENTS AND EMPLOYEES FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES INCLUDING BUT NOT LIMITED TO, ATTORNEYS' FEES, ARISING OUT OF OR RESULTING FROM CONSTRUCTION OF THE PROJECT, BUT ONLY TO THE EXTENT CAUSED IN WHOLE OR IN PART BY ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THE CONTRACTOR OR SUBCONTRACTORS OR ANYONE ELSE FOR WHOSE ACTS THEY MAY BE LIABLE, UNLESS SUCH CLAIM, DAMAGE, LOSS OR EXPENSE IS CAUSED SOLELY BY A PARTY INDEMNIFIED HEREUNDER.

THE OBLIGATIONS OF THE CONTRACTOR UNDER THIS SECTION SHALL NOT EXTEND TO THE LIABLITY OF THE ARCHITECT, THE ARCHITECT'S CONSULTANTS, OR AGENTS AND EMPLOYEES OF ANY OF THEM, CAUSED BY OR RESULTING FROM: (1) DEFECTS IN PLANS, DESIGNS OR SPECIFICATIONS PREPARED, APPROVED, OR USED BY THE ARCHITECT OR ENGINEER; OR, (2) NEGLIGENCE OF THE ARCHITECT OR ENGINEER IN THE RENDITION OR CONDUCT OF PROFESSIONAL DUTIES CALLED FOR OR ARISING OUT OF THE CONSTRUCTION CONTRACT IN THE PLANS, DESIGNS OR SPECIFICATIONS THAT ARE PART OF THE CONSTRUCTION CONTRACT; AND, (3) ARISING FROM: (A) PERSONAL INJURY OR DEATH; (B) PROPERTY DAMAGE; OR, (C) ANY OTHER EXPENSE THAT ARISES FROM PERSONAL INJURY, DEATH OR PROPERTY DAMAGE OR AS OTHERWISE LIMITED BY TEXAS CIVIL PRACTICE & REMEDIES CODE §130.001, ET SEQ.

FURTHER, AND IN ACCORDANCE WITH TEXAS INSURANCE CODE §151.102, AS APPLICABLE, THE OBLIGATIONS OF THE CONTRACTOR UNDER THIS SECTION SHALL NOT REQUIRE CONTRACTOR TO INDEMNIFY, HOLD HARMLESS, OR DEFEND THE

PARTY(S) INDEMNIFIED HEREUNDER AGAINST A CLAIM CAUSED BY (I) THE NEGLIGENCE OR FAULT, (II) THE BREACH OR VIOLATION OF A STATUTE, ORDINANCE, GOVERNMENTAL REGULATION, STANDARD, OR RULE, OR (III) THE BREACH OF CONTRACT, OF THE OWNER, ITS AGENT OR EMPLOYEE OR ANY THIRD PARTY UNDER THE CONTROL OR SUPERVISION OF THE OWNER, OTHER THAN THE CONTRACTOR OR ITS AGENT, EMPLOYEE OR SUBCONTRACTOR OF ANY TIER.

J. **AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE PROJECT.**

1. The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner the names of persons or entities proposed for each principal portion of the Project, if any. The Owner will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any proposed person or entity. Failure of the Owner to reply within ten (10) District business days shall constitute notice of no reasonable objection.

2. The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

3. If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. However, no increase in the Contract Sum shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

4. The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner makes reasonable objection to such change.

5. The Contractor shall not subcontract the Project as a whole. The approval of Subcontractors in no way relieves the Contractor from full responsibility.

6. Communications by and with Subcontractors and material suppliers shall be through the Contractor.

7. The Contract shall not be construed to create a contractual relationship of any kind:

   a. between the Owner and a Subcontractor or Sub-subcontractor, or

   b. between any persons or entities other than the Owner and Contractor.

K. **WORKERS' COMPENSATION.**

A copy of a certificate of insurance, a certificate of authority to self-insure issued by the Texas Department of Insurance, or a coverage agreement (DWC-81, DWC-82, DWC-83, or DWC-84), showing statutory

workers' compensation insurance coverage for the person's or entity's employees providing services on a project is required for the duration of the Project.

