City of Waco, Texas

Request for Bid

RFB No. 2020-054

WMARSS Central Plant North Blower MCC (Motor Control Center) Replacement Project

Issue Date:	**Friday, September 4, 2020**
Closing Date & Time:	**Friday, October 2, 2020 at 2:00 p.m.**
Opening Date & Time:	**Friday, October 2, 2020, at 2:01 p.m.**

RFB Opening Location: Purchasing Services Office, 1415 N. 4th Street, Waco, Texas

For Information Contact: Tim Cubos, Purchasing Services, 254-750-6616

Pre-submittal Meeting Location: WMARSS Central Sewer Treatment Plant
1147 Treatment Plant Road, Waco, Texas, 76706
on September 21, 2020 at 10:00 A.M.

****Attendance by Teleconference and/or Video Only****

Purchasing Services
Post Office Box 2570
Waco, Texas 76702-2570
Telephone 254 / 750-6616
Fax 254 / 750-8063 www.waco-texas.com

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REGISTER INTEREST

You have received a copy of the above described Request document. If you would like to register your interest in this project so that you will receive any future notices or addenda concerning the project, please fill in the information requested below and fax this page to 254-750-8063. You may also scan this page and email to: ccubos@wacotx.gov.

Company/Firm:

_____

Name of Contact Person(s): _____

Email(s):

_____

Telephone: _____ **Fax:**_____

Mailing Address:

_____

It is your responsibility to complete and return this form to the City. Failure to do so will result in your not receiving notices and addenda related to this project from the City of Waco. Notices and addenda are posted on the City's website and can be accessed at: http://www.waco-texas.com/purchasing-rules.asp.

City of Waco Purchasing Services
Post Office Box 2570
Waco, Texas 76702-2570
Telephone 254 / 750-6616
Fax 254 / 750-8063 www.waco-texas.com

I. Schedule for Solicitation

The proposed schedule of events is tentative and may be modified throughout the selection process at the discretion of the City of Waco.

Issuance of the RFB	Friday, September 4, 2020
Pre-submittal Meeting at 10:00 A.M.	Monday, September 21, 2020
This is a non-mandatory meeting,* attendance by Teleconference and/or Video Only*	
Deadline for questions in 5:00 p.m.	Thursday, September 24, 2020
Bids due by 2:00 p.m.	Friday, October 2, 2020
Evaluation of submission:	October 2 thru October 6, 2020

Tentatively, the final selection decision will be made, and submitters will be notified of award by October 12, 2020. This schedule is subject to change by the City.

II. Contact with City of Waco

The contact person for this solicitation process is Tim Cubos, Purchasing Agent who can be reached at:

Email: ccubos@wacotx.gov Telephone: (254) 750-6616 Fax: (254) 750-8063

Questions concerning the solicitation must be submitted to contact person **in writing** on or before date shown in the schedule above.

Via U.S. Mail:	**Via Delivery Services/Personal Delivery:**
City of Waco Purchasing Services Attn: Tim Cubos, Purchasing Agent P.O. Box 2570 Waco, Texas 76702-2570	City of Waco Purchasing Services Attn: Tim Cubos, Purchasing Agent 1415 North 4th Street Waco, Texas 76707 **NOTE: US Mail does NOT deliver to street address**

Contact with someone other than the Purchasing Agent listed above, or his/her designated representative, at the City of Waco concerning this solicitation may be grounds for removal from consideration.

Interpretation, modification, corrections, or changes to the solicitation documents will be made by addenda issued by the City of Waco. Addenda will be made available http://www.wacotexas.com/bids.asp. Interested vendors are encouraged to return the Register Interest form on the previous page.

A complete copy of this RFB, including information for bidders, bid forms, contract forms, plans, specifications, bid bond forms, performance and payment bond forms and all other contract documents related to this project are available at http://www.wacotexas.com/bids.asp.

III. Definitions

The following definitions apply to this document and the transaction between the City and the selected submitter unless otherwise designated in the context. Terms, which are singular, may include multiple, where applicable and when in the best interests of the City:

(1) "City" means and refers to the City of Waco, Texas.

(2) "Company" or "Firm" means and refers to any submitter, whether such submitter be a sole proprietor, corporation, company, partnership, company, or any other entity legally defined or recognized under the laws of the State of Texas.

(3) "Bid" or "Submission" refers to a response submitted to an RFB.

(4) "RFB" means and refers to a Request for Bid that will be awarded based on lowest responsible bid or best value to City of Waco.

(5) "Selected submission" means and refers to the submission sent to the City of Waco by the Selected Firm.

(6) "Selected Firm" means the firm who is selected by the City and to whom the City Council/City Manager awards a contract for the services or commodities requested in this solicitation.

(7) "Solicitation" means an RFB issued by the City Waco seeking products or services described in the document.

(8) "Submitter" or "Vendor" or "Bidder" or "Contractor" means a firm that submits a response to a solicitation.

(9) "Contract documents" includes the RFB and all of the Appendices attached to the RFB.

(10) "Day" means a calendar day unless otherwise specifically defined.

(11) "WMARSS" means the Waco Metropolitan Area Regional Sewerage System.

IV. REQUESTED SERVICES/PRODUCTS

A. Scope of Services / Specifications

(1) The City of Waco has issued this solicitation for the replacement of the North Blower Motor Control Center (MCC) at the WMARSS Central Wastewater Treatment Plant.

(2) The purpose of this Request for Bids is to solicit bids from qualified individuals to install a new Motor Control Center for the North Blowers in the Engine Bldg. at the Central Wastewater Treatment Plant. The system will include control panels, a new MCC Room, air conditioning units, cable trays, electrical grounding and all other miscellaneous items to make a complete MCC system. The control panels and the starters for the 5 blowers will be incorporated into the existing Engine Bldg. PLC panel. In addition, a new automatic power factor correction unit will be included in the work. Care must be taken so as to not damage the existing equipment, generators, walls, roof, and other items in and around the Engine Building. In addition, the project work will be done inside an operational sanitary sewer treatment plant that must be kept up and running. Therefore, any and all steps must be taken to prevent plant shutdowns, process delays or damage to the existing equipment. The project is all inclusive to provide a new complete and fully functional Motor Control Center.

(3) Detailed specifications are attached as Appendices.

(4) A digital version of this document can be obtained from the City of Waco website at http://www.waco-texas.com/bids.asp.

B. Terms, Conditions, and Requirements

In addition to the specifications for the Project, the attached Appendices include the City's Contract Requirements.

C. Duration of Service

The City of Waco is seeking to have the work that is the subject of this RFB completed within 200 calendar days from the date of the Notice to Proceed. In determining the number of days for completion of the work under this Contract, it is anticipated that work will not be performed on Saturdays, Sundays, or City holidays unless specifically approved by City. Since "day" is defined as a calendar day, Saturdays, Sundays, and City holidays shall be counted as days and included in calculating the Contract time. If a Contractor wants to perform work on Saturdays, Sundays, or City holidays, the Contractor shall seek approval by making a written request to City. Contractor shall be responsible for all City staff and third-party time, costs, expenses and overtime for work performed on Saturdays, Sundays, or City holidays, unless excused in writing by the City prior to the work.

D. Reservations by City:

The City of Waco reserves the right to reject any and all submittals. This issuance of this solicitation does not obligate the City to contract for expressed or implied services. The City of Waco will not reimburse vendors for any costs incurred during the preparation or submittal of responses to this solicitation.

(1) Furthermore, the City expressly reserves the right to:

(a) Waive any defect, irregularity, or informality in any submittal or procedure;

(b) Extend the solicitation closing time and date;

(c) Reissue this solicitation in a different form or context;

(d) Procure any item by other allowable means;

(e) Waive minor deviations from specifications, conditions, terms, or provisions of the solicitation, if it is determined that waiver of the minor deviations improves or enhances the City's business interests under the solicitation; and/or

(f) Extend any contract when most advantageous to the City, as set forth in this solicitation.

(g) Retain all bids submitted and to use any ideas in a bid regardless of whether or not that bid is selected.

V. REQUEST FOR BIDS – SUBMISSION AND AWARD PROCEDURES

A. Requirements

(1) Qualified vendors should submit one (1) original and two (2) copies of the Pricing Forms for the services/products sought by this solicitation and complete all of the required forms by the stated deadline.

(2) Pricing Forms and Submission/Bid Security

(a) Pricing Forms.

1. Bids are to be submitted with a response on each item and the total extended. More than one (1) bid may be submitted on items that meet the specifications and the other RFB requirements.

2. Pricing is to be submitted on units of quantity specified on the Pricing Form with extended totals. In the event of a discrepancy in any extension total, the unit prices shall govern and be binding for purposes of this RFB.

3. All prices included are to be submitted less Federal Excise and State of Texas Sales Taxes. A tax exemption certificate will be executed upon request. The City's federal tax identification number is 1-74-6002468-4.

(b) Security – Bid Bond. **(Applies only to Construction work)**

1. Each submission must be accompanied by a **certified check** of the submitter, or a **bid bond** executed by the submitter as principal and having as surety thereon a surety company approved by the City in the amount of 5% of the submission. The Surety's Power of Attorney must accompany the bid bond. The bid bond and surety's Power of Attorney must both carry the same date which is no earlier than three (3) days prior to the scheduled bid opening date.

2. Checks will be returned to all except the three lowest bidders within three days after the opening of bids. The remaining checks will be returned promptly after the City and the selected bidder have executed the contract.

3. If no award has been made within ninety (90) days after the date of the opening of bids, a bidder may demand that the security submitted be returned so long as said bidder has not been notified of the acceptance of his bid.

4. If the selected bidder refuses or fails to execute and deliver the contract and bonds (payment and/or performance) required within 10 days after receiving notice of the acceptance of his bid, the bid security shall forfeit to the City as liquidated damages for such failure or refusal.

5. A Bid Bond form can be found in the Appendices.

B. Completeness of Submission

(1) Vendors are responsible for examining and being familiar with all specifications, drawings, standard provisions, instructions, and terms and conditions of the solicitation and their responses.

(2) The vendor must attach all required forms with each submission copy. Forms must be signed by a representative of the vendor authorized to bind the vendor contractually. The vendor must include a statement identifying any exceptions to this RFB or declare that there are no exceptions taken to the RFB.

C. Bid Response Date and Location

Bids must be received at the office of Purchasing Department by 2:00 p.m. (Central Time) **on Friday, October 2, 2020**.

Interested parties may submit their bids **Via Delivery Services or Personal Delivery** to:

City of Waco Purchasing Services
Attn: Tim Cubos, Purchasing Agent
1415 North 4th Street
Waco, Texas 76707

Interested parties may also submit their bids through **U.S. Mail** delivered to:

City of Waco Purchasing Services
Attn: Tim Cubos, Purchasing Agent
P.O. Box 2570
Waco, Texas 76702-2570

If using U.S. Mail, note that U.S. Mail is initially received at Waco City Hall and then delivered to the office of Purchasing Services by a City courier. That delivery may occur a day or more after being received at Waco City Hall. Allow additional time in advance

of the bid due date for U.S. Mail delivery. If the Purchasing Office has not received the bids by the stated deadline, the bid will be returned unopened.

All submittals shall be sent to the attention of the Purchasing Agent in a sealed envelope that is clearly marked on the outside as follows:

"RFB 2020-054

WMARSS Central Plant North Blower MCC Replacement Project"

Bid Opening: 2:01 p.m. (Central Time) **on Friday, October 2, 2020**.

Vendors accept all risk of late delivery bids regardless of instance or fault. A bid received after the submission deadline will not be considered and will be returned unopened to the submitter. Vendors accept all risks of delivery.

The City will **NOT** accept a response submitted by facsimile transmission (fax) or by electronic mail (email).

All submissions and accompanying documentation will become the property of the City.

D. Modification to or Withdrawal of Submission

Submissions cannot be altered or amended after the submission deadline passes. Submissions may be modified prior to the deadline by providing a written notice to the Purchasing contact person at the address previously stated. To modify a submission prior to the submission deadline:

(1) Submit a written notice of the modification WITHOUT revealing the bid price. The modification should provide the addition, subtraction, or other modifications so that the final prices or terms will not be revealed to the City until the sealed bid is opened.

(2) The written modification may be submitted by electronic transmission (fax or email or personal delivery to Purchasing Agent identified earlier in this document. The written modification must be received by the City prior to the closing time.

(3) If the modification is submitted through an electronic transmission (fax or email), the City must receive an original of the modification document signed by the bidder and submitted to a delivery company (UPS, FedEx, etc.) prior to the bid closing time. If the original of the modification was not submitted to a delivery company prior to the closing time or is not received within three (3) days after the closing time of the bid, consideration will not be given to the modifications provided in the electronic transmission.

A submission may also be withdrawn by providing the notice in person by a representative of the vendor who can provide proof of his authority to act for the vendor. The representative will be required to execute a receipt reflecting the submission is being withdrawn. If a submission is withdrawn before the submission deadline stated herein, the vendor may submit a new sealed bid provided the new bid is received prior to the closing

date and time deadline stated on the cover page and in the Schedule for the Solicitation. This provision does not change the common law right of a submitter to withdraw a submission due to a material mistake in the submission.

E. Submission Validity Period

A submission responding to this RFB signifies the vendor's agreement that the submission, and the content thereof, are **valid for ninety (90)** days following the submission deadline unless otherwise agreed to in writing by all parties. The submission may become part of the contract that is negotiated between the City and the successful vendor.

F. Vendor's Cost to Develop Submission

Costs for developing and assembling submissions in response to this solicitation are entirely the responsibility and obligation of the vendor and shall not be reimbursed in any manner by the City.

G. References

The submission shall include a list of 5 references, at least 3 of which have obtained services or materials from the vendor in the last 24 months.

H. Method of Award and Evaluation of Factors

(1) For this solicitation, the City will award the contract to the :

☒ Lowest responsible bidder

☐ Bidder who provides goods or services at the best value for the City.

(2) Lowest Responsible Bidder:

(a) The contract will be awarded to the lowest responsible bidder based on the base bid plus any selected alternatives provided the amount does not exceed the funds then estimated by the City as available to finance the contract.

(b) If the contract is bid with alternatives, the City reserves the right to select any combination of alternatives and will then compare all bids using the selected alternatives. If the amount of the bids exceeds the funds available to finance the contract, the City may (i) reject all bids or (ii) may award the contract based on the base bid with such deductions as produces a net total which is available within the available funds.

(3) Best Value:

(a) In determining best value for the City, the City may consider:

1. the purchase price;
2. the reputation of the bidder and of the bidder's goods or services;
3. the quality of the bidder's goods or services;

4. the extent to which the goods or services meet the municipality's needs;

5. the bidder's past relationship with the municipality;

6. the impact on the ability of the municipality to comply with laws and rules relating to contracting with historically underutilized businesses and non-profit organizations employing persons with disabilities;

7. the total long-term cost to the municipality to acquire the bidder's good or services; and

(b) Compliance with all bid requirements, delivery and needs of the City are considerations in evaluating bids. The City of Waco reserves the right to contact any offeror, at any time, to clarify, verify or request information with regard to any bid.

(4) During the evaluation process, the City reserves the right, where it may serve the City's best interest, to request additional information or clarifications from bidders.

I. Contact Award and Execution

The final contract must be awarded and approved by the Waco City Council if the amount of the contract will exceed $50,000.00. If the contract is for less than that amount, depending on the amount, the contract may be executed by the City Manager, an Assistant City Manager, department head or director.

APPENDIX A

Services/Products Bid Forms

(1) Pricing Form(s)
(2) Sample Bid Bond Form

CITY OF WACO
OFFICIAL BID SHEET
BID INVITATION NO: RFB 2020-054
WMARSS Central Plant North Blower MCC Replacement Project

DATE: _____

BIDDER:_____

AUTHORIZED
SIGNATURE:_____

I. Refer to "Standard Instructions for all Bids" before completing Bid Sheet.
   a. Price: quote your best price, F.O.B. Destination, on each item. II.
   In submitting this bid, I certify:
   a. Items bid are in exact accordance with specifications, unless noted in bid.
   b. That prices in this bid have been arrived at independently, without consultation or agreement with any competitor for the purpose of restricting competition.

PRICING INFORMATION				
Note: Depending on the unit prices, requirements and approved budgeted funds, quantities may be reduced or increased during the contract period				
Item No.	**Description**	**Unit Price (A)**	**No. of Units (B)**	**Total Price (A x B) = C**
1.0	Mobilization (Max. 5% of Bid)		Lump Sum	
2.0	Motor Control Center		1 Each	
3.0	1200 Amp Frame Breaker for Panel		1 Each	
4.0	Lighting Transformer and Panelboard		Lump Sum	
5.0	Indoor Lighting		Lump Sum	
6.0	Exposed Conduit		Lump Sum	

7.0	Cable Tray		Lump Sum	
8.0	Wire and Cables		Lump Sum	
9.0	Grounding, Electrical		Lump Sum	
10.0	Equipment Stands and cable tray, conduit drop supports, and misc. hardware and supports		5 Each	
11.0	Power Factor Correction Unit-100 Kvar Transient Free		Lump Sum	
12.0	Blower Control Panels with Blower Startup with commissioned manufacturer's Rep.		5 Each	
13.0	SCADA Instrumentation		1 Each	
14.0	HVAC including 5-Ton unit with roof curb, duct work, and grills		1 Each	
15.0	Building Modifications including masonry walls, electric room doors and frames, paint, masonry sealing, and other misc. metals and supplies		306 Square Foot	
16.0	Demolition of the Old Bus Duct Work and MCC		Lump Sum	
17.0	Special Wall Surfacing		986 Square Feet	
18.0	Record Drawing		Lump Sum	
19.0	**TOTAL PRICE**			

<u>Debarment Verification:</u> Prior to the execution of a contract, the successful bidder hereby agrees to provide the City of Waco with a final list of all subcontractors (name, address, telephone number, contact person, etc.) for debarment verification:

Yes ____ No _____

Early Payment Terms:

a) Bidder may offer an early payment discount by filling in the blanks in section b below. City may accept an early payment discount, but in doing so, City does not waive any of its rights under Texas Government Code Section 2251 (Prompt Payment Act).

b) Payment is due thirty (30) DAYS after acceptance of order and receipt of an original invoice, but a _____ percent early payment discount is offered for full payment made within _____(__) DAYS after acceptance of order and receipt of an original invoice.

I WILL USE THE FOLLOWING SUBCONTRACTORS FOR THIS WORK:

SUBCONTRACTOR	TYPE OF WORK
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

FRIM NAME: _____

BY: _____

TITLE: _____

ADDRESS: _____

BID BOND

THE STATE OF TEXAS §

COUNTY OF _____§

KNOW ALL MEN BY THESE PRESENTS, THAT _____

_____, (hereinafter called the Principal), as Principal, and _____, (hereinafter called the Surety), as Surety, are bound unto the **City of Waco,** Texas, a home rule municipal corporation of McLennan County, Texas (hereinafter called Obligee) in the amount _____DOLLARS ($_____), which is five percent (5%) of the bid, for the payment whereof said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid to enter into a certain written Contract with Obligee for *{enter description of contract below}*

_____,

which is scheduled to be opened on _____, 20_____.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully, enter into such written Contract, then this obligation shall be void; otherwise to remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if said Principal should withdraw its Bid any time after such Bid is opened and before official rejection of such Bid or, if successful in securing the award thereof, said Principal should fail to enter into the Contract and furnish, if required, satisfactory Performance Bond and Payment Bond, the Obligee, in either of such events, shall be entitled and is hereby given the right to collect the full amount of this Bid Bond as liquidated damages.

The Surety, for value received, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such Bid, and said Surety does hereby waive notice of any such extension.

PROVIDED, further that if any legal action be filed upon this Bond, venue shall lie in McLennan County, Texas.

IN WITNESS WHEREOF, the said Principal and Surety do sign and seal this instrument this _____ day of _____, 20_____.

ATTEST/WITNESS:

_____ _____

Secretary (if corporation) / Witness — *Name of Principal - Contractor*

(if corporation Corporate Seal)

BY:_____
signature

Title: _____

Address: _____

_____

ATTEST:

_____ _____

Surety Secretary — *Name of Surety*

BY: _____

(Surety Seal) — Attorney-in-Fact signature

_____ Address: _____

Witness to Surety — For Attorney in Fact

Address: _____ _____

_____

NOTE: Submit an original bid bond and a certified copy of the power of attorney along with full contact information for the Surety. Both the bid bond and the power of attorney should be dated for the same date which is no earlier than three (3) business days prior to the scheduled bid opening. [Count back from the day of the bid opening and do not count the bid opening day. Example: bid opening on Thursday, count back Wednesday, Tuesday, and Monday.] If the opening is delayed or rescheduled, Principal and/or Surety may be asked to provide proof that the bid bond executed is still valid. (11/03/2016)

COMPLETED FORM MUST BE RETURNED WITH BID/PROPOSAL

APPENDIX B

Contract Requirements

(1) City of Waco General Terms and Conditions
(2) General Conditions for Construction Work
(3) Insurance & Indemnification Requirements
(4) Wage Rates
(5) Sales Tax Information
(6) Worker's Compensation
(7) HB89 Israel Form
(8) HB1295 Information Sheet
(9) Protest Procedure
(10) Sample Payment and Performance Bond Requirements

APPENDIX B.(1)

General Waco Terms and Conditions

(a) **Applicable Law and Venue.** This solicitation and any resulting contract will be governed and construed according to the laws of the State of Texas. The terms and conditions of the contract awarded pursuant to the solicitation are fully performable in McLennan County, Texas and venue for any dispute regarding contract shall be in McLennan County, Texas.

(b) **Arbitration / Mediation.** The City of Waco will not agree to binding or mandatory arbitration or mediation.

(c) **Conflict of Interest.** Vendor agrees to comply with the conflict of interest provisions of the Waco City Charter, Waco Code of Ordinances, and/or state law. Vendor agrees to maintain current, updated disclosure of information on file with the Purchasing Services Division throughout the term of the contract.

(d) **Gratuities.** The City may, by written notice to the Vendor, cancel this contract without liability to the City, if it is determined by the City that gratuities have been offered to any officer or employee of the City with a view toward securing a contract, securing favorable treatment with respect to the awarding, amending, or the making of any determinations in respect to the performance of such a contract. In the event this contract is canceled by City as set forth in this paragraph, the City shall be entitled to recover from Vendor all additional costs incurred by City as a result of the cancellation.

(e) **Unfunded Liability.** City's obligation is payable only and solely from funds available for the purpose of this purchase. Lack of funds shall render this contract null and void to the extent funds are not available and any delivered but unpaid for goods will be returned to Vendor by City. The City will not incur a debt or obligation to pay selected bidder any amounts the City does not have the current funds available to pay, unless the contract includes a provision for the City to appropriate funding for the debt or obligation.

(f) **Advance Payments.** The City will not make advance payments to a selected firm or any third party pursuant to this solicitation or resulting contract.

(g) **Gift of Public Property.** The City will not agree to any terms or conditions that cause the City to lend its credit or grant public money or anything of value to the selected firm.

(h) **Procurement Laws.** The City will not agree to any terms or conditions that cause the City to violate any federal, Texas, or local procurement laws, including its own charter.

(i) **Limitation of Liability.** The City of Waco will not agree to an artificial limitation of liability (e.g. liability limited to contract price or liability capped at an amount actually paid in previous 3 months, etc.) or an artificial statute of limitations (e.g. any lawsuit must be commenced within one year of the event).

(j) **Waiver.** No claim or right arising out of a breach of the contract resulting from this solicitation can be discharged in whole or in part by a waiver or renunciation of the

claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party.

(k) **Right To Assurance.** Whenever one party to this contract in good faith has reason to question the other party's intent to perform, that party may request that the other party give written assurance of his intent to perform. In the event that a request is made and no assurance is given within five (5) days, the requesting party may treat this failure as an anticipatory repudiation of the contract.

(l) **Attorney's fees; Legal Costs.** The City will not agree to pay the selected firm's attorney's fees or other legal costs under any circumstances.

(m) **Advertising.** Vendor shall not advertise or publish, without City's prior consent, the fact that City has entered into this contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

(n) **Arrears In Taxes.** Article VII. Taxation, Section 8, of the City of Waco Home Rule Charter states: The City shall be entitled to counterclaim and offset against any debt, claim, demand or account owed by the City to any person, firm or corporation who is in arrears to the City of Waco for taxes, in the amount of taxes so in arrears, and no assignment or transfer of such debt, claim, demand or account after the said taxes are due, shall affect the right of the City to offset the said taxes against the same.

(o) **Tax Certification; Offset of Other Debts Against City.** Selected bidder hereby certifies that it is not delinquent in the payment of taxes owed to the City and will pay any taxes owed to the City so that such taxes will not become delinquent. If this certification is subsequently determined to be false, such false certification shall constitute grounds for termination of the contract awarded under this SOLICITATION, at the option of City. Furthermore, Selected bidder agrees the City is entitled to counterclaim and offset against any debt, claim, demand, or account owed by the City to the selected bidder, pursuant to the awarded contract, for any debt, claim, demand, or account owed to the City, including other than the taxes mentioned above. The City may withhold from payment under the awarded contract an amount equal to the total amount of debts, claims, accounts, or demands including taxes owed to the City by the selected bidder. The City may apply the amount withheld to the debts and taxes owed to the City by the selected bidder until said debts are paid in full. No assignment or transfer of such debt, claim, demand or account after the said taxes or debts are due shall affect the right of the City to offset the taxes and the debt against the same.

(p) **Independent Contractor.** The selected bidder will be an independent contractor under the contract. Professional services provided by the selected bidder shall be by the employees or authorized subcontractors of the selected bidder and subject to supervision by the selected bidder, and not as officers, employees or agents of the City. Selected bidder will be required and agrees to comply with all state and federal employment laws as well as all other federal, state and local laws, rules and regulations affecting the performance of all obligations taken herein.

(q) **No Joint Enterprise/Joint Venture.** It is not the intent of this solicitation or the contract to be awarded to create a joint enterprise or joint venture.

(r) **Subcontracting Bid.** If subcontracting with another company or individual is proposed, that fact, along with providing the same information for the subcontractor that is required to be provided by the bidder under this solicitation, must be provided and clearly identified in the bid. Following the award of the contract, no additional subcontracting will be permitted without the express prior written consent of the City.

(s) **Assignment-Delegation.** No right or interest in the contract shall be assigned or delegation of any obligation made by Vendor without the written permission of the City. Any attempted assignment or delegation by Vendor shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.

(t) **Modifications:** This contract can be modified or rescinded only by a written instrument signed by both of the parties or their duly authorized agents.

(u) **Interpretation-Parol Evidence:** This writing is intended by the parties as a final expression of their agreement and is intended also as a complete agreement for dealings between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this agreement. Acceptance or acquiescence in a course of performance rendered under this agreement shall not be relevant to determine the meaning of this agreement even though the accepting or acquiescing party has knowledge of the performance and opportunity for objection.

(v) **Equal Employment Opportunity:** Vendor agrees that during the performance of its contract it will:

1. Treat all applicants and employees without discrimination as to race, color, religion, sex, national origin, marital status, age, or handicap.
2. Identify itself as an "Equal Opportunity Employer" in all help wanted advertising or request. The Vendor shall be advised of any complaints filed with the City alleging that Vendor is not an Equal Opportunity Employer. The City reserves the right to consider its reports from its human relations administrator in response to such complaints in determining whether or not to terminate any portion of this contract for which purchase orders or authorities to deliver have not been included, however, the Vendor is specifically advised that no Equal Opportunity Employment complaint will be the basis for cancellation of this contract for which a purchase order has been issued or authority to deliver granted.

(w) **Israel:** Vendor acknowledges that effective September 1, 2017, the City is required to comply with Section 2270.001 of the Texas Government Code, enacted by House Bill 89 (85th (R) Texas Legislature), which requires that 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 does not boycott Israel and will not boycott Israel during the term of the contract. By executing this Agreement, Vendor verifies that it does not boycott Israel and will not boycott Israel during the term of this Agreement.

APPENDIX B.(2)
General Conditions for Construction Work

The "City of Waco Standard Specifications for Construction" (2013 Edition), hereinafter referred to as City Standard Specifications, is incorporated herein by reference for all intents and purposes. The General Provisions of the City Standard Specifications include provisions related to the administration of the contract. If a provision of the City Standard Specifications conflicts with a provision in this solicitation, the provision in this solicitation controls. If the applicable provision is still unclear, the City Manager for the City of Waco, or his designee, will determine which provisions, specification or standard controls and his determination shall be final.

The City Standard Specifications may be obtained by accessing the City of Waco website at www.waco-texas.com and going to Bid Opportunities – Engineering Services. It may also be obtained by contacting the City of Waco Public Works Department at 254-750-5440.

(a) **Permits and Fees:** All permitting fees from the City will be waived on construction projects. The contractor will still need to apply for all applicable permits. However, there will be no cost associated with issuance of City permits.

(b) **Time of Completion and Liquidated Damages:** Completing the work described in this solicitation in a timely manner is very important to the City of Waco. Submitter must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the City and to fully complete the project within the time stated in the contract documents. As it is impracticable and extremely difficult to fix the actual damages, if any, that may proximately result from a failure by Submitter to perform the service, should Submitter fail to complete the project within the calendar days specified in the contract, Submitter agrees to pay to City, or have withheld from monies due it, the amount stated in the contract documents as liquidated damages for each calendar day of delay or nonperformance. Any sums due and payable hereunder by the Submitter shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the City, estimated at the time of executing this Contract. Execution of a contract for this Project shall constitute agreement by the City and Submitter that said amount is the minimum value of the costs and actual damage caused by the failure of the Submitter to complete the Project within the allotted time. A sum due as liquidated damages may be deducted from payments due the Contractor if such delay occurs. Adjustments to the contract times can only be made as provided in the contract documents and any conditions or specifications referenced therein.

(c) **Conditions of Work:** While the City is issuing a solicitation including specifications, each Submitter is still responsible for examining all of the issued documents, attending any pre-bid conference, making a site visit, and taking whatever steps are necessary to inform itself of the conditions relating to the project and the employment of labor thereon. Each Submitter must inform itself of the conditions relating to the project and the employment of labor thereon. Failure to do so will not relieve the Submitter awarded this contract of its obligation to furnish all material and labor necessary to carry out the provisions of the contract. Insofar as possible, the Selected Firm, in carrying out the Project, must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

(d) **Employment Conditions/Requirements:** Submitters shall pay particular attention to the required employment conditions that must be observed and the minimum wage rates to be paid. If federal or state funds are involved in paying for the work, there may be additional requirements that must be followed to comply with the terms of the federal or state funding.

(e) **Price Discrepancy.** In the case of a discrepancy between the unit price and the extended total for a bid item, the unit price will prevail. The unit prices of bids that have been opened may not be changed for the purpose of correcting an error in the bid price.

(f) **Security for Faithful Performance [Payment and Performance Bonds]:** Simultaneously with his delivery of the executed contract, the Selected Firm shall furnish the required surety bonds as security for faithful performance of this contract (Performance Bond) and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract (Payment Bond), as specified in the documents included herein. For public works contracts, state law requires a Performance Bond if the contract is for an amount in excess of $100,000.00 and a Payment Bond if the contract is for an amount in excess of $50,000.00. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the City. The surety who signs contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

(g) **Force Majeure:** In the event performance by the Selected Firm of its obligations under this Agreement shall be interrupted or delayed by or as a consequence of a fire, flood, severe weather, or other act of God, war, insurrection, civil disturbance, or act of state, the Selected Firm shall be excused from such performance for the period of time such occurrence shall have lasted or such period as is reasonably necessary to rebuild or take other action necessary to resume performance. The period of time reasonably necessary to rebuild or take other action necessary to resume performance shall be as determined by the agreement of the parties, which agreement shall be negotiated and arrived at in good faith. The Selected Firm shall notify the Contact Person or Contract Administrator of any matter covered above, the occurrence of which interferes or threatens to interfere with the performance of any of its

obligations under the bid. Upon such notice, the Selected Firm and the City shall consult and cooperate as to measures which may be taken to overcome the interference or as to alternative measures which may be undertaken by the parties with a view to the continued performance of the bid agreement.

(h) **Right to Assurance:** Whenever one party to this contract in good faith has reason to question the other party's intent to perform, the questioning party may demand the other party give written assurance of its intent to perform. In the event that a demand is made, and no assurance is given within five (5) days, the demanding party may treat this failure as an anticipatory repudiation of the contract.

(i) **Invoice Submittal Procedures:** If invoices are submitted or otherwise used pursuant to the bid awarded under this solicitation, the Selected Firm shall present invoices to the City in the following form and content:

1. Each invoice must reference the City of Waco contract, agreement or Purchase Order number;
2. Only one contract, agreement, or project shall be billed on a particular invoice;
3. Only one invoice per every thirty (30) days per contract, agreement, or project may be submitted; and
4. Each invoice must have a billing number, which reflects in sequence the number of invoices that have been submitted on the contract, agreement, or project.

The invoice requirements stated herein shall not be read to disallow or exclude other information that may be otherwise required or requested by the City. Such information required herein must be submitted only on an invoice and not in any other non-invoice form or document.

(j) **Termination of Contract:** Except as provided elsewhere in the contract documents:

1. The City may terminate the contract for cause for Selected Firm’s failure to perform work, non-adherence to established federal, state and/or local laws, or a violation of any of the contract provisions. Upon written termination, the City may exclude the Selected Firm from the Project site and pursue any remedies available to the City.
2. Upon ten (10) days written notice, City may terminate the contract for convenience, for any reason. In such case, the Selected Firm shall be paid, without duplication, for completed and acceptable work and expenses, including reasonable overhead and profit, and for other reasonable expenses directly attributable to the termination. In no case shall the Selected Firm be paid for anticipated profits or other consequential damages. Upon receipt of written notice, the Selected Firm shall have a duty to mitigate its termination costs and shall not incur additional costs unrelated to the costs directly related to either securing completed work or winding down the Project.

(k) **Israel:** Vendor acknowledges that effective September 1, 2017, the City is required to comply with Section 2270.001 of the Texas Government Code, enacted by House Bill 89 (85th (R) Texas Legislature), which requires that 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 does not boycott Israel and will not boycott Israel during the term of the contract. By executing this Agreement, Vendor verifies that it does not boycott Israel and will not boycott Israel during the term of this Agreement.

City of Waco Insurance & Indemnification Requirements
Vertical Construction with Builder's Risk & Professional Liability

Insurance Requirements:

A contractor's financial integrity is of interest to the City. Therefore, subject to a contractor's right to maintain reasonable deductibles, a contractor shall obtain and maintain in full force and effect for the duration of the contract, and any extension hereof, at contractor's sole expense, insurance coverage written on an occurrence basis by companies authorized to do business in the State of Texas that are rated A- or better by A.M. Best Company and/or otherwise acceptable to the City in the following types and amounts:

Type	Amount
Workers' Compensation	Statutory
Employer's Liability	$1,000,000/$1,000,000/$1,000,000
Commercial General Liability Including: • Premises/Operations • Independent Contractors • Products Liability/Completed Operations • Personal & Advertising Injury • Broad form property damage, to include fire legal liability	$1,000,000 per occurrence; $2,000,000 General Aggregate, or its equivalent in Umbrella or Excess Liability Coverage
Business Automobile Liability a. Owned/leased vehicles b. Non-owned vehicles c. Hired vehicles	$1,000,000 per occurrence or its equivalent on a combined single limit (CSL basis).
All Risk Builder's Risk / Installation Floater • Including Flood and Earthquake • City as named insured or additional insured • Replacement Cost	Amount of the contact or replacement value of the facility.

Term of Policy: With regard to any approved claims-made policy form, a contractor shall maintain and keep in force and effect said coverage during the term of this contract and for a period of seven (7) years following the expiration or completion of the contract with the City, either through an existing carrier or a carrier of comparable financial statute and reputation.

Unless otherwise agreed to in the contract documents, Builders Risk coverage shall be in force when vertical construction begins and can be terminated at the time that the City accepts the structure as substantially complete, unless the project is being completed in phases; then the coverage shall remain in effect until the City accepts the entire structure or structures as substantially complete.

Modification of Insurance Requirement: The City reserves the right to review these insurance requirements during the effective period of the contract and any extension or renewal hereof and to modify insurance coverages and their limits when deemed necessary and prudent by City's Risk

Manager or designee, based upon changes in statutory law, court decisions, or circumstances surrounding this contract.

Proof of Insurance Required and When to Submit:

Examination & Approval. All insurance policies shall be subject to the examination and approval of the City for their adequacy as to form and content, form of protection, and financial status of insurance company.

When to Submit. Prior to the execution of the contract by the City of Waco and before commencement of any work under this contract, a contractor shall furnish original proof of insurance to the City's Risk Manager which is clearly labeled with the contract name and City department. The proof will include completed/current Certificate(s) of Insurance, endorsements, exclusions, and/or relevant extracts from the insurance policy, or copies of policies. Thereafter, new certificates, policy endorsements, exclusions, and/or relevant extracts from insurance policies, or policies shall be provided prior to the expiration date of any prior certificate, endorsement, or policy. No officer or employee other than the City's Risk Manager or designee shall have authority to waive this requirement.

Additional Insured. Except for Workers' Compensation and Employers' Liability, the City, its elected officials, officers, servants, agents, volunteers and employees shall be named as additional insureds. No officer or employee, other than the City Risk Manager or designee, shall have authority to waive this requirement.

Other-Insurance Endorsement -- All insurance policies are to contain or be endorsed to state that an "Other Insurance" clause shall not apply to the City where the City is an additional insured shown on the policy.

Agent Information. The certificate(s) or other proof of insurance must be completed by the broker of record and must be signed and include the agent information including the agent name, title and phone number. The proof of insurance shall be sent directly from the insurance agent to the City's Risk Management Office by U.S. Postal Service to City of Waco, ATTN: Risk Manager, P.O. Box 2570, Waco, Texas 76702-2570 or by delivery service to 1415 North 4th Street, Waco, Texas 76707. To send by email, please contact the Risk Management Office at 254-750-5730 to obtain the email address.

Precondition to Performance & Basis for Termination. The City shall have no duty to pay or perform under the contract until such certificate(s), policy endorsements, exclusions, and/or relevant extracts from the insurance policy have been delivered to and approved by the City's Risk Manager. The contractor understands that it is the contractor's sole responsibility to provide this necessary information to the City and that failure to timely comply with these insurance requirements shall be a cause for termination of a contract. If the City determines that it will deny payment, not perform, or terminate the contract because of the failure to provide certain information or documents, the City shall give the contractor notice of that determination and allow contractor fifteen (15) days to correct the deficiency.

Waiver of Subrogation. All liability policies will provide a waiver of subrogation in favor of the City.

Notice of Cancellation, Non-renewal, Material Change. The Contractor shall provide written notification to the City of the cancellation, non-renewal, or material change of any insurance required herein. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation, non-renewal, or material change, or is first aware that

the cancellation, non-renewal, or material change is threatened or otherwise may occur, whichever comes first. Contractor shall provide the City with a replacement certificate(s) of insurance, policy endorsements, exclusions, and/or relevant extracts from the insurance policy either before the cancellation, non-renewal, or material change is effective, if it knew in advance of such, or within ten (10) business days of first learning of the cancellation, non-renewal, or change if it did not learn of that such action in advance.

INDEMNIFICATION.

A CONTRACTOR EXECUTING A CONTRACT WITH THE CITY AGREES TO ASSUME FULL RESPONSIBILITY AND LIABILITY FOR THE SERVICES RENDERED PURSUANT TO THE CONTRACT AND AGREES TO INDEMNIFY, PROTECT, DEFEND, AND HOLD HARMLESS THE CITY, ITS EMPLOYEES, AGENTS, AND SERVANTS, OF AND FROM ALL CLAIMS, DEMANDS, AND CAUSES OF ACTIONS OF EVERY KIND AND CHARACTER, INCLUDING THE COST OF DEFENSE THEREOF, FOR ANY INJURY TO, INCLUDING DEATH OF, PERSONS AND ANY LOSSES FOR DAMAGES TO PROPERTY CAUSED BY OR ALLEGED TO BE CAUSED, ARISING OUT OF, OR ALLEGED TO ARISE OUT OF, EITHER DIRECTLY OR INDIRECTLY, OR IN CONNECTION WITH, THE SERVICES TO BE RENDERED HEREUNDER, WHETHER OR NOT SAID CLAIMS, DEMANDS, CAUSES OF ACTIONS ARE CAUSED BY CONCURRENT NEGLIGENCE OF THE CITY AND A PARTY TO THIS AGREEMENT, OR WHETHER IT WAS CAUSED BY CONCURRENT NEGLIGENCE OF THE CITY AND SOME OTHER THIRD PARTY.

Employee Litigation: In any and all claims against any party indemnified hereunder by any employee (or the survivor or personal representative of such employee) of the contractor, any subcontractor, any supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the work, or anyone for whose acts any of them may be liable, the indemnification obligation herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for contractor or any such subcontractor, supplier, or other individual or entity under workers' compensation or other employee benefit acts.

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Prevailing Wage Rates Information

Texas Government Code Chapter 2258 requires a worker employed by a contractor or subcontractor in the execution of a contract for the public work by or on behalf of political subdivision of the state to be paid a prevailing wage rate.

Definition of "public work." A public work to which this provision applies includes but is not limited to construction of a building, highway, road, excavation, and repair work or other project development or improvement, paid for in whole or in part from public funds, without regard to whether the work is done under public supervision or direction. It does not apply to work done directly by a public utility company under an order of a public authority. Whether this Project is a public work shall be determined by the City, and such determination shall be provided in writing to the Contractor before the opening of bids.

Worker wage rate. Contractor agrees, covenants, and guarantees that it and its subcontractor(s) constructing this Project, if a public work, shall pay their workers, other than maintenance workers, employed on this Project:

1. not less than the general prevailing rate of per diem wages for work of a similar character performed within the geographical limits of the City; and
2. not less than the general prevailing rate of per diem wages for legal holiday and overtime work.

"Worker employed on a public work" defined. A worker is employed on a public work for the purposes of this provision if the worker, including a laborer or mechanic, is employed by a contractor or subcontractor in the execution of a contract for a public work with the City, or any officer of the City, or the City Council of the City of Waco.

Determination of prevailing wage rate. The City Council of the City of Waco shall determine the general prevailing rate of per diem wages to be paid for each craft or type of worker needed to construct the Project by:

1. conducting a survey of the wages received by classes of workers employed on public works of a character similar to the contract work in the geographical limits of the City in which this public work is to be performed; or
2. using the prevailing wage rate as determined by the United States Department of Labor in accordance with the Davis-Bacon Act (40 U.S.C. Section 276a et seq.) if the survey used to determine that rate was conducted within a three-year period preceding the date the City Council of the City of Waco issues invitations for bids for this public work.

Sum certain of prevailing wage rate. The City Council shall determine the general prevailing rate of per diem wages as a sum certain, expressed in dollars and cents.

Wage rates incorporated in agreement and in invitation to bid. The prevailing wage rate to be paid for each craft or type of worker needed to construct the public work shall be specified in the invitation to bid for this Project and is incorporated by reference herein.

Determination final. The City Council's determination of the general prevailing rate of per diem wages is final.

Penalty. A contractor or subcontractor who violates this provision shall pay to the City sixty dollars ($60) for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the invitation to bid and this contract. The City Council shall use any money collected under this provision to offset the costs incurred in the administration of this provision. A contractor or subcontractor does not violate this provision if the City Council, in awarding the bid for this contract, does not determine the prevailing wage rates and specify the rates in the invitation to bid and in this contract.

Maintenance of wage record. Contractor agrees, covenants, and guarantees that it and its subcontractor(s) shall keep a record showing:

1. the name and occupation of each worker employed by the contractor(s) and subcontractor(s) in the construction of this public work; and
2. the actual per diem wages paid to each worker.

Inspection of wage record. The record shall be open at all reasonable hours to inspection by the officers and agents of the City.

Payment greater than prevailing rate not prohibited. This provision does not prohibit the payment to a worker employed on a public work an amount greater than the general prevailing rate of per diem wages.

Reliance on certificate of subcontractor. The contractor awarded this bid is entitled to rely on a certificate by a subcontractor regarding the payment of all sums due those working for the subcontractor until the contrary has been determined.

Duty of City to hear complaints and withhold payment. The City Council shall:

1. take cognizance of complaints of all violations of this provision committed in the execution of the construction of this public work; and
2. withhold money forfeited or required to be withheld under this provision from the payments to the contractor(s) under the bid contract, except that the City may not withhold money from other than the final payment without a determination by the City Council that there is good cause to believe that the contractor has violated this provision.

Complaint; initial determination. The City Council shall comply with Sections 2258.023 and 2258.056, Government Code, in the initial determination of a complaint presented pursuant to this provision.

For the purposes of this Project, the general prevailing rate of per diem wages are the wage the rates set forth on the following page(s).

General Decision Number: TX180310 09/14/2018 TX310

Superseded General Decision Number: TX20170310

State: Texas

Construction Type: Building County: McLennan

County in Texas.