Duration of the Project includes the time from the beginning of the Work on the Project until the Contractor's/person's work on the project has been completed and accepted by the Owner.

Persons providing services on the Project ("subcontractor" in Texas Labor Code §406.096) include all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity that furnishes persons to provide services on the Project.

Services include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. Services do not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code §401.011(44) for all employees of the Contractor providing services on the project for the duration of the Project.

The Contractor must provide a certificate of coverage to the Owner prior to being awarded the Contract.

If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner showing that coverage has been extended.

The Contractor shall obtain from each person providing services on a project, and provide to the Owner:

1. A certificate of coverage, prior to that person beginning work on the Project, so the Owner will have on file certificates of coverage showing coverage for all persons providing services on the Project; and

2. No later than seven (7) days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

The Contractor shall retain all required certificates of coverage for the duration of the Project and for one year thereafter.

The Contractor shall notify the Owner in writing by certified mail or personal delivery, within ten (10) days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.

The Contractor shall post on each project site a notice, in the text, form, and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

The Contractor shall contractually require each person with whom it contracts to provide services on a Project, to:

1. Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code §401.011(44) for all of its employees providing services on the project for the duration of the Project;

2. Provide to the Contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project for the duration of the Project;

3. Provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

4. Obtain from each other person with whom it contracts, and provide to the Contractor:

   a. A certificate of coverage, prior to the other person beginning work on the Project; and

   b. A new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

5. Retain all required certificates of coverage on file for the duration of the Project and for one year thereafter;

6. Notify the Owner in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

7. Contractually require each person with whom it contracts to perform as required by items 1-6, with the certificates of coverage to be provided to the person for whom they are providing services.

By signing this Contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor that entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Owner.

The coverage requirement recited above does not apply to sole proprietors, partners, and corporate officers who are excluded from coverage in an insurance policy or certificate of authority to self-insure that is delivered, issued for delivery, or renewed on or after January 1, 1996. 28 TAC §110.110(i)**.**

L. **PAYMENT AND PERFORMANCE BONDS.**

In accordance with Texas Government Code §2253.021, the Contractor shall furnish, before beginning the Work, a Performance Bond in an amount equal to one hundred percent (100%) of the Contract Sum, if the Contract Sum meets or exceeds $100,000.00, to be used as security of the faithful performance of the Contract. The Contractor shall also furnish, before beginning the Work, a Payment Bond in accordance with Texas Government Code §2253.021, in an amount equal to one hundred percent (100%) of the Contract Sum, if the Contract Sum meets or exceeds $25,000.00, as security for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with the Contract. ~~The Contractor shall also furnish, before commencing the Work, a Maintenance Bond in an amount equal to fifteen percent (15%) of the Contract Sum, to protect Owner against any repairs arising from defective workmanship or materials used in any part of the Work, for a period of two (2) years after the date of final acceptance of the Work by Owner.~~ The Performance Bond, the Payment Bond, and the Maintenance Bond may be in one or in separate instruments in accordance with local law. Surety companies must be authorized to write surety bonds in Texas and any such surety bond must comply with the requirements Section 7.19-1, Texas Insurance Code. Proof of such Performance, Payment, and Maintenance Bonds shall be submitted to the Superintendent for his inspection and review prior to beginning any Work on the Project.

1. The Contractor shall deliver the required Bonds to the Owner not later than the date set in the Notice to Proceed. All Bonds will be reviewed by the District for compliance with the Contract Documents prior to the start of construction.

2. All Bonds shall be originals. The Contractor shall require the attorney-in-fact who executes the required Bonds on behalf of the Surety to affix thereto a certified and current copy of the power-of-attorney. The name, address, and telephone number of a contact person for the Bonding Company shall be provided.

M. **CONTRACTOR'S INSURANCE.**

Contractor shall carry the following insurance with the minimum limits set forth herein. Such insurance must be carried with insurance companies acceptable to Owner. Contractor shall maintain such insurance, at its sole cost and expense, in full force and effect until this Contract has been fully performed, all equipment, implements and machinery of Contractor has been removed from, and all employees, agents, representatives and Subcontractors of Contractor have left Owner's premises, and final payment of the Contract Sum is made, unless any such coverage is required pursuant to the terms of the Contract Documents to be maintained after all of the foregoing items have been completed. Contractor shall cause each insurance company (i) to issue the insurance on an occurrence basis; (ii) to provide defense as additional benefit and not within the limits of liability, (iii) to issue an endorsement to all policies that the policies are primary and that Owner's policies

are excess, secondary and noncontributing, (iv) issue an endorsement to all policies to provide a waiver of subrogation in favor of Owner, (v) to issue an endorsement to all policies, except the workers' compensation and employer's liability insurance policies, to include Owner and its trustees, officers, employees, and agents as "additional insureds," and, (vi) to include in each insurance policy a provision that the insurance company or companies shall not cancel, non-renew, or change coverage from the requirements of the Contract Documents without providing at least 30 days' advance written notice to Owner. The insurance company or companies shall not exclude from coverage the negligence, of the "additional insureds," unless such negligence is solely attributable to the conduct of an "additional insured." Contractor releases Owner and its trustees, officers, employees and agents from any liability covered by the insurance for which subrogation is waived. Contractor shall provide to Owner at least 30 days' advance written notice of any contemplated cancellation, non-renewal, or material reduction in insurance coverage. Contractor shall provide to Owner a certified copy of any and all insurance policies required in this Contract if Owner requests a copy.

Insurance coverage shall be written for the greater of the following limits or as specified in Owner's RFP/CSP, or as required by law, if greater:

1. Employer's Comprehensive General Liability insurance with minimum limits of $1,000,000 for each employee for bodily injury by accident and for each employee for bodily injury by disease.

2. Commercial General Liability insurance, including liability for the Project and blanket coverage, Personal and Advertising Injury, Products-Completed Operations, Medical Payments, Bodily Injury, and Property Damage, with minimum limits of $300,000 per occurrence, $300,000 general aggregate, $300,000 products-completed operations aggregate, $50,000 fire damage (any one fire), and $5,000 medical expense. Contractor shall obtain an endorsement to each insurance policy to provide aggregate limits per location. Contractor shall cause each insurance company to delete any contractual liability exclusion with respect to the insurance, including insurance coverage for personal injury, hazards of explosion, collapse, fire, and underground property damage.

3. Business Automobile Liability insurance with minimum combined single limits of $1,000,000. Contractor shall cause each insurance company to provide coverage for liability arising out of the operation of owned, hired, and non-owned vehicles.

4. Contractual Liability insurance with minimum limits of $1,000,000 per occurrence, and $1,000,000 general aggregate. Contractor shall obtain an endorsement to each insurance policy to provide aggregate limits per location. The contractual liability insurance shall not be limited to coverage for the Indemnity, Waiver, and Obligation to Defend provisions in this Contract, but, instead, the contractual liability insurance shall cover all of Contractor's obligations to the fullest extent possible under the contractual liability endorsement. Further, the contractual liability insurance shall not limit, in any way, coverage provided to Owner and its trustees, officers, employees, and agents as additional insureds under each of Contractor's insurance policies.

5. Builder's Risk "all-risk" or equivalent insurance policy, including boiler and machinery insurance, in the amount of the initial Contract Sum plus the value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis. Coverage shall insure against the perils of fire, (with extended coverage) and physical loss or damage including, without limitation or duplication of coverage, lightning, collapse,

earthquake, flood, wind storm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, theft, vandalism, malicious mischief, falsework, testing and start-up, temporary buildings, debris removal including demolition occasioned by enforcement of any applicable legal requirements, and all other perils, and shall include materials stored on-site, off-site and in transit. Owner shall be a named insured under the policy, and the insurance shall also include the interests of Contractor, subcontractors, and sub-subcontractors. Contractor shall be responsible for maintaining said builder's risk insurance until the date of Final Completion. For any claim made against the builder's risk insurance, the deductible shall not exceed $2,500.