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

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 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 calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	07/06/2018
2	07/27/2018
3	09/14/2018

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ELEC0072-002 06/01/2018

	Rates	Fringes
ELECTRICIAN	$ 26.15	3%+$7.74

ENGI0178-005 06/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 29.00	10.60
(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.....$ 27.50 10.60

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* IRON0084-011 06/01/2018

Rates Fringes

IRONWORKER, ORNAMENTAL.....$ 23.77 7.12

PLUM0286-011 06/04/2018

Rates Fringes

PIPEFITTER (Excludes HVAC
Pipe Installation).....$ 29.50 12.82

PLUM0529-002 04/01/2017

Rates Fringes

Plumber.....$ 26.14 9.31

SUTX2014-036 07/21/2014

Rates Fringes BRICKLAYER.....$ 18.00 0.00

CARPENTER, Excludes Drywall
Hanging, and Metal Stud
Installation.....$ 14.76 0.00

CEMENT MASON/CONCRETE FINISHER...$ 13.13 0.00

DRYWALL HANGER AND METAL STUD
INSTALLER.....$ 14.27 0.00

GLAZIER.....$ 20.00 0.00 HVAC MECHANIC (Installation

of HVAC Unit Only).....$ 15.00 1.56 INSULATOR - MECHANICAL

(Duct, Pipe & Mechanical
System Insulation).....$ 19.77 7.13

IRONWORKER, REINFORCING.....$ 13.35 0.00

IRONWORKER, STRUCTURAL.....$ 20.50 5.15

LABORER: Common or General.....$ 11.10 0.00

LABORER: Mason Tender - Brick...$ 8.00 0.00

LABORER: Mason Tender -

Cement/Concrete.....$ 9.93 0.00

LABORER: Pipelayer.....$ 12.49 2.13

LABORER: Roof Tearoff.....$ 11.28 0.00

OPERATOR:
Backhoe/Excavator/Trackhoe.....$ 13.59 1.60

OPERATOR: Bobcat/Skid
Steer/Skid Loader.....$ 13.93 0.00

OPERATOR: Bulldozer.....$ 18.29 1.31

OPERATOR: Drill.....$ 16.22 0.34

OPERATOR: Forklift.....$ 15.00 0.00

OPERATOR: Grader/Blade.....$ 14.34 1.68

OPERATOR: Loader.....$ 14.01 0.44

OPERATOR: Mechanic.....$ 17.52 3.33

OPERATOR: Paver (Asphalt,
Aggregate, and Concrete).....$ 16.03 0.00

OPERATOR: Roller.....$ 13.11 0.00

PAINTER (Brush, Roller, and
Spray).....$ 13.00 0.00

ROOFER.....$ 13.75 0.00

SHEET METAL WORKER (HVAC Duct
Installation Only).....$ 19.00 5.73

SHEET METAL WORKER, Excludes
HVAC Duct Installation.....$ 14.62 0.00

TILE FINISHER.....$ 11.22 0.00

TILE SETTER.....$ 14.74 0.00

TRUCK DRIVER: Dump Truck.....$ 12.24 1.62

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.

========== 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 www.dol.gov/whd/govcontracts.

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) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate
(weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which 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. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates

the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of 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. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

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

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the

Branch of Construction Wage Determinations. Write 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 the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write 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 by 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

4.) All decisions by the Administrative Review Board are final.

========== END OF

GENERAL DECISION

TEXAS SALES TAX EXEMPTION INFORMATION

This information is being provided to assist contractors and is therefore general in nature. It is not a substitute for advice from the contractor's attorney or accountant.

Under the Texas Tax Code Section 151.309, the City of Waco is exempt the payment of sales tax. In addition, when the City contracts with a third party to make certain improvements to real property, purchases of materials/consumable items that are physically incorporated into that real property may also exempt from state and local sales tax. Items qualifying for this exemption must be used up entirely on a job for the City of Waco.

To claim this exemption, a contractor who has a Texas Taxpayer Number (the number on their Texas Sales and Use Tax Permit number) can complete the Texas Sales and Use Tax Resale Certificate (front side of Form 01-339) and provide it to the vendor from whom the contractor is purchasing materials and supplies for use under a contract with the City of Waco. The form is available on the Texas Comptroller website at:

http://www.window.state.tx.us/taxinfo/taxforms/01-forms.html
or
http://www.window.state.tx.us/taxinfo/taxforms/01-339.pdf

A copy of a blank form has been attached for your convenience. In completing the exemption form (01-339 front) when purchasing materials and supplies, a contractor will:

(1) List itself (the contractor) as the purchaser and complete required information;

(2) Fill in the name and required information about the seller;

(3) Describe the item being purchased or attached order or invoice – the only items included must be items that will be entirely consumed or used in the project for the City of Waco – might include statement that purchase is related to contract with City of Waco, Texas, for Project {description, e.g., New Street sewer lien project};

(4) Describe the type of business activity generally engaged in by purchaser or type of items normally sold by the purchaser

Since the City of Waco is a governmental entity, the contract or purchase order with the City provides the necessary documentation that the materials are acquired for an exempt contract [See 34 TAC §3.291(c)(1)]. However, if requested, the City of Waco will provide to the contractor awarded the contract an executed exemption certification showing that the city is exempt from sales tax (Form 01-339 back).

The state statutes and rules related to sales tax can be accessed from the Texas Comptroller website: http://www.window.state.tx.us/taxinfo/sales/
In addition, the Texas Comptroller's office can be contacted at 1-800-252-555 for questions about Sales and Use Taxes.

State statutes regarding sales tax can be found in Texas Tax Code Chapter 151 at:
http://www.statutes.legis.state.tx.us/Docs/TX/htm/TX.151.htm

Rules related to sales tax in the Texas Administrative Code can be found at:
http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=34&pt=1&ch=3&sch=O&rl=Y

Comptroller of Public Accounts FORM 01-339 Front (Rev.4-13/8)

Texas Sales and Use Tax Resale Certificate

Name of purchaser, firm or agency as shown on permit	Phone *(Area code and number)*

Address *(Street & number, P.O. Box or Route number)*

City, State, ZIP code

Texas Sales and Use Tax Permit Number *(must contain 11 digits)*

Out-of-state retailer's registration number or Federal Taxpayers Registry (RFC) number for retailers based in Mexico

(Retailers based in Mexico must also provide a copy of their Mexico registration form to the seller.)

I, the purchaser named above, claim the right to make a non-taxable purchase (for resale of the taxable items described below or on the attached order or invoice) from:

Seller: _____

Street address: _____

City, State, ZIP code: _____

Description of items to be purchased on the attached order or invoice:

_____

_____

_____

Description of the type of business activity generally engaged in or type of items normally sold by the purchaser:

_____

_____

The taxable items described above, or on the attached order or invoice, will be resold, rented or leased by me within the geographical limits of the United States of America, its territories and possessions or within the geographical limits of the United Mexican States, in their present form or attached to other taxable items to be sold.

I understand that if I make any use of the items other than retention, demonstration or display while holding them for sale, lease or rental, I must pay sales tax on the items at the time of use based upon either the purchase price or the fair market rental value for the period of time used.

I understand that it is a criminal offense to give a resale certificate to the seller for taxable items that I know, at the time of purchase, are purchased for use rather than for the purpose of resale, lease or rental, and depending on the amount of tax evaded, the offense may range from a Class C misdemeanor to a felony of the second degree.

sign here ▶ Purchaser	Title	Date

This certificate should be furnished to the supplier.
Do <u>not</u> send the completed certificate to the Comptroller of Public Accounts.

Comptroller of Public Accounts FORM 01-339 (Back)
(Rev.4-13/8)

Texas Sales and Use Tax Exemption Certification

This certificate does not require a number to be valid.

Name of purchaser, firm or agency	
Address *(Street & number, P.O. Box or Route number)*	Phone *(Area code and number)*
City, State, ZIP code	

I, the purchaser named above, claim an exemption from payment of sales and use taxes (for the purchase of taxable items described below or on the attached order or invoice) from:

Seller: _____

Street address: _____ City, State, ZIP code: _____

Description of items to be purchased or on the attached order or invoice:

_____

_____

_____

Purchaser claims this exemption for the following reason:

I understand that I will be liable for payment of all state and local sales or use taxes which may become due for failure to comply with the provisions of the Tax Code and/or all applicable law.

I understand that it is a criminal offense to give an exemption certificate to the seller for taxable items that I know, at the time of purchase, will be used in a manner other than that expressed in this certificate, and depending on the amount of tax evaded, the offense may range from a Class C misdemeanor to a felony of the second degree.

sign here ▶ Purchaser	Title	Date

NOTE: This certificate cannot be issued for the purchase, lease, or rental of a motor vehicle.

THIS CERTIFICATE DOES NOT REQUIRE A NUMBER TO BE VALID.

Sales and Use Tax "Exemption Numbers" or "Tax Exempt" Numbers do not exist.

This certificate should be furnished to the supplier.
Do <u>not</u> send the completed certificate to the Comptroller of Public Accounts.

CITY OF WACO

Workers' Compensation Coverage Information

The City of Waco, a State of Texas Governmental Entity and Municipality, is required to comply with the Texas Labor Code. Specifically **Texas Labor Code – Section 406.096** directs Contractors who enter into a building or construction Contract with a Municipality to certify in writing that (1) the **contractor** provides workers' compensation insurance coverage for each employee of the contractor employed on public projects, and (2) the contractor receive a certificate from each **subcontractor** showing that every employee of the subcontractor is covered by workers' compensation insurance. Texas Labor Code – Section 406.096 states:

Sec. 406.096. REQUIRED COVERAGE FOR CERTAIN BUILDING OR CONSTRUCTION CONTRACTORS.

(a) A governmental entity that enters into a building or construction contract shall require the contractor to certify in writing that the contractor provides workers' compensation insurance coverage for each employee of the contractor employed on the public project.

(b) Each subcontractor on the public project shall provide such a certificate relating to coverage of the subcontractor's employees to the general contractor, who shall provide the subcontractor's certificate to the governmental entity.

(c) A contractor who has a contract that requires workers' compensation insurance coverage may provide the coverage through a group plan or other method satisfactory to the governing body of the governmental entity.

(d) The employment of a maintenance employee by an employer who is not engaging in building or construction as the employer's primary business does not constitute engaging in building or construction.

(e) In this section:

(1) "Building or construction" includes:

(A) erecting or preparing to erect a structure, including a building, bridge, roadway, public utility facility, or related appurtenance;

(B) remodeling, extending, repairing, or demolishing a structure; or

(C) otherwise improving real property or an appurtenance to real property through similar activities.

(2) "Governmental entity" means this state or a political subdivision of this state. The term includes a municipality.

Acts 1993, 73rd Leg., ch. 269, Sec. 1, eff. Sept. 1, 1993.

28 Texas Administrative Code Section 110.110(c)(7) follows:

Texas Administrative Code Title 28 Section 110.110(c)(7) requires the following language to be contained in building and construction bid specifications and contracts:

Workers' Compensation Insurance Coverage

A. Definitions:

Certificate of coverage ("certificate")- 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, 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 governmental entity.

Persons providing services on the project ("subcontractor" in §406.096) - includes 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 which 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" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

B. 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, Section 401.011(44) for all employees of the contractor providing services on the project, for the duration of the project.

C. The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.

D. 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 governmental entity showing that coverage has been extended.

E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:

(1) a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and

(2) no later than seven 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.

F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.

G. The contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 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.

H. 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.

I. 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, Section 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 governmental entity in writing by certified mail or personal delivery, within 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 paragraphs (1) - (7), with the certificates of coverage to be provided to the person for whom they are providing services.

J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity 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.

K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles 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.

CERTIFICATION REQUIRED BY TEXAS GOVERNMENT CODE SECTION 2270.001

State law requires certification from a Company for contracts (which includes contracts formed through purchase orders) involving goods or services: (1) between a government 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 fund of the governmental entity.

By signing below, Company hereby certifies the following:

1. Company does not boycott Israel; and

2. Company will not boycott Israel during the term of the contract.

PRINT COMPANY NAME: _____

SIGNED BY: _____

Print Name & Title: _____

Date Signed: _____

The following definitions apply to this state statute:

(1) "Boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes; and

(2) "Company" means a for-profit organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company, or affiliate of those entities or business associations that exists to make a profit.

By signing below, Contractor hereby certifies that Section 2270.001 does not apply to this contract due to the following (check all that apply):

☐ Contractor is a sole proprietor; or

☐ Contractor has less than 10 full-time employees; or

☐ Contract value is for less than $100,000.00.

PRINT COMPANY NAME: _____

SIGNED BY: _____

Print Name & Title: _____

Date Signed: _____

NOTICE OF HB 1295 DISCLOSURE

Beginning January 1, 2016, business entities entering into a contract which is approved by the Waco City Council for goods or services to be used by the City of Waco are required to complete a Certificate of Interested Parties Form 1295 on the Texas Ethics Commission website.

Certificate of Interested Parties (Form 1295):

In 2015, the Texas Legislature adopted House Bill 1295, which added Section 2252.908 to the Texas Government Code. Beginning January 1, 2016, a business entity which:

(1) enters into a contract which must be approved by the Waco City Council

(2) for goods or services

(3) to be used by the City of Waco

is required to complete a Certificate of Interested Parties Form 1295 on the Texas Ethics Commission website. **The disclosure requirement applies to a contract (including an amendment, extension or renewal) entered into on or after January 1, 2016.** Business entities required to comply include for-profit and non-profit entities.

The Texas Ethics Commission adopted rules to implement the law and adopted the Certificate of Interested Parties form (Form 1295). The Commission states that it does not have any additional authority to enforce or interpret House Bill 1295.

Form 1295 requires disclosure of interested parties (a) who have a controlling interest in a business entity with whom the government entity contracts or (b) who actively participate in facilitating a contract or negotiating the terms of a contract (such as a broker, advisor, or attorney for business entity) if the person receives compensation from the business entity (but is not an employee of the entity) and communicates directly with the governmental entity regarding the contract. A person has a controlling interest if the person: (1) has an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent; (2) has membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or (3) serves as an officer of a business entity that has four or fewer officers, or serves as one of the four officers most highly compensated by a business entity that has more than four officers.

Filing Process:

The Texas Ethics Commission has made the filing Form 1295 available on its website as an electronic form at: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

A business entity entering into a contract for goods or services with the City of Waco must use that website application to enter the required information on Form 1295 and then print a copy of the form. A certification of filing will be issued by the Commission containing a unique certification number established by the Commission. An authorized agent of the business entity must sign the printed copy of the Form and have the form notarized. The original executed and notarized Form 1295 (with certification of filing) must be filed with the City of Waco. The City is then required to notify the Commission using the Commission's website that the Form 1295 has been received by the City. The information from the completed Form 1295 will then be posted on the Commission's website. The City will retain the original of the notarized form.

CERTIFICATE OF INTERESTED PARTIES

FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 Name of business entity filing form, and the city, state and country of the business entity's place of business.

2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.

3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the goods or services to be provided under the contract.

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 Check only if there is NO Interested Party. ☐

6 AFFIDAVIT

I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

_____
Signature of authorized agent of contracting business entity

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said _____, this the _____ day of _____, 20 _____, to certify which, witness my hand and seal of office.

_____ _____ _____
Signature of officer administering oath | Printed name of officer administering oath | Title of officer administering oath

ADD ADDITIONAL PAGES AS NECESSARY

Procedure to Protest Award Recommendation

A. If a firm or person believes it is injured as a result of an RFB, a written protest may be filed.

B. The written protest may be delivered to the City's Purchasing Services Department ("Purchasing") in person to the department offices located at **1415 N. 4th St., Waco, Texas, 76707,** or by certified mail, return receipt requested, to the following address:

Purchasing Services c/o City of Waco
Post Office Box 2570
Waco, Texas 76702-2570

C. The written protest must be filed no later than 5:00 p.m. on the fifth (5th) business day from the date of receipt of notification of the recommendation for the contract award.

D. The written protest must include the following information before it may be considered:

1. Name, mailing address, and business phone number of the protesting party;
2. Identification of the RFB being protested;
3. A precise and concise statement of the reason(s) for the protest which should provide enough factual information to enable a determination of the basis of the protest; and
4. Any documentation or other evidence supporting the protest.

E. In conjunction with the department that requested the RFB, Purchasing will attempt to resolve the protest, which may at Purchasing's discretion include meeting with the protesting party. If the protest is successfully resolved by mutual agreement, written verification of the resolution of each ground addressed in the protest will be provided to the city manager or designee assistant city manager.

F. If the Purchasing is unable to resolve the protest, the protesting party may request the protest be reviewed and resolved by the city manager or designee assistant city manager.

G. A request for the city manager's review must be in writing and received by the Purchasing within three (3) business days from the date the Purchasing informs the protesting party the protest cannot be resolved. The request for review must be delivered in person to the Purchasing at the address stated above or by certified mail, return receipt requested, to the mailing address stated above.

H. If a protesting party fails or refuses to request a review by the city manager within the three (3) days, the protest is deemed finalized and no further review by the city is required.

I. Applicable documentation and other information applying to the protest may be submitted by the protesting party to the Purchasing before review by the city manager. If the protesting party requests a review by the city manager, such documentation will be forwarded to the city manager or designee assistant city manager for consideration. The city manager or designee assistant city manager may likewise notify the protesting party or any city department to provide additional information. The decision reached by the city manager or designee assistant city manager will be final, but the protesting party may still appear before the City Council during the Hearing of the Visitors session of a City Council meeting.

SAMPLE CONTRACT

A sample contract is being provided for information purposes so that the Bidder will be familiar with the possible form of the contract. The City of Waco reserves the right to revise this contract form.

CONTRACT

THIS CONTRACT ("the Contract"), made this _____ day of _____, 2020, by and between **CITY OF WACO**, herein called "Owner" acting herein through its City Manager or Assistant City Manager, and _____., of _____, herein called "Contractor".

WITNESSETH: that for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction and repair work for the _____, hereinafter called the Project, for the sum of _____ ($_____) and all extra work in connection therewith, and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said Project in accordance with the Contract Documents. The Contract Documents consist of the following:

1. This Contract;
2. Permits and licenses from other agencies as may be required by law;
3. The Specifications/Plans which consist of:
    a. Specifications prepared by the City of Waco.
    b. City of Waco Standard Specifications for Construction" dated 2013, as revised by Special Provisions listed on the City of Waco website at http://www.waco-texas.com/engineering-specifications.asp ("Standard Specifications"); and
    c. City of Waco, Texas – Manual of Standard Details revised April 15, 2015, (also referred to as "Standard Plans" in the Standard Specifications), the Special Project Provisions, and the Plans (as defined in the Standard Specifications); and
4. Addenda to the RFB (if any);
5. All documents included in **RFB No. 2020-0XX**
6. Contractor's Bid Proposal;
7. Required bonds;
8. Reference Specifications (as defined in the Standard Specifications);
9. Change Directives and Change Orders (as defined in the Standard Specifications);
10. All Modifications issued after the execution of the Agreement; and
11. Any other drawings and printed or written explanatory matter.

The Contractor hereby agrees to commence work under this Contract on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the

Project within **200 Calendar days** thereafter and perform the work in accordance with the Contract Documents. The Contractor further agrees to pay, as liquidated damages, the sum of **$250.00** for each CALENDAR day thereafter as provided in Section 7.8 of the General Provisions of the Standard Specifications.

The **OWNER** agrees to pay the **CONTRACTOR** in current funds for the performance of the contract, subject to additions and deductions, as provided in Section 4 of the City of the General Provisions of the Standard Specifications.

IN WITNESS WHEREOF, the parties to these presents have executed this contract, in the year and day first above mentioned.

CITY OF WACO, TEXAS

BY: _____
Bradley Ford, City Manager

APPROVED AS TO FORM & LEGALITY

_____
Jennifer Richie, City Attorney

APPROVED:

(Corporate Seal)

_____
CONTRACTOR

ATTEST/WITNESS:

By: _____

_____
Corporate Secretary or Witness

Title: _____

Address: _____

_____

Note: If Contractor is a corporation, corporate secretary should attest. For other types of entities, a witness should sign.

Performance Bond

Bond No._____

PERFORMANCE BOND

Required by City of Waco where contract is over $100,000

STATE OF TEXAS
COUNTY OF McLENNAN

KNOW ALL BY THESE PRESENTS: That we (1) _____, (2) a _____ of (3) _____hereinafter called **Principal** and (4) _____ _____ of _____ _____, State of _____, which is duly authorized to do business in the State of Texas and is hereinafter called **Surety**, are held and firmly bound unto City of Waco of McLennan County, Texas in the amount of _____Dollars **($_____)** in lawful money of the United States, to be paid in McLennan County, Texas, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with City of Waco dated the (5) _____ day of _____, A.D., 20____, a copy of which is hereto attached and make a part hereof for the construction of:

_____

(1) Correct legal name of Contractor
(2) A Corporation, a Partnership, Limited Liability Company or an Individual, whatever the business entity form
(3) City and state of contractor's office
(4) Correct name of Surety along with city and state
(5) Leave dates blank. City will fill in with date of City Council action.

NOW THEREFORE, if the Principal shall well, truly and faithfully perform the work in accordance with the plans, specifications and contract documents during the original term thereof, and any extensions thereof which may be granted by the City of Waco, with or without notice to the Surety, and if Principal shall fully satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the City of Waco from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the City of Waco all outlay and expense which the City of Waco may incur in making good any default, then this obligation shall be void. Otherwise, this obligation remains in full force and effect.

For value received, Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work performed thereunder, or the plans, specifications, drawings, etc. accompanying same, with or without notice to Surety, shall in any way affect its obligation on this Bond; and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder.

Surety's telephone number is (_____) _____. Any notice of claim shall be sent to Surety at:

Performance Bond

Mailing address: _____

Address of surety company: _____.

IN WITNESS WHEREOF, this instrument is executed, this the ____day of _____, A.D. 20____.

NOTE: Date of Bond must NOT be prior to date of Contract or date of Council action, whichever is later.

ATTEST:

_____
(Principal) Secretary

_____
Principal - Contractor*

(Corporate Seal)

BY:_____

_____
Witness as to Principal

Title: _____

Address: _____

Address: _____

_____

_____

ATTEST:

_____
Surety

_____
(Surety) Secretary

BY: _____
Attorney-in-Fact

(Surety Seal)

_____
Witness to Surety

Address: _____

Address: _____

_____

*If Contractor is Partnership, all partners should execute bond. Use extra pages if necessary.

Form 09/22/2016

Bond No._____

PAYMENT BOND

Required by City of Waco where contract is over $50,000

THE STATE OF TEXAS
COUNTY OF McLENNAN

KNOW ALL MEN BY THESE PRESENTS: That we (1)_____ (2) _____of (3) _____ hereinafter called Principal and (4) _____ of _____, State of _____, which is duly authorized to do business in the State of Texas and is hereinafter called Surety, are held and firmly bound unto THE CITY OF WACO of McLENNAN COUNTY, TEXAS, and unto all persons, firms, and corporations, who may furnish materials for, or perform labor upon the building or improvements hereinafter referred to in the amount of

_____ Dollars ($_____) in lawful money of the United States, to be paid in McLENNAN COUNTY, TEXAS, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with THE CITY OF WACO dated the (5) _____ day _____, A.D., 20___, a copy of which is hereto attached and made a part hereof for _____ (herein called the "Work").

(1) Correct name of Contractor
(2) A Corporation, a Partnership, Limited Liability Company or an Individual, whatever the business entity form
(3) City and state of contractor's office
(4) Correct name of Surety along with city and state
(5) Leave dates blank. City will fill in with date of City Council action.

NOW, THEREFORE, the condition of this obligation is such that, if the Principal shall promptly make payment to all payment bond beneficiaries as defined in Chapter 2253 of the Texas Government Code, supplying labor and materials in the prosecution of the work provided for in said Contract, then this obligation shall be null and void; otherwise the obligation shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed under the Contract, with or without notice to Surety, shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed under the Contract.

The Surety agrees to pay the City of Waco upon demand all loss and expense, including attorney's fees and court costs, incurred by the City of Waco by reason of or on account of any breach of this obligation by the Surety.

Payment Bond

This bond is made for and entered into solely for the protection of all payment bond beneficiaries supplying labor and materials in the prosecution of the work provided for in said contract, and all such payment bond beneficiaries shall have a direct right of action under the bond as provided in Chapter 2253 of the Texas Government Code.

PROVIDED FURTHER, that no final settlement between the City of Waco and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

Surety's telephone number is (_____) _____. Any notice of claim shall be sent to Surety at:

Mailing address: _____

Address of surety company: _____

IN WITNESS WHEREOF, this instrument is executed, this the _____ day of _____, A.D. 20____.

NOTE: Date of Bond must NOT be prior to date of Contract or date of Council action, whichever is later.

ATTEST:

_____
(Principal) Secretary

_____
Principal - Contractor*

(Corporate Seal)

BY:_____

_____
Witness as to Principal

Title: _____

Address: _____

Address: _____

_____

_____

ATTEST:

_____
Surety

_____
(Surety) Secretary

BY: _____
Attorney-in-Fact

(Surety Seal)

_____
Witness to Surety

Address: _____

Address: _____

_____

_____

*If Contractor is Partnership, all partners should execute bond. Use extra pages if necessary.

APPENDIX C

Forms to Complete and Return

(1) Submission of Bid/Proposal and Acknowledgment of Addenda
(2) Business Identification Form
(3) Conflict of Interest Questionnaire (CIQ form)
(4) Disclosure of Relationships with City Council/Officers (City Charter)
(5) Litigation Disclosure
(6) Minority/Women Owned Business
(7) Certification Regarding Debarment
(8) Non-collusion Affidavit
(9) Resident Certification
(10) Texas Public Information Act
(11) Drug-Free Workplace Certification

Submission of Bid/Proposal and Acknowledgment of Addenda

RFB/P No. 2020-_____ issued by City of Waco, Texas

The entity identified below hereby submits its response to the above identified RFB/P. The entity affirms that it has examined and is familiar with all of the documents related to RFB/P.

DECLARATION OF INTENT

I attest that the bid submitted is: (check one box below)

☐ 1. to the exact Specifications and the Terms and Conditions of the bid documents.

☐ 2. to the exact specifications with modifications to the Specifications and/or the Terms and Conditions as noted in the attached documentation.

or

☐ 3. NOT to the exact Specifications and/or the Terms and Conditions and is therefore an alternate bid, submitted for the City's consideration, with attached justification(s) and documentation defending the alternate bid as meeting or exceeding the intent of the specifications or scope of work.

Submitter further acknowledges receipt of the following addenda:

Addendum No ____ issued _____

Addendum No ____ issued _____

Addendum No ____ issued _____

Addendum No ____ issued _____

Addendum No ____ issued _____ Addendum

No ____ issued _____

Date : _____

Proposal of (entity name) _____

Signature of Person Authorized to Sign Submission:

_____

Signor's Name and Title (print or type):

_____

PLEASE SIGN AND RETURN WITH BID

Business Entity Identification

To identify the appropriate person to execute documents, please fill in this form:

Full Legal Name of Business Entity: _____

Doing Business As (assumed name): _____ Main

Contact Person: _____

Registered Office Address: _____

Mailing Address: _____

Business Phone #: _____ Fax #: _____

Email Address: _____

_ DUNS Number: _____

Check the appropriate box to designate the type of business entity & complete the information below.

Is entity: Sole ☐ Proprietorship ☐ Corporation ☐ Professional Corporation

☐ General Partnership ☐ Limited Partnership ☐ Limited Liability Partnership

☐ Limited Liability Company ☐ Professional Limited Liability Company

☐ Other _____

Date Business Started: _____ State Where Started: _____

If the entity was formed in another state, registration with the Texas Secretary of State may be required before transacting business in Texas. See http://www.sos.state.tx.us/corp/foreign_outofstate.shtml

Publicly traded company ☐ No ☐ Yes – where traded: _____

Depending on the type of business entity, the business will have owners, corporate officers, corporate directors, partners, managers, members, etc. Complete the information below.

To provide information on more than one person or entity for boxes 1 to 5, please use back of page, blank page, or another copy of this form.

1	Name of Primary Officer, Partner, Owner, Manager, Member, Director	
2	Position or title with business entity	
3	Address *(if different from above)*	
4	Who is authorized to execute contracts and other documents?	
5	What is the title or position of the person listed in #4?	
6	**Please provide a document (resolution, bylaw, agreement, etc.) that states the person identified in #4 has authority to execute contracts or execute affidavit.**	

In signing this form, I acknowledge that I have read the above and state that the information contained therein is true and correct.

Signature: _____ Date: _____

Print Name: _____ Print Title: _____

ESTABLISHING AUTHORITY TO EXECUTE CONTRACT

When an instrument is signed on behalf of a business entity, documentation must be submitted that states the person signing on behalf of the business entity has the authority to do so. That documentation may be in the form of a resolution approved by a corporate board of directors, charter provisions, by-laws, partnership agreement, etc.

If a business entity has a document authorizing one or more individuals to enter into contracts or execute any instrument in the name of the business entity that it may deem necessary for carrying on the business of the entity, a certified copy of that document may be submitted.

If the business has a document stating who can execute documents for the business (such as a corporate resolution, charter provision, corporate bylaw, etc), the certification below may be signed and that document attached to this page.

CERTIFICATION REGARDING ATTACHED DOCUMENT

I, the undersigned person, as the *{title}* _____ of *{business entity}* _____, certify that the attached document authorizes *[name of person]* _____ to execute contracts and other documents on behalf of said business entity and said document has not been revoked, altered, or amended and is still in full force and effect.

SIGNED this _____ day of _____, 20_____

_____
(Signature)

_____
Print Name

Attach document to this form

If a corporation does not have a document authorizing someone to execute contracts on behalf of the corporation, this resolution form may be used to establish that authority.

RESOLUTION FOR CORPORATION

BE IT RESOLVED by the Board of Directors of _____

_____ that
(Name of Corporation)

_____ is hereby authorized to execute a contract
(Name)

with the City of Waco to complete/construct_____

_____ .
(Name of Project, Project No.)

_____, Secretary, is authorized to attest the signature binding the corporation.

_____
Corporate Name

(Corporate Seal) By: _____

Title: _____

ATTEST:

_____
Secretary of Corporation

CERTIFICATION

I, _____, certify that the above resolution
(Secretary of Corporation)

was adopted by the Board of Directors of _____
(Corporation)

at a meeting on the _____ day of _____, 20__.

_____
(Signature of Secretary)

_____
(Print Name of Secretary)

If business entity has no document declaring who has authority to execute a contract on behalf of a business entity, this affidavit must be completed.

AFFIDAVIT OF AUTHORITY TO SIGN FOR COMPANY, CORPORATION, OR PARTNERSHIP

Name of Business Entity: _____

Which is ☐ Corporation ☐ Professional Corporation
☐ General Partnership ☐ Limited Partnership ☐ Limited Liability Partnership
☐ Limited Liability Company ☐ Professional Limited Liability Company

On behalf of the above named business entity, I, the undersigned, certify and affirm that the following named person has authority to execute contracts and other documents on behalf of said business entity:

Name: _____

Title: _____

I declare under penalty of perjury that the above is true and correct.

_____
Signature

_____
Print Name

_____
Print Title

STATE OF _____

COUNTY OF _____

SWORN TO AND SUBSCRIBED BEFORE ME this _____ day of _____, A.D., 20____.

(seal)

_____
Notary Public

My Commission Expires:

_____

INSTRUCTIONS FOR
CONFLICTS OF INTEREST QUESTIONNAIRE
[Form CIQ]

Chapter 176 of the Texas Local Government Code requires vendors who wish to conduct business or be considered for business with a city to file a "conflict of interest questionnaire." The Texas Ethics Commission (TEC) created the conflict of interest questionnaire (Form CIQ).

Who must complete and filed CIQ form?
Every vendor doing business with the City or seeking to do business with the City must complete Box 1 and sign and date in Box 4. Whether or not a conflict exists determines the other information to include on the form.

Who is a vendor?
The term "vendor" includes a partnership, corporation or other legal entities, including those performing professional services. Partnerships or corporations act through individuals, but it is the partnership or corporation that is doing business with or seeking to do business with the City.
If the vendor seeking to do business with the City is a sole proprietorship, then just the name of the person who is the vendor is needed.

What triggers the requirement to file the Form CIQ?
When a vendor (or an agent of the vendor) begins (1) contract discussions or negotiations with the city or (2) submits an application, quote, response to request for proposals or bids, or anything else that could result in an agreement (contract or purchase order) with the City, Form CIQ must be completed. Whether the vendor initiates the discussion or the City initiates the discussions, Form CIQ must be completed. The monetary amount or value of the contract/purchase does not matter. The contract or purchase may involve the sale or purchase of property, goods, or services with the City of Waco

When does a conflict requiring disclosure exist? What has to be revealed?

- A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with the City of Waco and the vendor:
  (1) has an employment or other business relationship with an officer of the City of Waco, or a family member of an officer, that results in taxable income exceeding **$2,500** during the 12 month period preceding the date a contract/purchase is executed or a contract/purchase is being considered; or
  (2) has given an officer of the City of Waco, or a family member of an officer, one or more gifts with the aggregate value of more than **$100** in the 12 month period preceding the date a contract/purchase is executed or a contract/purchase is being considered
  (3) has a family relationship with an officer of the City of Waco.

What family relationships create a conflict?
A "family member" is a person related to another person within the first degree by consanguinity (blood) or affinity (marriage), as described by Subchapter B, Chapter 573, Texas Government Code. The ending of a marriage by divorce or the death of a spouse ends relationships by affinity created by that marriage unless a child of that marriage is living, in which case the marriage is considered to continue as long as a child of that marriage lives.
"Family relationship" means a relationship between a person and another person within the third degree by consanguinity or the second degree by affinity, as those terms are defined by Subchapter B, Chapter 573, Texas Government Code.

Who are officers of the City of Waco?
Officers are the members of the Waco City Council, the City Manager, and any agent or employee who exercises discretion in the planning, recommending, selecting, or contracting with a vendor. An agent may include engineers and architects, as well as others, who assist the City is making a decision on some contract or purchase.

When must a vendor file the conflict of interest questionnaire?
No later than seven days after the date the vendor: (a) begins contract discussions or negotiations with the city, or (b) submits an application or response to a request for proposals or bids, correspondence, or another writing related to a potential agreement with a city, or (c) becomes aware of an employment or other business relationship with an officer or family member of the officer that the vendor (i) has made one or more gifts of more than $100 or (ii) has a family relationship with.

How do I go about filling out the Conflict of Interest Questionnaire form?

Section 1: Fill in the full name of the **person or company** who is trying to do business with the City. If the "person" is a corporation, partnership, etc., then it is the name of that corporation, partnership, etc., that is required on Form CIQ. If a sole proprietorship, then just the name of the individual is needed. If the "person" is an individual acting as an agent for some other person or a company, then it is the agent's name. **Any time an agent is involved, two FORM CIQs must be completed and submitted**: one for the agent, and one for the person or company that the agent acted for. The agent's FORM CIQ must note the vendor that the agent acted for.

Section 2: Check box if the form is an update to a form previously completed. Updates are required by the 7th business day after an event that makes a statement in a previously filed questionnaire incomplete or inaccurate. Updates are also required by September 1 of each year in which the person submits a proposal, bid or response to the City of Waco or begins contract discussions or negotiations with the City.

Section 3: Complete by listing the name of the City of Waco officer with whom there is an affiliation to or business relationship and check the "Yes" or "No" box in Section 3 A, B, or C. If there is more than one City officer with whom there is an affiliation or business relationship, a separate form should be completed for each officer.

3.A: State whether the officer named on the form receives or is likely to receive taxable income, other than investment income, from the vendor filing the questionnaire.

3.B: State whether the vendor receives or is likely to receive taxable income, other than investment income, from or at the direction of the officer named on the form AND the taxable income is not received from the City.

3.C: State whether the filer is employed by a corporation or other business entity with which the City officer serves as an officer or director or holds an ownership interest of 1% or more.

3.D: Describe each employment or business relationship with the local government officer named on the form.

Section 4. Person completing form must date and sign the form. If the form is being completed for a corporation, partnerships, etc., the person signing should be someone who is authorized to act on behalf of the corporation, partnership, etc.

A signature is required in box #4 regardless of any other entry on the form.

A copy of Chapter 176 of the Texas Local Government Code can be found at:

http://www.statutes.legis.state.tx.us/SOTWDocs/LG/htm/LG.176.htm

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

This includes the vendor name even if a conflict does not exist

1 **Name of vendor who has a business relationship with local governmental entity.**

Insert name of vendor seeking to do business with the City of Waco

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.**

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information in this section is being disclosed.**

Insert name of officer with whom there is business, employment or family relationship. If no conflict, insert N/A.

Name of Officer

This section (item 3 including subparts A, B, C, & D) must be completed for each officer with whom the vendor has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the vendor?

Complete A-C if a conflict exist

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more?

☐ Yes ☐ No

D. Describe each employment or business and family relationship with the local government officer named in this section.

Identify and describe the relationship, if applicable

4

Signature required -- so sign and date, even if no conflict

Signature of vendor doing business with the governmental entity

Date

Adopted 8/7/2015

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.**

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information in this section is being disclosed.**

_____

Name of Officer

This section (item 3 including subparts A, B, C, & D) must be completed for each officer with whom the vendor has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more?

☐ Yes ☐ No

D. Describe each employment or business and family relationship with the local government officer named in this section.

4

_____ _____

Signature of vendor doing business with the governmental entity Date

Adopted 8/7/2015

DISCLOSURE OF RELATIONS WITH
CITY COUNCIL MEMBER, OFFICER, OR EMPLOYEE OF CITY OF WACO

Failure to fully and truthfully disclose the information required by this form may result in the termination of any business the City is now doing with the entity listed below and/or could impact future dealings.

1. Name of Entity/Business/Person doing business with City: _____

Is the above entity: (**Check one**)

☐ A corporation ☐ A partnership ☐ A sole proprietorship or an individual Other (specify): ☐ _____ **Check all applicable boxes.**

2. Is any person involved as an owner, principal, or manager of name listed in #1 related to or financially dependent on Council member, officer, or employee of the City of Waco?

☐ NO -- there is no such relationship between Entity/Business/Person and the City of Waco.

☐ **YES, a person who is a/an** ☐ owner, ☐ principal, or ☐ manager of this entity/business/person **is:** **(Check all applicable boxes below)** related to by blood or marriage* and/or a member of the same household as

and / or financially ☐ dependent upon** and/or financially ☐ supporting**

☐ to a City of Waco ☐ City Council member, ☐ officer or ☐ employee.

* As used here, "related to" means a spouse, child or child's spouse, and parent or parent's spouse. It also includes a former spouse if a child of that marriage is living (the marriage is considered to continue as long as a child of that marriage lives).

** As used herein, "financially dependent upon" and "financially supporting" refers to situations in which monetary assistance—including for lodging, food, education, and debt payments—is provided by owner, principal or manger of #1 to Council member, officer or employee of City of Waco, or that Council member, officer or employee of City of Waco provides to owner, principal or manger of #1.

If **YES**, provide (a) the name of owner, principal, or manager, **and** (b) the name of the City Council member, officer or employee (include the department the City officer or employee works for, if known), **and** (c) if a relationship by marriage or by blood/kinship exists. (Use back of sheet if more space is needed)

(a) Name of owner, principal, or manager	(b) Name of Council member, officer or employee & department	(c) What is relationship or household arrangement

3. Is a current City Council member or City employee involved with the name listed in #1 as an owner, principal, manager, or employee, or employed as a contractor for name listed in #1?

☐ NO (no person involved/working for Entity/Business/Person is Council member, officer or employee of the City).

☐ **YES, a person is** **(Check all applicable boxes)**

(a) **a current City of Waco** ☐ City Council member, ☐ officer or ☐ employee ,

(b) **and is** an ☐ owner, a ☐ principal, or ☐ a manager of the entity/business/person listed in #1, **or** an ☐ employee or an ☐ independent contractor of the entity/business/person listed in #1.

If YES, provide the name of owner, principal, manager, employee or independent contractor who is a City Council member, officer or employee. Include the department the City officer or employee works for, if known.

_____

_____

Signature: _____ Phone #: _____ Date: _____

Print Name: _____ Print Title: _____

CITY OF WACO

LITIGATION DISCLOSURE

Failure to fully and truthfully disclose the information required by this Litigation Disclosure form may result in the disqualification of your bid/proposal/qualifications from consideration or termination of the contract, once awarded.

1. Have you or any member of your Firm or Team to be assigned to this engagement ever been indicted or convicted of a felony or misdemeanor greater than a Class C in the last five (5) years?

☐ Yes ☐ No

2. Have you or any member of your Firm or Team been terminated (for cause orotherwise) from any work being performed for the City of Waco or any other Federal, State or Local Government, or Private Entity?

☐ Yes ☐ No

3. Have you or any member of your Firm or Team been involved in any claim or litigation with the City of Waco or any other Federal, State or Local Government, or a Private Entity during the last ten (10) years?

☐ Yes ☐ No

If you have answered "Yes" to any of the above questions, please indicate the name(s) of the person(s), the nature, and the status and/or outcome of the information, indictment, conviction, termination, claim or litigation, as applicable. Any such information should be provided on a separate page, attached to this form and submitted with your bid/proposal/qualifications.

CITY OF WACO
Purchasing Services
Minority/Women Owned Business Certification

The City of Waco is committed to assuring that all businesses are given prompt, courteous, and equal opportunity to provide goods and services to the City. To achieve this goal, the City Council requests the minority women owned status of each vendor on the City vendor list.

Definition: A Disadvantaged Minority and Woman owned Business Enterprise means a business concern owned and controlled by socially and economically disadvantaged individuals. This means any business concern that (a) is at least 51% owned by one or more socially and economically disadvantaged individuals; or in the case of publicly owned businesses, at least 51% of the stock which is owned by one or more socially or economically disadvantaged individuals; and (b) whose management and daily operations are controlled by one or more other socially and economically disadvantaged individuals who own it. The groups included in this program are Black Americans, Hispanic Americans, Women, Asian Pacific Americans, Service Disabled Veterans, and Native Americans

Certification: Bidder declares a minority and/or women owned business status:

_____ YES _____NO

If yes, check one of the blocks (indicate male or female):

Black M/F____; Hispanic M/F____; Woman_____; Asian M/F____;

Native American M/F____; Service Disabled Veteran of 20% or more M/F____.

HUB certified _____ YES _____ NO

COMPANY NAME:_____

AUTHORIZED SIGNATURE: _____

TITLE:_____

DATE:_____

CITY OF WACO

Completion of this Certification is required if federal funds will be used in the project

INSTRUCTIONS FOR CERTIFICATION REGARDING

Certification Regarding Debarment, Suspension, Ineligibility, and Voluntary Exclusion

1. By signing and submitting this proposal and the certification form, the prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) is providing the certification set out on the following form (or reverse side) in accordance with these instructions.

2. The certifications in this clause are a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant (BIDDER/PROPOSER/ SUBRECIPENT) knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) shall provide immediate written notice to the person to whom this bid/proposal is submitted if at any time the prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction, "without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Completion of this Certification is required if federal funds will be used in the project

CITY OF WACO

Purchasing Department
Post Office Box 2570
Waco, Texas 76702-2570
254 / 750-8060
Fax: 254 / 750-8063
www.waco-texas.com

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION

Project Name: _____

Location: _____

RFB/RFP #: _____

This certification is required (or may be required) by the federal regulations implementing Executive Order 12549, Debarment and Suspension. The regulations were published as Part VII of the May 26, 1988 *Federal Register* (pages 19160-19211). For further assistance in obtaining a copy of the regulations, contact the City of Waco Purchasing Department.

READ INSTRUCTIONS BEFORE COMPLETING CERTIFICATION

(1) The prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) certifies, by submission of this proposal that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal or State department or agency.

(2) Where the prospective lower tier participant (BIDDER/PROPOSER/SUBRECIPENT) is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

_____

Company

_____

Name and Title of Authorized Representative

_____

Signature Date

NON-COLLUSION AFFIDAVIT

STATE OF TEXAS §
§
COUNTY OF_____ §

By the signature below, the signatory for the bidder certifies that neither he nor the firm, corporation, partnership or institution represented by the signatory or anyone acting for the firm bidding this project has violated the antitrust laws of this State, codified at Section 15.01, *et seq.*, Texas Business and Commerce Code, or the Federal antitrust laws, nor communicated directly or indirectly the bid made to any competitor or any other person engaged in the same line of business, nor has the signatory or anyone acting for the firm, corporation or institution submitting a bid committed any other act of collusion related to the development and submission of this bid proposal.

Signature: _____

Printed Name: _____

Title: _____

Company: _____

Date: _____

THE STATE OF _____

COUNTY OF _____

Before me, the undersigned authority, on this day personally appeared _____ _____ (the person who signed above), known to me to be the persons whose names are subscribed to the foregoing instruments, and acknowledged to me that they executed same for the purposes and considerations therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE on this day of _____ A.D., 20_____.

(Seal) _____ Notary Public Signature

RESIDENT CERTIFICATION

Texas Government Code - Chapter 2252 "Contracts With Governmental Entity"
Subchapter A. Nonresident Proposers

In accordance with Chapter 2252 of the Texas Government Code, 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 amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principle place of business is located.

Section 2252.001 includes the following definitions:

(1) "Government contract" means a contract awarded by a governmental entity for general construction, an improvement, a service, or a public works project or for a purchase of supplies, materials, or equipment.

(2) "Governmental entity" means . . . .a municipality, county, public school district, or special-purpose district or authority;

(3) "Nonresident bidder" refers to a person who is not a resident.

(4) "Resident Bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

As used on this form, the term "bidder" includes a person or business entity responding to a request for bids or competitive sealed proposal or request for qualifications.

I certify that as defined in Texas Government Code, Chapter 2252 that:

COMPANY NAME: _____

Yes, I am a Texas Resident Bidder _____ No, I am not a _____ Resident Bidder

PRINTED NAME: _____

SIGNATURE: _____

E-MAIL ADDRESS: _____

Texas Public Information Act

Steps To Assert Information Confidential or Proprietary

All proposals, data, and information submitted to the City of Waco are subject to release under the Texas Public Information Act ("Act") unless exempt from release under the Act. You are not encouraged to submit data and/or information that you consider to be confidential or proprietary unless it is absolutely required to understand and evaluate your submission. On each page where confidential or proprietary information appears, you must label the confidential or proprietary information. Do not label every page of your submission as confidential as there are pages (such as the certification forms and bid sheet with pricing) that are not confidential. It is recommended that each page that contains either confidential or proprietary information be printed on colored paper (such as yellow or pink paper). At a minimum the pages where the confidential information appears should be labeled and the information you consider confidential or proprietary clearly marked.

Failure to label the actual pages on which information considered confidential appears will be considered as a waiver of confidential or proprietary rights in the information.

In the event a request for public information is filed with the City which involves your submission, you will be notified by the City of the request so that you have an opportunity to present your reasons for claims of confidentiality to the Texas Attorney General.

In signing this form, I acknowledge that I have read the above and further state:

☐ The proposal/bid submitted to the City **contains NO confidential information** and may be released to the public if required under the Texas Public Information Act. ☐

The proposal/bid submitted **contains confidential information** which is labeled and which may be found on the following pages:_____

_____

and any information contained on page numbers not listed above may be released to the public if required under the Texas Public Information Act.