6. Umbrella/Excess Liability Insurance with minimum limits of $1,000,000. Contractor shall cause each insurance company to provide the insurance on an umbrella basis in excess over and no less broad than the liability coverages required in this Contract, with the same inception and expiration dates as Commercial General Liability insurance, and with coverage that "drops down" for exhausted aggregate limits under liability coverages in this Contract.

Contractor shall provide to Owner before the Work is started and at least 30 days prior to the expiration of a policy or policies of insurance in effect during the term of this Contract a certificate or certificates of insurance evidencing all required insurance in the Contract Documents and acceptable to Owner. All certificates, among other things, shall:

1. Show Owner as a certificate holder.

2. Show Contractor as the Named Insured.

3. Show the names of the insurance companies providing each coverage, the policy numbers of each coverage, and policy dates of each coverage.

4. Show the name of the person providing the certificate and that person's address and telephone number.

5. Contain the signature of an authorized representative of the person providing the certificate.

6. Show that each insurance company named Owner and its trustees, officers, employees, and agents as additional insureds in each insurance policy.

7. Show the primary status of each insurance policy.

8. Have attached copies of all required endorsements to each insurance policy, and not contain the phrases "endeavor to" and "but failure to mail such notice will impose no obligation or liability of any kind upon Company, its agents or representatives," or similar phrases and shall include the commitment that each insurance company shall issue each insurance policy to the named and additional insureds, that each policy is in full force and effect, and that each insurance company shall give to Owner at least 30 days' advance written notice, by certified mail, return receipt requested in the event of cancellation, non-renewal, or material reduction in coverage of any insurance policy.

Contractor shall not procure an insurance policy or policies with deductibles or self-insured retention in excess of $10,000 or with an endorsement restricting, limiting, or excluding coverage in any manner without Owner's prior written approval. Contractor shall pay all deductibles in the insurance that Contractor is required to provide under the Contract Documents.

The Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the Contract. This coverage can be afforded by adding Owner as additional insured on general liability insurance coverage.

Contractor's failure to procure and maintain the required insurance shall constitute a material breach of, and default under, this Contract. If Contractor fails to remedy the breach within five (5) days after notice from Owner, Owner may, in addition to any other remedy available to it, at its option, purchase the insurance, at Contractor's expense, or immediately terminate this Contract. Contractor shall Indemnify and Defend Indemnified Persons from and against any Claims Arising from Contractor's failure to procure and/or maintain the insurance.

N. EQUAL EMPLOYMENT OPPORTUNITIES.

Contractor acknowledges that Owner, as an independent school district, is a political subdivision of the State of Texas and has certain requirements concerning equal employment and affirmative action under state and federal law, and shall comply with all applicable laws, regulations and special requirements under such federal and state laws, and the Contract Documents regarding equal employment opportunity and affirmative action programs.

Contractor and Contractor's Subcontractors, if any, shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex or national origin. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth policies of nondiscrimination.

VII. OWNER'S RIGHTS AND REMEDIES.

A. OWNER'S RIGHT TO REJECT THE PROJECT AND TO REQUIRE TESTING.

The Owner may reject all or part of the Project which does not conform to the Contract. Whenever the Owner considers it necessary or advisable, the Owner may require additional inspection or testing of the Project. Owner reserves the right to withhold any Progress Payment or portion thereof for any non-conforming or inferior Work, and the cost of any additional testing associated with non-conforming portions of the Work shall be charged to the Contractor and may be offset against any amounts still owed to the Contractor.

B. **OWNER'S RIGHT TO STOP THE PROJECT.**

If Owner discovers any defective Work, including any portion of Work not constructed in accordance with the Contract Documents, Contractor shall promptly, without cost to the Owner, correct such defective Work. If Contractor fails to commence such corrections within a reasonable period of time, not to exceed thirty (30) days, and does not diligently continue the prosecution of such corrections, or if the Contractor persistently fails to do the Project in accordance with the Contract, the Owner, by written order, may order the Contractor to stop the Project, or any portion thereof, until the cause for such order has been eliminated.

C. **OWNER'S RIGHT TO CARRY OUT THE PROJECT.**

If the Contractor defaults or neglects to carry out the Project in accordance with the Contract and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may after such seven-day period give the Contractor a second written notice to correct such deficiencies within a second seven-day period. If the Contractor within such second seven-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case the Owner shall deduct from payments then or thereafter due the Contractor the cost of correcting such deficiencies. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

D. **TERMINATION BY THE OWNER FOR CAUSE.**

1. The Owner may terminate the Contract if the Contractor:

   a. persistently or repeatedly refuses or fails to do the work on the Project, or any part thereof, in accordance with the Contract and/or fails to supply enough properly skilled workers or proper materials;

   b. fails to make prompt payment to Subcontractors or for materials or labor;

   c. repeatedly disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;

   d. otherwise is guilty of substantial breach of a provision of the Contract; or

   e. is adjudged bankrupt, makes a general assignment for the benefit of his creditors, or has a receiver appointed on account of its insolvency.

2. When any of the above reasons exist, the Owner may, but shall not be obligated to, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety seven days' written notice, terminate employment of the Contractor and may, but shall not be obligated to, subject to any prior rights of the surety:

   a. take possession of the site and all materials, including tools, and construction equipment and machinery located thereon which have been leased by the Contractor on behalf of the Owner;

b. accept assignment of subcontracts; and/or

c. finish the Project by whatever reasonable method the Owner may deem expedient.

3. When the Owner terminates the Contract for one of the reasons stated in Subparagraph 7(d)(1) above, the Contractor shall not be entitled to receive further payment until the Project is finished, if at all.

4. If the unpaid balance of the Contract Sum exceeds costs of finishing the Project, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be an obligation for payment which shall survive termination of the Contract.

E. **TERMINATION BY THE OWNER FOR CONVENIENCE.**

The Owner may, for convenience and without cause, terminate the Contract upon not less than seven (7) days' prior written notice to the Contractor. In the event of such termination for convenience and without cause, the Contractor shall be compensated for services performed prior to termination.

F. **SUSPENSION BY THE OWNER FOR CONVENIENCE.**

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

2. An adjustment may be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:

a. that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

b. that an equitable adjustment is made or denied under another provision of this Contract.

VIII. CLAIMS.

A. **CLAIMS FOR ADDITIONAL COST.**

If the Contractor wishes to make a claim for an increase in the Contract Sum or for extra costs or damages, the Contractor shall give the Owner written notice thereof within five (5) days after the event giving rise to such claim. Such claim will be submitted to the Superintendent of the Rockwall Independent School District, or designee, and that action shall be final and binding. Failure to give such notice shall be a waiver of the claim and such claim or possible claim shall be invalid and unenforceable unless so made.

B. **CLAIMS FOR ADDITIONAL TIME.**

1. If the Contractor wishes to make claim to change the date of Final Completion to allow for additional time, the Contractor shall give the Owner written notice thereof within five (5) days following the beginning of any such delay. In the case of a continuing delay only one claim is necessary. Such claim will be submitted to the Superintendent of the Rockwall Independent School District, or designee, and reviewed and approved or denied. Failure by Contractor to give such notice shall be a waiver of the claim and such claim or possible claim shall be invalid and unenforceable unless so made.

2. If adverse weather conditions are the basis for a claim for additional time, such claim shall be accompanied by Weather Bureau documentary evidence showing by comparison that such weather is abnormal to each of the past five (5) years. The guide for average climatological conditions will be the bulletin "Summary of Monthly Normals," for DFW Airport published by the Department of Commerce in cooperation with the National Oceanic & Atmospheric Administration.