Vendor/Proposer Submitting: _____

Signature: _____ Date: _____

Print Name: _____ Print Title: _____

PLEASE SIGN AND RETURN WITH PROPOSAL/BID Revised 10/15/2012

DRUG-FREE WORK PLACE ACT CERTIFICATION

1. The contractor certifies that it will provide a drug-free work place by:
   (a) Publishing a statement notifying employees that unlawfully manufacturing, distributing, possessing or using a controlled substance in the contractor's work place is prohibited and specifying the actions that will be taken against employees for violation of such prohibition.
   (b) Establishing a drug-free awareness program to inform employees about:
      (1) the dangers of drug abuse in the work place;
      (2) the contractor's policy of maintaining a drug-free work place;
      (3) any drug counseling, rehabilitation, and employee assistance programs that are available; and
      (4) the penalties that may be imposed upon employees for drug abuse violations in the work place.
   (c) Making it a requirement that each employee to be engaged in the performance of the contract be given a copy of the statement required by paragraph (a).
   (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the contract the employee will:
      (1) Abide by the terms of the statement; and
      (2) Notify the employer of any criminal drug statute conviction for a violation occurring in the work place no later than five (5) days after such a conviction.
   (e) Notifying the City of Waco within ten (10) days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction.
   (f) Taking one of the following actions within thirty (30) days of receiving notice under subparagraph (d)(2) with respect to any employee so convicted:
      (1) Taking appropriate personnel action against such an employee, up to and including termination; or
      (2) Requiring such an employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state, or local health, law enforcement, or other appropriate agency.
   (g) Making a good faith effort to continue to maintain a drug free work place through implementation of paragraphs (a), (b), (c), (d), (e), and (f).

2. The contractor's headquarters is located at the following address. The addresses of all other work places maintained by the contractor are provided on the accompanying list.

Name of Contractor: _____

Street _____

_____ County: _____

_____ Zip Code: _____

Address:

City:

State:

SIGNED BY: Date Signed: _____

Print Or Type Name And Title: _____

APPENDIX D
General Specifications

1. In addition to the attached Specification and/or Drawings, the "City of Waco Standard Details is incorporated herein by reference for all intents and purposes. If a detail in the City of Waco Standard Details conflicts with a standard or detail included within, or an attached specification and/or drawing, the attached specification and/or drawing should control. If it is unclear which detail it to be used, the City Manager or designee for the City of Waco will determine which details controls and his determination shall be final.

2. A copy of the City of Waco Standard Details may be obtained by contacting the Public Works Department for the City of Waco at 254-750-5440 or by accessing the City of Waco website at www.waco-texas.com and going to Bid Opportunities–Engineering Services (Public Works).

3. The work will be performed in an active sewer treatment plant. And as such, any and all steps must be taken to keep the sewer plant up and running during construction. The plant manager is to be contacted at least 3 calendar days in advance of disconnecting any sewer and/or electrical lines or switches. Said lines shall not be cut or disconnected without the approval of the sewer plant manager.

4. The work will be performed during the hours of 7:30 am to 5:00 pm Monday thru Friday.

5. The sewer treatment plant is a secured facility, so the contractor's workers must sign in and out of the facility every day. The sign in sheet will be located at the front desk of the plant administration office.

6. The sewer plant has hazardous materials on site, therefore the contractor must obtain, read, and follow the emergency evacuation plan. The contractor must provide written proof confirming this has been done.

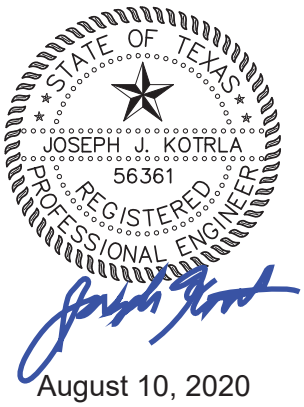
APPENDIX E

Technical Specifications

SPECIFICATIONS AND CONTRACT DOCUMENTS

FOR THE

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
CENTRAL WASTEWATER TREATMENT PLANT
PHASE I – NORTH PLANT BLOWER MCC REPLACEMENT



August 10, 2020

Prepared By

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Firm No. F-338
DALLAS, TEXAS
(972) 458-8745

August 2020

TECHNICAL SPECIFICATIONS INDEX

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01110 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SCOPE

A. This section shall include summary of work to be performed in accordance with the contract documents.

1.2 CONTRACT DESCRIPTION

A. The work will be at the Waco Metropolitan Area Regional Sewerage System at 1147 Treatment Plant Road, Waco, Texas.

B. Work of the project includes replacement of the MCC for the North Plant Blowers and all of the conduit and wiring between the new MCC and the existing blowers. The work shall include new blower control panels for each of the five blowers. The work shall include new lighting for the new electric room. The new work shall also include incorporation of the new blower starters and blower control panels into the existing Engine Building PLC (Programmable Logic Controller).

C. Work shall include air-conditioning for the new electric room. A new roof top unit air-conditioner and roof curb shall be installed on the roof of the Engine Building.

D. The work shall include construction of a new masonry wall and enclosing of the new electric room for the new MCC. The work shall include installation of new doors for the electric room and a new door for the blower room between the blower room and the generator room.

E. Perform Work of Contract under bid item descriptions in accordance with Conditions of the Contract.

F. Drawings and technical specifications cover Work of the Contract.

PART 2 – PRODUCTS [NOT USED]

PART 3 – EXECUTION [NOT USED]

END OF SECTION

DIVISION 4

MASONRY

SECTION 04020 UNIT MASONRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

General Requirements: The terms and conditions of Division One are made a part of and are applied in full force to the section.

1.02 DESCRIPTION OF WORK

The work under this section consists of furnishing all labor, materials, equipment and accessories required to complete the work covered under this section in a neat, finished and functioning manner. Work included as part of this section includes:

Concrete Masonry Units
Mortar
Masonry Accessories

1.03 STANDARDS AND CODES

All work shall be done in strict compliance with applicable portions of the NCMA standards and all applicable building codes.

1.04 SUBMITTALS

A. Drawings showing height and thickness of all masonry walls, location and size of reinforcing bars, including laps.

B. Material certificates, including reinforcing, anchors and ties, and masonry units.

PART 2 PRODUCTS

2.01 MATERIALS

Mortar: Shall be type S, complying with ASTM C 270. See Architectural documents for color requirements.

Sand and Water: Sand to meet ASTM C-144. Water to be potable.

Cement: Masonry cement complying with requirement of ASTM C 270.

Masonry Wall ties: Shall be equal to Durowall, size and spacing as indicated. Conform to ASTM A951.

Concrete Masonry Units: Shall be burnished smooth face, as indicated on the drawings. Units shall conform to ASTM C-90.

PART 3 EXECUTION

A. Conform to ACI 530.1, part 3.

B. Bonding Courses: Horizontal bonding of new courses into previously laid courses existing shall be required. Cut brick will not be allowed.

C. Bond: CMU shall be laid in a running bond.

D. Jointing: All exposed mortar joints to be tooled raked joint, maintaining 3/8" nominal width. After mortar is "Thumb Print" hard, finish joint with pointing tool, using sufficient pressure to compact mortar in positive contact with brick

E. Cleaning: After mortar has set weather conditions permit, masonry surfaces shall be cleaned to remove loose scale and dirt. Clean surface with a mixture of muriatic acid, mixed and applied per manufacturer's recommendations. Apply in conformance with all applicable environmental requirements.

F. Quality Control:

1. Owner will provide testing and inspection services.
2. Comply with requirements of ACI 530.1, section 1.6.E and IBC section 2105. See general notes sheets of structural drawings for additional information.
3. Contractor shall remove any masonry as directed by the Contracting Officer, that is out of plumb (more than 1/4" in ten feet), our of square, or if joints are inconsistent. New Masonry shall be laid up to the satisfaction of the Contracting Officer and at the expense of the Contractor.

END OF SECTION

DIVISION 5

METALS

SECTION 05120 STRUCTURAL STEEL

PART 1 GENERAL

1.01 REFERENCED DOCUMENTS

A. The drawings and General Provisions of the Contract, including the General and Supplementary Conditions and Division Specification Sections, apply to work specified in this Section.

1.02 DESCRIPTION OF WORK

A. Work Included: Furnish all labor, and materials, services, equipment and appliances required in conjunction with or properly incidental to furnishing, fabrication, delivery, and erection of structural steel complete, including, but not limited to, the following:

1. Structural steel columns, girders, beams, angles, rigid frames, trusses, shelf angles, angle frames for opening in floors and roofs, galvanized cooling tower grillage, steel supports for elevator machines, steel hoist beams for elevator equipment, steel supports for elevator guide rails, steel plates, miscellaneous deck support angles, shop welded shear studs, connections and component parts.
2. Qualification of welders.
3. Shop prime coat of paint and field touch-up painting.
4. Grouting of base plates.
5. Temporary construction bracing.
6. Fabrication/erection inspection and testing.

B. Extent of structural steel work is shown on Drawings including schedules, notes and details to show sizes and locations of members, typical connections and types of steel required.

C. Include all supplementary parts and members necessary to complete structural work, regardless of whether all such parts are definitely shown or specified and furnish all such bolts, gussets, plates, etc., as may be required for proper assembly of all items. Include miscellaneous deck support angles as required for proper support of metal floor deck around columns, gussets, openings, and obstructions.

D. Connection Design:

1. All typical beam to column and beam to beam connections are detailed and shown on the Construction Documents. The Contractor is to comply with these details.
2. Where indicated, truss, bracing connections and special or non-typical structural steel beam connections shall be designed by the fabricator, in accordance with criteria on Drawings. Fabricator-designed connections shall be submitted together with complete calculations for review for acceptability by the Architect.

E. Substitutions:

1. Proposed substitutions of sections or modification of details, and reasons therefore, shall be submitted with shop drawings for review. Submitted substitutions must be clearly identified and noted as such. Approved substitutions, modifications, and necessary changes in related portions of work shall be coordinated by fabricator and shall be accomplished at no additional cost to Owner.
2. Substitutions to the beam to column and beam to beam connections shown on the drawings will be reviewed for acceptability if submitted with calculations prepared by a licensed professional engineer.

F. Responsibility for Errors: Fabricator shall be responsible for all errors of detailing, fabrications, and for correct fitting of structural steel members.

G. Templates: Shall be furnished by fabricator with instructions for setting of anchor bolts and bearing plates.

H. Related Work Specified in Other Sections:

1. Testing laboratory services for verification of quality: Section 01 41 00.
2. Miscellaneous metal fabrications.
3. Metal stairs.
4. Finished painting.
5. Grouting of base plates: Section 03 30 00.

1.03 QUALITY CONTROL

A. Latest adopted edition of all standards referenced in this Section shall apply, unless noted otherwise. In case of conflict between Contract Documents and a referenced standard, Contract Documents shall govern. In case of conflict between Contract Documents and Building Code, more stringent shall govern.

B. Contractor shall furnish fabrication/erection inspection and testing of all welds in accordance with AWS D.1.1, Chapter 6. Submit records of inspections and tests to Owner's testing laboratory for their review.

C. Fabricator shall have developed a detailed fabrication procedural manual reflecting key quality control procedures used in fabrication process and shall provide a copy of the manual for examination by Owner's testing laboratory.

D. Fabricator shall employ a competent technician, engineer or independent testing laboratory to inspect fabrication work to ensure compliance with Contact Documents and shall identify such inspector to Owner's testing laboratory. Inspector shall examine in the shop all welding, bolting, shear studs, painting, galvanizing, and straightness and alignment of fabricated members.

E. All materials, fabrication procedures, and field erection are subject to verification inspection and testing by Owner's testing laboratory, in both shop and field. Such inspections and tests will not relieve Contractor of his responsibility for providing materials and fabrication procedures in compliance with specified requirements. Owner reserves the right to use ultrasonic or radiographic inspection to verify adequacy of all welds. Testing procedures and acceptance criteria shall be as

specified in AWS D1.1. Promptly remove and replace materials or fabricated components which do not comply.

F. Qualifications for Welding Work: Contractor shall be responsible for qualifying welding operators in accordance with AWS “Standard Qualification Procedure”. Provide certification, to Owner’s testing laboratory, that welders to be employed in work have satisfactorily passed AWS qualification tests within previous 12 months. If recertification of welders is required, retesting will be Contractor’s responsibility.

G. Qualifications of Welding Procedures: Contractor shall provide testing laboratory with welding procedures which are to be used in executing this work. Welding procedures shall be qualified prior to use in accordance with AWS D1.1, Part B.

H. Comply with Provisions of the Following Codes, Specifications and Standards, in Addition to Building Code:

1. AISC, “Code of Standard Practice for Steel Buildings and Bridges”.

2. AISC, “Specification for Structural Steel Buildings”, including “Commentary” and Supplements thereto, as issued.

3. AISC, “Specifications for Structural Joints using ASTM A 325 or A 490 Bolts”, Approved by the Research Council of Structural Connections for the Engineering Foundation.

4. AISC, “Specification for Architecturally Exposed Structural Steel”.

5. AWS D1.1, “Structural Welding Code”.

6. ASTM A6, “Specifications for General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use”.

7. Industrial Fasteners Institutes, “Handbook on Bolt, Nut, and Rivet Standards”.

8. Steel structure painting council:

a. Painting manual, Vol. 1, Good Painting Practice.
b. Painting manual, Vol. 2, Systems Specifications.

I. Qualifications:

1. Structural steel fabricator shall have not less than 10 years experience in fabrication of structural steel for buildings.

2. Structural steel erector shall have not less than 5 years experience in erection of structural steel.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer’s specifications and installation instructions, including laboratory test reports and other data, to show compliance with Specifications for the following products.
1. Structural steel primer paint.

2. Shrinkage-resistant grout.
3. Shear studs.

B. Mill Certificates: Submit for Architect's record certificates of mill analysis showing compliance with Specifications for the following products:

1. Structural steel (each type).

2. High-strength bolts (each type), including nuts and washers.

3. Shear studs.

C. Shop Drawings:

1. All typical beam to column and beam to beam connections are detailed and shown on the Contract Documents. The Contractor is to comply with these connection details. If the Contractor would like to substitute a connection, it shall be submitted in accordance with the specified procedure for substitutions, with calculations prepared by a licensed professional engineer.

2. Submit shop drawing of all structural steel, including complete details and schedules for fabrication and shop assembly of members, erection plans and details, procedures, and diagrams showing sequence of erection. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.

3. Submit design calculations for the non-typical beam, truss and bracing connections that are designed by the fabrication. Calculations shall bear seal of a Licensed Professional Engineer, licensed in the State of Texas. Calculations shall show applied loads and reference applicable piece mark from the shop drawings as well as location or mark from structural drawings.

4. Structural steel members for which shop drawings have not been reviewed shall not be fabricated. Architect's review shall cover general locations, spacings and details of design. Omission from show drawings of any materials required by Contract Documents shall not relieve Contractor of responsibility of furnishing and installing such materials, even though such shop drawings may have been reviewed and returned.

5. Submit setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by other trades.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that work.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground using pallets, platforms or other supports. Protected steel members and packaged materials from corrosion and deterioration.

C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

D. Support cambered members during shipment and handling in a manner which will not result in loss of camber.

1.06 JOB CONDITIONS

A. Coordinate erection of structural steel with work of other trades.

B .Do not installs columns which have embeds or anchor bolts in concrete until concrete members have attained their 28 day compressive strengths.

PART 2 PRODUCTS

1.01 MATERIALS

A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating and application of surface finishes.

B. Steel:

1. Wide flange (W) shapes, tees, splice plates and stiffener plates: ASTM A 992 (50 ksi yield).

2. Other rolled shapes, plates, and bars: ASTM A 36 (36 ksi yield).

3. Cold formed steel tubing (HHS): ASTM A 500, Grade B, (46,000 psi yield).

4. Steel pipe: ASTM A 53, Type E or S, Grade B.

5. All structural shapes within groups 4 and 5 of A.I.S.C. grouping for tensile property classification shall be supplied using killed steel.

6. For ASTM A 6 (Groups 4 and 5) rolled shapes (spliced or otherwise) connected by full penetration welds provide material with Charpy V-Notch testing, in accordance with ASTM A 6, Supplementary Requirement S5. Impact test shall meet a minimum average value of 20 foot-pounds absorbed energy at 70° F and shall be conducted in accordance with ASTM A 673 and AISC Specifications for Structural Steel Buildings.

7. For plates exceeding 2" thickness used in built-up members, which are spliced or connected by full penetration welds, provide material with Charpy V-Notch, testing in accordance with ASTM A 6, Supplementary Requirement S5. Impact test shall be conducted by producer in accordance with ASTM A 673, Frequency

P and shall meet a minimum average value of 20 foot-pounds absorbed energy at 70° F.

C. Bolts and Washers:

1. Anchor bolts: Anchor bolts (or anchor rods) for anchoring to concrete shall conform to ASTM F1554, Grade 36, and to requirements for regular hexagon bolts and nuts of ANSI Standards B 18.2.1 and B18.2.2. Washers for anchor bolts shall be oversize.

2. All bolts for connections shall be high strength bolts conforming to ASTM A 325. Dimensions of bolt heads and nuts shall conform to requirements for heavy hexagon nuts of ANSI Standards B18.2.1 and B18.2.2. Nuts shall be ASTM A 563 materials.

3. Washers: Flat and smooth circular hardened washers conforming to requirements of ASTM F 436. Beveled washers for S shapes and channels shall be square or rectangular, taper in thickness, and smooth. Washers for use with high-strength bolts shall be hardened.

4. Direct tension indicator washers for high-strength bolts in friction connections shall conform to ASTM F 959, Type A 325.

5. Tension control (twist off) bolts may, at Contractor's option, be used in lieu of conventional high-strength bolts. Tension control bolts shall conform to ASTM F 1852 with A 325 marking.

6. Drilled expansion anchor bolts shall be one of the following (no substitutions):

   Wej-it Bolt, Wej-it Corporation, Tulsa, OK
   Kwik Bolt, Hilti Fastening Systems, Tulsa, OK.
   Trubolt, Ramset Fastening Systems, Paris, KY.

D. Welding electrodes shall conform to requirements of Specifications of American Welding Society. Use E70 electrodes. For high-strength, low-alloy steel, provide electrodes, welding rods, and filler metals equal in strength and compatible in appearance with parent metal jointed.

E. Shear studs shall be shear connectors with proper ferrules and accessories, especially designed to create composite deck action between concrete deck and supporting beam. Steel for studs shall conform to requirements of Specifications for Steel Bars, Carbon, Cold Finished Standard Quality, ASTM A 108, Grades 1015-1020, with a minimum tensile strength of 60,000 psi. Studs shall be of uniform diameter, heads shall be concentric and normal to shaft and weld end shall be chamfered, welds shall be solid flux.

F. Primer Paint:

1. Standard shop coat of red oxide primer, meeting requirements of "SSPC-Paint 13" or Federal Specification "TT-P-636", applied to a dry film thickness of 2.0 mils, or

2. Tnemec 10-99G (Green) Primer or Carboline “Rustamore 29" (Gray) Primer, applied to a dry film thickness of not less than 2.5 mils.

3. Epoxy primer for exterior exposed steel (not noted to be galvanizied) - Tnemec “Series 66-1211 Hi-Build Epoxoline” Primer or Carboline “Carboline 885" applied to a dry film thickness of 3 to 5 mils.

4. For architecturally exposed steel - primer as specified in Division 9 or, if not specified, as recommended by manufacturer of finish coat specified in Division 9.

G. Non-shrink Grout: Premixed, non-shrinking, non-metallic grout. Compressive strength in 28 days shall be 5000 psi minimum, but in no case less than specified strength of base concrete. Grout shall conform to ASTM C 1107, Grade B when tested at fluid consistency.

H. Zinc-coating: For galvanized steel shall conform to ASTM A 123, threaded products shall conform to ASTM A 153, Class C and sheet steel shall conform to ASTM A 591.

I. Use “ZRC” cold galvanizing compound, as manufactured by ZRC Chemical Products, Quincy, Mass.

J. Slide Bearings: If required, shall be reinforced teflon, factory prebonded to steel plates with initial static coefficient of friction not exceeding 0.06 at interface, over a working stress range of 500 to 2000 psi. Bearing shall be one of the following:

1. “Fluorogold” slide bearings, by Fluorocarbon Co., Pine Brook, N.J.

2. “Con-Slide” slide bearings, by Con-Serv, Inc., East Hampton, N.J.

1.02 FABRICATION

A. Shop Fabrication and Assembly:

1. Fabricate and assemble structural assemblies in the shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

2. Provide camber in members where indicated. Specified camber applies at jobsite, just prior to erection, lying down flat so that member weight has no effect. Contractor shall take necessary precautions to prevent or compensate for camber loss during shipment. Measured camber in members up to 50'-0" long shall be within a tolerance of -0" to +1/2" from amount specified. For members greater than 50'-0" long, both positive and negative tolerance may increase 1/8" for every 10'-0" of length in excess of 50'-0". Members with a field measured camber outside of specified tolerance shall be returned to shop.

3. If heat is used to camber steel beams, it shall be carefully controlled and applied in a manner which will not alter the material properties of the member, and only in the presence of the testing laboratory. Follow AISC recommendations for heat cambering.

4. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

5. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of marking, burrs, and other defects.

6. Splicing of structural steel members is prohibited without prior approval of Architect. Any member having a splice not shown and detailed on approved shop drawings shall be rejected.

7. Members in compression joints which depend on contact bearing shall have bearing surfaces milled to a common plane. Members to be milled shall be completely assembled before milling.

8. Plates shall be free of gross internal discontinuities such as ruptures and delaminations. Plates shall comply with ASTM A 578, Level 1.

9. Mill tolerances: Comply with ASTM A 6.

10. Fabrication tolerances: Comply with AISC Code of Standard Practice.

B. Connections:

1. Weld or bolt shop connections, as indicated on Drawings.

2. Bolt field connections, except where welded connections or other connections are indicated. Provide specified threaded fasteners for all principal bolted connections. Holes for bolted connections shall be drilled or punched at right angles to member. Slope of surfaces under bolt head and nut shall not exceed 1:20. Provide beveled washers where slopes exceed 1:20. Bolt holes shall have a diameter not greater than 1/16" larger than nominal bolt diameter. Do not flame cut holes or enlarge by burning. Provide washers over all slotted holes in an outer ply.

3. High-strength bolted construction: Install in accordance with AISC, “Specifications for Structural Joints using ASTM A 325 or A 490 Bolts”, (RCRBSJ)

4. Welded construction: Comply with AWS Structural Welding Code for procedures, appearance and quality of welds and methods used in correcting welding work. Assemble and weld built-up sections by methods which produce true alignment of axes without warp. Welds not specified shall be continuous fillet welds designed to develop full strength of member. No combination of bolts and welds shall be used for stress transmission at the same face of any connections.

5. Heavy shapes (ASTM A6, groups 4 and 5, and built-up sections containing plates thicker than 2"): Comply with all special requirements for welding heavy shapes continued in the AISC Specification and in AWS Structural Welding Code.

6. Clean completed welds prior to inspection. Slag shall be removed from completed welds, and adjacent base metal shall be cleaned by brushing or other suitable means. Tightly adherent splatter remaining after cleaning is acceptable unless its removal is required for the purpose of nondestructive testing.

7. For high-strength, low-alloy steels follow welding procedures recommended by steel producer for exposed and concealed connections.

8. Base plates: Hole sizes for anchor bolts may be oversized to facilitate erection as follows:

   Bolts 3/4" to 7/8" diameter - 5/16" oversize
   Bolts 1" to 2" diameter - 1/2" oversize

   Use oversize or plate washers under nut at all oversized holes in base plates. Washers must be large enough to cover entire hole. Washer thickness shall be at least 1/8 of bolt diameter.

C. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, shaped as shown, to beams and girders in composite construction which does not support metal deck. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions Apply before galvanizing where galvanized members are called for.

   1. Installation of shear connectors: End weld in shop, in accordance with Article 31 of AWS Code and Specifications of shear stud manufacturer. After installation, each ceramic ferrule shall be removed prior to placement of concrete. Adequate welding power must be available for studs being welded.

   2. All areas to which studs are to be attached shall be cleaned of rust, oil, grease, and paint.When mill scale is sufficiently thick to cause difficulty in obtaining proper welds removed by grinding or sand blasting.

D. Steel Wall Framing: Select members which are true and straight for fabrication. Straighten as required to provide uniform, square, and true members in completed wall framing.

E. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

F. Zinc-coating: Following Steel Shall be Galvanized:

   1. Cooling tower grillage and supports, including fasteners.

   2. Cooling tower screen support members and braces.

   3. Masonry shelf angles.

4. Exposed railing.

G. Architecturally Exposed Structural Steel: Shall be straight and true. Select or straighten members to meet permissible variations of ASTM A6, subject to tolerances of AISC Code of Standard Practice, Section 10. Exposed surfaces shall be smooth, free of embedded scale, trademarks, roll imperfection marks and other irregularities. Fill any depressions with weld metal of the same composition as the parent metal. Grind welds and raised marks smooth and flush with adjacent surfaces. See 05125 for additional information.

1.03 SHOP PAINTING

A. General: Shop paint structural steel, except members or portions of members to receive a galvanized coating or members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial 2" of embedded areas only.

1. Do not paint surfaces which are to be welded.

2. Do not paint surfaces which are scheduled to receive sprayed-on fireproofing.

3. Do not paint surfaces of exposed high-strength, low-alloy steel members (weathering steel).

4. Do not paint top surface of beams which support composite metal floor deck.

5. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steel to be painted. Remove loose rust, mill scale, spatter, and slag or flux deposits. Clean in accordance with Steel Structure Painting Council (SSPC) as follows:

1. SP-2, “Hand Tool Cleaning” or SP-3, “Power Tool Cleaning” (for members in enclosed, air conditioned spaces)

2. SP-6, “Commercial Blast Cleaning”. (for members exposed to weather, in non conditioned spaces, in crawl spaces, all members exposed to view, including those designated as AESS)

3. SP-10, Near-White Blast Cleaning. (for high-strength, low-alloy steel surfaces to avoid uneven oxidation.)

C. Painting: Immediately after surface preparation apply structural steel primer paint in accordance with manufacturer’s instructions, at a rate to provide a uniform dry film thickness as specified. Use painting methods which results in full coverage of joints, corners, edges and exposed surfaces.

PART 3 EXECUTION

1.01 INSPECTION

A. Erector must examine areas and conditions under which structural steel work is to be installed, and notify Contractor of conditions detrimental to proper and timely completion work.

1.02 SURVEY

A. Employ a registered professional engineer or public surveyor, experienced in survey work, to establish permanent bench marks as shown and as necessary for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces and locations of anchor bolts and similar devices before erection work proceeds, report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

1.03 ERECTION

A. General: Comply with AISC Specifications and Code of Standard Practice, and as herein specified.

B. Temporary Shoring and Bracing:

1. Provide adequate shoring and bracing to safely withstand all loads to which structure may be subjected during construction process including wind loads, dead loads, construction material, and equipment loads. Such bracing shall remain in place as long as required for safety.

2. As erection progresses, make a sufficient number of permanent welded or bolted connections to withstand erection stresses and maintain stability.

3. Design of temporary shoring and bracing shall be responsibility of Contractor.

C. Temporary Planking; Provide planking and working platforms, as necessary, to effectively complete work.

D. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work. Furnish templates and other devices as necessary for presetting bolts and other anchors in accurate locations. Refer to Division 3 of these Specifications for anchor bolt installation requirements in concrete, and Division 4 for masonry installation.

E. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates, for structural members, on wedges or other adjusting devices.

2. Tighten anchor bolts after supported members are positioned and plumbed. Do not remove wedges or shims but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

F. Slide Bearing Plates: Shall be permanently affixed to member and support, respectively, by welding or bolting as indicated. Member faces shall be aligned and leveled so as to maintain full and level contact between surfaces before completing installation. Use tapered shims where required for leveling.

G. Field Assembly:

1. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

2. Level and plumb individual members of structure within tolerances defined by AISC Code for Standard Practice, unless closer tolerances are required for proper fitting of adjoining or enclosing materials, in which case the most stringent shall apply.

3. Set horizontal members with their natural camber (or specified camber) up.

4. Exposed-to-view faces of members designated as architecturally exposed structural steel shall be plumbed, leveled and aligned to a tolerance not to exceed the amount permitted for structural steel, unless adjoining materials dictate a tighter tolerance.

5. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

6. Splice members only where indicated and accepted on final shop drawing.

7. Where parts cannot be assembled or fitted properly, as a result of errors in fabrication or of deformation due to handling or transportation, such condition shall be immediately reported to Architect, along with proposed method of correction. Straightening of bends or warps shall be done by approved methods. Bent or damaged heat-treated parts will be rejected.

8. Fastening of splices in compression members shall be done after abutting surfaces have been brought completely into contact.

H. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces. On non-exposed welded construction, erection bolts shall be tightened securely and left in place, or if removed, holes shall be filled with plug welds.

I. Bolted Connections:

1. High-strength bolts shall be installed in conformance with “Specifications for Structural Joints using ASTM A 325 or A 490 Bolts”.

2. A 307 bolts and high-strength (A 325 and A 490) bolts noted to be “snug-tight” shall be tightened using a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench, bringing plies into snug contact.

3. High-strength bolts which are not specifically designated to be “snug-tight” shall be tightened to provide at least the minimum tension shown in Table 4 of “Specification for Structural Joints using ASTM A 325 and A 490 Bolts”. Tightening shall be done by turn-of-the-nut method, with direct tension indicators, or by properly calibrated wrenches.

4. Bolted parts shall fit solidly together when assembled. All joint surfaces shall be free of burrs, dirt and other foreign material that would prevent solid seating of parts.

5. Bolts tightened by calibrated wrench or torque control shall have a hardened washer under the element (nut or bolt head) turned in tightening.

6. Hardened washers shall be placed over slotted holes in an outer ply. Hardened beveled washers shall be used where outer face of bolted parts has a slope greater than 1:20 with respect to bolt axis.

J. Field Welding: Comply with As Structural Welding Code and AISC Specification for Structural Steel Buildings. Pay particular attention to surface preparation, preheating, sequence, and continuity of welds. Where heavy shapes are to be welded, comply with all special requirements of AISC Specification and AWS Structural Welding Code.

K. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

L. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

M. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

N. Touch-up Painting; Immediately after erection, touch-up areas of hot-dip galvanized members where galvanizing has been abraded during shipping and erection and where it has been removed or damaged due to welding. Apply specified cold galvanizing compound in accordance with manufacturer’s instructions, to a minimum dry film thickness of 20 mils.

1.04 CLEANUP

A. Clean up all debris caused by work of this Section, keeping the area clean and neat at all times.

END OF SECTION

DIVISION 8

DOORS AND WINDOWS

SECTION 08110 HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SCOPE

A. This section shall include hollow metal doors and frames as shown on the drawings and specified herein.

B. Provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install hollow metal doors.

1.2 SUBMITTALS

A. Submit manufacturer's data.

B. Submit shop drawing, indicating dimensions that have been verified.

PART 2 – PRODUCTS

2.01 GENERAL

A. Materials shall be cold-rolled sheet steel, ASTM A366 and A568.

B. Fabricate doors and frames to the design and dimensions shown on the drawings. Doors and frames shall be constructed of 14 gage steel.

C. Electric room doors shall open out and shall have panic hardware for exit.

D. Surfaces shall receive a baked on prime coat of paint before roll forming. Provide finish coating in color selected by Owner.

E. Exit door panic hardware shall be Lockwood #N1550-5-OT53-C27, AL. Lock cylinder shall be GMS #R118SC-26DA2 with 2 keys. Closure, hold open hardware shall be Cal-Royal 750AL with #901/902-HO/PA. Hinges shall be Cal Royal #BB31USP, prime coated. Gasket shall be Nitrile/PVC blended gasket material. Door insulation shall be 1.5" poly foam board, with R9.75 insulation rating. Threshold shall be stainless steel. Provide 24" removable transom.

F. Exterior door signage for electric room shall state "Danger High Voltage Keep Out".

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install doors and adjust and align with frames.

END OF SECTION

DIVISION 9

DRY WALL AND FINISHES

SECTION 09910 PAINTING

PART 1 GENERAL

1.01 SCOPE

A. This section shall include painting of the new electric room door, and door frame for the new electric room.

B. Provide all labor, materials, equipment and incidentals as shown, specified and required to paint new and modified work.

1.02 SUBMITTALS

A. Submit manufacturer's data.

PART 2 PRODUCTS

2.01 GENERAL

A. New masonry block walls shall be sealed with a masonry sealer and shall be painted with acrylic latex. Glidden: 1 coat Glidden Professional PVA Wall 1030 primer, 2 coats Glidden Professional Ultra-Hide 250. Coordinate with Section 09920 Special Wall Surfacing for interior of electric room walls.

B. Primed door frames shall be painted with water based acrylic: 2 topcoats, Sherman Williams Zero VOC Acrylic Eg-Shell B66-660 Series.

PART 3 EXECUTION

3.01 PREPARATION

A. Masonry block surfaces: Prep and clean surface prior to painting. Seal with a masonry sealer. Latex fill minor defects. Spot prime defects after repair. Apply primer over surfaces and apply finish coat. Coordinate with Section 09920 Special Wall Surfacing for interior of electric room walls.

B. Shop primed steel surfaces: Sand and clean to remove loose primer and rust. Clean surfaces with solvent.

3.02 APPLICATION

A. The intent of the specifications is to produce the highest quality appearance of paint and finish surfaces. Application of paint shall be by skilled qualified painters.

B. Apply products in accordance with manufacturer's instructions. Final finish coats shall have visual evidence of solid hiding and uniform appearance and shall be free and smooth of brush marks, streaks, sags, runs, laps, or skipped areas.

C. Apply each coat to uniform finish and thickness.

3.03 CLEANING/TOUCH-UP

A. As work progresses, promptly remove paint where spilled, splashed, or spattered.

B. During progress of work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

C. Spot painting will be allowed to correct damaged paint surfaces when touch-up spot will blend into surrounding finish.

END OF SECTION

SECTION 09920 – SPECIAL WALL SURFACING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Durable, wall panels with textured finish. Panels will be used to provide a finished surface and to provide insulation. Mounting hardware, adhesives, accessories and trims.

B. Related Sections
   1. Division 04 Section: Unit masonry.
   2. Division 08 Section: Hollow Metal Doors and Frames

1.02 REFERENCES

A. General: Standards listed by reference, including revision by issuing authority, from a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation standard designation.

B. ASTM International:
   1. ASTME 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTMD 256 Standard Test Methods for determining the Izod Pendulum Impact Resistance of Plastics.
   3. ASTMD 638 Standard Test Method for Tensile Properties of Plastics.
   4. ASTMD 790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating materials.
   5. ASTMD 2583 Standard Test Method for Indentation Hardness of Rigid Plastics by means of a Barcol Impresser.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements: Provide durable, decorative wall panels which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage of failure.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with General Conditions of the Contract.

B. Product Data: Submit manufacturer’s product data, storage, handling and preparation requirements and installation instructions.

C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location and dimension of joints and fastener attachment.

D. Samples: Submit selection and verification samples for finishes, colors and textures. Submit 2 samples of each type of panel, trim and fastener.

General: Firm experienced in successful production of wall system similar to that indicated for the Project. Quality Assurance/ Control Submittals: submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Certificates:
    a. Submit manufacturer's certificate that products meet or exceed specified requirements.
    b. Submit certificate of installer's qualifications.
3. Manufacturer's Instructions: Manufacturer's installation instructions.

E. Closeout Submittals: Submit the following

1. Operations and Maintenance data: Operation and maintenance data for installed products in accordance with Division 01 Closeout Submittals (Maintenance Data and operation Data) section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty documents specified herein.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have a minimum of 3 years experience with composite wall panel works similar in scope and size to this project.

B. Regulatory Requirements and Approvals: (Specify applicable requirements of regulatory agencies).

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 01 Product Requirements Section.
B. Lead Time: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions, temperature and humidity conditions recommended by the manufacturer.
    1. Store panels in doors.

2. Lay panels flat. Do not stand panels on edge.
3. Protect panels from moisture.
4. Do not store panels in contact with the floor or against an outside wall.
5. Do not remove protective film from panel surface until after installation (if applicable).
6. Maintain optimum storage conditions of 60-75 degrees F (16-24 degrees C) at 35-55% relative humidity. Avoid extremes in temperature and humidity.

E. Handling: Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.07 PROJECT/SITE CONDITIONS

A. Environmental Requirements:
1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or terrazzo work has dissipated.
2. Install panels between 60 degrees F- 75 degrees F (15-24 degrees C) and relative humidity below 55%, ideally at the same conditions as the room's normal operating temperatures after building is occupied.
3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
4. Do not install wall system until normal lighting condition exists. Normal lighting conditions are described as those in place when the project is finished.

B. Field Measurements: Verify actual measurements/ openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
1. Wall, ceilings, floors and openings must be level, plumb, straight, in-line and square.

1.08 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not a limitation of other rights Owner may have under Contract documents.

PART 2 PRODUCTS

2.01 COMPOSITE WALL PANELS

A. Manufacturer: Nudo

1. Contact: 1500 Taylor Avenue, Springfield, IL 62703; Telephone: (800) 826-4132, (217) 528-5636; Fax: (217) 528-8722; E-mail: info@nudo.com; Website: www.nudo.com

B. Proprietary Products/ Systems: Composite wall & ceiling panels, including the following:

NuPoly Wall Panels:

NuPoly: High density polyethylene (HDPE) laminated to plywood or OSB

Substrate Texture: Smooth, Pebbled, Quadripple, Moroccan, Haircell

Substrate: Plywood, Oriented Strand Board (OSB)

Thickness: (0.375”, 0.420”, 0.625”, 0.700”)

Fire-Rating Class: C

Color: Light Grey

Size: 4 feet x 12 feet.

Physical Properties:

1. Flexural Strength (ASTM D790): 7,897lbf/in 2.
2. Flexural Modulus (ASTM D790):853,630 psi.
3. Tensile Strength (ASTM D638): 4,680 psi.
4. Barcol Hardness (ASTM D2583)
5. IZOD Impact (ASTM D256): 5.56ft-lb/in.
6. Surface Burning Characteristics (ASTM E84): Class C.

2.02 PRODUCT SUBSTITUITIONS

Substitutions: No substitutions permitted

2.03 ACCESSORIES

Moldings: Aluminum moldings beige color

Rivets: Rivets in complimentary colors.

PART 3 EXECUTION

3.01 MANUFACTURER’S INSTRUCTIONS

A. Adhesive: Provide panel adhesive as recommended by panel manufacturer.

B. Trim and Seam Treatment:

1. Manufacturer: Acceptable to panel manufacturer.

2. Manufacturer Designation: (Corner molding), (Division Bar), (Cap), (Specify manufacturer designation).
3. Material and Color: Color matched acrylic latex caulk.
4. Material and Color: Aluminum moldings and specify color.
5. Material and Color: Standard PVC Moldings and Specify color.

C. Fasteners: Provide appropriate fasteners and accessories as required to properly complete installation

3.03 PREPARATION

A. Comply with the instructions and recommendations of the durable, decorative wall panel manufacturer.

Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions. Verify that site conditions are acceptable for installation of wall panels. Examine back-up surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are counter sunk, and joints/cracks are filled flush and smooth with the adjoining surface. Do not proceed with installation of durable, decorative wall panels until unacceptable conditions are corrected.

3.04 INSTALLATION

A. General: Prior to installing panels, remove packaging and allow panels to acclimate to room temperature and humidity for at least 48 hours. Wall substrate must be dry and free from dirt, dust, grease and other contaminants. Walls must be flat and even. Remove high spots and fill low spots with material acceptable to panel manufacturer. Remove wall paper, soluble or loose paint and other foreign matter that might interfere with proper adhesive bond. Painted walls must be prepared to adhesive manufacturer specifications for proper adhesion.

B. General: Inspected panels for any defects immediately. Do not install panels of unacceptable quality. Field cutting of all wall systems should be accomplished using a circular saw with fine tooth carbide blade. Position panel so that the saw blade enters the finished HPL side first to avoid chipping or damage. Protect decorative laminate face of panel by covering work area; do not remove protective will until after installation. Follow adhesive manufacturer's recommendations for appropriate height of adhesive bead left by trowel and do not allow adhesive to skin over. When interior paneling is on an exterior wall or wet area, provide a barrier sheet and/or follow the adhesive manufacturer's installation recommendations for a secure bond.

C. For installation to concrete masonry units use specified adhesive and mechanical fasteners spaced 24 inches on center (O.C.) Furring straps shall be no less than 18

gauges 3-1/2 inches wide. Joint Seam Treatment: Install panels using the following method.

D. Installation Using Aluminum Moldings:

1. Start in the corner. Mark plumb line 48 1/8 inches from corner.
2. Apply adhesive directly to entire back of composite wall panel using correct trowel with 100% adhesive coverage using crosshatch pattern. Apply adhesive to within ½ inch of all edges of panel.
3. Slide panel into molding and withdraw 1/16 inch for aluminum moldings to provide appropriate gap. Align with plumb line.
4. Begin in top corner nearest molding with laminator roller, rolling down and out toward the edge without molding.
5. Continue rolling down and out, working across panel away from previously installed panel or initial molding. Remove all trapped air.
6. Install one-piece division bar and caps or next molding y sliding on top panel.
7. Repeat process, working in one direction around room.
8. Immediately removed all adhesive residues. To remove, clean with non abrasive cotton cloth and warm water. If necessary, use a mild non abrasive detergent. For clean up with solvent based adhesives, use mineral spirits or acetone to remove residue.

E. Installation Using Caulk:

1. Plan panel layout so seams are not directly over seams of substrate.
2. Apply adhesive directly to back of composite wall panel with 100% adhesive coverage using cross hatch pattern. Extend adhesive to all edges of panel.
3. Install panel. Place six-penny finishing nails at 1/8 inch (3.2mm) spacing against the panel using this method, leaving nails in place during installation.
4. Remove nails after adhesive sets.
5. Place a narrow piece of masking tape along panel edge from top to bottom, exactly at joint edge. Firmly apply tape to both panels.
6. Fill 1/8inch (3.2mm) gap between the panels with caulk, making sure gap is completely filled.
7. Tilt caulking tube back from vertical so that tip of tube advances first in direction of travel.
8. Wet finger and smooth bead in necessary.
9. Remove masking tape before bead cures. Clean off excess caulk with damp cloth.
10. Install corner moldings as described in molding instructions.

3.05 CLEANING

A. Clean panel surface in compliance with manufacturer’s recommendations.
1. Use a clean, damp, non abrasive cotton cloth and a mild liquid detergent or house hold cleaner.

2. Rinse with clean water using a clean, non abrasive cotton cloth.
3. Dry panels with a soft, clean non abrasive cotton cloth.
4. Do not use cleaners containing acid, alkaloids sodium hypochlorite.

3.06 Protection

A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION

DIVISION 11

EQUIPMENT

SECTION 11200 - BLOWER CONTROL PANEL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section provides specification requirements for constant speed Multistage Blower Control Panel herein referred to as Blower Control Panel.

B. The Blower Control Panel manufacturer shall furnish, field test, adjust and certify all installed controller units for satisfactory operation.

C. Any exceptions or deviations to this specification shall be indicated in writing and submitted with the quotation.

D. Provide new Blower Control Panels as shown on the drawings and as specified herein for Blower No. 1, 2, 3, 4 and Blower No. 5.

1.02 SUBMITTALS

A. One electronic copy of approval drawings shall be furnished for Engineer’s approval prior to factory assembly of the Blower Control Panel. These drawings shall consist of elementary power and control wiring diagrams, controller unit electrical one line diagram, front elevation and dimension drawings.

B. Front elevation drawings shall include dimensions for Blower Control Panel front view, top and bottom conduit entry locations, enclosure description and ratings, overall weight and anchoring points.

C. Elementary wiring diagrams shall include all power and control components packaged within the Blower Control Panel and documentation of any non-default settings programmed at the factory.

D. Unit schedule shall indicate drive output horsepower, duty/torque type, pilot devices, disconnect ratings and nameplate legends for each Blower Control Panel.

E. Submit with the delivery of the Blower Control Panel an Installation and Maintenance Manual and one (1) copy of the manufacturer's drawings per shipping block.

1.03 REGULATORY REQUIREMENTS

A. ANSI/NFPA 70 - National Electrical Code.

B. ANSI C84.1 – Electric Power Systems and Equipment - Voltages Ratings (60Hz).

C. CSA C22.2 No. 4-05 - Industrial Control Equipment.

D. NEMA ICS 1 – Industrial Control and Systems General Requirements

E. NEMA ICS 2.3 – Instruction for Handling, Operation and Maintenance of Motor Control Centers.

F. NEMA ICS 18 – Motor Control Centers.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

H. UL 508A - UL Standard for Safety for Industrial Control Equipment.

I. UL 508C - UL Standard for Safety for Power Conversion Equipment.

J. UL 50 - UL Standard for Safety for Enclosures for Electrical Equipment.

K. NFPA 70E Standard for Electgrical Safety

1.04 WARRANTY

A. The Blower Control Panel shall be warranted to be free from defects in materials and workmanship for a period of eighteen (18) months from date of shipment by the manufacturer.

B. A Certified Start-up Warranty shall expire thirty (30) months from the date of shipment by the manufacturer.

1.05 QUALITY ASSURANCE

A. The Blower Control Panel unit shall be manufactured by one supplier in an ISO 9001 certified facility.

B. The Blower Control Panel unit and all associated optional equipment shall be UL listed according to the UL 508A - UL Standard for Safety for Industrial Control Equipment.

C. The Blower Control Panel unit shall be designed, constructed and tested in accordance with UL, cUL, NEMA & NEC standards and shall be third party certified by UL, cUL.

D. The manufacturer of the Blower Control Panel unit shall have been specialized in the design and production of multistage blower controller units for a period of at least 10 years.

E. All factory supplied options shall be completely tested for successful operation before shipment.

F. Quality Assurance documentation shall be furnished to verify successful completion of the above tests upon written request of the engineer.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The Blower Control Panel unit shall be provided by Gardner Denver NASH or prior approved equal. Substitutions must be submitted in writing two (2) weeks prior to original bid date with supporting documentation demonstrating that the alternative manufacturer meets all aspects of the specifications herein. Gardner Denver NASH is representated by Newman Regency Group, Plano, Texas. Contact Brandon Mellgren at 972-769-1993.

2.02 GENERAL DESCRIPTION

A. The centrifugal blower control panel shall consist of blower bearing temperature and blower vibration protection for each blower. A cfm ammeter with switch contacts shall be furnished for surge protection in operation in manual. The Centrifugal Blower/Motor skids are exisiting and are Hoffman units rated for 3,000 SCFM with 480 volt 250 hp induction motor drivers.

B. The enclosure shall be NEMA 4 wall mount enclosure constructed of painted steel.

C. A door mounted digital meter for blower bearing temperature. Meter shall have temperature indication and indication LEDs for alarm and fault.

D. Indicating lights for "Running", "Common Fault", and "Hi Vibration".

E. A CFM ammeter with switch contacts for operation in manual.

F. A "Hand-Off Auto" selector switch and "Reset", "Start" and "Stop" pushbuttons.

G. Terminal blocks for field wiring.

H. The control panel shall be designed to operate in an ambient temperature from 0°C to +40°C (32°F to 104°F).

I. The blower control panel shall be designed to operate from an input voltage of 120 VAC - 15% to + 10%.

PART 3 EXECUTIONS

3.01 INSTALLATION

A. Installation shall be in compliance with manufacturer's instructions, drawings and recommendations.

B. The control panel manufacturer shall provide a factory certified technical representative to supervise the contractor's testing and start-up of the control panels furnished under this specification for a maximum total of 2 days.

3.04 TRAINING

A. An on-site training course of 1 training day shall be provided by a representative of the Blower Control Panel unit manufacturer to plant and/or maintenance personnel.

END OF SECTION

DIVISION 15

MECHANICAL

SECTION 15500 - HEATING, VENTILATION AND AIR-CONDITIONING

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install air-conditioning systems as specified herein and as indicated on the drawings.

B. Furnish all work, labor, tools, superintendence, material, equipment, and operations necessary to provide for a complete and workable system as shown on the PLANS and specified herein.

C. Auxiliary and accessory devices necessary for system operation or performance, such as supports, waterproofing, etc. shall be included. All registers, grilles, dampers, etc. shall be furnished as specified or as required.

D. It is the intent of the contract documents that upon completion of the mechanical work, the entire HVAC system shall be in a finished, workable condition.

1.02 CODES AND PERMITS

A. Secure all permits, licenses, and inspection as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations, and contract requirements bearing on the work.

B. Codes and ordinances having jurisdiction and specified codes shall serve as a minimum requirements; but, if the Contract Documents indicate requirements which are in excess of those minimum requirements, then the requirements of the Contract Documents shall be followed.

1.03 SUBMITTALS AND SHOP DRAWINGS

A. Submit the following in accordance with the requirements outlined in General Conditions.

B. Process catalog submittals for each item of mechanical equipment. Submit on the following:

1. Roof Top Units
2. Ductwork
3. Grilles, registers, and dampers
4. Duct hangers

PART 2 PRODUCTS

2.01 ROOF UNITS

A. Roof Top Units shall be as scheduled on the drawings. Provide factory roof curb as indicated on the drawings.

2.02 DUCTWORK

A. All ductwork shall be furnished in sizes as indicated and shall be constructed of aluminum sheets of lock-forming quality and such ductwork shall comply with ASHRAE and SMACNA standard except where higher standards are indicated. Ductwork shall be furnished with fittments and appurtenances required to satisfy the intent of the air handling system and to comply with codes.

B. Ductwork shall be constructed of sheet aluminum type 3003 h14 alloy. Thickness shall be 0.032" to 0.063". Joints shall be smacna types approved for aluminum rectangular ductwork.

C. Provide ductwork with indicated registers, balancing dampers and devices shown. Ductwork shall have turning vanes on all 90-degree turns. Balancing dampers shall be cda product with sleeve and round collar assembly.

D. Furnish grilles and registers as indicated on the plans. All grilles and registers shall be nailor or equal by tuttle and bailey.

E. Furnish duct hangars and supports as indicated on the plans and as required.

PART 3 EXECUTIONS

3.01 GENERAL INSTALLATION

A. Install all equipment and materials as indicated on the PLANS. Align materials and equipment in such manner as to eliminate undue stress on equipment and connections.

B. Tighten all connectors to proper torques as specified herein or as specified by the manufacturer

C. Provide all anchorage of materials and equipment as specified by the manufacturer or as shown in the Contract Documents. All hardware shall be 304 stainless steel.

D. After systems have been cleaned and installed and are complete with all controls and accessories, etc., the CONTRACTOR shall adjust and test all systems for proper operation, air distribution, temperatures, noise, and vibration.

E. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation so as to present a

first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

F. Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer, or with an approved paint.

G. Clean interiors of each item of mechanical equipment. At completion of work, all equipment interiors shall be free from dust, dirt, and debris.

3.02 TEST AND BALANCE

A. After all systems have been cleaned and installed and are complete with all controls and accessories, etc., the CONTRACTOR shall adjust and test air-conditioning system for proper operation, air distribution, temperatures, noise, and vibration. Provide all testing materials and products.

B. Standards: Testing and balancing shall be performed in accordance with these specifications and in accordance with the latest associated AABC National Standards for Total System Balance, latest edition.

C. Test all new equipment.

1. Room Temperature Tests:

a. After system balance has been complete, the balancing agency shall perform an operational test over a period of 8 hours. The test shall be performed only after each piece of equipment has been individually tested and adjusted to correct operating conditions. The following information shall be recorded and submitted.

1) Temperature of each conditioned space with setting of controlling thermostat. Date and outdoor DB and WB temperature range at the time indoor temperatures were recorded.

3.03 WORKMANSHIP AND GUARANTEE

A. The workmanship throughout shall be of the highest grade and all equipment furnished shall be guaranteed against defects in workmanship or materials for a period of not less than one (1) year from date it is placed in operation.

END OF SECTION

DIVISION 16

ELECTRICAL

SECTION 16010 - ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.01 GENERAL CONDITIONS

A. The General Conditions and Requirements, Special Provisions, are hereby made a part of this Section.

B. The Electrical Drawings and Specifications under this Section shall be made a part of the Contract Documents. The Drawings and Specifications of other sections of this contract, as well as supplements issued thereto, information to bidders and pertinent documents issued by the Owner's Representative are a part of these Drawings and Specifications and shall be complied with in every respect. All the above documents will be on file at the office of the Owner's representative and shall be examined by all the bidders. Failure to examine all documents shall not relieve the responsibility or be used as a basis for additional compensation.

C. Furnish all work, labor, tools, superintendence, material, equipment and operations Contract Documents. A licensed journeyman shall be on site at all times while electrical work is being performed and a licensed master electrician shall be in charge of the work. Submit license for master electrician and all journeymen.

D. Be responsible for visiting the site and checking the existing conditions. Ascertain the conditions to be met for installing the work and adjust bid accordingly. This project shall include electrical work as shown on the Location Map.

E. It is the intent of the Contract Documents that upon completion of the electrical work, the entire system shall be in a finished, workable condition.

F. All work that may be called for in the Specifications but not shown on the Drawings, or, all work that may be shown on the Drawings but not called for in the Specifications, shall be performed by the Contractor as if described in both. Should work be required which is not set forth in either document, but which work is nevertheless required for fulfilling of the intent thereof, then the Contractor shall perform all work as fully as if it were specifically set forth in the Contract Documents.

G. The definition of terms used throughout the Contract Documents shall be as specified by the following agencies:

1. Underwriters Laboratories
2. National Electrical Manufacturers Association
3. American National Standards Institute
4. Insulated Power Cable Engineers Association
5. National Electrical Code
6. National Fire Protection Association

H. The use of the terms "as (or where) indicated", "as (or where) shown", "as (or where) specified", or "as (or where) scheduled" shall be taken to mean that the reference is made to the Contract Documents, either on the Drawings or in the Specifications, or both documents.

I. The use of the words "furnish", "provide", or "install" shall be taken to mean that the item or facility is to be both furnished and installed under Division 16, unless stated to the contrary that the item or facility is to be either furnished under another Division or under another Contract, furnished under this Division and installed under another Division or under another Contract, or furnished and installed under another Division or under another Contract.

1.02 PERMITS AND CODES

A. Secure all permits, licenses, and inspection as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations and contract requirements bearing on the work.

B. The minimum requirements of the electrical system installation shall conform to the latest edition of the National Electrical Code, as well as state and local codes.

C. Codes and ordinances having jurisdiction and specified codes shall serve as minimum requirements, but, if the Contract Documents indicate requirements which are in excess of those minimum requirements, then the requirements of the Contract Documents shall be followed. Should there be any conflicts between the Contract Documents and codes, or any ordinances, report these with bid.

PART 2 PRODUCTS

2.01 STANDARDS

A. All materials and equipment shall conform to the requirements of the Contract Documents. They shall be new, free from defects, and they shall conform to the following standards where these organizations have set standards:

1. Underwriters Laboratories (UL)
2. National Electrical Manufacturer's Association (NEMA)
3. American National Standards Association (ANSI)
4. Insulated Cable Engineers Association (ICEA)

B. All material and equipment of the same class shall be supplied by the same manufacturer, unless specified to the contrary.

C. All products shall bear UL labels where standards have been set for listing. All other products shall be UL labeled. Motor control centers, switchboards, and switchgear shall have UL labels. Custom panels, modified motor starters, control panels, and instrument panels and the like shall be manufactured by a fabricator approved as a UL508A shop and shall bear a UL 508A or UL Industrial Control Panel label.

D. When the Contractor provides a product for this project he shall be bound by the terms and conditions of the Contract Documents and he shall agree to warrant and to be liable for the merchantability and fitness of his product to the applications to which his product is applied under the Contract Documents.

2.02 SHOP DRAWINGS AND SUBMITTALS

A. Shop drawings and submittals shall comply with general conditions and as specified herein.

B. Shop drawings shall be taken to mean detailed drawings with dimensions, schedules, weights, capacities, installation details and pertinent information that will be needed to describe the material or equipment in detail.

C. Submittals shall be taken to mean catalog cuts, general descriptive information, catalog numbers and manufacturer's name.

D. Submit for review all shop drawings and submittals as hereinbefore called for.

E. Review of submittals or shop drawings shall not remove the responsibility for furnishing materials or equipment or proper dimensions, quantity and quality, nor will such review remove the responsibility for error in the shop drawings or submittals.

F. Failure to process submittals or shop drawings on any item and/or items specified shall make the Contractor responsible for the suitability for the item and/or items, even though the item and/or items installed appear to comply with the Contract Documents.

G. Assume all costs and liabilities which may result from the ordering of any material or equipment prior to the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's Representative, and such procedures will not be cause for delay.

H. Submittals and shop drawings shall be compiled from the manufacturer's latest product data. Should there be any conflicts between this data and the Contract Documents, report this information for each submittal and/or shop drawing.

I. Shop drawings and submittals will be returned and unchecked if the specific items proposed are not clearly marked, or if the General Contractor's approval stamp is omitted.

J. When requested, furnish samples of materials for acceptance review. If a sample has been reviewed and accepted, then that item of material or equipment installed on the job shall be equal to the sample; if it is found that the installed item is not equal, then replace all such items with the accepted sample equivalent.

2.03 ACCEPTANCE AND SUBSTITUTIONS

A. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance. The judgment of equality of product substitution shall be made by the Engineer.

B. Substitutions after award of Contract shall be made only within sixty (60) days after the notice to proceed. Furnish all required supporting data. The submittal of substitutions for review shall not be cause for time extensions.

C. Where substitutions are offered, the substituted product shall meet the product performance as set forth in the specified manufacturer's current catalog literature, as well as meeting the details of the Contract Documents.

D. The details on the drawings and the requirements of the Specifications are based on the first listed material or equipment. If any other than the first listed material or equipment is furnished, then assume responsibility for the correct function, operation, and accommodation of the substituted item. In the event of misfits or changes in work required, either in this section or other sections of the Contract, or in both, bear all costs in connection with all changes arising out of the use of other than the first listed item specified.

E. Substitutions of products under other sections may occur. Make necessary adjustments and additions to work under Division 16 to accommodate those substitutions. Such adjustments and additions shall be performed in compliance with Division 16 Specifications at no additional charge.

F. Energy efficiency of each item of power consuming equipment shall be considered one of the standards for evaluation.

PART 3 EXECUTIONS

3.01 CUTTING AND PATCHING

A. Cutting and patching required under this section shall be done in a neat workmanlike manner. Cutting lines shall be uniform and smooth.

B. Use concrete saws for large cuts in concrete and use core drills for small round cuts in concrete.

C. Where openings are cut through masonry walls, provide lintel or other structural support to protect the remaining masonry. Adequate support shall be provided during the cutting operation to prevent damage to masonry.

D. Where large openings are cut through metal surfaces, attach metal angle around the opening.

E. Patch concrete openings that are to be filled with no shrinking cementing compound. Finish concrete patching shall be troweled smooth and shall be uniform with surrounding surfaces.

3.02 WATERPROOFING

A. Provide waterproof flashing for each penetration of exterior walls and roofs.

3.03 CONSTRUCTION REQUIREMENTS

A. Except where specifically noted or shown, the locations and elevations of equipment are approximate and are subject to small revisions as may prove necessary or desirable at the time the work is installed. Locations changed substantially from that shown on the drawings shall be confirmed with the Engineer in advance of construction.

B. Where equipment is being furnished under another Division, request from Engineer an accepted drawing that will show exact dimensions of required locations or connections. Install the required facilities to the exact requirements of the accepted drawings.

C. All work shall be done in the best and most workmanlike manner by qualified, careful electricians who are skilled in their trade. The standards of work required throughout shall be of the first class only.

D. Unless shown in detail, the Drawings are diagrammatic and do not necessarily give exact details as to elevations and routing of raceways, nor do they show all offsets and fittings; nevertheless, install the raceway system to conform to the structural and mechanical conditions of the construction.

E. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with an approved tool. Cutting openings with a torch or other device that produces a jagged, rough cut will not be acceptable.

F. Cabling inside equipment shall be carefully routed, trained and laced. Cables so placed that they obstruct equipment devices will not be acceptable.

G. Equipment shall be set level and plumb. Supporting devices installed shall be set and so braced that equipment is held in a rigid, tight-fitting manner.

3.04 EQUIPMENT PROTECTION

A. Provide suitable protection for all equipment, work and property against damage during construction.

B. Assume full responsibility for material and equipment stored at the site.

C. Conduit openings shall be closed with caps or plugs during installation and made watertight. All outlet boxes and cabinets shall be kept free of concrete, plaster, dirt and debris.

D. Equipment shall be covered and tightly sealed against entrance of dust, dirt and moisture.

E. All dry-type transformers prior to energization shall be protected against moisture and dirt absorption by a suitable covering. Also, maintain heat inside the covering by means of 100 watt minimum lamps.

F. Interiors of and motor control centers shall be kept clean and dry prior to energization. Maintain heat inside each unit with one (1) 100 watt lamp located at bottom of each vertical section or energize section space heaters.

3.05 COOPERATION WITH WORK UNDER OTHER DIVISIONS

A. Cooperate with all other trades so as to facilitate the general progress of their work. Allow all other trades every reasonable opportunity for the installation of their work and the storage of their materials.

B. The work under this section shall follow the general building construction closely. Set all pipe sleeves, inserts, etc., and see that openings for chases, pipes, etc.., are provided before concrete is placed or masonry installed.

C. Work with other trades in determining exact locations of outlets, conduits, fixtures, and pieces of equipment to avoid interference with lines as required to maintain proper installation of other work.

D. Make such progress in work that will not delay the work of other trades. Schedule the work so that completion dates as established by the Engineer are met. Furnish sufficient labor or work overtime to accomplish these requirements if directed to do so.

3.06 INSTALLATION OF WORK UNDER ANOTHER DIVISION

A. Verify the electrical capacities of all motors and electrical equipment furnished under other sections, or furnished by the Owner, and request wiring information from the Engineer if wiring requirements are different from that specified under this Section. Do not make rough-ins until equipment verification has been received.

B. Install all motors, controllers, terminal boxes, pilot devices, and miscellaneous items of electrical equipment that are not integrally mounted with the equipment furnished under other divisions. All such equipment shall be securely mounted and adequately supported in a neat and workmanlike manner.

3.07 CLEAN-UP

A. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation so as to present a first class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

B. Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer or with an approved paint.

C. Clean interiors of each item of electrical equipment. At completion of work all equipment interiors shall be free from dust, dirt and debris.

3.08 TESTS

A. Test all systems furnished under Division 16 and repair or replace all defective work. Make all necessary adjustments to the systems and instruct the Owner's personnel in the proper operation of the system.

B. Make all circuit breaker and protective relay adjustments and settings.

C. Make the following minimum tests and checks prior to energizing the electrical equipment:

1. Check all wire and cable terminations for tightness.
2. Test all wiring as specified in Section 16120.
3. Test grounding system as specified in Section 16450.

4. Set all transformer taps as required to obtain the proper secondary voltage.
5. Carefully check all interlocking, control and instrument wiring for each system to ascertain that the system will function properly as indicated by schematics, wiring diagrams, or as specified herein.
6. Mechanical inspection of all low voltage circuit breakers, disconnect switches, motor starters, control equipment, etc. for proper operation.
7. Provide all instruments and equipment required for the above tests.

3.09 RECORD DRAWINGS

A. At the start and during the progress of the job, keep one separate set of blue-line prints for making construction notes and mark-ups.

B. Show conduit routing and wiring runs as constructed and identify each.

C. Record all deviations from the Contract Documents.

D. Submit set of marked-up drawings for review. The final payment will not be made until the review is complete.

3.11 OPERATIONS AND MAINTENANCE MANUALS

A. Compile an Operations and Maintenance Manual on each item of equipment. These manuals shall include detailed instructions and maintenance as well as spare parts lists.

B. Submit copies for review as hereinbefore specified.

C. Preliminary Operations and Maintenance Manuals shall be included with the initial shipments.

END OF SECTION

SECTION 16110 - RACEWAYS

PART 1 GENERAL

1.01 SCOPE

A. This section shall include raceways, enclosures, supporting devices ancillary fittings and appurtenances. Furnish and install the complete raceway systems as shown on the Drawings and as specified herein.

B. Raceway is a broad-scope term that shall be defined by the National Electrical Code under Article 100.

1.02 APPLICATIONS

A. Except as otherwise shown on the Drawings, or otherwise specified, all above exposed conduit raceways shall be of the following type:

1. Indoor exposed power and control conduit shall be rigid aluminum conduit. Instrumentation, signal, and communication conduit shall be have 24” separation from power conduits.

2. Outdoor exposed power, control, and instrumentation, signal, and communication conduit shall be rigid aluminum conduit, except where areas are denoted as corrosive or NEMA 4X. In those area furnish plastic coated rigid aluminum conduit, fittings, and boxes.

3. Instrument conduits shall be separated by 24” from power conduits when run in parallel for more that 5’.

1.03 SUBMITTALS AND SHOP DRAWINGS

A. Process catalog submittals for the following:

1. Rigid Metallic Aluminum Conduit
2. Plastic Jacketed Rigid Aluminum Conduit
3. Rigid Non-Metallic Conduit
4. Liquid-tight Flexible Conduit
5. Liquid-tight Fittings
6. Conduit Bushings
7. Conduit Bodies
8. Conduit Sealing Fittings
9. Expansion-Deflection Fittings
10. Expansion Fittings
11. Cast Metal Boxes
12. Tape Products
13. Wiring Devices
14. Supporting Devices
15. Labels
16. Grounding Devices

17. Foam Sealant

PART 2 PRODUCTS

2.01 RACEWAYS

A. Rigid metallic aluminum conduit shall be manufactured of 6063 alloy, T-1 temper, with no more than 0.02% copper content. All conduit couplings shall be threaded aluminum. All such conduit shall be listed with UL and comply with UL-6 and ANSI C80.5. Aluminum conduit shall be New Jersey Aluminum, or equal.

B. Plastic coated rigid aluminum conduit shall consist of rigid aluminum body that complies with above specifications for rigid aluminum conduit, plus conduit shall have 40 mil thick heat-fused PVC over outside and 2 mil coat of fully catalyzed phenolic inside. The inside coat shall have the chemical resistance of the outer coating and shall not dissolve in lacquer thinner. All couplings shall be equipped with PVC sleeves that extend one pipe diameter or 2", whichever is less, beyond the end of the coupling. All plastic coated conduit shall conform to NEMA Standard #RNI-1974 (Type A) and such conduit shall be manufactured by Robroy, Perma-Cote, or Kor-Kap.

C. Non-metallic rigid conduit shall be Schedule 40 PVC. Such conduit shall be UL listed for 90 degrees C and shall conform to NEMA TC-2 and UL-651 standards. Furnish Carlon, Sedco, or equal. Furnish manufacturer's approved solvent for joining couplings.

D. Liquid-tight flexible conduit shall be constructed of non-metallic sunlight resistant PVC with aluminum core. Furnish Anaconda or equal product.

2.02 CONDUIT FITTINGS

A. Conduit Hubs for rigid metallic conduit shall be constructed of aluminum. Furnish Meyers Hubs.

B. Conduit field-applied hubs for sheet metal enclosures shall be aluminum body with recessed neoprene sealing ring, threaded NPT insert, and shall be, T&B 370 AL series, or equal products by OZ/Gedney.

C. Conduit hubs for non-metallic enclosures shall be fiberglass polyester reinforced with galvanized steel core, complete with locknut and grounding bushing. All such hubs shall be Crouse-Hinds Type NHU, or equal.

D. Rigid metallic conduit chase nipples, split couplings, slip fittings, unions, reducers, and enlargers, shall be aluminum.

E. Rigid metallic conduit short els and long els shall be rigid aluminum with NPT threaded hubs and male ends. Throats shall be smooth and free from burrs. All such fittings shall be OZ/Gedney Type "9" Series, Appleton, or equal.

F. Rigid metallic conduit split couplings shall made of aluminum and have threaded body with split tightening shelves with neoprene sandwich. Such fittings shall be OZ type "SSP", or equal.

G. Rigid metallic conduit grounding bushings shall be aluminum body with threaded hub, bakelite insulated throat, and tin-plated copper ground lug. Furnish OZ/Gedney type ABLG, or equal.

H. Liquid-tight flexible conduit fittings shall be suitable for the specified flexible conduit and shall be type B. Furnish straight or angle connectors as required. All such connectors shall be OZ/Gedney type 4QP, or equal.

I. Rigid metallic conduit expansion fittings shall consist of metallic barrel joined to hubs at each end. One hubs shall be threaded to barrel and other hub shall have slip fit to allow up to four (4") inches of conduit lateral movement. Provide external bonding jumper for each expansion joint.Shall have stainless steel clamps and aluminum straps. Furnish OZ Type "EXA", or equal for expansion fitting and OZ Type ABJ for jumper.

J. Conduit waterstops for sealing inside of conduit runs shall consist of aluminum pressure discs with sandwiched neoprene seal and with 316 stainless steel hardware. Furnish OZ/Gedney type "CS" series products, as indicated.

K. Conduit sealing bushings for penetrations in exterior walls shall be constructed of neoprene and shall have a stainless steel disk with stainless steel bolts and hardware. Furnish OZ/Gedney “CSM” series products. For existing walls core drill wall to size recommended by manufacturer of sealing bushing. Use two bushings per wall penetration, one each side. For newly constructed walls provide a PVC Schedule 40 sleeve in concrete pour. PVC sleeve shall have water stop and the sleeve size shall be as recommended by the manufacturer of the sealing bushing.

2.03 CONDUIT BODIES AND BOXES

A. Conduit bodies such as "C", "LB", "T" and the like pulling fittings shall be aluminum. Covers for damp and/or wet location use shall be gasketed cast metal with "wedge-nut" clamps. Covers for dry locations shall be cast aluminum and hardware shall be 316 stainless steel. All covers shall be equipped with clamp type clevises. Furnish Crouse-Hinds Form 7, or Appleton Form "FM7" products.

B. Conduit bodies for use in corrosive areas shall be as specified above but shall have 40 mil plastic coated PVC jacket and 2 mil interior coating as specified for plastic coated rigid metallic conduit. Furnish Robroy, Perma-Cote, or Kor-Kap

C. Conduit bodies such as "GUA", "GUAT", "GUAL", and the like pulling/splicing fittings shall be cast aluminum with threaded cast aluminum covers. All such conduit bodies shall be Killark "GE" series, or equal products by Crouse-Hinds or Appleton.

D. Outlet boxes, pullboxes, and junction boxes whose volume is smaller than 100 cubic inches shall be sand-cast, copper-free aluminum. All boxes shall have threaded hubs and integral cast mounting lugs. Furnish Crouse-Hinds "FD" style condulets, Appleton "FD" style Unilets, or equal.

E. Covers for cast metal boxes shall be gasketed cast metal covers with 316 stainless steel screws and shall be suitable for use in wet or damp locations.

F. Conduit and device boxes for use in concealed drywall applications only shall be pressed sheet steel type. Furnish Raco or equal.

2.04 PULL AND JUNCTION BOXES

A. Pullboxes and junction boxes whose volume is less than 100 cubic inches shall be furnished as specified hereinbefore except where sheet metal types are shown, in which case, furnish such sheet metal enclosures in NEMA 4X 316 stainless steel construction with gasketed covers of same material. Provide 316 SS quick release luggage type latches.

B. Pullboxes and junction boxes whose volume is 100 cubic inches and greater shall be NEMA 4X 316 grade stainless steel type with gasketed stainless steel covers. Provide print pocket and interior back panel for mounting of terminal strips where terminal strips are called for on the drawings. Sheet metal boxes shall be as manufactured by Hoffman or equal. Provide 316 SS quick release luggage type latches.

C. Covers for sheetmetal pullboxes and junction boxes over 100 cubic inches (and for smaller sized where shown) shall have hinged doors. All hardware shall be stainless steel.

D. Cast metal junction boxes shall be cast aluminum type with gasket, cast metal covers, integral mounting lugs, and with stainless steel cover screws.

2.05 LABELS

A. Buried conduit marking tape for marking path of secondary buried conduits shall be four (4") inch nominal width strip of polyethylene with highly visible, repetitive marking "BURIED CONDUIT" or similar language, repeated along its length.

B. Voltage warning labels for cabinets shall be waterproof vinyl strips with adhesive back and shall have "DANGER (VOLTAGE) - DISCONNECT ALL SOURCES OF POWER BEFORE ENTERING". Letters shall be highly visible red color on white background.

C. Specify stainless steel or non-metallic machine printed conduit tags attached with stainless steel wire or nylon tie wraps.

2.06 SUPPORTING DEVICES

A. Mounting hardware, nuts, bolts, lockwashers, and washers, shall be Grade 316 stainless steel.

B. Unless otherwise indicated, channel framing and supporting devices shall be manufactured of ASTM 6063, TO6 grade aluminum; 1-5/8" wide x 3-1/4" deep (double opening type). Thickness shall be 0.105”. Clamp nuts for use with channels shall be grade 316 stainless steel.

C. Where indicated, furnish grade 316 stainless steel slotted channel members 1-5/8" wide x 1-5/8" deep or 1 5/8" x 3 1/4" deep, double-faced type, 12 gauge. All hardware and conduit clamps shall be grade 316 stainless steel.

D. Conduit clamp supports for terminating conduits onto cable trays shall be mechanically galvanized 316 SS or aluminum with adjustable angle clamp. Fittings shall be provided with 316 stainless steel hardware. Furnish OZ/Gedney type CTC products.

E. All such channel members and fittments shall be B-Line, Unistrut or equal.

F. Conduit straps, and associated nuts, lock washers and bolts for use with channels shall be 316 stainless steel with 316 stainless steel hardware. Furnish B-Line products or equal.

G. After-set concrete inserts (drilled expansion shields "D.E.S.") shall consist of two types. For anchors to accommodate 5/16" diameter bolts and smaller, provide HILTI "HDI" series 316 stainless steel anchors. For anchors to accommodate 3/8" diameter and larger bolts, provide HILTI "HVA" series with 316 stainless steel threaded inserts.

H. Hanger rod shall be 3/8" minimum diameter Type 316 stainless steel all-thread.

I. Nest-back or clamp-back conduit supports shall be two-piece type constructed of copper free aluminum. Furnish Thomas & Betts 1976AL Series, or equal.

J. Conduit beam clamps shall be stainless steel or hardened aluminum and shall be as follows:

TYPE	MANUFACTURER
1. Right Angle	OZ/Gedney Type "UBCG", or equal.
2. Parallel	OZ/Gedney Type "UPCG", or equal.
3. Edge	OZ/Gedney Type "UECG", or equal.

K. Hanger rod beam clamps shall be clamp type with hardened 316 stainless steel, bolt, Steel City "500" Series, Crouse-Hinds type "MW", or equal. Furnish swivel stud for each rod make- up.

L. Conduit "J" hangers shall consist of stainless steel straddle with detachable bolt. Furnish Kindorf type "C-149", Unistrut "J-1200" Series, or equal.

M. Conduit "U" bolts shall be 316 stainless steel with 316 stainless steel hex-head bolts.

N. Equipment stands for supporting devices such as control stations, device boxes and the like, shall consist of a welded structural aluminum c-channel and plate aluminum floor plate as detailed on the drawings.

2.07 MISCELLANEOUS MATERIAL

A. Double bushings for insulating wiring through sheet metal panels shall consist of mating male and female threaded phenolic bushings. Phenolic insulation shall be high-impact thermosetting plastic rated 150 degrees C. Furnish OZ Type "ABB", or equal.

B. Conduit pull-cords for use in empty raceways shall be glass-fiber reinforced tape with foot-marked identification along its length. Furnish Thomas, Greenlee, or equal products.

C. Conduit thread coating compound shall be conductive, non-galling, and corrosion-inhibiting. Furnish Crouse- Hinds Type "STL", Appleton Type "ST", or equal.

D. Plastic compound for field-coating of ferrous material products shall be PVC in liquid form that sets-up semi- hard upon curing. Furnish Rob Roy "Rob Kote", Sedco "Patch Coat", or equal.

E. Foam sealant for waterproofing uses shall be Polywater ZipSeal duct sealant or equal.

F. Foam sealant for fire stop use in fire rated walls shall be Dupont Great Stuff Fireblock or approved equal.

PART 3 - EXECUTION

3.01 RACEWAYS

A. Install the conduit system to provide the facility with the utmost degree of reliability and maintenance free operation. The conduit system shall have the appearance of having been installed by competent workmen. Kinked conduit, conduit inadequately supported or carelessly installed, do not give such reliability and maintenance free operation and will not be accepted.

1. Parallel runs of conduit shall be parallel to each other throughout the entire run. Bends and offsets shall occur at the same point such that all offset angles are the same.
2. Conduits making vertical or horizontal changes in direction such that concentric bends are required are acceptable. All concentric bends shall have radii with the same center point.
3. Conduit installation shall be planned such that conduits crossing each other will be minimized.
4. Conduit installations not meeting these criteria in the sole judgment of the Owner or Engineer shall be removed and reinstalled at no charge in the contract price or schedule.
5. Conduits having conductors installed shall not be a reason to not remove and reinstall unacceptable conduit installations. The installed conductors shall be removed and replaced if present in unacceptable conduit systems.

B. Raceways shall be installed for all wiring runs, except as otherwise indicated.

C. Conduit sizes, where not indicated, shall be N.E.C. code-sized to accommodate the number and diameter of wires to be pulled into the conduit. Unless otherwise indicated, 3/4" trade-size shall be minimum size conduit.

D. Unless otherwise noted, conduit runs shall be installed exposed. Such runs shall be made parallel to the lines of the structure. Conduit shall be installed such that it does not create a tripping hazard or an obstruction for headroom.

E. All runs of rigid conduit shall be threaded, and all male threads shall be coated with non-galling thread compound prior to assembly.

F. Plastic coated metallic conduit lengths shall be joined with threaded metallic coupling that shall be each equipped with a 40 mil thickness sleeve that shall extend over the threads of the joined conduit. Each joint shall be watertight.

G. Field-cut threads in runs of plastic coated metallic conduit shall be cut with a special die that has rear reamed out oversize so as to slip over plastic coating. Do not attempt to cut threads on plastic coated conduit with regular dies, whereby plastic coating is skinned back to allow the incorrect die to be used. Coat all field-cut threads with cold-galvanizing spray, use two coats to provide 1-mil minimum coating thickness.

H. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint, or at every 100 feet.

I. Unless otherwise shown, conduit penetrations through floors located below enclosures, shall be made each with couplings set flush with the outside faces of the concrete pour. Each pair of couplings shall be joined with a threaded spool piece. Use coated aluminum couplings.

J. Rigid metallic conduit runs shall have their couplings and connections made with screwed fittings and shall be made up wrench-tight. Check all threaded conduit joints prior to wire pull. Coat all male threads with Crouse-Hinds "STL" or equal, conductive lubricant prior to joining.

K. All conduit runs shall be watertight over their lengths of run, except where drain fittings are indicated. In which cases, install specified drain fittings.

L. Plastic jacketed flexible steel conduit shall be used to connect wiring to motors, limit switches, bearing thermostats, and other devices that may have to be removed for servicing. Unless otherwise indicated, maximum lengths of flex shall be three (3') feet.

M. Where plastic jacketed flex is installed, make up terminal ends with liquid-tight flex connectors. In wet locations, install sealing gaskets on each threaded male connector. Each flex connector shall be made-up tightly so that the minimum pull-out resistance is at least 150 lbs. Install external spirally-wrapped ground wire around each run of liquid-tight flex and bond each end to specified grounding-type fittings.

N. Empty conduits shall have pull-ropes installed. Identify each terminus as to location of other end and trade size of conduit. Use blank plastic waterproof write-on label and write information on each label with waterproof ink. Pull a mandrel through each conduit to check and clear blockage before installing pull-rope. Owner’s representative shall witness test. Provide documentation that all conduits are clear and ready for future use. Cap exposed ends of empty conduit with threaded plugs.

O. Conduit runs into boxes, cabinets and enclosures shall be set in a neat manner. Vertical runs shall be set plumb. Conduits set cocked or out of plumb will not be acceptable.

P. Conduit entrances into equipment shall be carefully planned. Cutting away of enclosure structure, torching out sill or braces, and removal of enclosure structural members, will not be acceptable. No top entry into NEMA 4X where installed outdoors.

Q. Use approved hole cutting tools for entrances into sheet metal enclosure. Use of cutting torch or incorrect tools will not be acceptable. Holes shall be cleanly cut and they shall be free from burrs, jagged edges, and torn metal.

R. All raceways shall be swabbed clean after installation. There shall be no debris left inside. All interior surfaces shall be smooth and free from burrs and defects that would injure wire insulation.

S. Outdoor aluminum runs of raceways shall be installed with expansion fittings and supports as required to accommodate thermal expansion due to changes in temperature appropriate with the structure from which the conduit is supported. Installation shall not appear to be loose or non-linear with changes in temperature from night to day or from summer to winter. In no case shall a straight run of conduit be installed over 20’ without an expansion fitting. Furnish additional expansion fittings if required by the characteristics of the particular installation.

3.02 CONDUIT BODIES AND BOXES

A. Conduit bodies such as "LB", "T", "GUAT", etc., shall be installed in exposed runs of conduit wherever indicated and where required to overcome obstructions and to provide pulling access to wiring. Covers for such fittings shall be accessible and unobstructed by the adjacent construction. GUA series pulling bodies rather than LB fittings and the like, shall be used for splicing purposes as well as pulling access.

B. Covers for all conduit bodies shall be installed with gasketed cast metal type where located in damp or wet locations.

C. All conduit boxes installed whose inside volume is less than 100 cubic inches shall be cast metal type with gasketed cast metal cover, unless otherwise indicated.

D. All conduit boxes whose inside volume exceeds 100 cubic inches shall be sheet metal type except where gasketed cast metal type, stainless steel or fiberglass reinforced polyester are indicated.

E. Aluminum boxes and aluminum strut shall be supported ¼” off of concrete surfaces with insulating washers or similar material, or shall be coated with bitumastic.

F. Use mounting lugs. Drilling through back of boxes is prohibited.

3.03 RACEWAY SUPPORT

A. All raceway systems shall be adequately and safely supported. Loose, sloppy and inadequately supported raceways will not be acceptable. Supports shall be installed at intervals not greater than those set forth by the NEC, unless shorter intervals are otherwise indicated, or unless conditions require shorter intervals of supports.

B. Multiple runs of surface mounted conduit on concrete or masonry surfaces shall be supported off the surface by means of aluminum or stainless steel channels. Attach each slotted channel support to concrete surface by means of two (2) 1/4" diameter stainless steel bolts into drilled expansion shields.

C. Single runs of surface mounted conduit on concrete or masonry surfaces shall be supported with hot-dipped malleable iron conduit clamps and nest-back spacers. Furnish plastic coated malleable iron conduit clamps and nest backs where corrosive areas are called out.

D. Conduit runs that are installed along metallic structures shall be supported by means of beam clamps as specified herein.

E. Where Aluminum is used, install neoprene spacers to prevent Aluminum from direct contact with CMU or concrete.

3.04 LABELING

A. In addition to labeling requirements as specified throughout this and other Sections, install wiring and raceway labeling as follows:

1. Apply identification labels as specified to empty conduits to identify each conduit as to terminus of other end and also to identify trade size of conduit.

2. Where active conduits terminate into bottoms of motor control centers, install label on each conduit terminus and show number and size of wiring and function of circuitry and trade size of conduit.

END OF SECTION

SECTION 16115 - CABLE TRAY

PART 1 - GENERAL

1.01 SCOPE

A. Furnish and install complete cable tray systems, with all accessories, fittings, supports, as indicated on the drawings, specified herein, and in accordance with latest applicable NEMA and ASTM standards.

B. Cable trays shall be an assembly of units, or sections, that shall form a rigid structural system used to support cables. Cable tray systems include straight sections of ladder type cable trays, bends, tees, elbows, drop-outs, supports and accessories.

C. Cable tray runs shown on the drawings outline the general routing of trays. Select actual routing in the field to follow drawings as closely as possible and to avoid interfering with pipes, ducts, structural members, or other equipment.

1.02 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code

B. NEMA VE 1-1998 - Metallic Cable Tray Systems

C. NEMA VE 2-2000 - Cable Tray Installation Guidelines

1.03 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of cable trays and fittings of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. NEMA Compliance: Comply with NEMA Standards Publication Number VE1, "Cable Tray Systems".

C. NEC Compliance: Comply with NEC, as applicable to construction and installation of cable tray and cable channel systems (Article 318, NEC).

D. UL Compliance: Provide products that are UL-classified and labeled.

E. NFPA Compliance: Comply with NFPA 70B, "Recommended Practice for Electrical Equipment Maintenance" pertaining to installation of cable tray systems.

1.04 SUBMITTALS AND SHOP DRAWINGS

A. Process catalog submittals, and equipment data for the following:

B. Cable tray products including straight sections, elbows, tees, and drop-outs.

C. Cable tray supporting devices.

D. Cable tray splice plate connections.

E. Expansion joint assemblies.

F. For side rails and rungs, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).

G. Submit scaled shop drawings for cable tray. Shop drawings shall show each complete run of each cable tray system. Show all lengths, tees, bends, reducers, clamps, brackets, and expansion fittings.

2.02 DELIVERY AND STORAGE

A. Deliver cable tray systems and components carefully to avoid breakage, denting and scoring finishes. Do not install damaged equipment.

B. Store cable trays and accessories in original cartons and in clean dry space; protect from weather and construction traffic. Wet materials should be unpacked and dried before storage.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Cable tray shall be suitable for 20’ support spans with 100 lbs per foot loading, NEMA Class 20C. Cable tray shall be Cooper B-Line 46A series, or approved equal.

2.02 CABLE TRAY SECTIONS AND COMPONENTS

A. General: Except as otherwise indicated, provide metal cable trays, of types, classes and sizes indicated; with splice plates, bolts, nuts and washers for connecting units. Construct units with rounded edges and smooth surfaces; in compliance with applicable standards; and with the following additional construction features.

B. Materials and Finish: Material and finish specifications for each tray type are as follows:

1. Aluminum: Straight section and fitting side rails and rungs shall be extruded from Aluminum Association Alloy 6063. All fabricated parts shall be made from Aluminum Association Alloy 5052.

2. All hardware for joining sections shall be 304 stainless steel.

2.03 TYPE OF TRAY SYSTEM

A. Ladder type trays shall consist of two longitudinal members (side rails) with transverse members (rungs) welded to the side rails. Rungs shall be spaced 6 inches on center. Spacing in radiused fittings shall be 9 inches and measured at the center of the tray's width. Rungs shall have a minimum cable-bearing surface of 7/8 inch with radiused

edges. No portion of the rungs shall protrude below the bottom plane of the side rails. Each rung must be capable of supporting the maximum cable load, with a safety factor of 1.5 and a 200 pound concentrated load when tested in accordance with NEMA VE-1, section 5.4.

B. Tray Sizes shall have 5 inch minimum usable NEMA loading depth, or as noted on the drawing.

C. Straight tray sections shall have side rails fabricated as I-Beams. All straight sections shall be supplied in standard 20 foot lengths, except where shorter lengths are permitted to facilitate tray assembly lengths as shown on the drawings.

D. Tray widths shall be as shown on drawings.

E. All fittings must have a minimum radius of 24 inches.

F. Splice plates shall be the bolted type made as indicated below for each tray type. The resistance of fixed splice connections between adjacent sections of tray shall not exceed .00033 ohms. Splice plate construction shall be such that a splice may be located anywhere within the support span without diminishing rated loading capacity of the cable tray.

1. Aluminum Tray - Splice plates shall be made of 6063-T6 aluminum, using four square neck carriage bolts and serrated flange locknuts. Hardware shall be 316 stainless steel.

2. Splice plates shall be furnished with straight sections and fittings.

G. Cable Tray Supports: Shall be placed so that the support spans do not exceed maximum span indicated on drawings. Supports shall be constructed from 12 gauge 316 stainless steel formed shape channel members 1-5/8 inch by 1-5/8 inch with 316 stainless steel hardware such as Trapeze Support Kits (9G-55XX-22SH) as manufactured by Cooper B-Line, Inc. or approved equal. Cable trays installed adjacent to walls shall be supported on 316 stainless steel wall mounted brackets such as B297 as manufactured by Cooper B-Line, Inc. or approved equal.

H. Trapeze hangers shall be supported by 1/2 inch (minimum) diameter rods constructed of 316 stainless steel. All nuts and washers shall be 316 stainless steel.

I. Barrier Strips: Shall be placed as specified on drawings and be fastened into the tray with self-drilling screws.

J. Accessories - special accessories shall be furnished as required to protect, support, and install a cable tray system. Accessories shall consist of but are not limited to; section splice plates, expansion plates, blind-end plates, specially designed ladder dropouts, barriers, etc.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Furnish new 18” tray between new Blower Control Panels and the existing MCC.

B. Install cable trays as indicated: Installation shall be in accordance with equipment manufacturer's instructions, and with recognized industry practices to ensure that cable tray equipment comply with requirements of NEC and applicable portions of NFPA 70B. Reference NEMA-VE2 for general cable tray installation guidelines.

C. Coordinate cable tray with other electrical work as necessary to properly integrate installation of cable tray work with other work.

D. Provide sufficient space encompassing cable trays to permit access for installing and maintaining cables.

E. Cable tray fitting supports shall be located such that they meet the strength requirements of straight sections. Install fitting supports per NEMA VE-2 guidelines, or in accordance with manufacturer's instructions. In addition, cable tray runs shall be supported at intervals such that with all cables installed and all trays in place, the maximum mid-span horizontal deflection shall not exceed ¼”. Horizontal runs shall have no more that 10’ spacing between supports.

F. Conduit terminating horizontally at cable tray shall be attached to cable tray with B-Line type 9ZN-1158 series adapters.

G. Wall supports shall be bolted to structural steel building members. Bolt cable trays to support members with 304 stainless steel clips and 304 stainless steel hardware, one on each side of the tray rail.

H. Provide trapeze supports for suspended cable tray. Provide galvanized unistrut to span steel beams and purlins as necessary to support tray. Provide allthread, nuts and bolts as required.

3.02 CABLE TRAY EXPANSION JOINTS

A. Cable tray installation shall incorporate features, which provide for adequate compensation for thermal contraction and expansion. Maximum spacing between expansion joints shall be 65’. Additionally, cable tray expansion joints shall be installed at all building expansion joints. Expansion joints shall provide for one inch movement. The temperature at the time of installation shall determine the original gap setting. Obtain information from the manufacturer on the proceedure for setting this gap.

B. The cable tray shall be anchored at the support closest to the midpoint between the expansion joints with hold down clamps and secured by expansion guides at all other support locations.

C. Each expansion joint shall have a bonding jumper. Run bare ground full length of all

tray, bond to each tray and to every elclosure fed by conductors in the tray.

3.03 WIRING INSTALLATION

A. Install all wiring shown for cable tray runs. Wiring shall be neatly and evenly laid into cable trays.

B. Install wiring runs with roller and pulleys in accordance with cable tray manufacturer's recommendations. Do not exceed 80% of cable manufacturer's maximum pulling tension for each cable pulled.

C. Tie each multi-conductor power cable 1/0 and larger to tray rungs with 0.3" wide weather-resistant (T&B nylon 6/6) tie wraps. Install at the following maximum spacings: Horizontal – 56", vertical – 36", and vertical elbows – 9".

D. Except as otherwise indicated, one-conductor power cable shall be grouped into triangular sets with three phases per set and laced to cable tray with 0.3" wide tie wraps with a maximum spacing of 36".

E. All other power and instrument cables shall be grouped into bundles and tie-wrapped to cable tray every 36".

F. Run a 4/0 tin plated ground wire along entire length of cable tray and bond to each section on each end.

3.04 TESTING

A. Test cable trays to ensure electrical continuity of bonding and grounding connections, and to demonstrate compliance with specified maximum grounding resistance. See NFPA 70B, Chapter 18, for testing and test methods.

END OF SECTION

SECTION 16120 - WIRE AND CABLE

PART 1 GENERAL

1.01 SCOPE

A. This section shall include wire and cable, terminating devices, splice kits, labeling, and appurtenances.

1.02 STANDARDS

A. ASTM

B. UL 1277 Electrical Power and Control Tray Cables

C. UL 1685 Flame Exposure Test for Tray Cables

D. ICEA T-29-520 Vertical Cable Tray Flame Test

E. IEEE 1202 Flame Testing of Cables for use in Cable Tray

1.03 SUBMITTALS AND SHOP DRAWINGS

A. Process catalog submittals for the following:

1. Power and control cable
2. Instrument cable
3. Conductor Connectors
4. Tape Products
5. Labels

PART 2 PRODUCTS

2.01 WIRE AND CABLE

A. All conductors shall be soft-drawn annealed copper, Class B stranding that meets ASTM B-8. Copper conductors shall be uncoated, except as otherwise specified.