IX. MISCELLANEOUS.

A. AUTHORITY OF BOARD.

The Owner is the Rockwall Independent School District, as identified in the Contract Documents. The Board of Trustees, by majority vote, is the only representative of the Owner, an independent school district, having the power to enter into or amend a contract, to approve changes in the scope of Work, to approve and execute a Change Order or Construction Change Directive modifying the Contract Sum or Guaranteed Maximum Price, or agree to an extension to the date of Substantial or Final Completion. The Board will act as soon as reasonably possible to avoid undue delays. The Board designates authorized representatives to act on its behalf for day-to-day operations under the Contract. Unless otherwise designated in the Contract Documents, Owner's authorized representative shall be the Superintendent of Schools, who may delegate responsibilities as appropriate. Owner's Board of Trustees hereby delegates to the Superintendent of Schools or designee(s) the authority to approve changes to the Work where such changes are within the Owner's Contingency not to exceed (Insert Dollar Amount), or will not increase the dates for Substantial or Final Completion by more than (Insert Number) days. Any such change shall be confirmed in writing between the Contractor and Owner's Superintendent or designee(s), and notice of such approved changes shall be given to the Board at its next regular meeting; except as otherwise provided in the Contract Documents, the Architect or Owner's Consultant does not have such authority. Neither Architect or Owner's Consultant nor Contractor may rely upon the direction of any employee of Owner who has not been designated in writing by the Superintendent or Board of Trustees; Owner shall not be financially responsible for actions taken by the Architect or Owner's Consultant or Contractor in reliance upon direction from unauthorized persons.

B. HAZARDOUS MATERIALS.

IF HAZARDOUS MATERIALS ARE ENCOUNTERED AS A RESULT OF CONTRACTOR OR ITS SUBCONTRACTORS' IMPORTATION OF SUCH MATERIALS ONTO THE PROJECT SITE, THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD HARMLESS THE OWNER, ITS OFFICERS, DIRECTORS, AND EMPLOYEES FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, COSTS AND EXPENSES, INCLUDING BUT NOT LIMITED TO, ATTORNEYS' FEES, ARISING OUT OF OR RELATED

TO THE IMPORTATION OF SUCH MATERIALS ONTO THE PROJECT SITE AND/OR CONSTRUCTION WORK IN ANY AREA AFFECTED BY HAZARDOUS MATERIALS.

If hazardous materials are encountered as a result of the Owner's failure to identify or remove hazardous materials prior to the commencement of construction, Owner agrees to (1) release the Contractor and its subcontractors, officers, directors, and employees from any and all claims, damages, losses, or expenses incurred by Owner arising out of or related to the performance of the Construction Work in the area affected by the hazardous material up to and including the time when Contractor first learns of or discovers the existence of the hazardous materials, but not for any additional work done by the Contractor after the identification of such hazardous materials; (2) release the Contractor from any indemnification obligations in this Agreement arising out of or related to the hazardous materials, except to the extent that any such claims, damages, losses, or expenses incurred by Owner arise from Contractor's actions or inaction after the initial discovery and identification of hazardous materials; and (3) extend the contract time by the actual number of days that Contractor is delayed in the completion of the contract arising out of or related to the identification, test, and/or abatement of the hazardous material if Contractor is unable to complete the Project by the scheduled completion date plus any agreed extension under other conditions of the Agreement.

C. **IMMIGRATION LAW.**

Contractor represents and warrants that all contractors and subcontractors working on this project for Owner will comply with all applicable federal and state immigration laws, and verify all employees' eligibility to work in this country. Further, Contractor shall ensure that all contractors and subcontractors will indemnify the Owner for any damages and legal fees that the Owner incurs as a result of Contractor's and/or any subcontractor's failure to comply with applicable immigration laws.

D. **PREVAILING WAGE RATES.**

1. Contractor, Contractor's Subcontractors and Sub-subcontractors shall pay all workers not less than the general prevailing rate of per diem wages for work of a similar character where the Project is located, as detailed in the "Minimum Wage Schedule" provided herein. Wages listed are minimum rates only. However, no claims for additional compensation above the Contract Sum shall be considered by the Owner because of payments of wage rates in excess of the applicable rate provided herein. Texas Government Code §2258, *et seq.*; Texas Labor Code §62.0512, *et seq.*

2. Contractor shall forfeit, as a penalty to the Owner, $60 for each laborer, worker or mechanic employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the Contract Documents.

3. Owner reserves the right to receive and review payroll records, payment records, and earning statements of employees of Contractor, and of Contractor's Subcontractors and Sub-subcontractors.

4. In executing the Work under the Contract Documents, Contractor shall comply with all applicable state and federal laws, including but not limited to, laws concerned with labor, equal employment opportunity, safety and minimum wages.