B. Single conductor cable for power, control, and branch circuits shall have cross-linked polyethylene insulation, rated for 600 volts. Cable shall be NEC type XHHW-2. All such cable shall be rated for wet or dry use. Cable insulation shall be color coded with factory pigmented colors below size #6 awg. Color coding shall be as specified under Part 3 of this section. Cable shall be as manufactured by Southwire or equal.

C. Multi-conductor power cable for use in cable trays shall be XLP insulated type XHHW with overall PVC jacket and ground. Furnish Southwire type TC Power Cable or approved equal.

D. Multi-conductor control cable for use in cable trays shall be XLP insulated type XHHW with overall PVC jacket and ground. Furnish Southwire type TC Control Cable or approved equal.

E. Instrument cable for analog circuits, shall be # 16 awg, twisted shielded pairs or triads with PVC insulation and overall jacket. Cable assembly shall be rated for 600 volts, wet or dry locations. Furnish Okonite "Okoseal-N Type P-OS" or approved equal.

F. Single conductor cable for 24 volt dc control shall be minimum size #16. Furnish MTW type insulation for panel wiring and XHHW-2 insulation for field wiring in conduits.

G. Ground mat and associated upcomers and grounding conductors shall be tin-plated stranded copper.

2.02 CONNECTORS

A. Mechanical connectors for 600V class wiring shall be tin-plated copper alloy bolted pressure type with bronze tin-plated hardware. Furnish connectors as follows:

TYPE	MANUFACTURER & TYPE
Single conductor to flat-plate connector	Blackburn LH
Multiple conductor to flat-plate connector	Blackburn L2H, L3H, L4H
Split-bolt connector	Blackburn HPS
Two-bolt parallel connector with spacer	Blackburn 2BPW
Cross Connector	Blackburn XT
Splice Connector	Blackburn S
Flush ground connector	OZ Type "VG"

B. Insulated spring wire connectors, "wire-nuts", for small building wire taps and splices shall be plated spring steel with thermoplastic jacket and pre-filled sealant. Connector shall be rated for 600 volts, 75 degrees C continuous. Furnish King Technology, or equal.

C. Connectors for control conductor connections to screw terminals shall be crimp-type with vinyl insulated barrel and tin-plated copper ring-tongue style connector. Furnish T&B "Sta-Kon", 3M "Scotchlok", or equal.

D. Terminal strips for miscellaneous field terminations of control and instrumentation circuits shall consist of 12 point box lug terminals with marking surface. Terminal

assembly shall accept #18 to #12 awg and shall be rated 600 volts. Furnish Allen-Bradley #1492-HJ812 terminal blocks.

2.03 INSULATING PRODUCTS

A. Tape products shall be furnished as hereinafter specified and shall be Plymouth, Okonite, 3M, or equal.

B. General purpose electrical tape shall be 7 mil thick stretchable vinyl plastic, pressure adhesive type, "Slipknot Grey", 3M Scotch 33+, or equal.

C. Insulating void-filling tape and high voltage bedding tape shall be stretchable ethylene propylene rubber with high-tack and fast fusing surfaces. Tape shall be rated for 90 degrees C continuous, 130 degrees C overload, and shall be moisture-proof. Void filling tape shall be "Plysafe", 3M Scotch 23, or equal.

D. High temperature protective tape shall be rated 180^{o}C continuous indoor/outdoor, stretchable, self-bonding silicone rubber. High temperature tape shall be Plysil #3455, 3M Scotch 70, or equal.

E. Insulation putty filler-tape shall be Plymouth #32074, 3M Scotchfill, or equal.

F. Arc and fireproofing tape shall be Plymouth #3318, 3M Scotch #70 or equal.

2.04 LABELS

A. Colored banding tape shall be 5 mil stretchable vinyl with permanent solid color. Colors shall be as hereinafter specified. Tape shall be Plymouth "Slipknot 45", 3M Scotch #35, or equal.

B. Numbered wire marking labels shall be PVC sleeve-type markers, T&B, Brady or equal. Markers using adhesive are not acceptable.

C. Cable identification ties shall be weather resistant polyester with blank write-on space, T&B, Brady or equal.

2.05 MISCELLANEOUS MATERIAL

A. Cable grips shall be 316 SS grip-type wire mesh with machined metal support. Furnish Kellems, Appleton, or equal products.

B. Wire pulling compound shall be non-injurious to insulation and to conduit and shall be lubricating, non- crumbling, and non-combustible. Furnish Gedney "Wire- Quick", Ideal "Yellow" or equal.

PART 3 EXECUTION

3.01 POWER AND CONTROL CABLE

A. Power and control conductors shall be sized as shown and where no size is indicated, the conductor size shall be #12 awg for power circuits #14 awg for 120 vac control circuits, and #16 awg for instrumentation circuits.

B. Equipment grounding conductors shall be installed with type XHHW insulated stranded copper conductors and the insulation color shall be green in sizes up to and including #10 awg.

C. Color coding shall be as follows. Non-factory color coded cables shall be marked With specified color tape. Use the following colors:

CONDUCTOR	120/208V SYSTEMS	480V SYSTEMS
Phase A or L1	Black	Brown
Phase B or L2	Red	Orange
Phase C	Blue	Yellow
Neutral	White	N/A
Ground	Green	Green

D. Branch circuits may be spliced for receptacle, lighting and small appliance load inside appropriate junction boxes. Feeders, branch circuit, power wiring, control wiring, and signal wiring shall be installed without splice.

E. Except as otherwise specified, taps and splices with #10 AWG and smaller, shall be made with insulated spring wire connectors. Such connectors in damp or wet locations shall be waterproofed by filling interstices around wires with silicone rubber and further insulating with an envelope of stretched piece of EPR tape around each wire. Then, apply one-half lapped layer of electrical tape over all.

F. Motor connections made with #10 AWG and smaller wire shall be made up with set-screwed copper lugs with threaded-on insulating jacket. After make-up of each connector, install two (2) layers half-lapped, of high temperature tape over connector barrel and down one (1") inch over wires.

G. Taps, splices, and connections in #8 AWG and larger wires shall be made with copper alloy bolted pressure connectors. Each such connector shall be insulated by means of applying insulation putty over sharp edges so as to present a smooth bonding surface. Next, apply at least four (4) layers, half-lapped each layer of EPR tape. Then, make final wrapping of at least three (3) layers, half-lapped each layer of electrical tape.

H. Control wiring connections to stud type and screw type terminals shall be made with ring-tongue type crimp connectors. Label each terminal jacket with wire marking label at each connection.

I. Each wire connection shall be made up tightly so that resistance of connection is as low as equivalent length of associated conductor resistance.

J. Numbered marking labels shall be installed to identify circuit numbers from panel boards. Install labels on each wire in each panelboard, junction, pullbox and device connection.

K. Label each wiring run with write-on waterproof labels inside motor control center. Install write-on label ties around wire group at conduit entrance and write-on label the wire size, conduit size and service.

L. Install PVC sleeve type numbered marking on each control wire termination at each terminal strip and at each device. Do this in motor control center, terminal cabinets, safety switches, remote controllers, pilot operators, and instrumentation equipment. Number selected shall correspond to number on terminal strip.

M. All wiring inside equipment enclosures shall be neatly trained and laced with nylon tie-wraps.

3.02 INSTRUMENTATION WIRING

A. All 4-20mA analog pairs shall have shields grounded at the instrumentation panel and insulated on the field end unless otherwise required by instrument supplier. Single point grounding shall be maintained.

3.03 GROUND WIRING

A. Each item of equipment shall be adequately and thoroughly grounded. Comply with Article 250 of N.E.C., except where higher standards of grounding have been specified. In addition to requirements as specified under Section 26 04 50, install grounding for general wiring systems as follows.

B. Equipment grounding conductors (EGC) shall be installed in each run of power and control conduits. These wires shall be green colored in sizes #6 AWG and smaller and green banded in larger sizes. Ground wires shall be type XHHW-2 insulated copper wires.

C. EGC runs into equipment shall be grounded to equipment bus where available, or to equipment ground lugs.

D. Where grounding type bushings are installed, bond EGC thereto, and furthermore, ground each bushing lug to equipment ground bus or ground lug, or ground rod.

E. In each motor terminal box, install equipment ground lug and connect EGC thereto. Bond pump frame to motor frame. Bond motor and pump to grounded electrode conductor.

3.04 LABELING

A. In addition to labeling requirements as specified throughout this Section, install wiring and raceway labeling as follows:

1. Apply numbered wire marking labels to control wiring terminations for each termination in each item of equipment. Use PVC sleeve type labels.

2. Apply numbered wire marking labels to power and control wiring terminations in motor control centers, panel boards, and at outlets, to identify circuit numbers. Use PVC sleeve type labels.

3. Apply numbered wire marking labels to each signal wire termination in each instrument junction box, and in each item of equipment served by instrumentation circuits. Use PVC sleeve type labels.

4. Apply write-on identification labels to wiring sets in each motor control center, and in each pullbox and junction box. Show wire size, conduit size, and line and load information. Use waterproof plastic write-on labels with nylon tie-wraps.

3.05 TESTING

A. Each run of 600V class power and control wiring shall be tested prior to connection of line and load. Make tests with 1000V dc hand-crank or motor driven ohmmeter. Each run of wiring shall be tested phase-to-phase and/or phase-to-neutral, and phase-to-ground. Test results for each test shall be equal to or greater than 25,000,000 ohms with 1000V dc applied. All tests shall be made in the presence of the Owners representative or Engineer.

B. Test all runs of signal wiring with 250V dc megger. Insulation values shall meet or exceed 1,000,000 ohms per 100 feet (cable to shield).

C. Should any cable or circuit fail to meet the above tests, replace wire and retest.

END OF SECTION

SECTION 16195 LIGHTING PANELBOARDS

PART 1 GENERAL

1.01 SCOPE

A. This specification covers the requirements for 240 volt and 208 volt lighting panelboards.

B. This specification defines minimum requirements, characteristic guidelines and features required.

1.02 STANDARDS

A. All panelboards shall be designed, manufactured and tested in accordance with the latest applicable standards of UL and NEMA. Panelboards shall be UL listed.

1.03 SUBMITTALS

A. Submit outline and dimensional drawings and catalog literature to Engineer for review.

PART 2 PRODUCTS

2.01 GENERAL

A Ratings shall be as indicated on the drawings.

B Circuit Breakers shall be bolt on and rated 14,000 amps rms symmetrical interrupting capacity.

C Panelboards shall have integrated SPD rated for 120 kA. Provide alarm contacts, event counter, and indicator lights.

2.02 CONSTRUCTION

A. All buses shall be tin-plated copper.

B. Enclosures shall be painted steel.

C. NEMA 12 for installation indoors.

2.03 MANUFACTURER

A. Panelboards shall be General Electric approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install panelboards as scheduled and in locations shown on the Drawings. Provide grounding as specified per 16450 and per NEC.

END OF SECTION

SECTION 16196 DRY TYPE TRANSFORMERS

PART 1 GENERAL

1.01 SCOPE

A. This specification covers the requirements for dry-type ventilated transformers with 480 volt primary and ratings from 10 to 75 kVA.

B. This specification defines minimum requirements, characteristic guidelines and features required.

1.02 REFERENCES

A. NFPA 70 - National Electric Code

B. NEMA ST20

C. UL 1561

D. NEMA TP-1

E. NEMA TP-2

1.03 SUBMITTALS

A. Submit outline and dimensional drawings and catalog literature to Engineer for review.

1.04 STANDARDS

A. Transformers shall be listed by Underwriters Laboratories.

B. Transformers shall conform to the requirements of ANSI/NFPA 70.

C. Transformers are to be manufactured and tested in accordance with NEMA ST20.

PART 2 PRODUCTS

2.01 GENERAL

A. Ratings shall be as indicated on the Drawings.

B. All insulating materials are to exceed NEMA ST20 standards and be rated for 180 deg C UL-component-recognized insulation system.

2.02 CONSTRUCTION

A. Transformers shall be 150 deg C temperature rise above 40 deg C ambient. Transformer shall be capable of carrying a 15% overload without exceeding 115 deg C

in a 40 deg C ambient. Transformers shall have a minimum of two 2.5% full capacity primary taps. The top of the transformer enclosure shall not exceed 50 deg C rise above a 40 deg C ambient.

B. The maximum temperature of the top of the enclosure shall not exceed a 65 deg C rise above a 40 deg C ambient.

C. NEMA 1 for installation indoors. The transformer enclosure shall be ventilated and be fabricated of heavy gauge, sheet steel construction. The entire enclosure shall be finished using a continuous process consisting of degreasing, cleaning, and phosphatizing by electrostatic deposition of polymer polyester powder coating, with a baking cycle to provide uniform coating of all edges and surfaces. The coating color shall be ANSI 49.

D. All cores shall be constructed of high-grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Magnetic flux densities shall be kept well below the saturation point.

E. Terminations shall consist of were leads with a minimum insulation rating of 125 deg C.

F. The sound levels shall not exceed 45 dB level as defined by NEMA ST20.

2.03 MANUFACTURER

A. Transformers shall be as manufactured by General Electric or equal by Square D or Eaton.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install transformers in locations shown on the Drawings. Provide grounding as specified per 16450 and per NEC.

END OF SECTION

SECTION 16280 – AUTOMATIC POWER FACTOR CORRECTION CAPACITOR UNIT

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install 480 volt anti-resonant automatic power factor correction capacitor unit (APFCC) as shown on the drawings and specified herein. Work shall include all necessary materials, equipment, labor, and services.

B. Auxiliary and accessory devices necessary for system operation or performance, such as relays or terminals to interface with other Sections of these Specifications, shall be included.

C. APFCC unit shall be rated for use at 480 volt, three phase, three wire, 60 Hertz power system having a short circuit rating of 65,000 amperes RMS symmetrical.

1.02 SUBMITTAL AND SHOP DRAWINGS

A. Process catalog data submittals for the following:

1. Pilot lights
2. Pilot operators
3. Control relays
4. Timers
5. Protective relays and digital voltmeters
6. Contactors
7. Circuit breakers including catalog number and time current curve trip number
8. Ground fault protective devices
9. Fuses
10. Control Wire

B. Process shop drawings for the APFCC unit.

1.03 STANDARDS

A. APFCC unit shall have UL labels where UL labels apply.

B. APFCC unit and enclosures shall include a UL 508A (UL Industrial Control Panel) Label representing that the equipment was assembled by and meets the requirements of a UL508A shop.

C. APFCC unit shall be manufactured and tested in accordance with Internal capacitor cells shall be UL Listed in compliance with UL 810, NEMA CP-1 and IEEE standards.

PART 2 – PRODUCTS

2.01 APFCC UNIT CONSTRUCTION

A. The APFCC unit shall be pre-wired and factory assembled, including main terminal lugs, a microprocessor programmable controller, Class A resettable ground fault protected control voltage, individual capacitor stages including current limiting fuses, tuning reactors and contactors cabled to each capacitor bank step.

B. Enclosure shall be free standing, constructed of #14 gauge rigidly welded steel, minimum, including a hinged door, ground lug, and removable lifting eyes, finished with ANSI 49 medium gray textured polyester paint.

C. Enclosure(s) shall be NEMA Type 12 for indoor installation.

D. Enclosure door(s) shall be full height, key lockable with controller module. All components shall be dead front with the enclosure door open and no components requiring system level voltage shall be mounted on the enclosure door.

D. All major components and wiring shall be adequately marked for identification and shall agree with wiring diagrams and instructions provided with each unit.

E. Capacitor shall be dry-type with no liquid dielectric.

F. Furnish circuit breakers as disconnect for APFCC unit rated for full rated capacitance operation.

2.02 APFCC UNIT RATINGS

A. Normal average operating ambient temperature range shall be –10degrees C (+14 degrees F) to +30 degrees C (+86 degrees F).

B. Rated capacitor voltage shall be 690V for 480V networks (line to line). Capacitors shall be Delta connected at rated voltage. Wye connected capacitor elements shall not be acceptable.

C. Total kVAR size shall be a nominal value of 100 kVAR.

D. The total kVAR capacity shall be divided into steps of 25 kVAR units.

E. Filter de-tuning of each capacitive / inductive stage shall be 3.78 x 60 Hertz (227 Hertz).

F. Basic Impulse Level: 30 Kilovolts @ 50μS

G. Main terminal lugs and buswork shall be braced to withstand fault level at 42 KA RMS Amperes symmetrical.

2.03 INTERNAL COMPONENTS

A. Individual Capacitor Units

1. Each capacitor/inductor stage shall consist of hermetically sealed three phase capacitor cell(s) on a modular assembly with the contactor, three phase fusing and thermistor relay. Each module shall be designed to facilitate maintenance if replacement should ever become necessary. Tuning Reactors shall be mounted in a vertical stack where possible to reduce risk of induced mutual inductance.

2. Discharge resistors mounted internal to the cells shall be provided to reduce voltage on the cells to 50 Volts or less within one minute after the capacitor has been switched off.

3. Individual capacitor elements shall be of a dry-type self-healing design utilizing a low loss metalized film dielectric system with a pressure sensitive circuit interrupter. Each element shall contain a 100kA HRC fuse as part of the pressure interrupter circuit. Electrical losses, including contribution of discharge resistors, shall average less than 0.5 Watts per kVAR. Liquid filled or impregnated capacitors shall not be acceptable.

4. Capacitor shall be rated for 115% continuous overvoltage and 140% continuous over current.

B. Internal Protective Fusing

1. Class C fuses shall be provided in each phase of each capacitor cell and on the line side of the contactor and mounted so as to facilitate replacement without removing power wiring. Fuses shall be UL Listed and current limiting, rated at 200,000 RMS Amperes symmetrical.

2. Fuse holders shall be dead front with or without the fuses in place.

C. Contactors

1. Contactors shall be UL Listed and rated 600VAC with 120V operating coils. Contactors shall be listed for use in switching capacitive currents without derating.

D. Tuning Reactors

1. The reactor shall be de-tuned to the 3.78 (227) harmonic order. The reactor shall have copper windings, Class R 220 degrees C insulation system, and be designed with open frame construction.

2. The copper winding shall be designed for maximum temperature rise of 80 deg C. Thermal protection shall be provided by three normally closed auto reset thermal switches designed to operate at 180 degrees C.

3. The reactors shall be sized for at least 140% of the nominal current rating for each stage.

4. Center leg of tuning reactor shall have an embedded thermistor connected to a thermostat relay for the stage to de-energize the associated contactor in the event of overheating.

E. Control Power Requirements

1. Low voltage, 120V control circuit transformation shall be provided within the enclosure.

2. Control power fusing to all major components including primary and secondary transformer fusing shall be provided. All components shall be dead front and finger safe.

3. Control circuit shall be protected with a resettable Class A ground fault protection breaker.

4. A shorting terminal shall be provided for two incoming current transformer wires. A single current transformer shall be installed at the Motor Control Center Main Lug Compartment. A current transformer ratio of 1600:5 shall be provided. The CT shall be donut type with an opening large enough to facilitate installation on the cables.

F. Microprocessor Controller

1. The controller shall be a microprocessor-based programmable unit with a single current input and single line-to-line or line-to-neutral voltage input required. The controller measures reactive power consumption in the load and, according to programmed control logic, will connect or disconnect the required amount of capacitor stages needed to maintain the preset power factor.

2. The controller shall utilize a switching logic that optimizes the use of capacitor elements and contactors in the bank.

3. An ON power indication and AUTOMATIC / MANUAL override control shall be provided.

4. A Liquid Crystal Display for display of power factor and alarms shall be provided. Indication of stage energization and inductive / capacitive condition shall be provided.

5. An alarm dry contact closure and annunciation shall be provided in the event that target power factor is not met, power to the controller has been lost or CT current is too high/low, temperature exceeds preset limits or a system overvoltage condition occurs.

6. An automatic shutdown and systematic re-staging of capacitor stages shall be provided in the event of a power loss, high internal system temperatures, a system under voltage or overvoltage condition.

7. A reversed CT polarity shall be automatically corrected by the automatic controller.

8. The controller shall permit programming of the switching stage response time, number of stages (12 maximum) and switching program.

9. In Automatic mode, the control unit shall accept an inhibit signal consisting of a dry contact. The dry contact shall inhibit or turn off the PFCC Unit whenever one of the soft starters is ramping up or down.

2.04 EXTERNAL CURRENT TRANSFORMER

A. Furnish an external multi-tap split core current transformer for phase A. Accuracy shall be 1-5% accuracy depending on selected ratio. Ratios shall be 3000:5, 2500:5, 2200:5, 1500:5, 1200:5, 1000:5, 800:5, 500:5, and 300:5.

2.05 MANUFACTURER

A. The APFCC unit shall be STACO Energy Products model StacoVAR or approved equal. STACO Energy Products is represented by Brady Waters Company, Richardson, Texas.

PART 3 EXECUTION

3.01 FACTORY TESTS

A. All equipment shall be carefully inspected after assembly and all wiring shall be checked to ensure correctness of connections and operation.

B. Design tests shall be performed to confirm proper operation of the complete equipment, including operation of all control circuits, pre-programming and functioning of the controller, and confirmation of kVAR power rating.

C. Five copies of certified test reports shall be submitted.

3.02 INSTALLATION OF APFCC UNIT

A. Prior to energization of motor control centers, keep enclosures protected with plastic sheets and protected from the environment.

B. Set sections in place and shim level; use metal shims. Bolt bottom rails to concrete pad by means of 3/8" diameter stainless steel bolts into drilled expansion anchors. Use two bolts per wide section, one in front and one in rear.

C. Make all field cable connections with torque wrench set to manufacturer's recommended torque settings.

D. Each conduit entry into the cabinets shall be equipped with grounding bushing. Bond each raceway equipment grounding conductor to its bushing ground lug, and thence to equipment ground bus where bonding jumper shall be connected with specified flat bus connector. Where empty conduits terminate, install blank disc in grounding bushing. Bring specified foot-marked pull tape through the blank penny and label with plastic

write-on label and show the size of conduit and the terminus of the other end. For each active conduit, install plastic write-on label and identify cable number, size, conduit size, and identify load served.

E. Install all power and control wiring and make all connections. Install power and CT wiring between APFCC and MCC. Phase band each power cable at each connection. Neatly train and lace all gutter wiring with nylon tie wraps. Do not obstruct relays and other pan-mounted devices with load cables. Install wire markers to identify each control wire at each termination.

F. Install all devices, fuses, breakers, and make installation ready. Set all adjustable and programmable devices.

3.03 SPARE PARTS

A. Furnish the following spare parts with the equipment in conformance with the specifications.

1. One control relay for every three or less of each range and type installed complete with mounting socket.

2. Two pilot light bulbs and 10% spare lenses.

3. One extra overload relay for each type used.

4. Two spare fuse for each fuse type.

3.04 TRAINING

A. The Contractor shall provide one (1) training session at the electrical building for owner's representatives for up to four (4) hours within two (2) months after facility start-up and checkout.

B. manufacturer's qualified representative familiar with the maintenance and servicing of the equipment shall conduct the training session.

C. The training program shall consist of instruction on operation of the assembly, control devices, microprocessor, circuit breakers, fuses, location of resets, switches, and major components of the assembly.

D. Additionally, the training program shall consist of instructions and requirements for normal programming, troubleshooting, and maintenance of the equipment including locations of resets and circuit breakers required for returning the equipment to normal operation after a failure or unusual shutdown.

E. The program shall include showing which devices and equipment the local operations or maintenance personnel can work on, program, and replace and the equipment that should only be repaired by a qualified representative of the manufacturer. Devices and

major components that require a maintenance timetable and procedures to be followed as part of an ongoing maintenance program shall be identified.

END OF SECTION

SECTION 16350 MOTOR CONTROL CENTERS

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install 480 volt motor control centers as shown on the drawings and specified herein. Work shall include all necessary materials, equipment, labor, and services.

B. Auxiliary and accessory devices necessary for system operation or performance, such as relays or terminals to interface with other Sections of these Specifications, shall be included.

C. Motor control centers shall be 480 volt three phase, three wire solidly grounded.

1.02 STANDARDS

A. Motor control center shall have UL label.

1.03 RELATED SECTIONS

A. Section 16357 Reduced Voltage Solid State Starters

1.04 SUBMITTALS AND SHOP DRAWINGS

A. Process catalog data submittals for the following:

1. Pilot lights
2. Pilot operators
3. Control relays
4. Overloads
5. Contactors
6. Circuit breakers
7. Ground fault protective devices
8. Fuses
9. Control Wire
10. Surge protection devices
11. Soft Starters

B. Process shop drawings for the motor control centers.

1. Submit time current curves for each of overcurrent device and overloads used in the motor control centers. Furnish time current curves with shop drawings.

PART 2 – PRODUCTS

2.01 Motor Control Center Construction

A. Motor Control centers shall have NEMA 1B wiring. The motor control center shall be rated for 65,000 rms symmetrical interrupting rating. Control wiring shall be labeled on each end with permanent markers. Furnish main breakers or Main Lugs Only as indicated on the drawings.

B. Motor Control Centers shall consist of 20" deep structures in indoor NEMA 1 gasketed enclosures.

C. Paint finish of enclosures shall comply with the following minimum specifications unless the manufacturer's standard paint processes are considered equal.

1. Clean and degrease and rinse all steel parts, then they shall be phosphatized to MIL Specification TT- C-490.

2. Further, all steel parts shall be cleaned and over- dried primed, and painted with an electrostatically deposited coat.

3. Paint thickness shall be manufacturer's standard.

D. Main buses and vertical drops of each motor control center shall be rated 480V, three-phase, three-wire, and they each shall be braced for 65,000 amps rms symmetrical fault duty. Provide ground bus through each section. All buses shall be tin-plated copper.

E. Additionally, motor control centers shall be as follows:

1. Each cubicle shall be equipped with stab-in power connections. All unused power stab openings shall be equipped with removable insulating plugs.

2. Signage shall be as follows:

a. Each cubicle shall have laminated plastic nameplates identifying load served. Nameplate shall be at least 1" by 3" and shall have white letters engraved on a black background and shall be attached with self tapping screws and adhesive backing. Letters shall be at least 5/32" tall and shall denote load information as shown on the one line diagram.

b. All compartments with voltages present from outside of the compartment shall have a sign on the inside on the compartment door marked "DANGER - DISCONNECT DOES NOT DE-ENERGIZE ALL CIRCUITS INSIDE THIS UNIT". Letters shall be black on yellow background and sign shall be adhesive backed vinyl approximately 1-1/2" by 4".

3. All motor controllers shall be full voltage, nonreversing type except where other types are indicated. Contactors and overcurrent devices and conductors shown shall be minimum sizes, confirm all external loads prior to manufacture. Starters shall be NEMA rated. Soft Starters shall meet the requirements of Section 16357.

4. Each controller shall be in an isolated compartment, complete with its overcurrent device, unless otherwise indicated. Where overcurrent devices are in a separate compartment from the associated controller, the doors of both compartments shall be mechanically interlocked. Where individual overcurrent devices, contactors, and the like are indicated, they too shall be housed in an isolated compartment.

5. Provide a vertical bus shutter mechanism that covers the vertical bus stab area when a plug-in starter or feeder is withdrawn. This feature shall allow for complete vertical bus isolation and insulation.
6. Each compartment shall have a hinged door. Disconnect device operating handles shall have on- off positions clearly marked and each handle shall have pad-locking provisions. Compartment doors shall have mechanical interlocks to prevent their being opened unless the disconnect is in the "Off" position; however, there shall be a defeat mechanism for authorized personnel entry.
7. Each controller shall be equipped with its fused secondary power transformer (CPT). VA capacity of CPT shall be sized to handle its compartment load plus external connected loads. Provide double- fused primary protection for each CPT.
8. Each cubicle shall be equipped with pull-apart terminal blocks. Terminal block conductors shall be tin-plated copper.
9. Control wiring shall be type SIS for ungrounded conductors and shall be numbered with wire marking labels at each terminal, device and connection. Control wires shall be type MTW for neutral and grounds. Color codes shall be white for neutral conductors, green for ground wires. Numbers shall correspond to those displayed by the manufacturer on their record drawings. Wire markers shall be Brady PVC sleeve type or equal. Provide necessary terminal strips for connection of field control wiring with 10% spares.
10. Each controller shall be equipped with indicated pilot operators and other devices. Each contactor shall have two normally open auxiliary contacts and two normally closed auxiliary contacts. All auxiliary contacts not used by control circuit shall be wired to field terminals. All pilot operators such as pilot lights, selector switches, and pushbuttons shall be oil-tight grade. Each device shall be equipped with engraved legend plates.
11. All pilot lights shall be equipped with indicated colored lenses. Each pilot light shall be LED type with push-to-test feature.
12. Control wiring and associated control devices in each motor control center shall be furnished as shown; however, if different external control arrangements caused by substitution or changes under another Section are required, then make such changes as required to accommodate those changes. All such changes shall be reviewed and accepted by the Engineer.
13. Provide three overloads for each motor controller. Selection of overloads shall be determined by the full-load current of motors to be supplied. All overloads shall be mechanically-reset type with door-mounted reset pushbuttons.
14. Motor control center arrangement and number of sections and cubicles shall be furnished.
15. Each vertical section with more than one cubicle shall be equipped with vertical wire way. Such wire ways shall have metal side barriers. Side barriers adjacent to cubicles shall be equipped with grommeted opening into each cubicle.

16. Horizontal and vertical bus runs shall have each set of busses barriered from cubicles with insulated barriers.
17. Each vertical section of the line-ups shall be equipped with a horizontal ground bus that shall run continuous through all sections. Ground bus size shall be at least 1/4" x 1" size and shall be tin-plated copper.
18. Control relays with 120 volt coils shall be industrial type. Contacts for 120 volt control circuits shall have contacts rated NEMA A600. Contacts which are indicated low energy shall be gold flashed or logic reed type. Low energy contacts shall be used for 12 volt dc status input to telemetry. Each contact shall be field convertible. Each relay shall have open-close position indication. Each relay shall be fully equipped with its maximum number of contacts.
19. Control relays for 24 volt dc circuits shall have diode suppression on coil, with contacts rated 10 amps at 120 vac, and shall be general purpose type with octal pin plug-in base.
20. Elapsed time meters shall be panel mounted in the door of the starter unit and shall be non- resettable with 99,999.9 hour register and 2.5" square bezel. Furnish Cramer model 635K for each pump motor and where indicated on the drawing.
21. Phase failure monitors shall have adjustable unbalance pickup, and adjustable voltage dropout and adjustable time delay. Furnish unit in each three phase starter.
22. Motor branch circuit overcurrent protection shall be motor circuit protectors, unless otherwise indicated. Each "MCP" shall have adjustable current setting pickup.
23. Other branch overcurrent devices shall be thermal-magnetic type, unless otherwise indicated. Minimum IC of each thermal-magnetic breaker shall be 65 KA rms symmetrical amps. Breaker shall have 120VAC shunt trip for ground fault protection relay where indicated on the drawings.

F. Motor control centers shall be General Electric or approved equal.

PART 3 – EXECUTION

3.01 FACTORY TESTS

A. All equipment shall be carefully inspected after assembly and all wiring shall be checked to ensure correctness of connections and operation.

B. the MCC, accessories and wiring shall be tested in accordance with latest revision ANSI C19.3 and any other applicable ANSI standard.

C. the Owner reserves the right to witness tests. The Contractor shall notify the Owner two weeks in advance of scheduled tests.

D. Five copies of certified test reports shall be submitted.

3.02 INSTALLATION

A. Prior to energization of motor control centers, keep enclosures protected with plastic sheets and maintains specified space heaters energized to prevent internal condensation, use 150W lamp in bottom of each section.

B. Set sections in place and shim level, use metal shims. Bolt bottom rails to concrete pad by means of 3/8" diameter stainless steel bolts into drilled expansion anchors. Use two bolts per wide section, one in front and one in rear.

C. Make all field bus connections with torque wrench set to manufacturer's recommended torque settings.

D. Each conduit entry into bottom of cabinets shall be equipped with grounding bushing. Bond each raceway equipment grounding conductor to its bushing ground lug, and thence to equipment ground bus where bonding jumper shall be connected with specified flat bus connector. Where empty conduits terminate, install blank disc in grounding bushing. Bring specified foot-marked pull tape through the blank penny and label with plastic write-on label and show the size of conduit and the terminus of the other end. For each active conduit, install plastic write-on label and identify cable number, size, conduit size, and identify load served.

E. Install all power and control wiring and make all connections. Install wiring between MCC units. Phase band each power cable at each connection. Neatly train and lace all gutter wiring with nylon tie wraps. Do not obstruct relays and other pan-mounted devices with load cables. Install wire markers to identify each control wire at each termination.

F. Bond neutral of lighting transformer to its enclosure and to grounding electrode conductors per NEC article 250. Install grounding electrode conductors from transformer secondary neutral to ground mat.

G. Install all devices, fuses, breakers, and make installation ready. Set all adjustable and programmable devices such as breaker magnetic trips. Main breaker trip settings shall be made as directed by Engineer. Furnish time current curve and manufacturer’s descriptive literature of overload relay selected for each pump to Engineer for Approval.

3.03 SPARE PARTS

A. Spare Parts

Furnish the following spare parts with the equipment in conformance with the specifications.

1. One timing relay for every three or less of each range and type installed complete with mounting socket.
2. One control relay for every three or less of each range and type installed complete with mounting socket.
3. Twenty pilot light bulbs and 10% spare lenses.
4. One extra overload relay for each type used.
5. Two starter coils for every three or less starters of each NEMA size installed.
6. One set of starter contacts for every three or less starters of each NEMA size installed.
7. One spare phase failure relay.

END OF SECTION

SECTION 16357 REDUCED VOLTAGE SOLID STATE STARTERS

PART 1 - GENERAL

1.01 SCOPE

A. Solid State Reduced Voltage Starters (soft starters) as specified herein and as shown on the drawings.

B. The solid state motor controller shall be designed, manufactured and tested in accordance with the latest applicable standards of NEMA, ANSI and UL.

C. The solid state starters shall be furnished in the Motor Control Center specified in Section 16350

1.02 STANDARDS

A. The products shall be meet UL 508 and shall be labeled as such.

1.03 SUBMITTALS

A. The following information shall be submitted to the Engineer:

Wiring diagrams

Ratings including

1. Voltage
2. Horsepower and/or continuous current.

B. Submittals and Shop Drawings. Process catalog data submittals for the following:

1. Circuit breakers
2. Submit time-current curves for each protective device

PART 2 - PRODUCTS

2.01 GENERAL

A. Reduced Voltage Solid State Starters:

1. All solid-state reduced-voltage starters shall be UL listed and consist of an SCR based power section, logic board and bypass contactor.

2. The SCR based power section shall consist of six (6) back-to-back SCRs and shall be rated for a minimum peak inverse voltage rating of 1500 volts PIV.

3. Units using triacs or SCR/diode combinations shall not be acceptable.

4. Resistor/capacitor snubber networks shall be used to prevent false firing of SCRs due to dv/dt effects.

5. The logic board shall be mounted for ease of testing, service and replacement. It shall have quick disconnect plug-in connectors for current transformer inputs, line and load voltage inputs and SCR gate firing output circuits.

6. The logic board shall be identical through all ampere ratings and voltage classes and shall be conformably coated to protect environmental concerns.

7. The paralleling bypass contactor shall energize when the motor reaches full speed and close/open under one (1) times motor current.

8. The overload protection shall be electronic and be based on an inverse time current algorithm.

9. Overload protection shall be adjusted via logic board.

10. Class 10 or 20 overload characteristic shall be selectable.

11. Provide class 20 bi-metal overload relays in addition to the electronic overload relay

12. Over-temperature protection (on heat sink) shall be standard.

13. The solid-state logic shall be phase sensitive, and shall inhibit starting on incorrect rotation.

14. Improper phase rotation shall be indicated on the starter logic board.

    a. Starters shall protect against a phase loss/unbalance condition shutting down if a 35% current differential between any two phases is encountered.

15. Provide four programmable normally open (NO) contact shall annunciate fault conditions, with contact ratings of 60 VA (resistive load) and 20 VA (inductive load). In addition, an LED display on the logic board shall indicate type of fault (current trip, phase loss, phase rotation).

16. The following logic board adjustments are required:

    i. Ramp Time; 1 to 45 seconds

    ii. Initial Torque; 100 to 200% current

    iii. Current limit; 100 to 500% current

    iv. FLA of motor; 4 to 1 range of starter

17. Smooth stopping shall provide a linear voltage deceleration should the load require it. It is to be adjustable from 1 to 10 seconds. Smooth stop or fast stop shall be selectable.

18. Enclosed units shall include a thermal magnetic circuit breaker or HMCP for short-circuit protection and quick disconnect means.

19. Starters and breakers/HMCPs are to rated per UL 508D for a withstand rating of 65 kAIC RMS.

20. The manufacturer of the solid-state starter shall employ a field-based factory service organization for the purpose of start-up and repair of units.

21. Maximum continuous operation shall be at 115% of continuous ampere rating.

22. An adjustable time delay for re-starting each motor controller after power recovery after a power outage shall be provided to allow each starter to be started in sequence. Time delays shall be from 10 seconds to 600 seconds.

23. Each soft starter shall be provided with a overload relay with phase failure protection in addition to the soft starters standard control and indication provisions. The motor overload relay shall be integrated into the control system to provide the functions indicated on the drawings.

24. Soft starter shall have 4-20 mA output signal representing phase A current. Provide range as indicated on the drawings.

B. Soft starter shall have electronic overload relays that are active in bypass. Electronic overloads shall have single phase protection.

2.04 MANUFACTURER

A. Soft starters shall be General Electric ASTAT XT or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Startup services shall be provided by the manufacturer's representative. The following minimum work shall be performed:

1. Inspection and final adjustments.

2. Set the protective devices and configure the soft starter. Coordinate with commissioning of MCC.

3. Operational and functional checks of controllers/starters and spare parts.

END OF SECTION

SECTION 16450 GROUNDING SYSTEMS

PART 1 - GENERAL

1.01 SCOPE

A. Furnish and install complete grounding systems in accordance with Article 250 of the National Electrical Code as shown on the Drawings and as specified herein.

B. Provide ground mat grounding electrode system as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. Submit manufacturers' catalog sheets with catalog numbers marked for the items furnished, which shall include:

1. Ground well casings
2. Ground rods
3. Terminal lugs and clamps
4. Exothermal welding materials
5. Ground cable
6. Ground connection hardware

PART 2 - PRODUCTS

2.01 GROUNDING ELECTRODES

A. All ground mat grounding electrodes and grounding electrode conductors shall consist of tin plated stranded copper.

B. All ground rods shall be copper clad steel products, 3/4" diameter x 10 foot long, unless otherwise indicated. Ground rods shall be Blackburn #6258, or equal. Provide heavy duty ground rod clamps, exothermic welds where concealed or below grade. Equal to Blackburn #GG58 where vertical connections are installed and #GUV where U-bolt connectors are installed to serve horizontal connections.

2.02 GROUNDING DEVICES

A. Connectors shall be furnished as specified under Section 26 01 20.

B. Conduit grounding bushings shall be furnished as specified under Section 26 01 10.

C. Equipment grounding conductors shall be furnished as specified under Section 26 01 20.

D. Flush cast metal grounding plates shall consist of bronze body with flat plate on top and bolted clamp connector on bottom. Furnish OZ type "VG", or equal flush

connectors. Each such connector shall be furnished with silicon bronze connector bolts for installation of top-mounted grounding connectors.

E. Exothermal welding kits shall be "Cadweld" products as manufactured by Erico. Molds, cartridges, powder, and accessories shall be as recommended by the manufacturer.

2.03 GROUND TEST WELLS

A. Ground test wells shall be furnished each ground rod for the purpose of field testing the ground mat system.

B. Ground test wells shall each consist of ground rod with connector attached to a #4 up comer from the ground mat and contained within an access well with labeled top.

C. Ground test well enclosures shall be Brooks product #3RT series, or equal. Enclosures shall be 10 1/4" diameter and shall include cast iron cover with integrally cut "GROUND TEST WELL" in top of cover.

PART 3 - EXECUTION

3.01 GROUND MATS AND GROUND WELLS

A. Install grounding for the new MCC as indicated on the drawings. Install upcomer with indicated wire sizes of tin plated copper conductors. Exothermally weld all connections.

B. Unless other larger sizes are indicated on the drawings, install #2 upcomers from ground mat to PLC, and other equipment indicated on the drawings. Install "VG" flush floor connector to serve each upcomers and run #2 stingers from top side of each "VG" to ground bus in equipment. Bond VG to rebar in concrete.

C. Install ground rods in test wells where indicated on the Drawings.

D. Install chemical grounding kits where called for. Drill holes as required and install kit per manufacturer’s instructions. Exothermic weld all concealed, imbedded in concrete or buried connections.

3.02 TRANSFORMER

A. Bond transformer neutral to cabinet.

B. Install grounding electrode conductor from each transformer neutral to system ground and to local electrodes as shown. Run #2 ground wire to ground mat.

3.03 WIRING SYSTEMS GROUNDING

A. All equipment enclosures, motor and transformer frames, metallic conduit systems and exposed structural steel systems shall be grounded.

B. Equipment grounding conductors shall be run with all wiring. Sizes of equipment grounding conductors shall be based on Article 250 of the N.E.C. except where larger sizes may be shown. Bond each equipment grounding conductor to the equipment grounds at each end of each run. Run 4/0 ground full length of tray, bond to each section and every enclosure where conductors originate or terminate. Protect grounded equipment conductor in conduit where it leaves the tray.

C. Liquid tight flexible metal conduit in sizes 1" and larger shall be equipped with external bonding jumpers. Use liquid tight connectors integrally equipped with suitable grounding lugs.

D. Where conduits enter into equipment free of the metal enclosure, install grounding bushing on each conduit and bond bushing lug to equipment ground bus.

E. Where conduits enter equipment enclosures, equip each penetration inside with grounding bushing. Install bonding jumper from each grounding bushing to ground bus.

F. Equipment enclosures that do not come furnished with a ground bus, install ground lug in each enclosure that shall be bonded to the metal cabinet or backpan of the enclosure.

G. Separately derived systems shall be each grounded as shown and shall comply with Article 250 of the NEC except where higher standards are shown.

3.04 TESTING

A. All exothermic weld connections shall successfully resist moderate hammer blows. Any connection which fails such test or if upon inspection, weld indicates a porous or deformed connection, the weld shall be remade.

B. All exothermic welds shall encompass 100 percent of the ends of the materials being welded. Welds which do not meet this requirement shall be remade.

C. Test the ground resistance of the system. All test equipment shall be furnished by Contractor and be approved by Engineer. Test equipment shall be as manufactured by Biddle or approved equal. Dry season resistance of the system shall not exceed five ohms. If such resistance cannot be obtained with the system as shown, provide additional grounding as directed by Engineer.

END OF SECTION

SECTION 16930 SCADA

PART 1 GENERAL

1.01 SCOPE

A. This section covers SCADA (Supervisory Control & Data Acquisition) equipment, testing and verification. Work shall include all necessary materials, equipment, labor, and services.

1.02 QUALITY ASSURANCE

A. All PLC programming and HMI configeration changes shall be done by Control Panel USA, Inc. of Georgetown, Texas.

PART 2 PRODUCTS

2.01 PLC

A. PLC is an Allen-Bradley Control Logix PLC and is existing in the location shown on the drawings.

B. All input and input cards shown on the drawings are existing. No new cards will be required.

PART 3 EXECUTION

3.01 GENERAL

A. Modify PLC program to accommodate the new work. The PLC is connected to the administation bldg control room HMI with fiberoptic cable. Monitor all new alarm and status points listed in the PLC I/O Schedule.

B. At WMARSS control room in administration bldg. Wonderware HMI, build new graphic screens for the new I/O points to allow control of the blowers as currently used. Modify graphic screens to accomodate the additional I/O points. Methodology shall match existing control schemes. Blowers shall be manually run from the control room HMI. A future automatic aeration control scheme will be provided in the future by others.

3.02 TESTING

A. A field acceptance test (FAT) shall be conducted for the SCADA equipment and computer system. Testing shall verify all I/O, analog ranges and programmed control functions.

B. The Owner and Engineer shall be given 10 days prior notice of FAT test.

END OF SECTION

CONTRACT DRAWINGS FOR:

WACO METROPOLITAN AREA
REGIONAL SEWERAGE SYSTEM

BELLMEAD • HEWITT • LACY LAKEVIEW • LORENA • ROBINSON • WACO • WOODWAY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

AUGUST 2020

OWNER:

WACO METROPOLITAN AREA
REGIONAL SEWERAGE SYSTEM
P.O. BOX 2570
WACO, TX 76702

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240
TEXAS P.E. FIRM REGISTRATION No. F-338

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotra

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

SHEET INDEX:

LOCATION MAP
SCALE: 1"=300'-0"

0 300 600
SCALE IN FEET

NORTH

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Krock
DATE: AUG 10, 2020
McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

LOCATION MAP

STATE OF TEXAS
JOSEPH J. KROCK
56361
REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO.
G-01
OF G-02

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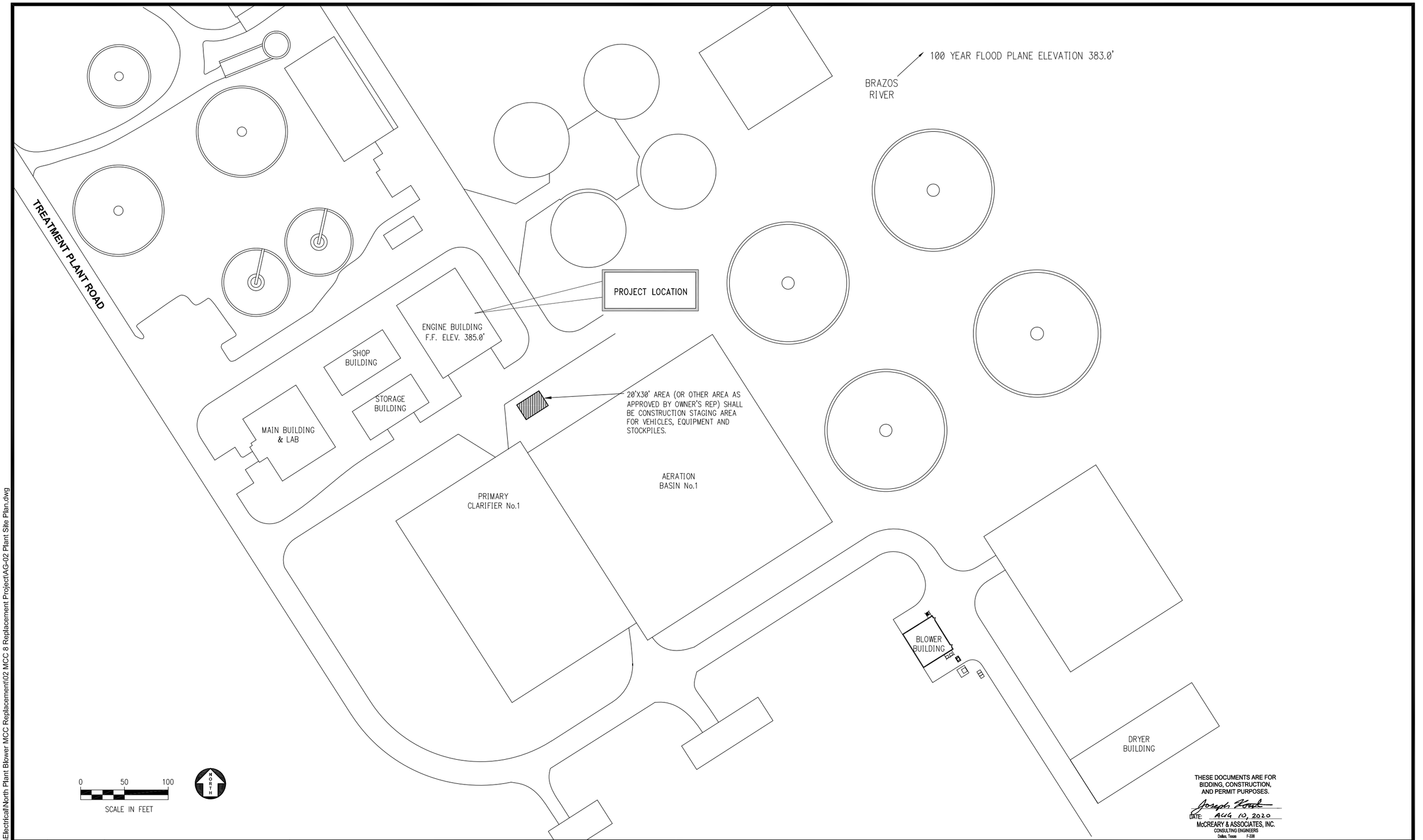

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Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

PLANT LAYOUT PLAN

STATE OF TEXAS
JOSEPH J. KOTRLA
56361
REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO.
G-02
OF G-02

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ABBREVIATIONS

AI	ANALOG INPUT
AFF	ABOVE FINISHED FLOOR
AL	ALUMINUM
ANN	ANNUNCIATOR
AO	ANALOG OUTPUT
APFC	AUTOMATIC POWER FACTOR CORRECTION
ATS	AUTOMATIC TRANSFER SWITCH
BRG	BEARING
BRKT	BRACKET
CKT	CIRCUIT
CL2	CHLORINE
CONC	CONCRETE
C	CONDUIT
CR	CONTROL RELAY
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
DES	DRILLED EXPANSION SHIELD
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
EC	EMPTY CONDUIT
EF	EXHAUST FAN
EGC	EQUIPMENT GROUNDING CONDUCTOR
EOEH	ELECTRICALLY OPERATED ELECTRICALLY HELD
EOMH	ELECTRICALLY OPERATED MECHANICALLY HELD
ETM	ELAPSED TIME METER
EXOW	EXOTHERMIC WELD
FDR	FEEDER
FVNR	FULL VOLTAGE NON-REVERSING
G	GROUND
GND	GROUND, GROUNDED, GROUNDING
GFP	GROUND FAULT PROTECTION
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GRS	GALVANIZED RIGID STEEL
HDG	HOT DIPPED GALVANIZED
HDW	HARDWARE
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HMAC	HOT MIX ASPHALT CONCRETE
HOA	HAND-OFF-AUTOMATIC SELECTOR SWITCH
HOR	HAND-OFF-REMOTE SELECTOR SWITCH
HPS	HIGH PRESSURE SODIUM
HS	HAND SWITCH
HTR	HEATER
ICTO	INSTANT CLOSE, TIMED OPEN
IOTC	INSTANT OPEN, TIMED CLOSE
J-BOX	JUNCTION BOX
LA	LIGHTNING ARRESTOR
LLCO	LOW LEVEL CUT OFF
LOR	LOCAL-OFF-REMOTE
LOS	LOCKOUT STOP
LS	LIMIT SWITCH
LT	LIGHT
LTG	LIGHTING
LTF	LIQUID TIGHT FLEXIBLE CONDUIT
MB	MAIN BREAKER
MBD	MOTORIZED BACKDRAFT DAMPER
MCP	MOTOR CIRCUIT PROTECTOR
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MH	METAL HALIDE
MLO	MAIN LUGS ONLY
MPD	MOTOR PROTECTIVE DEVICE
MPU	MOTOR PROTECTIVE UNIT
MSP	MAIN SERVICE PANEL
MTD	MOUNTED
MTR	MOTOR
MV	MERCURY VAPOR
N/P	NAMEPLATE
NOTC	NORMALLY OPEN, TIMED CLOSED
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
OC	ON CENTER
OLS	OVERLOADS
OSC	OPEN-STOP-CLOSE
PB	PUSHBUTTON
PCC	PLASTIC COATED CONDUIT
PCV	PRESSURE CONTROL VALVE
PH	HYDROGEN ION CONCENTRATION
PNL	PANEL
PMT	PAD MOUNTED TRANSFORMER
PP	POWER POLE
PQM	POWER QUALITY METER
PVC	POLYVINYL CHLORIDE
PT	POTENTIAL TRANSFORMER
RECEP	RECEPTACLE
RGI	RIGID GALVANIZED IRON
RTD	REMOTE TEMPERATURE DETECTOR
RTU	REMOTE TELEMETRY UNIT
RVNR	REDUCED VOLTAGE, NON-REVERSING
S	SPST SWITCH
S2	DPST SWITCH
S3	SPDT SWITCH
S4	DPDT SWITCH
SP	SWITCH W/ PILOT LIGHT
SM	MANUAL MOTOR STARTER
SC	SURGE CAPACITOR
SF	SUPPLY FAN
SPD	SURGE PROTECTIVE DEVICE (TVSS)
S/N	SOLID NEUTRAL
S/S	SAFETY SWITCH
SS	START-STOP
STN/STL	STAINLESS STEEL
SW	SWITCH
SWGR	SWITCHGEAR
SWBD	SWITCHBOARD
SZ	SIZE
TYP	TYPICAL
TR	TIME DELAY RELAY
UG	UNDERGROUND
UH	UNIT HEATER
VIB	VIBRATION
WP	WEATHER PROOF
XFER	TRANSFER
XFMR	TRANSFORMER
XMTR	TRANSMITTER

ELECTRICAL SITE & PLAN SYMBOL LEGEND

SYMBOL	DESCRIPTION
A	LIGHT FIXTURE – LETTER DENOTES FIXTURE TYPE
HA	LED WALL MOUNTED FIXTURE – LETTER DENOTES FIXTURE TYPE
A	LED FIXTURE – RECESSED, SURFACE OR WALL MOUNTED
	EMERGENCY POWER PACK FIXTURE – WALL MOUNTED
	EXPOSED CONDUIT RUN
	CONCEALED OR UNDERGROUND CONDUIT RUN
	CIRCUIT HOME RUN TO PANELBOARD
S	WALL SWITCH, SPST
S2	WALL SWITCH, 2 POLE
S3	WALL SWITCH, 3-WAY
SM	MOTOR RATED SWITCH WITH OVERLOADS
GFCI WP	DUPLEX RCPT & GFCI DEVICE MOUNTED IN WEATHERPROOF BOX & COVERS
	RCPT-20A 125V 2P 3W GND. DUPLEX-12" UP OR AS NOTED
J OR J	JUNCTION BOX – WALL OR CEILING MOUNTED
	MOTOR LOCATION
	COMBINATION FUSED DISCONNECT SW./ MAGNETIC MOTOR STARTER
	MAGNETIC MOTOR STARTER
	DISCONNECT SWITCH – HEAVY DUTY TYPE
C	CONTACTOR
S	EXPLOSION-PROOF CONDUIT SEAL
HH	HAND HOLE
CS	CONTROL STATION. REF CONTROL SCHEMATICS FOR TYPE.
	FLEXIBLE CONDUIT
	CONDUIT TEE FITTING
	CONDUIT FITTING LB, LR, ETC.
	CROSS CONDUIT FITTING
T	WALL MOUNTED THERMOSTAT
OHE	OVERHEAD ELECTRICAL LINES
WP	WEATHERPROOF
GFI	GROUND FAULT INTERRUPTER
+48"	MOUNTING HEIGHT ABOVE FLOOR
E.C.	EMPTY CONDUIT
T122	CONDUIT AND CABLE TAG NUMBER. REF SCHEDULE
	480/277V PANELBOARD
	208/120V PANELBOARD
PC	PHOTOCELL
	EXIT SIGN, SOLID PORTION INDICATES DIRECTION OF SIGN
T	TELEPHONE OUTLET
E	ETHERNET OUTLET

ONE LINE DIAGRAM LEGEND

SYMBOL	DESCRIPTION
	POWER TRANSFORMER
	CURRENT TRANSFORMER
	CONTROL POWER (CPT) OR POTENTIAL (PT) TRANSFORMER
20AT 100AF	THERMAL MAGNETIC CIRCUIT BREAKER; AF=FRAME SIZE, AT=AMP TRIP
3 MCP	MAGNETIC ONLY CIRCUIT BREAKER; NUMBER INDICATES CONTINUOUS CURRENT RATING
5	STAB-IN CONNECTION, NUMBER INDICATES MCC UNIT DESIGNATION
	FUSE
	FUSED SWITCH
SZ3	FULL VOLTAGE, NON-REVERSING STARTER, WITH OVERLOAD RELAY, NUMBER INDICATES NEMA SIZE
	CONNECTION TO GROUND
	SPACE HEATER
S/N	SOLID NEUTRAL
	DELTA CONNECTED TRANSFORMER WINDINGS
	WYE CONNECTED TRANSFORMER WINDINGS
LA	LIGHTNING ARRESTER
SC	SURGE CAPACITOR
VS	VOLTMETER SWITCH
V	VOLTMETER
AS	AMMETER SWITCH
A	AMMETER
SPD	SURGE PROTECTION DEVICE
K	KIRK KEY INTERLOCK
SS	SOLID STATE SOFT STARTER
VFD	VARIABLE FREQUENCY DRIVE

CONTROL DIAGRAM LEGEND

SYMBOL	DESCRIPTION
	DOOR MOUNTED DEVICE
	DEVICE MOUNTED REMOTE FROM MOTOR CONTROL
	DEVICE MOUNTED REMOTE FROM STARTER UNIT BUT IN MCC
	TERMINAL FOR CONNECTION OF EXTERNAL CIRCUITS
	NORMALLY CLOSED CONTACTS
	NORMALLY OPEN CONTACTS
CPT	CONTROL POWER TRANSFORMER
HAND OFF AUTO	3 POSITION SELECTOR SWITCH
	MOTOR SPACE HEATER
M	MOTOR CONTACTOR
CR	CONTROL RELAY
TR	TIMING RELAY
	FUSE
STOP	"STOP" PUSH BUTTON
START	"START" PUSH BUTTON
STOP	EMERGENCY "STOP" MUSHROOM BUTTON
TR1	TIMED CONTACTS
T'STAT	THERMOSTAT
LS	LIMIT SWITCH
FS	FLOAT SWITCH
PS	PRESSURE SWITCH
ETM	ELAPSED TIME METER
	AUDIBLE ALARM
G	PUSH-TO-TEST PILOT LIGHT LETTER INDICATES COLOR

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

LEGENDS AND ABBREVIATIONS

STATE OF TEXAS
JOSEPH J. KOTRLA
56361
REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

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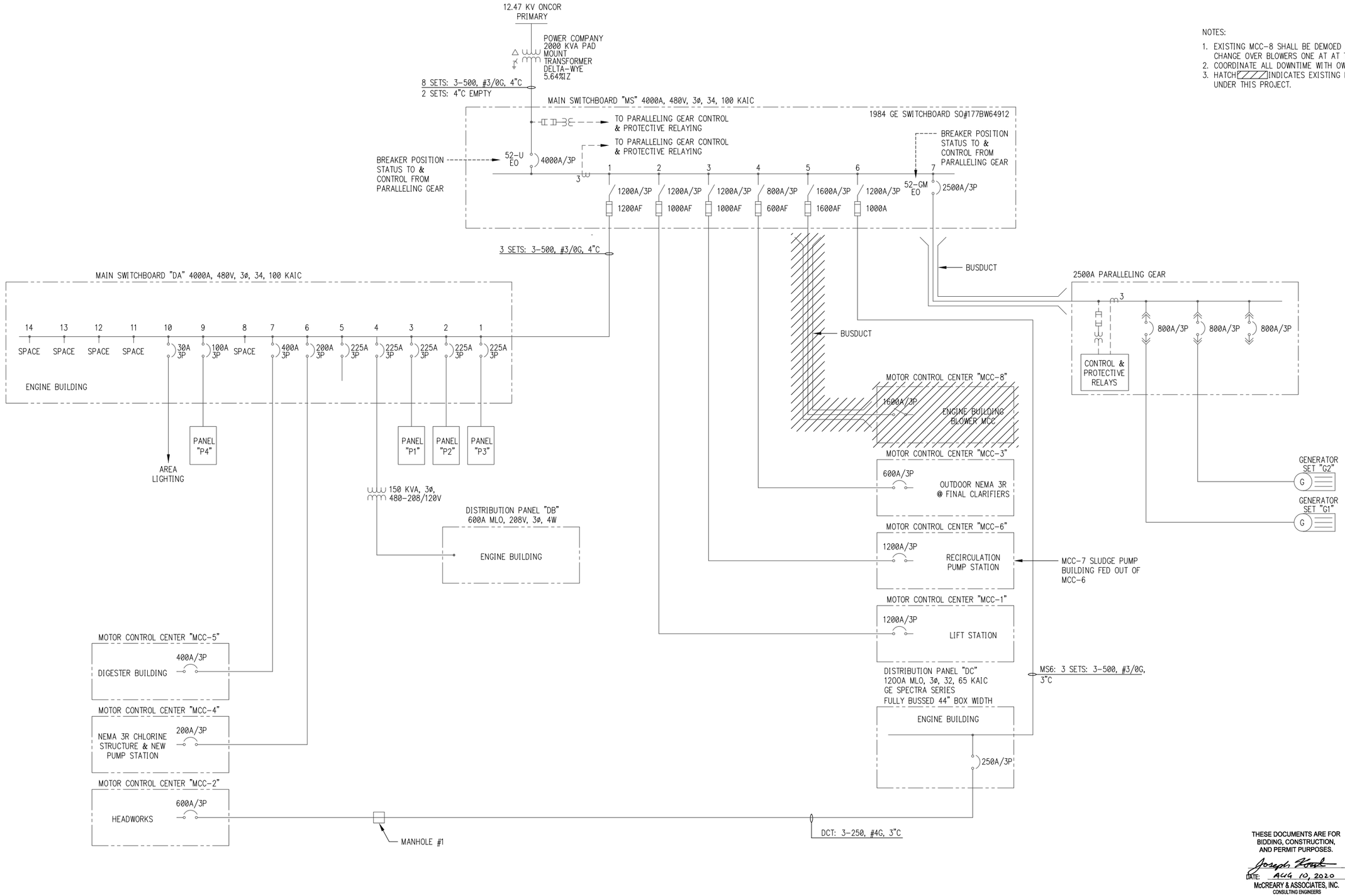

NOTES:

1. EXISTING MCC-8 SHALL BE DEMOED AFTER NEW MCC-8 IS INSTALLED. CHANGE OVER BLOWERS ONE AT AT TIME TO MINIMIZE DOWNTIME.
2. COORDINATE ALL DOWNTIME WITH OWNER.
3. HATCH ▨ INDICATES EXISTING EQUIPMENT TO BE DEMOLISHED UNDER THIS PROJECT.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotra

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ONE LINE DIAGRAM I - EXISTING/DEMO

STATE OF TEXAS JOSEPH J. KOTRA 56361 REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-02
OF E-17

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NOTES:

1. NEW MCC-8 SHALL BE FED OUT OF PANEL "DC" UNDER THIS CONTRACT. THIS IS TO ALLOW THE MAIN SWITCHGEAR TO BE REPLACED BY OTHERS IN A SUBSEQUENT PROJECT. DURING THE MAIN SWITCHGEAR REPLACEMENT PROJECT, PANEL "DA" AND PANEL "DC" WILL BE TEMPORARILY CONNECTED TO THE GENERATOR SWITCHGEAR.

12.47 KV ONCOR PRIMARY

POWER COMPANY 2000 KVA PAD MOUNT TRANSFORMER DELTA-WYE 5.64%IZ

8 SETS: 3-500, #3/0G, 4"C
2 SETS: 4"C EMPTY

MAIN SWITCHBOARD "MS" 4000A, 480V, 3ø, 34, 100 KAIC

1984 GE SWITCHBOARD SO#177BW64912

TO PARALLELING GEAR CONTROL & PROTECTIVE RELAYING

TO PARALLELING GEAR CONTROL & PROTECTIVE RELAYING

BREAKER POSITION STATUS TO & CONTROL FROM PARALLELING GEAR

52-U EO 4000A/3P

BREAKER POSITION STATUS TO & CONTROL FROM PARALLELING GEAR

1	2	3	4	5	6	7
1200A/3P 1200AF	1200A/3P 1000AF	1200A/3P 1000AF	800A/3P 600AF	1600A/3P 1600AF	1200A/3P 1000A	52-GM EO 2500A/3P

3 SETS: 3-500, #3/0G, 4"C

BUSDUCT

MAIN SWITCHBOARD "DA" 4000A, 480V, 3ø, 34, 100 KAIC

14	13	12	11	10	9	8	7	6	5	4	3	2	1
SPACE	SPACE	SPACE	SPACE	30A 3P	100A 3P	SPACE	400A 3P	200A 3P	225A 3P	225A 3P	225A 3P	225A 3P	225A 3P

ENGINE BUILDING

PANEL "P4"

AREA LIGHTING

PANEL "P1"

PANEL "P2"

PANEL "P3"

150 KVA, 3ø, 480-208/120V

DISTRIBUTION PANEL "DB"
600A MLO, 208V, 3ø, 4W

ENGINE BUILDING

2500A PARALLELING GEAR

CONTROL & PROTECTIVE RELAYS

800A/3P 800A/3P 800A/3P

NEW MOTOR CONTROL CENTER "MCC-8"

1600A/3P

ENGINE BUILDING BLOWER MCC

MOTOR CONTROL CENTER "MCC-3"

600A/3P

OUTDOOR NEMA 3R @ FINAL CLARIFIERS

GENERATOR SET "G2"

GENERATOR SET "G1"

MOTOR CONTROL CENTER "MCC-6"

1200A/3P

RECIRCULATION PUMP STATION

MCC-7 SLUDGE PUMP BUILDING FED OUT OF MCC-6

MOTOR CONTROL CENTER "MCC-1"

1200A/3P

LIFT STATION

MOTOR CONTROL CENTER "MCC-5"

400A/3P

DIGESTER BUILDING

MOTOR CONTROL CENTER "MCC-4"

200A/3P

NEMA 3R CHLORINE STRUCTURE & NEW PUMP STATION

MOTOR CONTROL CENTER "MCC-2"

600A/3P

HEADWORKS

MANHOLE #1

4 SETS; EACH-#600 KCMIL, #1/0G IN CABLE TRAY

DISTRIBUTION PANEL "DC"
1200A MLO, 3ø, 32, 65 KAIC
GE SPECTRA SERIES
FULLY BUSSED 44" BOX WIDTH

ENGINE BUILDING

1200A/3P 250A/3P

MS6: 3 SETS: 3-500, #3/0G, 3"C

DCT: 3-250, #4G, 3"C

PROVIDE NEW 1200 AMP BREAKER. BREAKER SHALL BE GE TYPE SK WITH LI TRIP AND 65,000 AMPS INTERRUPTING CAPACITY

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla
DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
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CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ONE LINE DIAGRAM II - MODIFIED

STATE OF TEXAS JOSEPH J. KOTRLA 56361 REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

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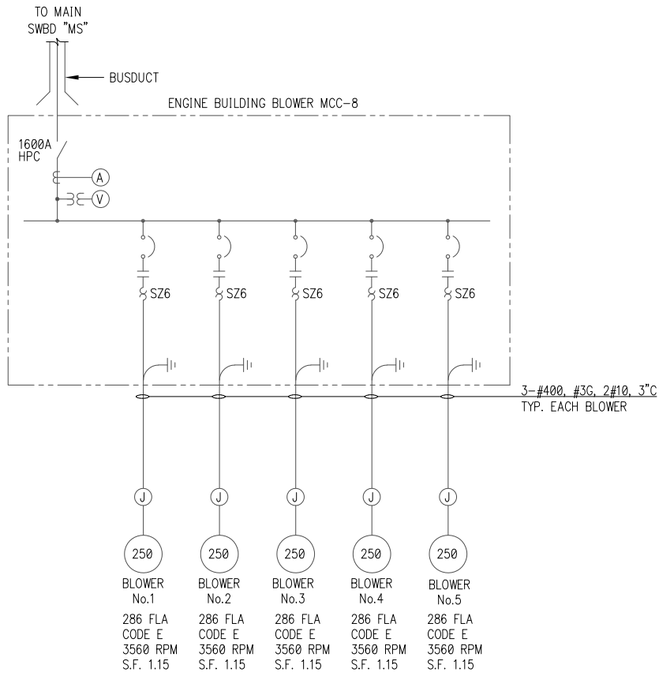
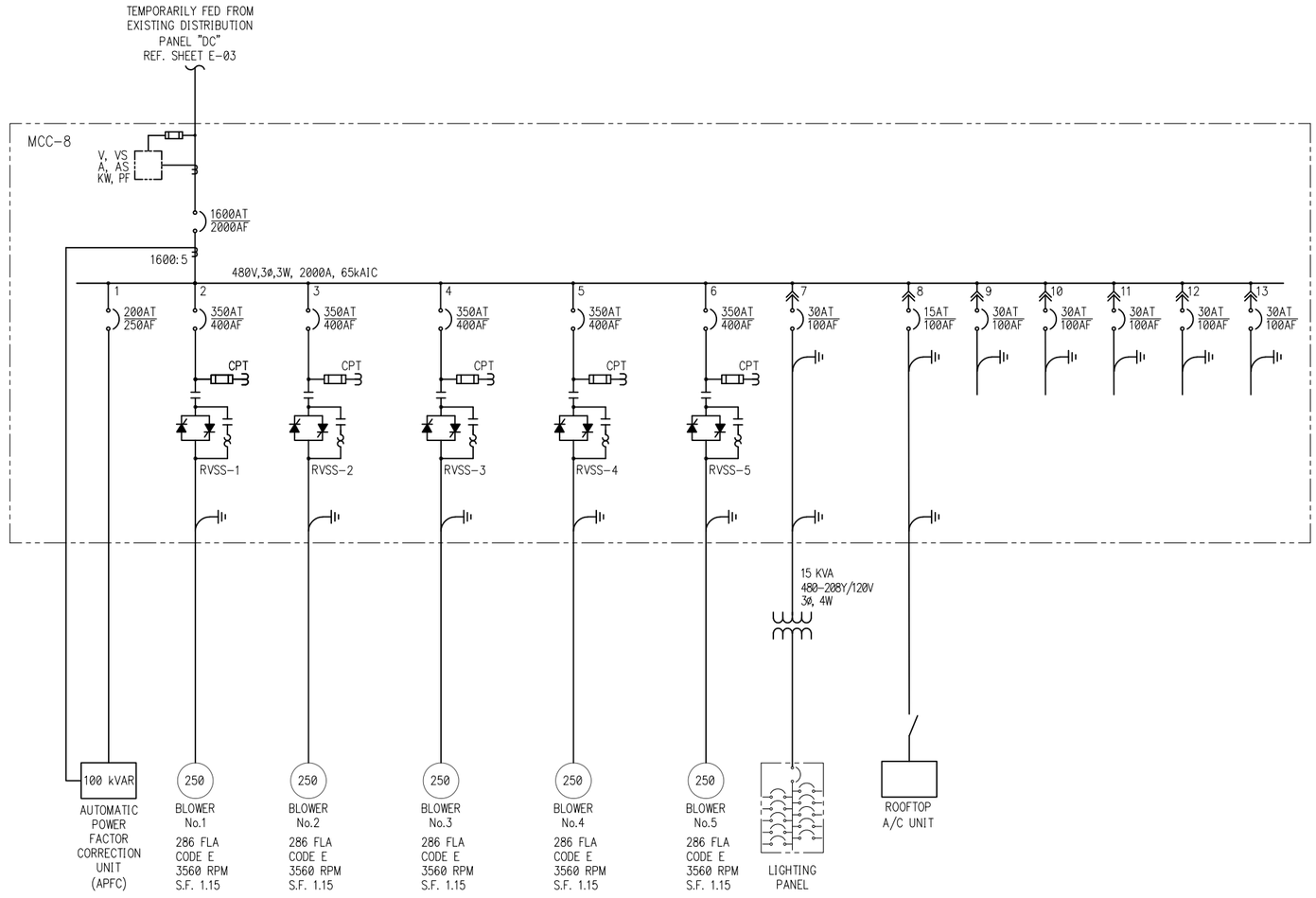


01 MCC-8 ONE LINE DIAGRAM
EXISTING/DEMO



02 MCC-8 ONE LINE DIAGRAM
MODIFIED

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Dallas, Texas F-338

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CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I
ONE LINE DIAGRAM III

STATE OF TEXAS
JOSEPH L. KOTRA
56361
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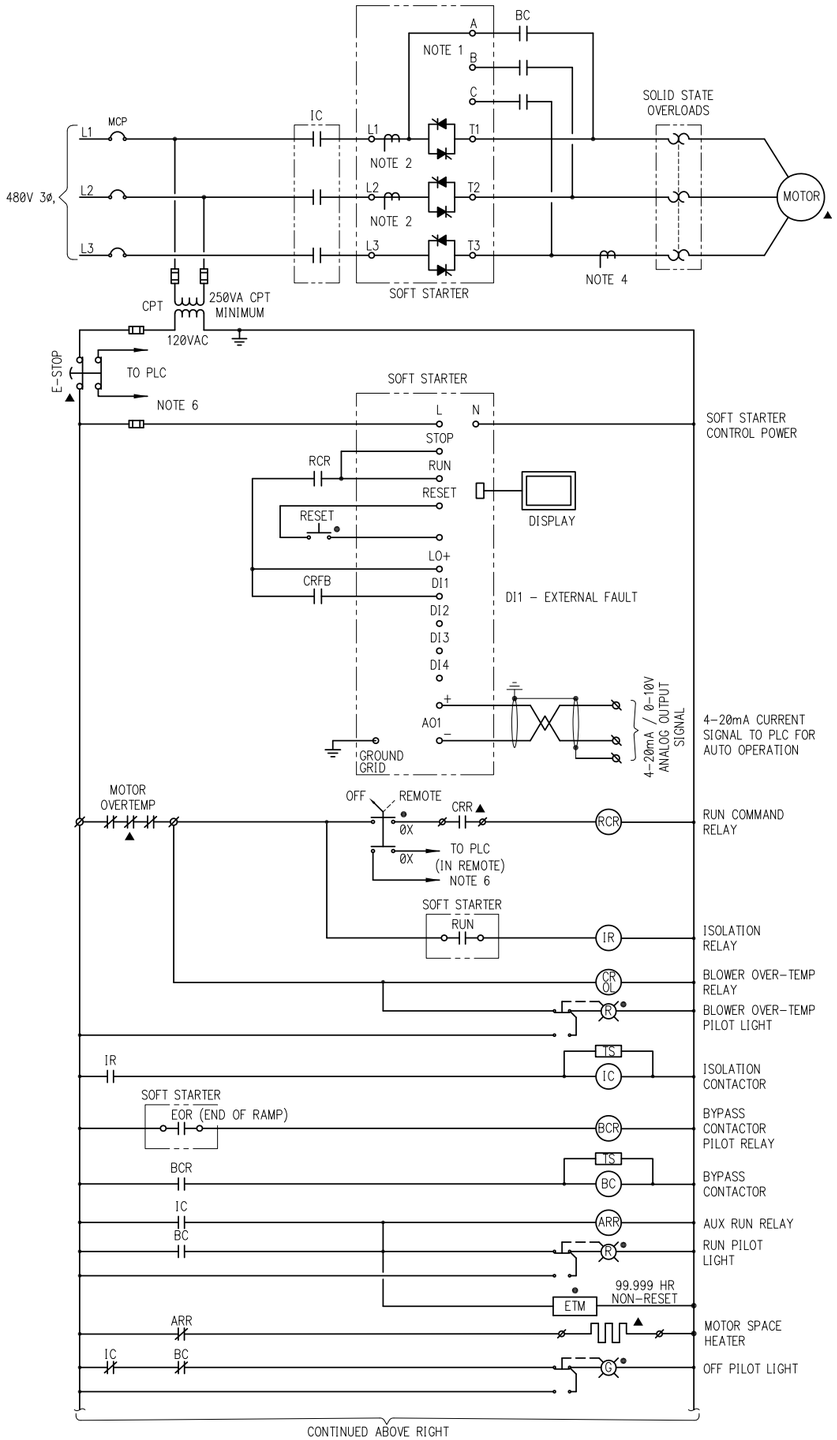
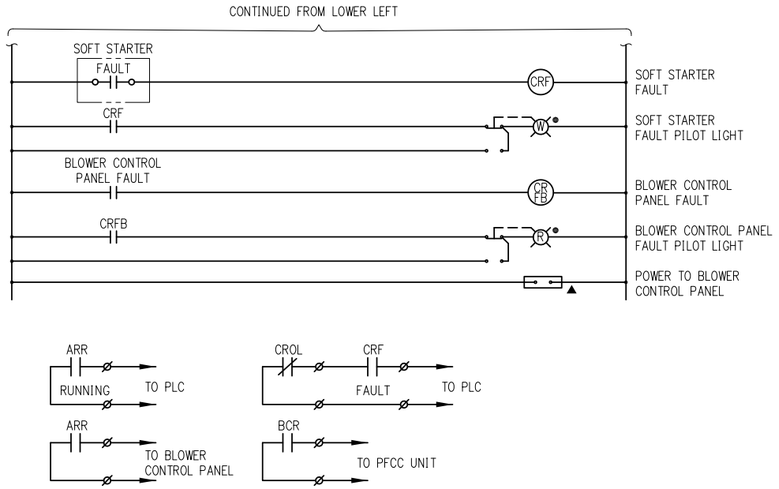


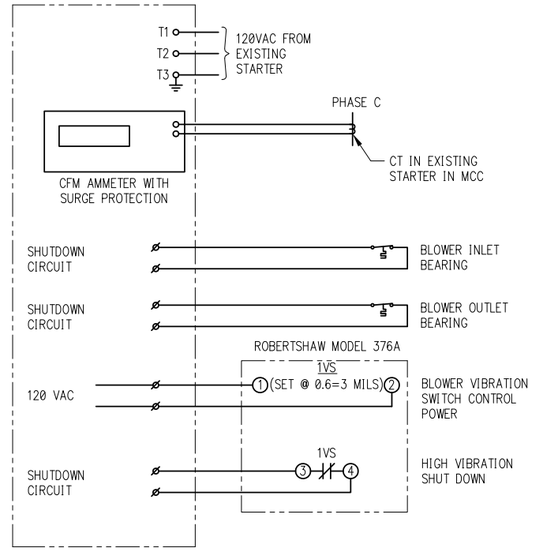


NOTE:

1. POWER POLE SHOWN IS TYPICAL FOR ALL THREE POLES.
2. INTERIOR CT FOR SOFT STARTER CONTROL & PROTECTION.
3. SOLID STATE OVERLOAD RELAY SHALL HAVE PHASE LOSS PROTECTION AND CURRENT UNBALANCE PROTECTION.
4. CT PROVIDED BY BLOWER CONTROL PANEL MANUFACTURER FOR SURGE CONTROL IN MANUAL OPERATION.
5. PROGRAM SOFT STARTER FOR 7 SECOND RAMP UP, NORMAL STOP, NO RAMP DOWN.
6. WIRE NORMALLY CLOSED CONTACT IN SERIES WITH 0X CONTACT FROM SELECTOR SWITCH.
7. PROVIDE WARNING SIGN STATING 120VAC FOREIGN VOLTAGE IS PRESENT FROM PLC ON DOOR OF EACH STARTER.

101 CONTROL SCHEMATIC – BLOWERS

EXISTING AUXILIARY BLOWER CONTROL PANEL



NOTES:

1. EXISTING AUXILIARY BLOWER CONTROL PANELS ARE IN EXISTING MCC–8 AND SHALL BE REMOVED.
2. EXISTING VIBRATION SWITCH ON EACH BLOWER SHALL BE REPLACED WITH NEW UNIT.
3. EXISTING BEARINGS WILL BE UPGRADED BY OWNER TO ACCEPT NEW RTDS FROM NEW BLOWER CONTROL PANEL. COORDINATE WITH OWNER.
4. INLET VALVE IS A BRAY CONTROLS SERIES 79 WITH A SERVO NXT MODULATING CONTROLLER. THE VALVE IS CONTROLLED IN MANUAL BY A MANUAL OVERRIDE LEVER.

102 EXISTING AUXILIARY BLOWER CONTROL PANEL

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

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DATE: AUG 10, 2020

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CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
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WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

CONTROL SCHEMATICS I

STATE OF TEXAS
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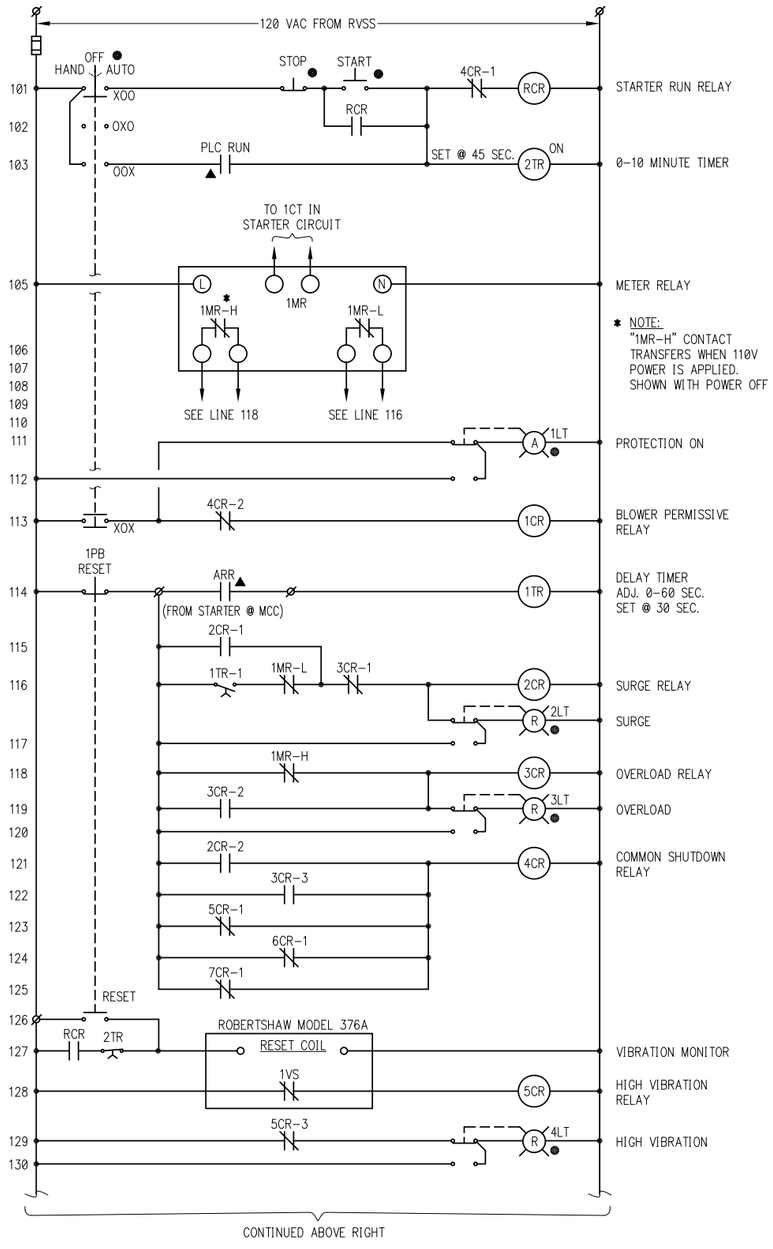
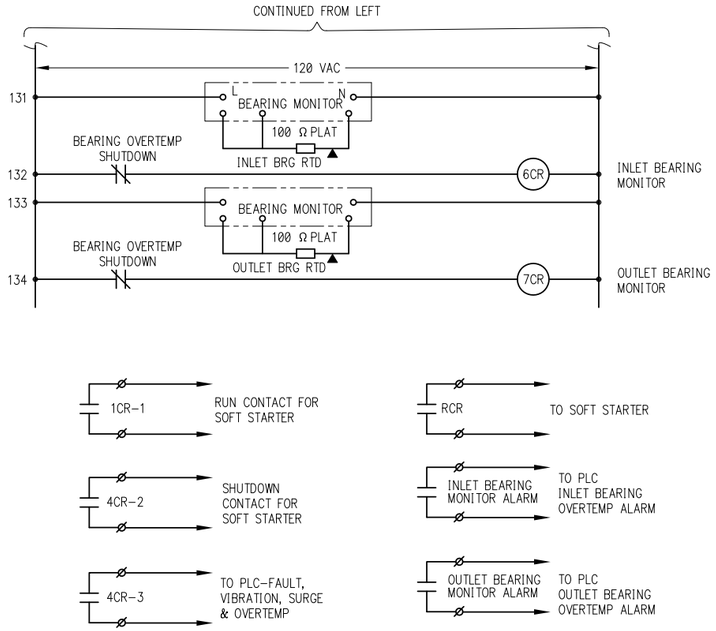
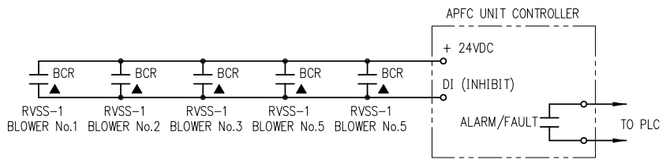


* NOTE:
"1MR-H" CONTACT TRANSFERS WHEN 110V POWER IS APPLIED. SHOWN WITH POWER OFF



NOTES:
1. ALL CONTACTS ARE SHOWN WITH POWER OFF. 1CR IS ENERGIZED FOR NORMAL OPERATION.
2. RESET COIL IS ALSO USED TO INHIBIT VIBRATION SWITCH ON STARTUP.
3. PROVIDE WARNING SIGN STATING 120VAC FOREIGN VOLTAGE IS PRESENT FROM PLC ON DOOR OF EACH BLOWER CONTROL PANEL.

201 SCHEMATIC – NEW BLOWER CONTROL PANEL



NOTES:
1. APFCC UNTIL SHALL BE TURNED OFF OR INHIBITED FROM OPERATION WHENEVER A BLOWER SOFT STARTER IS RAMPING UP. RAMP DOWN FEATURE WILL NOT BE USED. NORMAL FREE WHEEL STOP.
2. PROVIDE WARNING SIGN STATING 120VAC FOREIGN VOLTAGE IS PRESENT FROM PLC ON DOOR OF EACH STARTER.

202 SCHEMATIC – APFC UNIT

SEQUENCE OF OPERATION – MANUAL MODE

PUSH START PUSHBUTTON 2PB. RELAY 1CR BECOMES ENERGIZED, CLOSING 1CR-1 AND ALLOWING BLOWER STARTER TO BE ENERGIZED.

WHEN BLOWER SOFT STARTER IS ENERGIZED, CONTACT ARR CLOSES. TIMER 1TR IS ENERGIZED AND STARTS ITS PRE-SET CYCLE (ADJUSTABLE 0-60 SEC.). AFTER BLOWER MOTOR COMES UP TO RATED SPEED, BUTTERFLY VALVE ON BLOWER INLET SHOULD BE OPENED. WHEN SURGE POINT IS PASSED, METER RELAY 1MR IS ENERGIZED, WHICH OPENS CONTACT 1MR-L.

SURGE

WHEN VOLUMETRIC DEMAND OF BLOWER IS REDUCED TO APPROXIMATELY THE SURGE POINT, METER RELAY 1MR SENSES THE REDUCED MOTOR CURRENT AND IS DE-ENERGIZED. CONTACT 1MR-L CLOSES, ENERGIZING 2CR AND PILOT LIGHT 2LT. CONTACT 2CR-2 CLOSES TO ENERGIZE 4CR. CONTACT 4CR-1 OPENS TO DE-ENERGIZE 1CR WHICH SHUTS DOWN BLOWER. CONTACT 4CR-2 CLOSES TO ENERGIZE REMOTE CUSTOMER ALARM AND 1CR-1 OPENS TO PREVENT ANY MANUAL RESTART OF BLOWER MOTOR UNTIL CIRCUIT HAS BEEN RESET. PUSHING RESET PUSHBUTTON 1PB DE-ENERGIZES TIMER 1TR AND RELAYS 2CR, 3CR AND 4CR. CONTROL CIRCUIT IS NOW RESET TO ITS NORMAL PRE-START POSITION.

OVERLOAD

WHEN VOLUMETRIC DEMAND OF BLOWER INCREASES BEYOND THE OVERLOAD SETTING, METER RELAY 1MR SENSES THE INCREASED MOTOR CURRENT AND IS DE-ENERGIZED. CONTACT 1MR-H CLOSES, ENERGIZING 3CR AND PILOT LIGHT 3LT. CONTACT 3CR-3 CLOSES TO ENERGIZE 4CR. CONTACT 4CR-1 OPENS TO DE-ENERGIZE 1CR, WHICH SHUTS DOWN BLOWER. CONTACT 4CR-2 CLOSES TO ENERGIZE REMOTE CUSTOMER ALARM AND 1CR-1 OPENS TO PREVENT ANY MANUAL RESTART OF BLOWER MOTOR UNTIL CIRCUIT HAS BEEN RESET. 3CR IS DE-ENERGIZED BY PUSHING RESET BUTTON MOMENTARILY. CONTROL CIRCUIT IS NOW RESET TO ITS NORMAL PRE-START POSITION.

VIBRATION

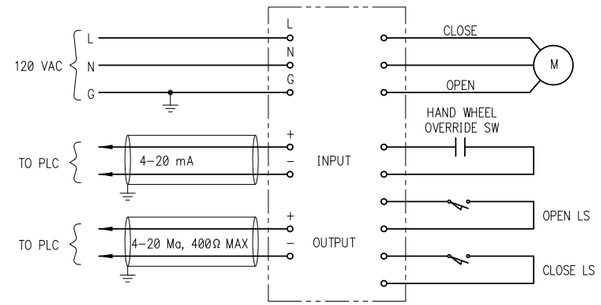
IF THE VIBRATION SENSOR SWITCH 1VS OPENS, 5CR IS DE-ENERGIZED, WHICH OPENS THE BLOWER START CIRCUIT, SHUTTING DOWN THE BLOWER AND ENERGIZING PILOT LIGHT 4LT. CONTACT 4CR-2 CLOSES TO ENERGIZE REMOTE CUSTOMER ALARM AND 1CR-1 OPENS TO PREVENT ANY MANUAL RESTART. 5CR IS ENERGIZED BY PUSHING RESET BUTTON MOMENTARILY. CONTROL CIRCUIT IS NOW RESET TO ITS NORMAL PRE-START POSITION.

BEARING TEMPERATURE

THE BEARING MONITOR UNIT MONITORS THE INLET BEARING RTD AND THE OUTLET BEARING RTD. THE BEARING MONITOR HAS A DISPLAY TO INDICATE EACH BEARING TEMPERATURE AND HAS ALARM AND SHUTDOWN INDICATION LIGHTS. THE SETPOINT FOR THE ALARM AND SHUTDOWN IS PROGRAMMABLE. THE BEARING TEMPERATURE SHUTDOWN CONTACTS ARE ACTIVE IN HAND AND AUTO.

SEQUENCE OF OPERATION – AUTO MODE

IN AUTOMATIC MODE, THE BLOWER IS STOPPED AND STARTED BY THE PLC AND THE PLC CONTROLS THE POSITION OF THE INLET VALVE THROUGH A 4-20mA POSITION AND 4-20mA POSITION FEEDBACK SIGNAL.