5. If no "minimum wage schedule" is provided herein, the Contractor shall use the wage rates determined by the US Department of Labor in accordance with the Davis-Bacon Act, 40 USC Section 3141, which can be accessed on the internet at www.gpo.gov/davisbacon/, or determined by any local contractor association, whichever is less.

E. **TIME.**

1. Time limits stated in the Contract are of the essence. By executing the Agreement, the Contractor confirms that the date selected for Final Completion provides a reasonable period for performing the Project. Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Project is to be performed and correlated personal observations with requirements of the Contract.

2. The Contractor shall proceed expeditiously with adequate forces and shall achieve Final Completion by the date selected for Final Completion.

F. **GOVERNING LAW.**

This Contract shall be governed by the law of the State of Texas. Venue for any legal action arising out of the Project shall be in a state or federal court, as appropriate, in the county where the Owner's Administrative Offices are located.

G. **NO ASSIGNMENT.**

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

H. **WRITTEN NOTICE.**

Written notice shall be deemed to have been duly served if delivered in person or if delivered at or sent by registered or certified mail to the following:

If to Owner:

Superintendent of Schools
Rockwall Independent School District
1050 Williams Street
Rockwall, Texas 75087

and to the Owner's authorized representative at the address set forth above.

David Carter, Senior Chief Financial Officer

If to Contractor:

(Insert Name and Address)

Contractor's authorized representative or, if a corporation, to an officer of the corporation at the address set forth above.

I. **RIGHTS AND REMEDIES.**

Duties and obligations imposed by the Contract and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

J. **ENTIRE AGREEMENT.**

This Agreement and the additional documents identified and referenced herein represent the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral.

K. **NO ISRAEL BOYCOTT.**

Pursuant to the requirements of Texas Government Code Chapter 2270, Contractor verifies that it does not boycott Israel, and it will not boycott Israel during the term of this Agreement.

[*the remainder of this page is intentionally left blank*]

This Agreement is entered into as of the day and year first written above and is executed in at least two original copies, one of which is to be delivered to the Contractor and one to the Owner.

OWNER:

_____
Signature

_____
Date

David Carter, CPA
Senior Chief Financial Officer

Rockwall Independent School District
1050 Williams Street
Rockwall, Texas 75087

CONTRACTOR:

_____
Signature

_____
Date

(Insert Name)
(Insert Title)

(Insert Company Name)
(Insert Company Address)
(Insert Contact Number)

Contractor Certification

Introduction: Texas Education Code Chapter 22 requires service contractors to obtain criminal history record information regarding covered employees and to certify to Rockwall Independent School District (the "District") that they have done so. Covered employees with disqualifying convictions are prohibited from serving at a school district.

Definitions:

Covered employees: All employees of a contractor who have or will have continuing duties related to the service to be performed at the District and have or will have direct contact with students. The District will be the final arbiter of what constitutes direct contact with students.

Disqualifying conviction: One of the following offenses, if at the time of the offense, the victim was under 18 or enrolled in a public school: (a) a felony offense under Title 5, Texas Penal Code; (b) an offense for which a defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; or (c) an equivalent offense under federal law or the laws of another state.

On behalf of_____ ("Contractor"), I certify that [check one]:

[ ] None of Contractor's employees are *covered employees,* as defined above. Or

[ ] Some or all of Contractor's employee are *covered employees.* If this box is selected, I further certify that:

(1) Contractor has obtained all required criminal history record information, through the Texas Department of Public Safety, regarding its covered employees. None of the covered employees has a disqualifying conviction. Contractor has taken reasonable steps to ensure that its employees who are not covered employees do not have continuing duties related to the contract services or direct contact with students.

(2) If Contractor receives information that a covered employee has a disqualifying conviction, Contractor will immediately remove the covered employee from contract duties and notify the District in writing within 3 business days.

(3) Upon request. Contractor will make available for the District's inspection the criminal history record information of any covered employee. If the District objects to the assignment of a covered employee on the basis of the covered employee's criminal history record information, Contractor agrees to discontinue using that covered employee to provide services at the District.

Noncompliance by Contractor with this certification may be grounds for contract termination.

_____
Signature

_____
Date