NOTES:
1. BLOWER INLET VALVE IS EXISTING AND TYPICAL FOR EACH OF 5 BLOWERS.
2. VALVE CAN BE OPERATED MANUALLY THROUGH HAND WHEEL OR REMOTELY THROUGH SCADA

203 SCHEMATIC – BLOWER INLET VALVE

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla
DATE: AUG 10, 2020
McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

CONTROL SCHEMATICS II

STATE OF TEXAS JOSEPH J. KOTRLA 56361 REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-06
OF E-17

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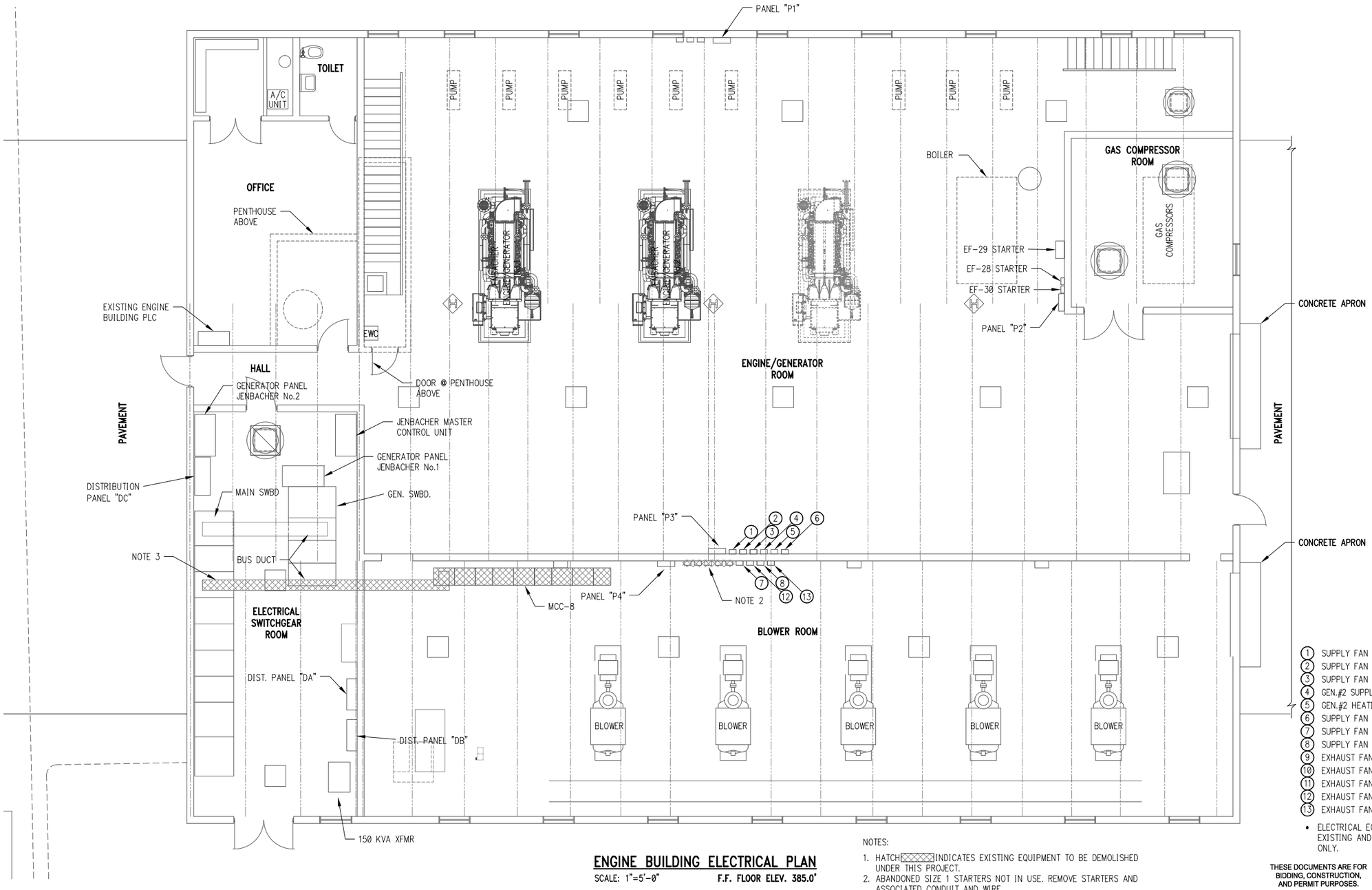

ENGINE BUILDING ELECTRICAL PLAN

SCALE: 1"=5'-0" F.F. FLOOR ELEV. 385.0'

0 5 10

SCALE IN FEET

NOTES:

1. HATCH ▨ INDICATES EXISTING EQUIPMENT TO BE DEMOLISHED UNDER THIS PROJECT.
2. ABANDONED SIZE 1 STARTERS NOT IN USE. REMOVE STARTERS AND ASSOCIATED CONDUIT AND WIRE.
3. PROVIDE FABRICATED CLOSURE PLATE FOR BUS DUCT OPENING IN SWITCHBOARD. FABRICATE FROM 10 GAUGE STEEL. PAINT ANSI 61 GRAY.

1. SUPPLY FAN SF-1 STARTER – EXISTING
2. SUPPLY FAN SF-2 STARTER – EXISTING
3. SUPPLY FAN SF-3 STARTER – EXISTING
4. GEN.#2 SUPPLY PREHEAT PUMP STARTER – EXISTING
5. GEN.#2 HEATING ELEMENTS – EXISTING
6. SUPPLY FAN SF-4 STARTER – EXISTING
7. SUPPLY FAN SF-5 STARTER – EXISTING
8. SUPPLY FAN SF-6 STARTER – EXISTING
9. EXHAUST FAN EF-25 STARTER – EXISTING
10. EXHAUST FAN EF-26 STARTER – EXISTING
11. EXHAUST FAN EF-27 STARTER – EXISTING
12. EXHAUST FAN EF-31 STARTER – EXISTING
13. EXHAUST FAN EF-32 STARTER – EXISTING

- ELECTRICAL EQUIPMENT LISTED ABOVE IS EXISTING AND IS SHOWN FOR REFERENCE ONLY.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Krock
DATE: AUG 10, 2020
McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ENGINE BUILDING ELECTRICAL PLAN - EXISTING/DEMO

STATE OF TEXAS · JOSEPH M. KROCK · 56361 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-07
OF E-17

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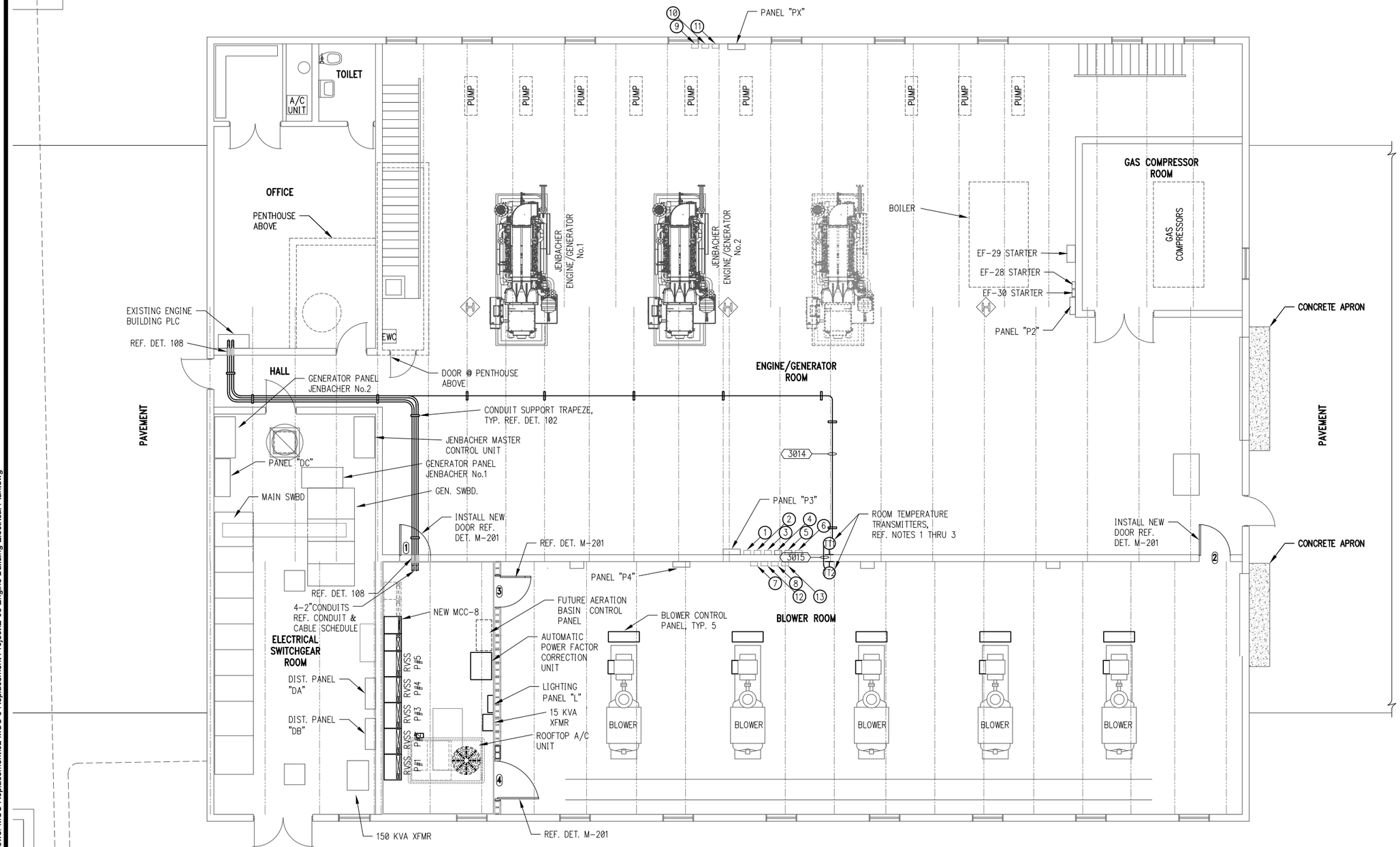

1. SUPPLY FAN SF-1 STARTER – EXISTING
2. SUPPLY FAN SF-2 STARTER – EXISTING
3. SUPPLY FAN SF-3 STARTER – EXISTING
4. GEN.#2 SUPPLY PREHEAT PUMP STARTER – EXISTING
5. GEN.#2 HEATING ELEMENTS – EXISTING
6. SUPPLY FAN SF-4 STARTER – EXISTING
7. SUPPLY FAN SF-5 STARTER – EXISTING
8. SUPPLY FAN SF-6 STARTER – EXISTING
9. EXHAUST FAN EF-25 STARTER – EXISTING
10. EXHAUST FAN EF-26 STARTER – EXISTING
11. EXHAUST FAN EF-27 STARTER – EXISTING
12. EXHAUST FAN EF-31 STARTER – EXISTING
13. EXHAUST FAN EF-32 STARTER – EXISTING

- ELECTRICAL EQUIPMENT LISTED ABOVE IS EXISTING AND IS SHOWN FOR REFERENCE ONLY.

ENGINE BUILDING ELECTRICAL PLAN

SCALE: 1"=5'-0"

0 5 10

SCALE IN FEET

NOTES:

1. ROOM TEMPERATURE TRANSMITTERS SHALL BE ROSEMOUNT SERIES 2088 WITH 214C SERIES RTD SENSOR. PROVIDE ROSEMOUNT MODEL NO. 2088G2S22A1M4D4S5T1Q4 OR EQUAL.
2. PROVIDE WALL MOUNTING BRACKET. MOUNT 50ø ABOVE FINISHED FLOOR.
3. CONFIGURE TRANSMITTER TO PRODUCE A 4-20 MA SIGNAL REPRESENTATING A RANGE OF 0 TO 150 DEGREES F.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotra

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

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CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ENGINE BUILDING ELECTRICAL PLAN

STATE OF TEXAS JOSEPH J. KOTRA 56361 REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-08
OF E-17

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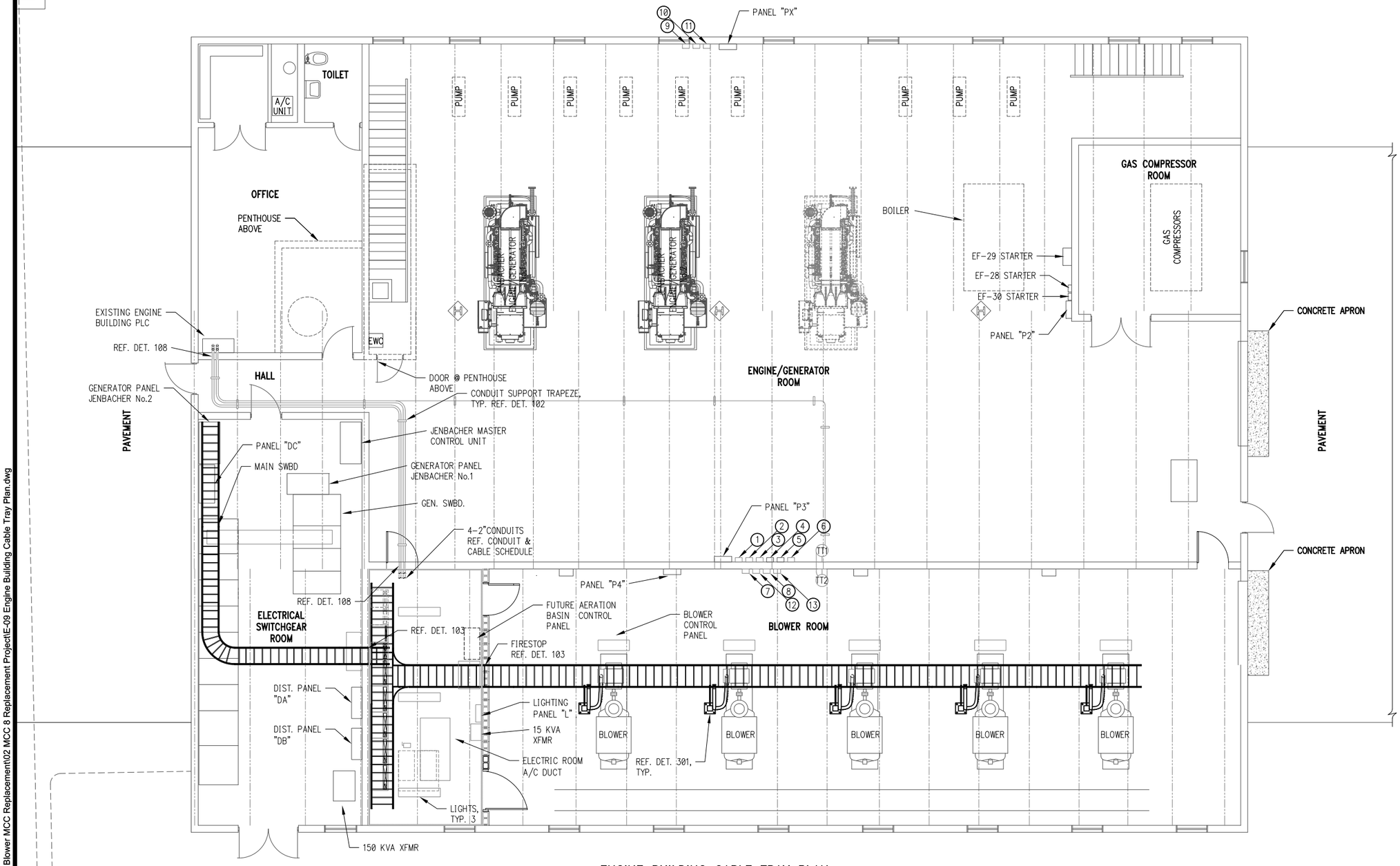

1. SUPPLY FAN SF-1 STARTER – EXISTING
2. SUPPLY FAN SF-2 STARTER – EXISTING
3. SUPPLY FAN SF-3 STARTER – EXISTING
4. GEN.#2 SUPPLY PREHEAT PUMP STARTER – EXISTING
5. GEN.#2 HEATING ELEMENTS – EXISTING
6. SUPPLY FAN SF-4 STARTER – EXISTING
7. SUPPLY FAN SF-5 STARTER – EXISTING
8. SUPPLY FAN SF-6 STARTER – EXISTING
9. EXHAUST FAN EF-25 STARTER – EXISTING
10. EXHAUST FAN EF-26 STARTER – EXISTING
11. EXHAUST FAN EF-27 STARTER – EXISTING
12. EXHAUST FAN EF-31 STARTER – EXISTING
13. EXHAUST FAN EF-32 STARTER – EXISTING

- ELECTRICAL EQUIPMENT LISTED ABOVE IS EXISTING AND IS SHOWN FOR REFERENCE ONLY.

ENGINE BUILDING CABLE TRAY PLAN

SCALE: 1"=5'-0"

0 5 10

SCALE IN FEET

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Krock

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
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Dallas, Texas F-338

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CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ENGINE BUILDING CABLE TRAY PLAN

STATE OF TEXAS · JOSEPH M. KROCK · 56361 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-09
OF E-17

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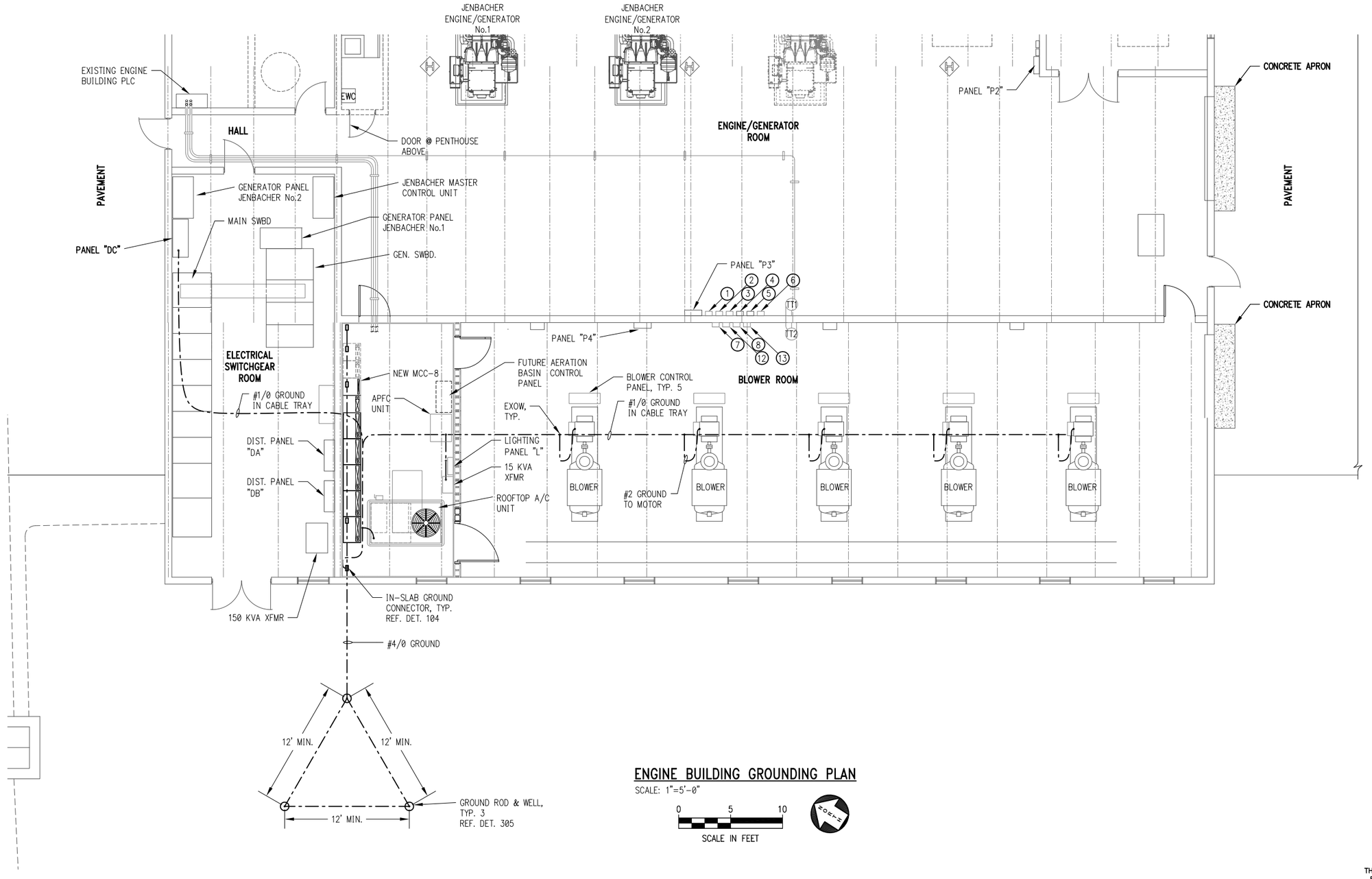

1. SUPPLY FAN SF-1 STARTER – EXISTING
2. SUPPLY FAN SF-2 STARTER – EXISTING
3. SUPPLY FAN SF-3 STARTER – EXISTING
4. GEN.#2 SUPPLY PREHEAT PUMP STARTER – EXISTING
5. GEN.#2 HEATING ELEMENTS – EXISTING
6. SUPPLY FAN SF-4 STARTER – EXISTING
7. SUPPLY FAN SF-5 STARTER – EXISTING
8. SUPPLY FAN SF-6 STARTER – EXISTING
9. EXHAUST FAN EF-25 STARTER – EXISTING
10. EXHAUST FAN EF-26 STARTER – EXISTING
11. EXHAUST FAN EF-27 STARTER – EXISTING
12. EXHAUST FAN EF-31 STARTER – EXISTING
13. EXHAUST FAN EF-32 STARTER – EXISTING

- ELECTRICAL EQUIPMENT LISTED ABOVE IS EXISTING AND IS SHOWN FOR REFERENCE ONLY.

ENGINE BUILDING GROUNDING PLAN

SCALE: 1"=5'-0"

0 5 10

SCALE IN FEET

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Joseph Krock

DATE: AUG 10, 2020

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CONSULTING ENGINEERS
Dallas, Texas F-338

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CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ENGINE BUILDING GROUNDING PLAN

STATE OF TEXAS · JOSEPH M. KROCK · 56361 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-10
OF E-17

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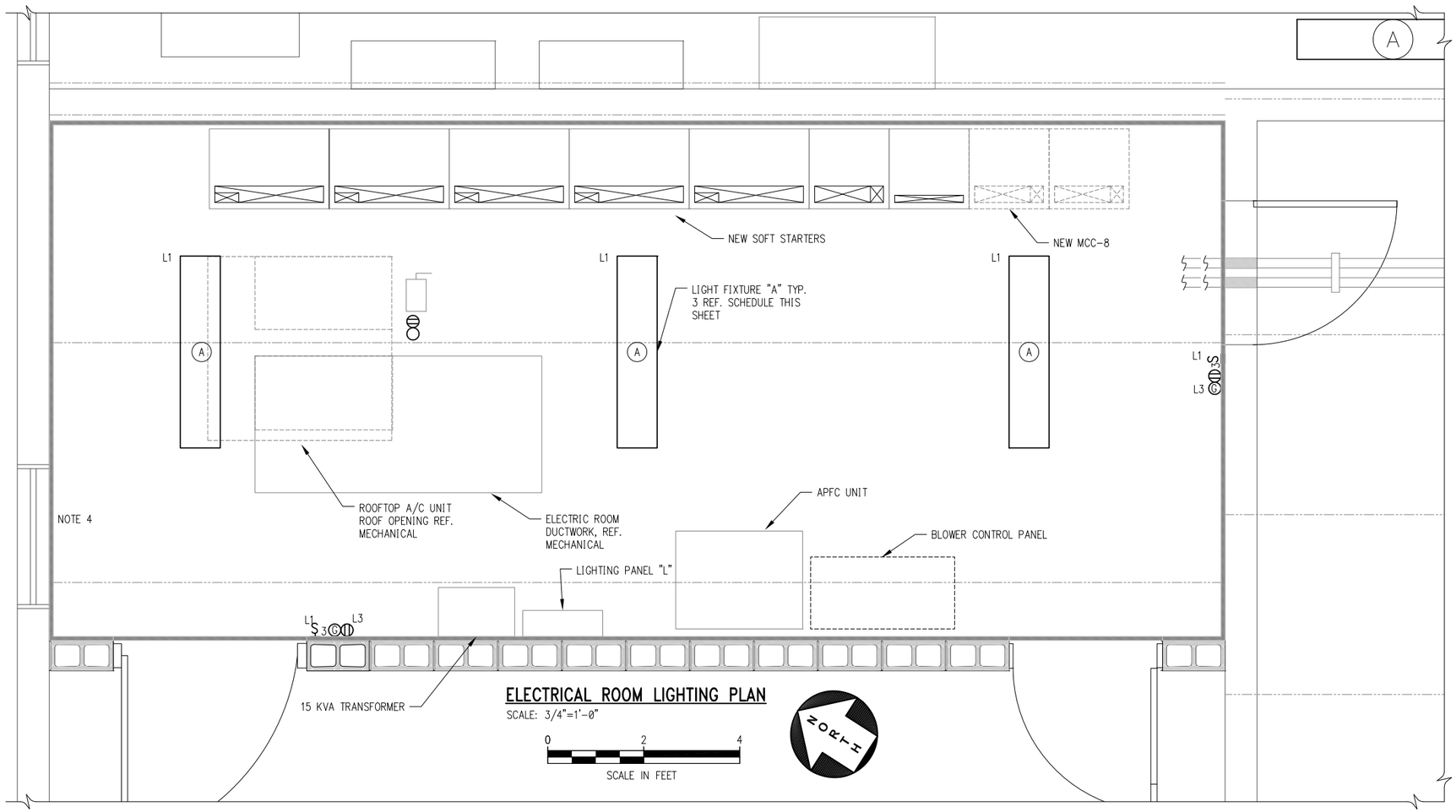

ELECTRICAL ROOM LIGHTING PLAN

SCALE: 3/4"=1'-0"

0 2 4

SCALE IN FEET

NOTES:

1. A NUMBER BESIDE A LIGHT FIXTURE, CIRCUIT OUTLET OR OTHER DEVICES INDICATES A PANEL BOARD BRANCH CIRCUIT CONNECTION. WHERE CONDUIT AND WIRE HAVE NOT BEEN SHOWN, FURNISH AND INSTALL CONDUIT AND WIRE TO PANEL BOARD. MATERIALS AND INSTALLATION SHALL BE PER THE SPECIFICATIONS. CONDUIT SHALL BE CODE SIZED PER THE NEC, 3/4" MINIMUM. WIRE SHALL BE CODE SIZED PER THE BREAKER THAT THE BRANCH CIRCUIT IS TO BE CONNECTED TO ON THE PANEL BOARD SCHEDULE. MINIMUM WIRE SIZE SHALL BE #12 AWG FOR ALL BRANCH CIRCUITS.
2. ALL RECEPTACLES SHALL BE MOUNTED 24"AFF. SWITCHES & T'STATS MOUNTED AT 4'-0" AFF.
3. INSTALL JUMPERS FOR OVERLOADS AT T'STAT.
4. EXISTING LOUVER IS CLOSED OFF AND SEALED.

208/120V PANELBOARD

NUMBER L
LOCATION NEW ELECTRIC ROOM
FED FROM 15 KVA TRANSFORMER

VOLTS 208/120V 3Ø 4 WIRE
SIZE: 40 AMP MCB

CIRCUIT DESCRIPTION	CKT BKR	CKT #	CKT #	CKT BKR	CIRCUIT DESCRIPTION
ELECTRIC ROOM LIGHTS	20/1	1	2	20/1	BLOWER ROOM LIGHTS
ELECTRIC ROOM RECEPTACLES	20/1	3	4	20/1	INLET ACTUATOR, BLOWER No.1
INLET ACTUATOR, BLOWER No.2	20/1	5	6	20/1	INLET ACTUATOR, BLOWER No.3
INLET ACTUATOR, BLOWER No.4	20/1	7	8	20/1	INLET ACTUATOR, BLOWER No.5
SPARE	20/1	9	10	20/1	SPARE
SPARE	20/1	11	12	20/1	SPARE
SPARE	20/1	13	14	20/1	SPARE
SPARE	20/1	15	16	20/1	SPARE
SPARE	20/1	17	18	20/1	SPARE
SPARE	20/1	19	20	20/1	SPARE
	NEUTRAL			GROUND	

LIGHT FIXTURE SCHEDULE

MARK	DESCRIPTION	LAMPS	VOLTS	MFGR	CATALOG NUMBER	MH	COMMENTS
A	LOW PROFILE LED WRAPAROUND	LED	120	LITHONIA	LBL4/4800LM/80CRI/40K/MIN10/GZT/MVOLT/E10WLCP	10.5 FT.	NOTE 1

NOTES:
1. PROVIDE E10WLCP 10 WATT EMERGENCY DRIVER ON "A" TYPE FIXTURES INSIDE ELECTRIC ROOM..

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla
DATE: AUG 10, 2020
McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

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CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ELECTRICAL ROOM LIGHTING PLAN

STATE OF TEXAS
JOSEPH V. KOTRLA
56361
REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO.
E-11
OF E-17

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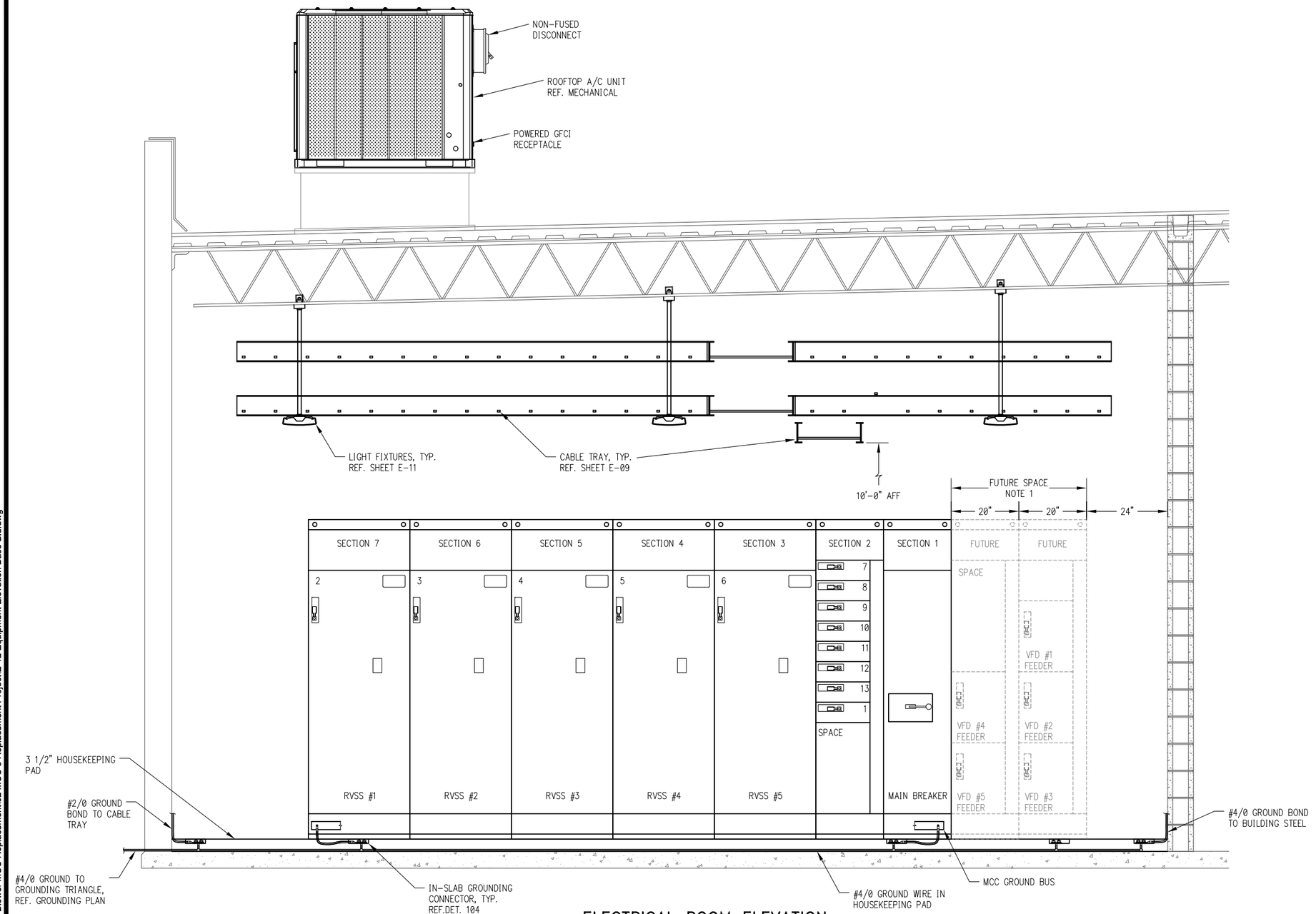

ELECTRICAL ROOM ELEVATION

SCALE: 3/4"=1'-0"

0 2 4

SCALE IN FEET

NOTES:

1. LEAVE SPACE FOR FUTURE SECTIONS AS SHOWN.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

EQUIPMENT ELEVATION

STATE OF TEXAS JOSEPH J. KOTRLA 56361 REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. E-12
OF E-17

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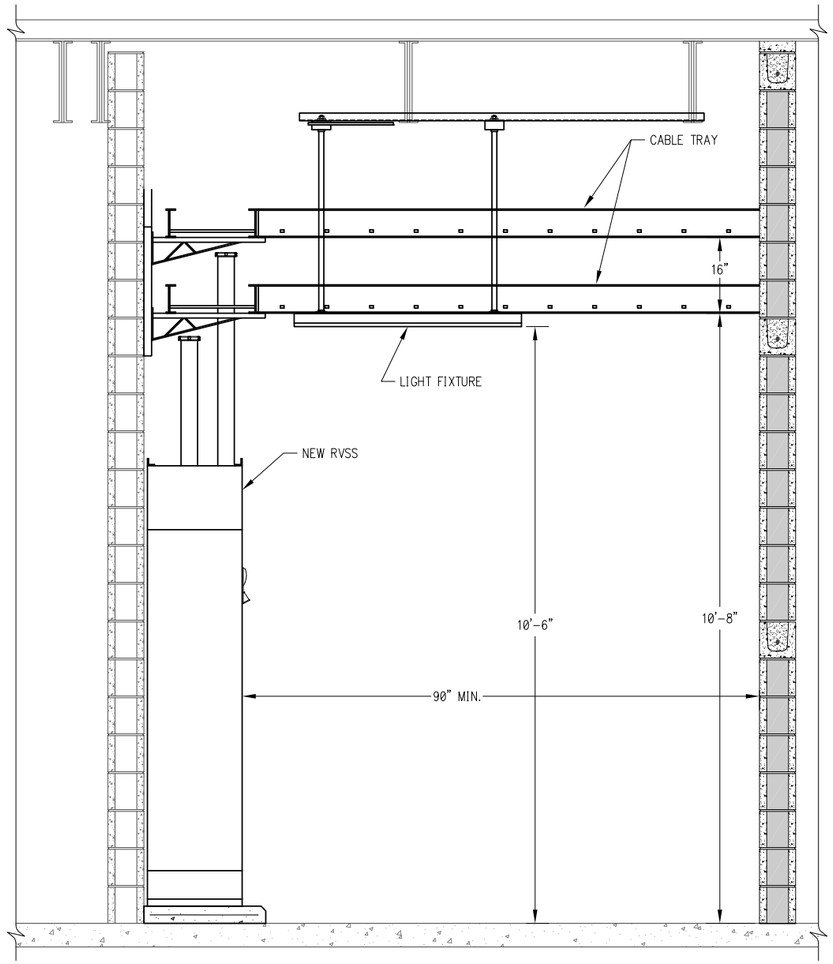

A E-0X ELECTRICAL ROOM

0 2 8

SCALE IN FEET

CONDUIT AND CABLE SCHEDULE

VOLTAGE	TAG	WIRING	CONDUIT	SOURCE	DESTINATION	COMMENTS
480 V	1000	4 SETS EACH: 3 #600, #4/0G	4-4"	DISTRIBUTION PANEL DC	MCC-8	
480 V	1001	3 #3/0, #4G	2"	MCC-8	APFCC UNIT	
480 V	1002	3 #500, #3G	3"	MCC-8	BLOWER NO. 1	
480 V	1003	3 #500, #3G	3"	MCC-8	BLOWER NO. 2	
208 V	1004	3 #500, #3G	3"	MCC-8	BLOWER NO. 3	
480 V	1005	3 #500, #3G	3"	MCC-8	BLOWER NO. 4	
480 V	1006	3 #500, #3G	3"	MCC-8	BLOWER NO. 5	
480 V	1007	3 #10, #10G	1"	MCC-8	15 KVA TRANSFORMER	
480 V	1008	3 #10, #10G	1"	MCC-8	ROOFTOP AC UNIT	
480 V	1009					TAG RESERVED FOR FUTURE USE
480 V	1010					TAG RESERVED FOR FUTURE USE
480 V	1011					TAG RESERVED FOR FUTURE USE
208 V	2000	3 #6, #6N, #6G	1"	15 KVA TRANSFORMER	PANEL L8	
120 V	2001	3C#10	1"	MCC-8	APFCC UNIT	
120 V	2002	3C#10, 12C #14	2"	MCC-8 RVSS-1	BLOWER NO. 1 CONTROL PANEL/BLOWER	
120 V	2003	3C#10, 12C #14	2"	MCC-8 RVSS-2	BLOWER NO. 2 CONTROL PANEL/BLOWER	
120 V	2004	3C#10, 12C #14	2"	MCC-8 RVSS-3	BLOWER NO. 3 CONTROL PANEL/BLOWER	
120 V	2005	3C#10, 12C #14	2"	MCC-8 RVSS-4	BLOWER NO. 4 CONTROL PANEL/BLOWER	
120 V	2006	3C#10, 12C #14	2"	MCC-8 RVSS-5	BLOWER NO. 5 CONTROL PANEL/BLOWER	
	2007					
	2008					
120 V	2009	2C#12, #12G	1"	PANEL L	BLOWER INLET VALVE NO. 1	
120 V	2010	2C#12, #12G	1"	PANEL L	BLOWER INLET VALVE NO. 2	
120 V	2011	2C#12, #12G	1"	PANEL L	BLOWER INLET VALVE NO. 3	
120 V	2012	2C#12, #12G	1"	PANEL L	BLOWER INLET VALVE NO. 4	
120 V	2013	2C#12, #12G	1"	PANEL L	BLOWER INLET VALVE NO. 5	
120 V	2014	2C#12, #12G	1"	PANEL L	ROOF TOP AC UNIT RECEPTACLE	
	2015					
24 VDC	3000	7C#14	1"	MCC-8	APFCC	INHIBIT CONTACT FROM RVSS-1 THRU RVSS-5
24 VDC	3001	3C#14	1"	APFCC	PLC	ALARM CONTACT NOTE 2
24 VDC	3002	30#14, #14G	2"	MCC-8	PLC	ALARM & STATUS FROM RVSS-1 THRU RVSS-5
24 VDC	3003	5 - 2CS#16	2"	MCC-8	PLC	CURRENT SIGNAL FROM RVSS-1 THRU RVSS-5
24 VDC	3004	7C#14	1"	BLOWER NO. 1 CONTROL PANEL	PLC	STATUS & ALARM NOTE 2
24 VDC	3005	7C#14	1"	BLOWER NO. 2 CONTROL PANEL	PLC	STATUS & ALARM NOTE 2
24 VDC	3006	7C#14	1"	BLOWER NO. 3 CONTROL PANEL	PLC	STATUS & ALARM NOTE 2
24 VDC	3007	7C#14	1"	BLOWER NO. 4 CONTROL PANEL	PLC	STATUS & ALARM NOTE 2
24 VDC	3008	7C#14	1"	BLOWER NO. 5 CONTROL PANEL	PLC	STATUS & ALARM NOTE 2
24 VDC	3009	2 - 2CS#16	1"	BLOWER NO. 1 INLET VALVE	PLC	POSITION AND POSTION FEEDBACK NOTE 3
24 VDC	3010	2 - 2CS#16	1"	BLOWER NO. 2 INLET VALVE	PLC	POSITION AND POSTION FEEDBACK NOTE 3
24 VDC	3011	2 - 2CS#16	1"	BLOWER NO. 3 INLET VALVE	PLC	POSITION AND POSTION FEEDBACK NOTE 3
24 VDC	3012	2 - 2CS#16	1"	BLOWER NO. 4 INLET VALVE	PLC	POSITION AND POSTION FEEDBACK NOTE 3
24 VDC	3013	2 - 2CS#16	1"	BLOWER NO. 5 INLET VALVE	PLC	POSITION AND POSTION FEEDBACK NOTE 3
4-20mA	3014	2 - 2CS#16	3/4"	PLC	ENGINE ROOM TEMP. XMTR TT-1	ENGINE ROOM TEMPERATURE
4-20mA	3015	1 - 2CS#16	3/4"	ENGINE ROOM TEMP. XMTR TT-1	BLOWER ROOM TEMP. XMTR TT-2	BLOWER ROOM TEMPERATURE

NOTES:

1. CONDUIT SIZE IS INDICATED ONLY FOR WHEN CABLE IS OUTSIDE OF CABLE TRAY.
2. 1"C IS FOR EQUIPMENT END. ONCE IN CABLE TRAY IN ELECTRIC ROOM, COMBINE AND RUN 2"C TO EXISTING PLC.
3. 1"C IS FOR VALVE END. ONCE IN CABLE TRAY IN ELECTRIC ROOM, COMBINE AND RUN 2"C TO EXISTING PLC.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

SECTIONS & SCHEDULES

STATE OF TEXAS
JOSEPH J. KOTRLA
56361
REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO.
E-13
OF E-17

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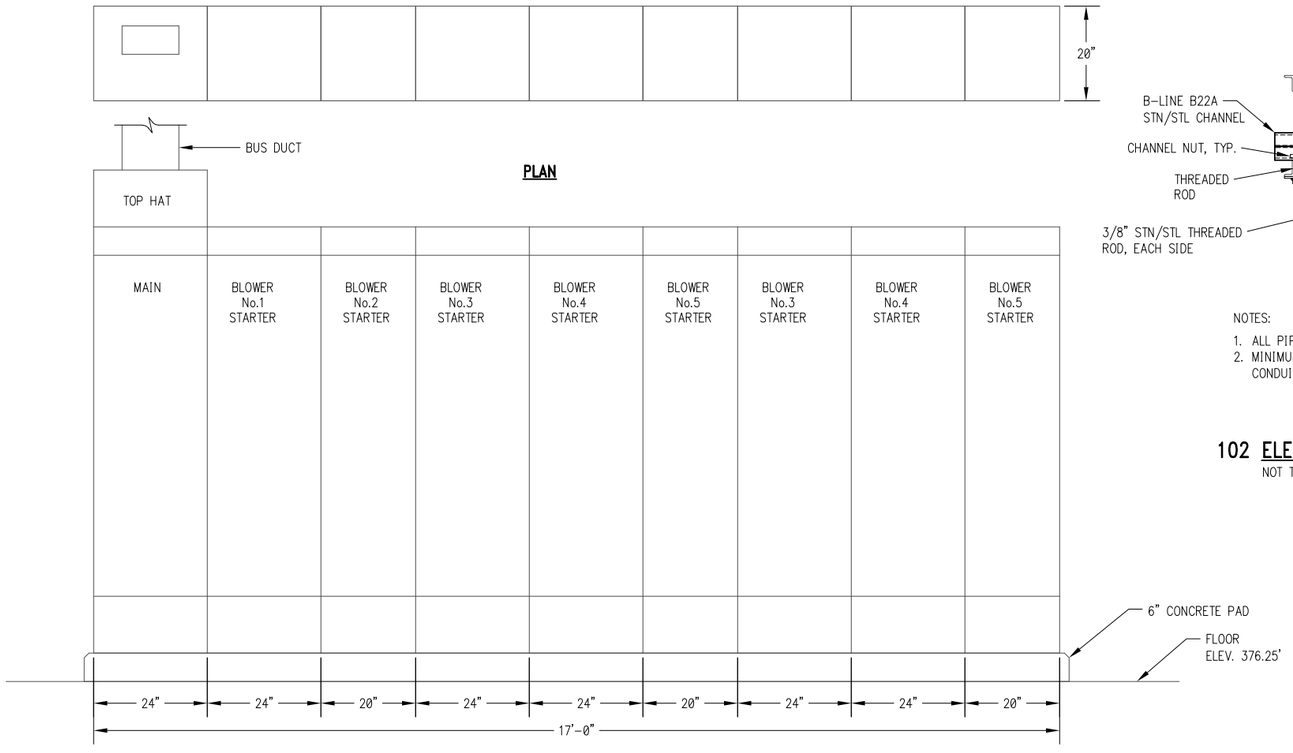


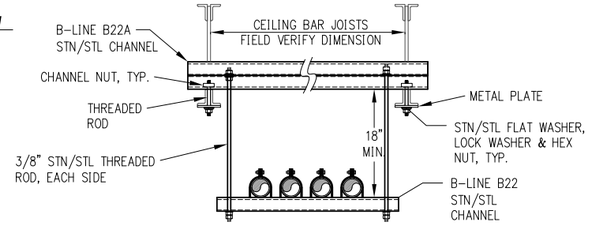
PLAN

NOTES:

1. MCC-8 SHOWN FOR REFERENCE ONLY AND IS TO BE REMOVED UNDER THIS PROJECT.

101 EXISTING MCC-8 ELEVATION

NOT TO SCALE

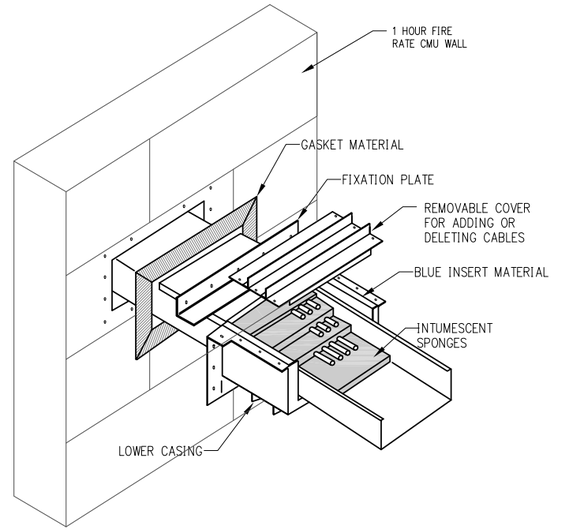


NOTES:

1. ALL PIPE CLAMPS, BOLTS AND NUTS SHALL BE STAINLESS STEEL.
2. MINIMUM 1" MINIMUM SPACING BETWEEN 1 1/2" AND LARGER CONDUITS.

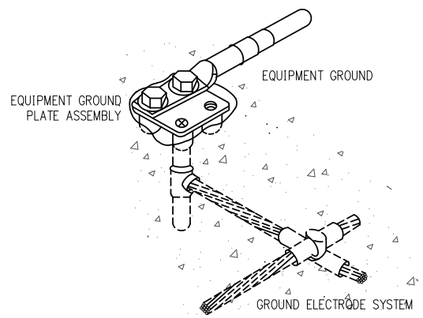
102 ELECTRICAL CONDUIT HANGER TRAPEZE

NOT TO SCALE



103 FIRESTOP / WEATHERPROOF CABLE TRAY

NOT TO SCALE

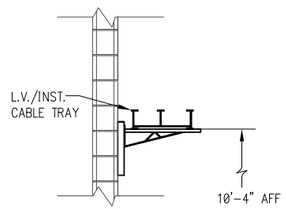


NOTES:

1. CAD WELD GROUND WIRE TO REBAR AT EACH VG.

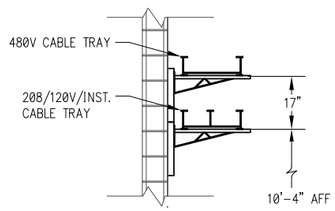
104 IN-SLAB GROUNDING CONNECTOR

NOT TO SCALE



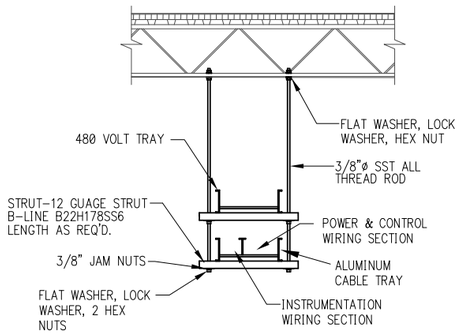
105 CABLE TRAY WALL MOUNTING

NOT TO SCALE — **SINGLE TRAY**



106 CABLE TRAY WALL MOUNTING

NOT TO SCALE — **DOUBLE TRAY**

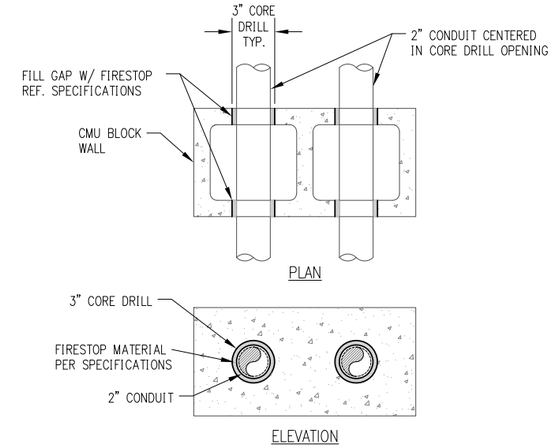


NOTES:

1. HARDWARE SHALL BE 316 STN/STL.
2. CABLE TRAY SHALL BE 24" WIDE UNLESS OTHERWISE NOTED.

107 CABLE TRAY TRAPEZE SUPPORT

NOT TO SCALE



NOTES:

1. TYPICAL FOR NEW FIREPROOF CONDUIT PENETRATIONS OF EXISTING AND NEW CMU WALLS.
2. REPAIR ALL DAMAGE DONE BY CORE DRILL.

108 FIRESTOP / WEATHERPROOF CONDUIT

NOT TO SCALE

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

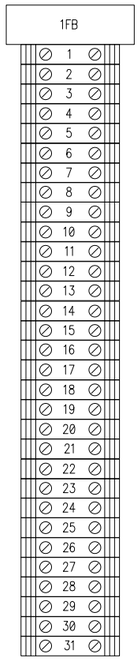
ELECTRICAL DETAILS I

STATE OF TEXAS — JOSEPH J. KOTRLA — 56361 — REGISTERED PROFESSIONAL ENGINEER

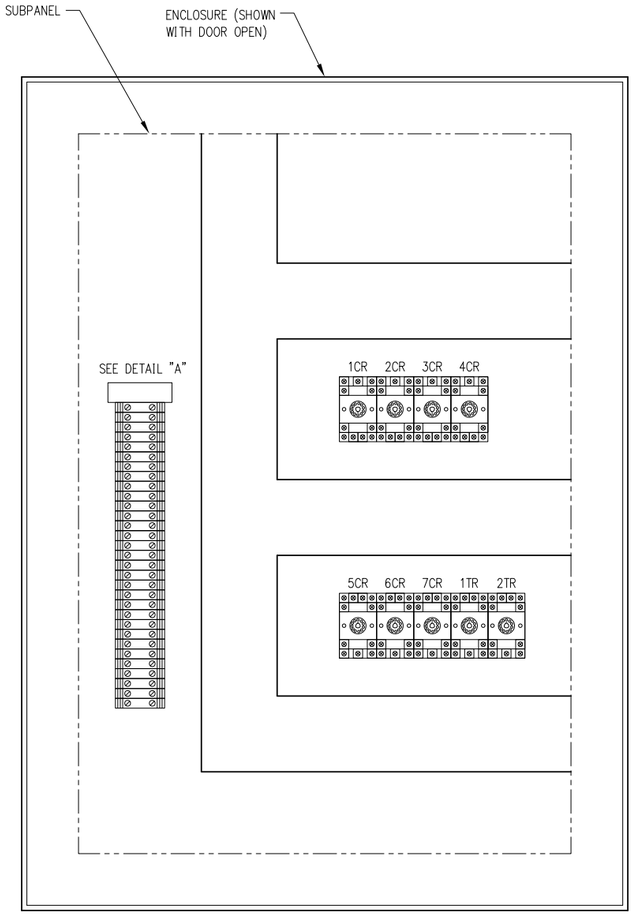
AUGUST 2020
date

SHEET NO. **E-14**
OF E-17

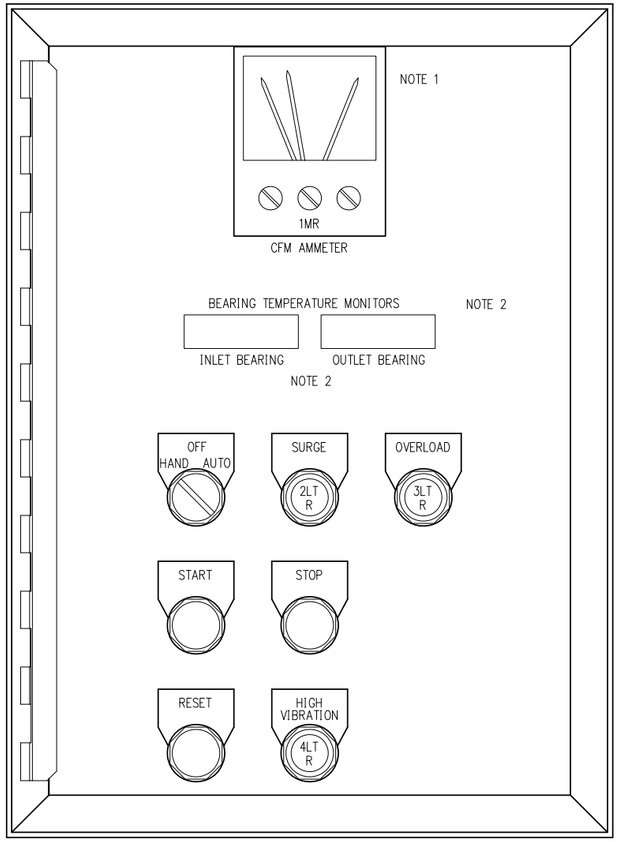
Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\E-14 Details I.dwg



DETAIL "A"



SUB-PANEL LAYOUT



ENCLOSURE DOOR LAYOUT

NOTES:

1. CFM AMMETER FOR SURGE PROTECTION IN MANUAL.
2. TWO BEARING MONITORS WITH TEMP DISPLAY, ONE EACH BEARING.
3. PROVIDE 5 NEW BLOWER CONTROL PANELS, REF. SPECIFICATIONS.

201 DETAIL – BLOWER CONTROL PANEL

NOT TO SCALE

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

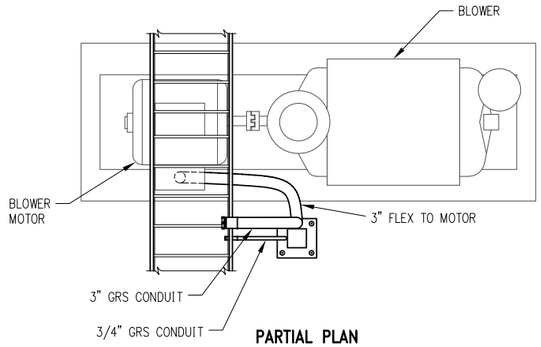
ELECTRICAL DETAILS II

STATE OF TEXAS
JOSEPH J. KOTRLA
56361
REGISTERED PROFESSIONAL ENGINEER

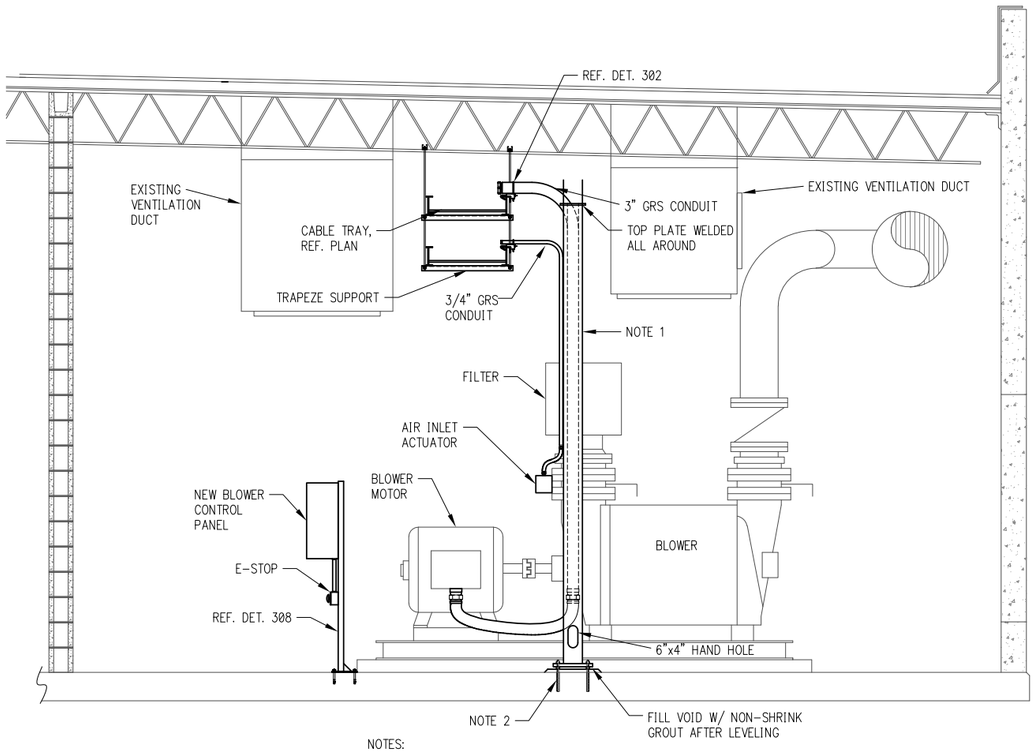
AUGUST 2020
date

SHEET NO.
E-15
OF E-17

Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\E-15 Details II.dwg



PARTIAL PLAN

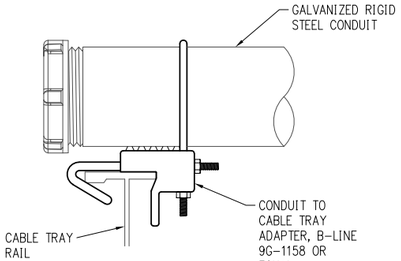


NOTES:

1. 6" NON-TAPERED SQUARE TUBING SUPPORT, 7 GA. WALL THICKNESS. HEIGHT AS REQUIRED.
2. HILTI HIT-RE 500 V3 SAFE SET SYSTEM WITH 5/16" HILTI HAS THREADED ROD. MINIMUM 6" EMBEDMENT. TYPICAL 4 PLACES EACH SUPPORT STAND.
3. SUPPORT STAND SHOWN FOR BLOWER No.1 AND IS TYPICAL FOR 5 BLOWERS
4. GROUND TUBING SUPPORT WITH POLE GROUND LUG AND #2 TPC CADWELD TO CABLE TRAY.

301 CONDUIT SUPPORT TO MOTOR

NOT TO SCALE

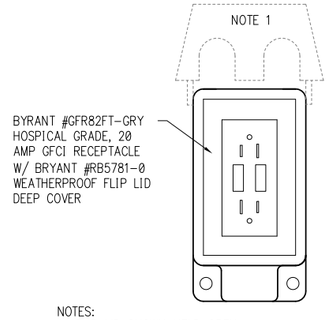


NOTES:

1. INSTALL GROUND BUSHING AT THE END OF CONDUIT AND BOND TO CABLE TRAY.

302 DETAIL-CONDUIT TO TRAY ADAPTER

NOT TO SCALE

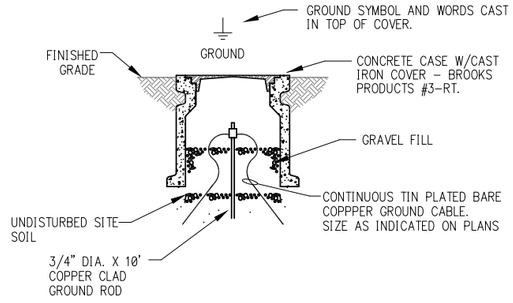


NOTES:

1. FLIP LID SHOWN HELD OPEN.
2. ATTACH TO WALL WITH 1/4"ø 316 SST BOLT INTO DRILLED EXPANSION SHIELD. ATTACHED TO STANCHION OR METAL PLATE WITH 1/4 ø 316 SST BOLTS, WASHERS, AND NUTS.
3. COVERS SHALL BE SUITABLE FOR WET LOCATIONS & SHALL BE GASKETED.
4. COVER WITH PLUG CAP INSERTED SHALL CARRY UL WET LOCATION LISTING.
5. PROVIDE ONE ASSEMBLY FOR EACH WP/GFCI LOCATION.

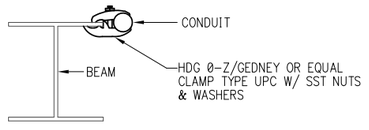
303 TYPICAL WP/GFCI DEVICE

NOT TO SCALE

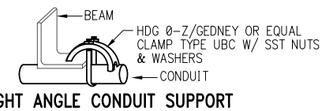


305 GROUND ROD & WELL

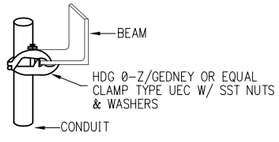
NOT TO SCALE



PARALLEL CONDUIT SUPPORT



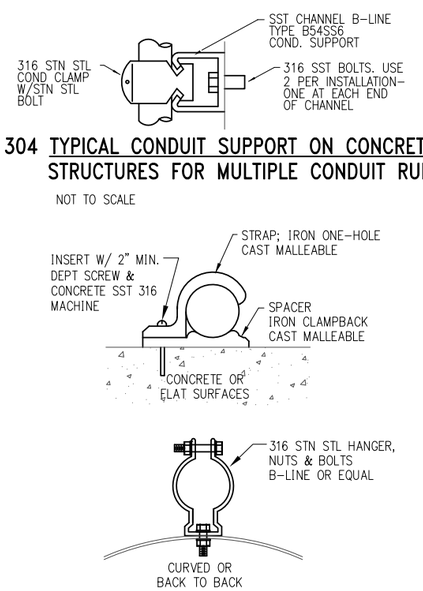
RIGHT ANGLE CONDUIT SUPPORT



EDGE TYPE CONDUIT SUPPORT

307 TYPICAL CONDUIT SUPPORT DETAILS

NOT TO SCALE

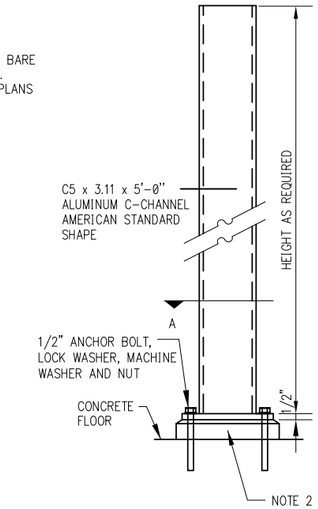


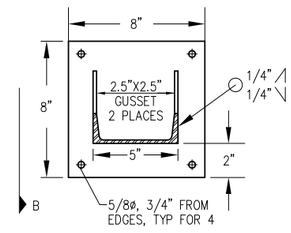
304 TYPICAL CONDUIT SUPPORT ON CONCRETE STRUCTURES FOR MULTIPLE CONDUIT RUNS

NOT TO SCALE

306 TYPICAL CONDUIT SUPPORT

NOT TO SCALE **SINGLE CONDUIT**

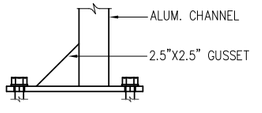




SECTION A

NOTES:

1. ALL ALUMINUM MATERIALS SHALL BE 6061 ALUMINUM ALLOY.
2. PROVIDE NEOPRENE ISOLATION GASKET BETWEEN C-CHANNEL STAND AND CONCRETE FLOOR



SECTION B

308 DETAIL - EQUIPMENT STAND

NOT TO SCALE **ALUMINUM**

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla
DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-328

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ELECTRICAL DETAILS III

STATE OF TEXAS · JOSEPH J. KOTRLA · 56361 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. **E-16**
OF E-17

Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\E-16 Details III.dwg

ENGINE BLDG PLC INPUT/OUTPUT SCHEDULE

DIGITAL INPUT CARD No.1

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	BLOWER 1	DI	STATUS	SOFT STARTER – RVSS-1	RUNNING
1	BLOWER 2	DI	STATUS	SOFT STARTER – RVSS-2	RUNNING
2	BLOWER 3	DI	STATUS	SOFT STARTER – RVSS-3	RUNNING
3	BLOWER 4	DI	STATUS	SOFT STARTER – RVSS-4	RUNNING
4	BLOWER 5	DI	STATUS	SOFT STARTER – RVSS-5	RUNNING
5	BLOWER 1	DI	ALARM	SOFT STARTER – RVSS-1	FAULT
6	BLOWER 2	DI	ALARM	SOFT STARTER – RVSS-2	FAULT
7	BLOWER 3	DI	ALARM	SOFT STARTER – RVSS-3	FAULT
8	BLOWER 4	DI	ALARM	SOFT STARTER – RVSS-4	FAULT
9	BLOWER 5	DI	ALARM	SOFT STARTER – RVSS-5	FAULT
10	EXHAUST FAN 1	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
11	EXHAUST FAN 2	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
12	EXHAUST FAN 3	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
13	EXHAUST FAN 4	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
14	EXHAUST FAN 5	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
15	EXHAUST FAN 6	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT

DIGITAL INPUT CARD No.2

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	EXHAUST FAN 7	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
1	EXHAUST FAN 8	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
2	EXHAUST FAN 9	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
3	EXHAUST FAN 10	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
4	EXHAUST FAN 11	DI	STATUS	EXHAUST FAN STARTER	EXISTING POINT
5	BLOWER 1	DI	ALARM	BLOWER CONTROL PANEL 1	FAULT – VIBRATION AND BEARING OVERTEMP
6	BLOWER 2	DI	ALARM	BLOWER CONTROL PANEL 2	FAULT – VIBRATION AND BEARING OVERTEMP
7	BLOWER 3	DI	ALARM	BLOWER CONTROL PANEL 3	FAULT – VIBRATION AND BEARING OVERTEMP
8	BLOWER 4	DI	ALARM	BLOWER CONTROL PANEL 4	FAULT – VIBRATION AND BEARING OVERTEMP
9	BLOWER 5	DI	ALARM	BLOWER CONTROL PANEL 5	FAULT – VIBRATION AND BEARING OVERTEMP
10	APFCC UNIT	DI	ALARM	APFCC UNIT	ALARM
11		DI			
12		DI			
13		DI			
14	CONTROL POWER	DI	MONITOR	ENGINE BLDG PLC CONTROL PANEL	EXISTING POINT
15	UPS POWER	DI	MONITOR	ENGINE BLDG PLC CONTROL PANEL	EXISTING POINT

DIGITAL INPUT CARD No.3

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	BLOWER NO. 1 RVSS – NOT IN AUTO	DI	STATUS	SOFT STARTER – RVSS-1	E-STOP OR NOT IN REMOTE
1	BLOWER NO. 2 RVSS – NOT IN AUTO	DI	STATUS	SOFT STARTER – RVSS-2	E-STOP OR NOT IN REMOTE
2	BLOWER NO. 3 RVSS – NOT IN AUTO	DI	STATUS	SOFT STARTER – RVSS-3	E-STOP OR NOT IN REMOTE
3	BLOWER NO. 4 RVSS – NOT IN AUTO	DI	STATUS	SOFT STARTER – RVSS-4	E-STOP OR NOT IN REMOTE
4	BLOWER NO. 5 RVSS – NOT IN AUTO	DI	STATUS	SOFT STARTER – RVSS-5	E-STOP OR NOT IN REMOTE
5	BLOWER NO. 1 CONTROL PANEL – NOT IN AUTO	DI	STATUS	BLOWER NO. 1 CONTROL PANEL	HOA NOT IN AUTO
6	BLOWER NO. 2 CONTROL PANEL – NOT IN AUTO	DI	STATUS	BLOWER NO. 1 CONTROL PANEL	HOA NOT IN AUTO
7	BLOWER NO. 3 CONTROL PANEL – NOT IN AUTO	DI	STATUS	BLOWER NO. 1 CONTROL PANEL	HOA NOT IN AUTO
8	BLOWER NO. 4 CONTROL PANEL – NOT IN AUTO	DI	STATUS	BLOWER NO. 1 CONTROL PANEL	HOA NOT IN AUTO
9	BLOWER NO. 5 CONTROL PANEL – NOT IN AUTO	DI	STATUS	BLOWER NO. 1 CONTROL PANEL	HOA NOT IN AUTO
10		DI			
11		DI			
12		DI			
13		DI			
14		DI			
15		DI			

DIGITAL OUTPUT CARD No.1

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	BLOWER 1	DO	CONTROL	BLOWER CONTROL PANEL 1	RUN COMMAND
1	BLOWER 2	DO	CONTROL	BLOWER CONTROL PANEL 2	RUN COMMAND
2	BLOWER 3	DO	CONTROL	BLOWER CONTROL PANEL 3	RUN COMMAND
3	BLOWER 4	DO	CONTROL	BLOWER CONTROL PANEL 4	RUN COMMAND
4	BLOWER 5	DO	CONTROL	BLOWER CONTROL PANEL 5	RUN COMMAND
5	EXHAUST FAN 1	DO	CONTROL	EXHAUST FAN 1 STARTER	EXISTING POINT
6	EXHAUST FAN 2	DO	CONTROL	EXHAUST FAN 2 STARTER	EXISTING POINT
7	EXHAUST FAN 3	DO	CONTROL	EXHAUST FAN 3 STARTER	EXISTING POINT
8	EXHAUST FAN 4	DO	CONTROL	EXHAUST FAN 4 STARTER	EXISTING POINT
9	EXHAUST FAN 5	DO	CONTROL	EXHAUST FAN 5 STARTER	EXISTING POINT
10	EXHAUST FAN 6	DO	CONTROL	EXHAUST FAN 6 STARTER	EXISTING POINT
11	EXHAUST FAN 7	DO	CONTROL	EXHAUST FAN 7 STARTER	EXISTING POINT
12	EXHAUST FAN 8	DO	CONTROL	EXHAUST FAN 8 STARTER	EXISTING POINT
13	EXHAUST FAN 9	DO	CONTROL	EXHAUST FAN 9 STARTER	EXISTING POINT
14	EXHAUST FAN 10	DO	CONTROL	EXHAUST FAN 10 STARTER	EXISTING POINT
15	EXHAUST FAN 11	DO	CONTROL	EXHAUST FAN 11 STARTER	EXISTING POINT

DIGITAL OUTPUT CARD No.2

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0		DO			
1		DO			
2		DO			
3		DO			
4		DO			
5		DO			
6		DO			
7		DO			
8		DO			
9		DO			
10		DO			
11		DO			
12		DO			
13		DO			
14		DO			
15		DO			

ANALOG INPUT CARD No.1

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	BLOWER 1 AMPS	AI	MONITOR	SOFT STARTER	0 – 400 AMPS
1	BLOWER 2 AMPS	AI	MONITOR	SOFT STARTER	0 – 400 AMPS
2	BLOWER 3 AMPS	AI	MONITOR	SOFT STARTER	0 – 400 AMPS
3	BLOWER 4 AMPS	AI	MONITOR	SOFT STARTER	0 – 400 AMPS
4	BLOWER 5 AMPS	AI	MONITOR	SOFT STARTER	0 – 400 AMPS
5	BLOWER 1 INLET VALVE	AI	MONITOR	INLET VALVE 1	INLET VALVE
6	BLOWER 2 INLET VALVE	AI	MONITOR	INLET VALVE 2	INLET VALVE
7	BLOWER 3 INLET VALVE	AI	MONITOR	INLET VALVE 3	INLET VALVE

ANALOG INPUT CARD No.2

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	BLOWER 4 INLET VALVE	AI	STATUS	INLET VALVE 4	0 – 100%
1	BLOWER 5 INLET VALVE	AI	STATUS	INLET VALVE 5	0 – 100%
2	UTILITY KILOWATT USAGE	AI	MONITOR	KW METER	EXISTING POINT
3	GENERATED KILOWATTS	AI	MONITOR	JENBACHER SWGR	EXISTING POINT
4	ENGINE ROOM TEMPERATURE	AI	MONITOR	TEMPERATURE TRANSMITTER TT1	NEW POINT
5	BLOWER ROOM TEMPERATURE	AI	MONITOR	TEMPERATURE TRANSMITTER TT2	NEW POINT
6		AI			
7		AI			

ANALOG OUTPUT CARD No.1

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
0	BLOWER 1 INLET VALVE	AO	COMMAND	INLET VALVE 1	0 – 100% POSITION
1	BLOWER 2 INLET VALVE	AO	COMMAND	INLET VALVE 2	0 – 100% POSITION
2	BLOWER 3 INLET VALVE	AO	COMMAND	INLET VALVE 3	0 – 100% POSITION
3	BLOWER 4 INLET VALVE	AO	COMMAND	INLET VALVE 4	0 – 100% POSITION
4	BLOWER 5 INLET VALVE	AO	COMMAND	INLET VALVE 5	0 – 100% POSITION

NOTES:

1. PLC AND ALL INPUT AND OUTPUT CARDS ARE EXISTING. PROVIDE NEW WIRING TO POINTS NOT LISTED AS EXISTING.
2. PLC PROGRAMMING AND TERMINATION WILL BE BY OTHERS. TAG ALL WIRING INSIDE PLC PANEL.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

ENGINE BUILDING PLC I/O SCHEDULE

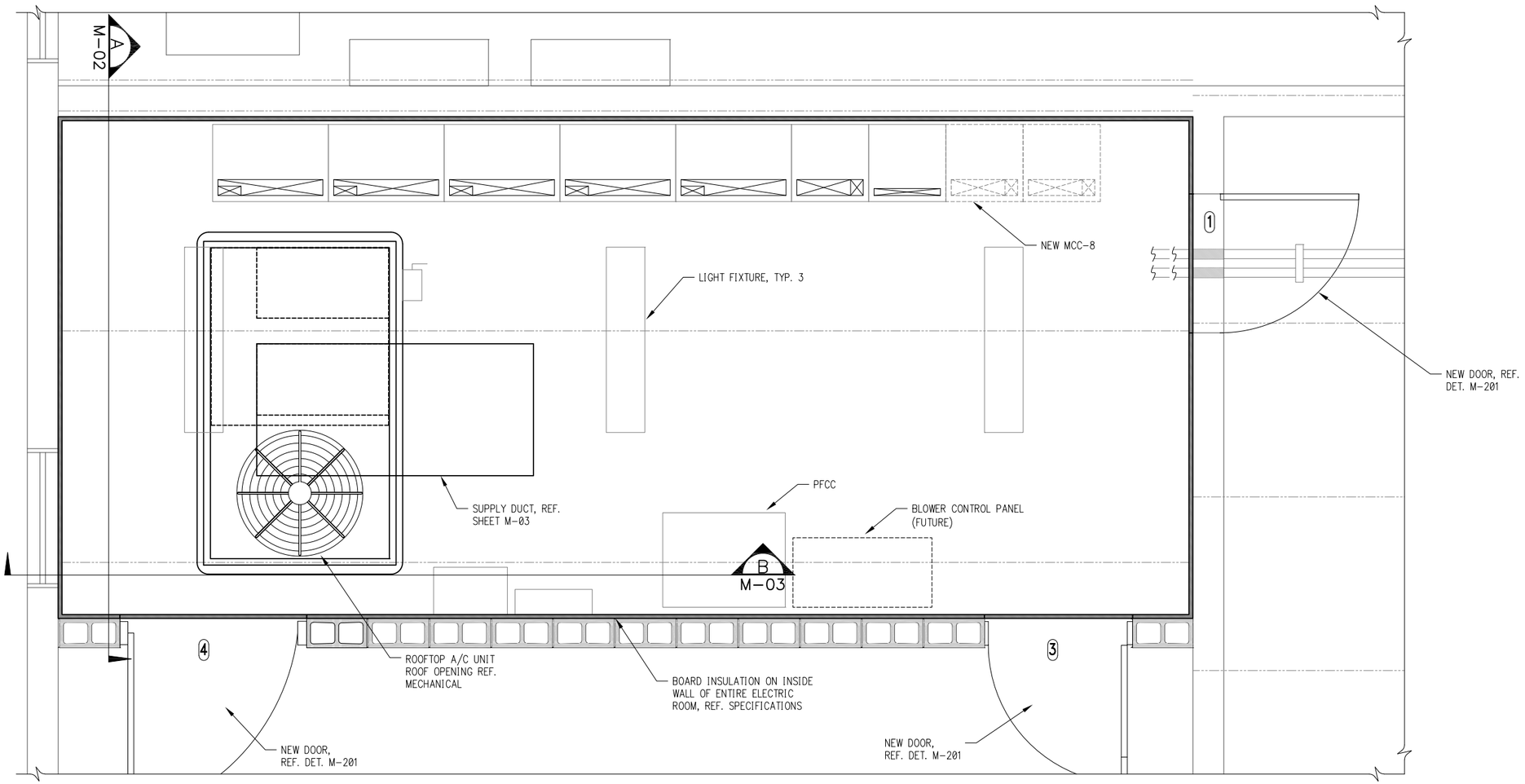
STATE OF TEXAS
JOSEPH J. KOTRLA
56361
REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO.
E-17
OF E-17

Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\E-17 Engine Bldg PLC IO Schedule.dwg

ENVELOPE INSULATION REQUIREMENTS		
ELECTRICAL BUILDING		
COMPONENT	INSULATION R-VALUE	MINIMUM U-FACTOR
NORTH WALL	7.0	0.102
SOUTH WALL	7.0	0.102
EAST WALL	7.0	0.102
WEST WALL	7.0	0.102
CEILING	19.0	0.048
DOORS	5.5	0.200



ELECTRICAL ROOM HVAC PLAN

SCALE: 3/4"=1'-0"

0 2 4

SCALE IN FEET

NORTH

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph J. Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-338

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

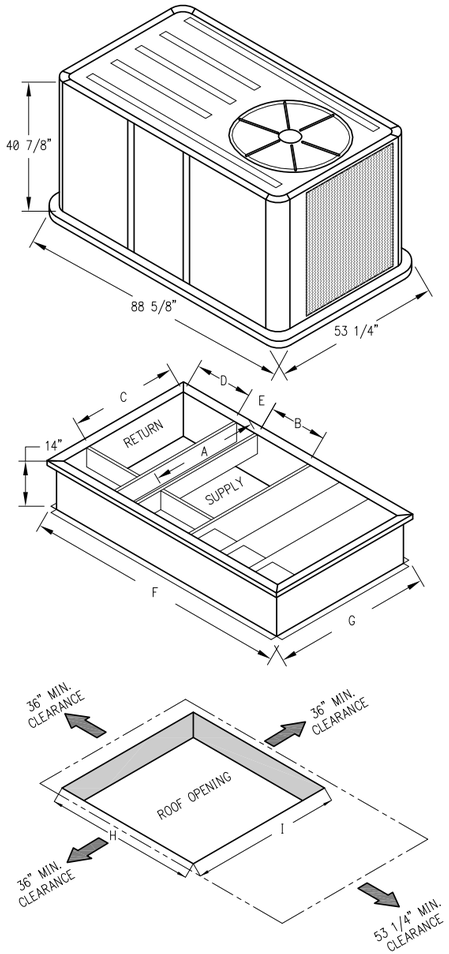
ELECTRICAL ROOM HVAC PLAN

STATE OF TEXAS · JOSEPH J. KOTRLA · 56361 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. M-01
OF M-03

Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\H-01 Electric Room HVAC Plan.dwg



DESIGNATION	AIR DUCT OPENINGS	A	B	C	D	E	F	G	H	I
ACU-1	SUPPLY	34 3/8""	18 1/2"	–	–	6 5/8"	84 1/2"	50 3/8"	46"	46"
	RETURN	–	–	34 3/8"	18-1/4"					

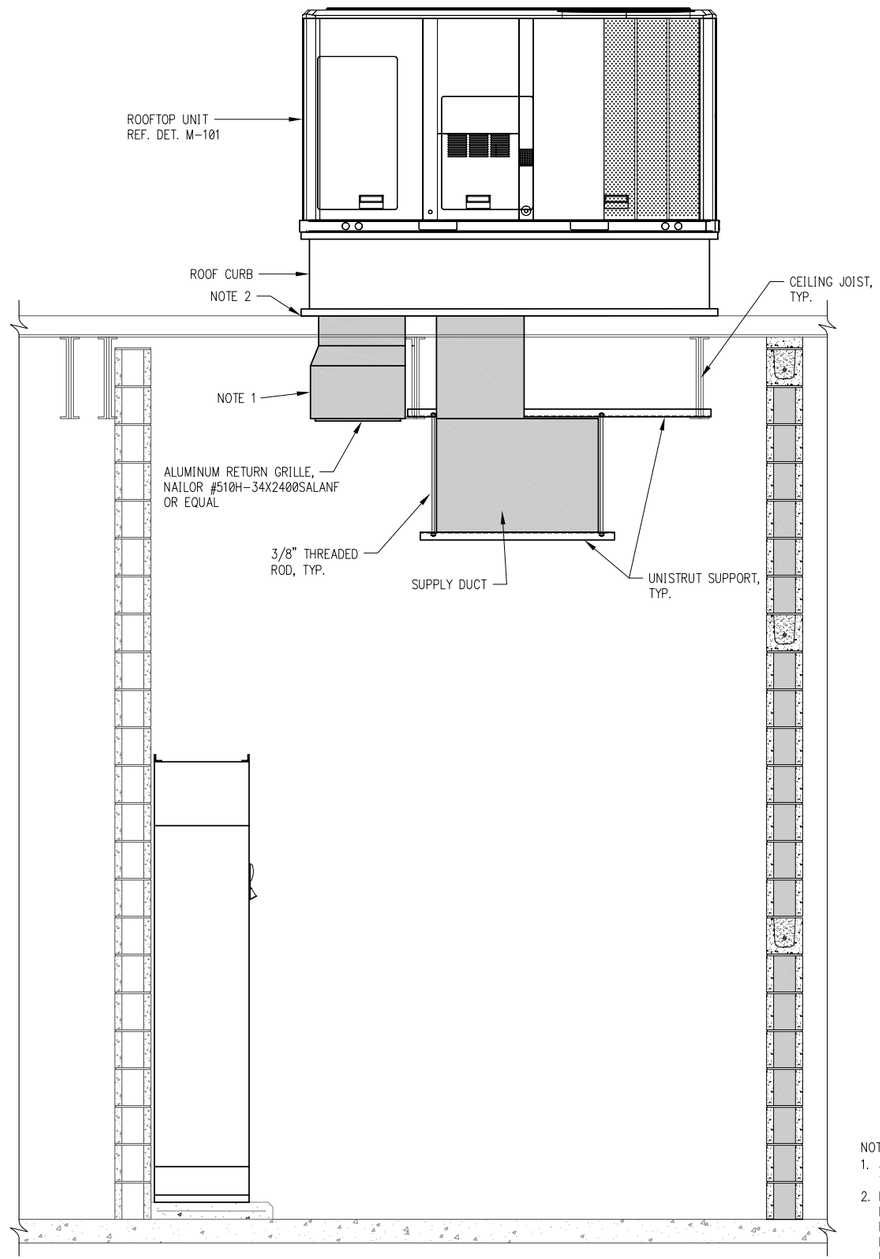
AIR CONDITIONING UNIT SCHEDULE

DESIGNATION	S/A CFM	HTG. KW	VOLT/PH	WEIGHT	MANUFACTURER/MODEL	COMMENTS
ACU-1	2000	6.0	480/3	778 LBS	THC060 4RBA**H6C5A1B000AE000	

UNIT SHALL BE HIGH EFFICIENCY UTILIZING R-410A REFRIGERANT. ECONOMIZER SHALL UTILIZE COMPARATIVE ENTHALPY 0-100% WITH BAROMETRIC RELIEF. PROVIDE HINGED FILTER ACCESS PANEL W/ 2" MERV-8 FILTERS. PROVIDE TRANE "CompleteCoat CONDENSER COIL W/ HAIL GUARD. PROVIDE "THROUGH-THE-BASE ELECTRIC, UNIT MOUNTED NON-FUSED DISCONNECT AND A POWERED CONVENIENCE OUTLET. PROVIDE RETURN AIR SMOKE DETECTOR, CLOGGED FILTER SWITCH, FAN FAILURE SWITCH AND CONDENSATE DRAIN PAN OVERFLOW SWITCH.

M-101 A/C UNIT AND MOUNTING CURB

NOT TO SCALE



A M-01 ELECTRICAL ROOM HVAC

SCALE: 3/4"=1'-0"

0 2 8

SCALE IN FEET

NOTES:
1. 34"x18" NON-INSULATED ALUMINUM RETURN DUCT, TRANSITION TO 36"x20" DUCT.
2. ROOF MEMBRANE IS MANUFACTURED BY DURO-LAST. PROVIDE MODIFICATIONS TO ROOF FOR CLOSURE AND NEW ROOF CURBS PER ROOF MANUFACTURER RECOMMENDATIONS, USING DURO-LAST MATERIALS AND MANUFACTURERS APPROVED WATERPROOFING AND JOINT SEALING METHODS.

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla
DATE: AUG 10, 2020
McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

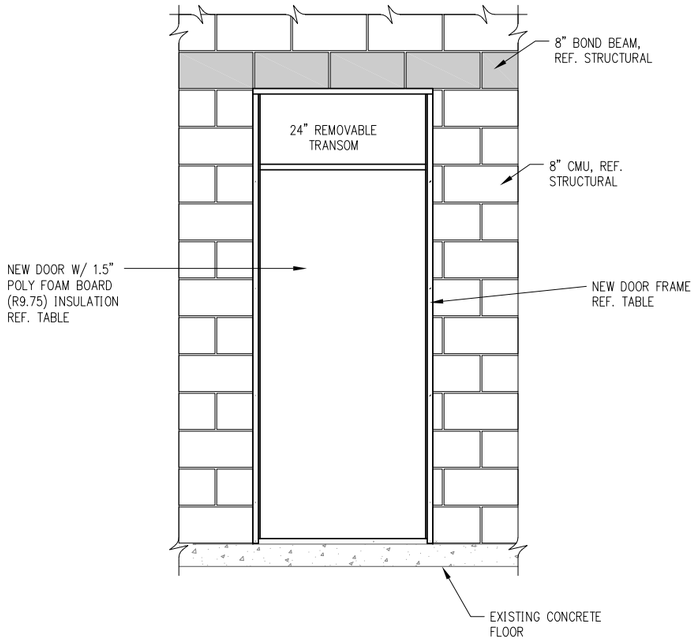
ELECTRICAL ROOM MECHANICAL DETAILS I

STATE OF TEXAS JOSEPH J. KOTRLA 56361 REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. M-02
OF M-03

Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\H-02 MCC-8 Mechanical Details.dwg



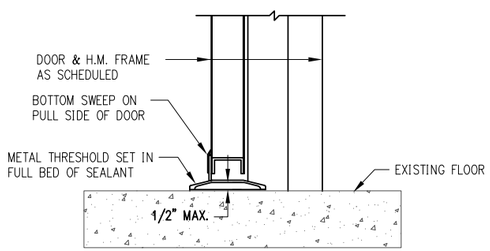
DOOR #	DOOR SIZE	DOOR FRAME	REF. DRAWINGS
1	3070	3090	E-08, M-01
2	3070	3090	E-08
3	3070	3090	E-08, M-01
4	4070	4090	E-08, M-01

NOTES:

1. DOOR MATERIAL SHALL BE 16 GA. G90 GALVANIZED STEEL. FRAME MATERIAL SHALL BE 14 GA. G90 GALVANIZED STEEL.
2. FURNISH AND INSTALL PANIC HARDWARE ON DOOR. REFERENCE SPECIFICATION.

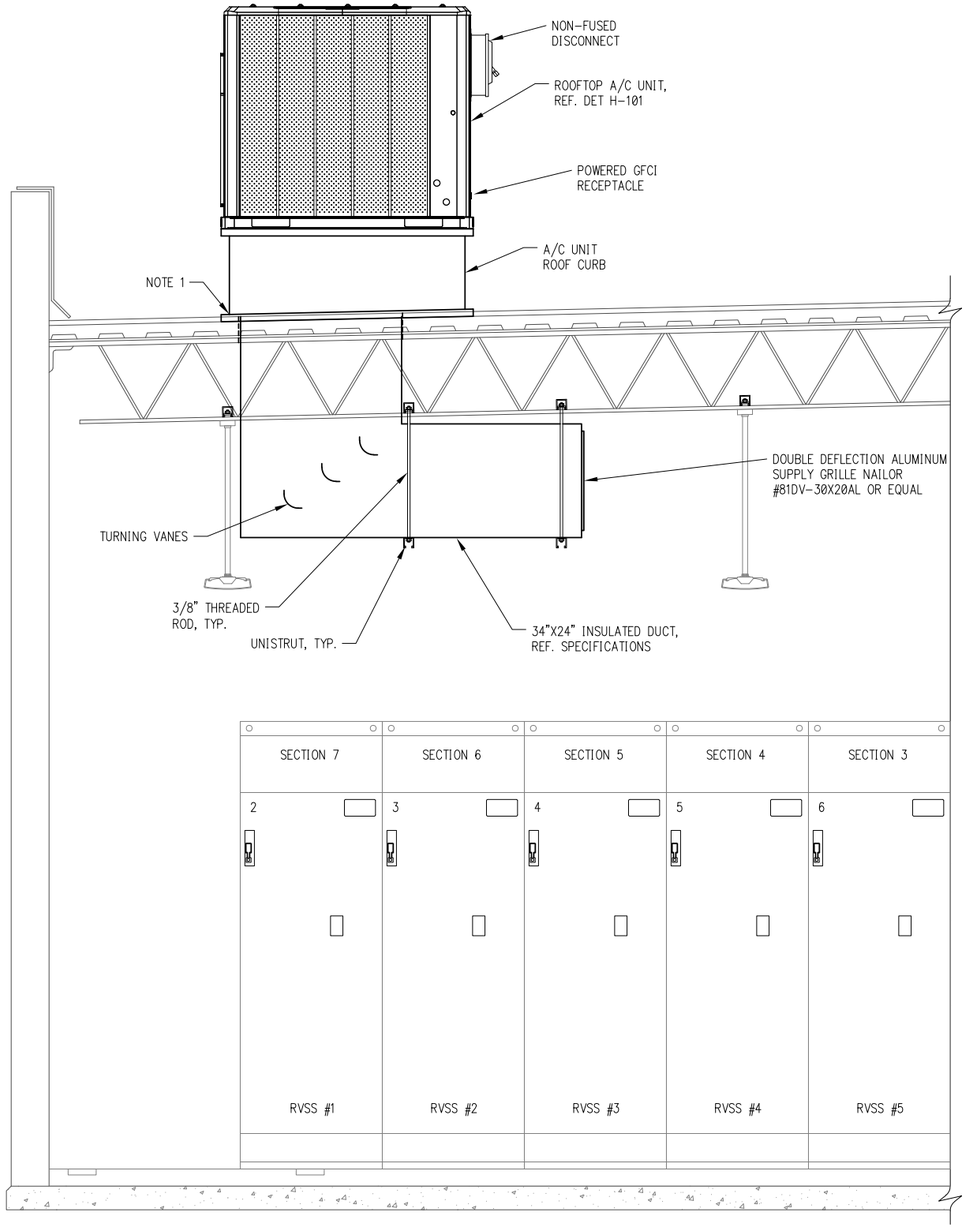
M-201 DETAIL – DOOR OPENING

NOT TO SCALE



M-202 DETAIL – INTERIOR DOOR SILL

NOT TO SCALE



NOTES:

1. ROOF MEMBRANE IS MANUFACTURED BY DURO-LAST. PROVIDE MODIFICATIONS TO ROOF FOR CLOSURE AND NEW ROOF CURBS PER ROOF MANUFACTURER RECOMMENDATIONS, USING DURO-LAST MATERIALS AND MANUFACTURERS APPROVED WATERPROOFING AND JOINT SEALING METHODS.

B M-01 ELECTRICAL ROOM HVAC

SCALE: 3/4"=1'-0"

0 2 4

SCALE IN FEET

THESE DOCUMENTS ARE FOR BIDDING, CONSTRUCTION, AND PERMIT PURPOSES.

Joseph Kotrla

DATE: AUG 10, 2020

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS
Dallas, Texas F-538

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT PHASE I - NORTH PLANT BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

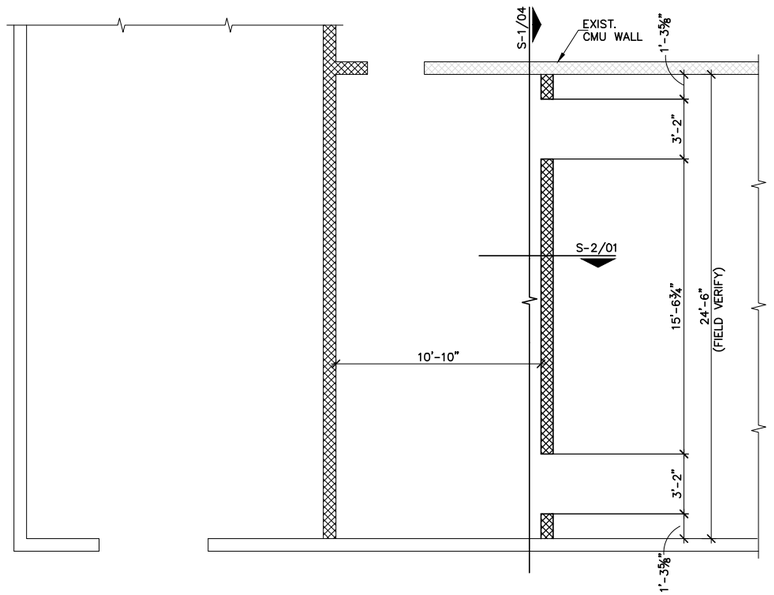
ELECTRICAL ROOM MECHANICAL DETAILS II

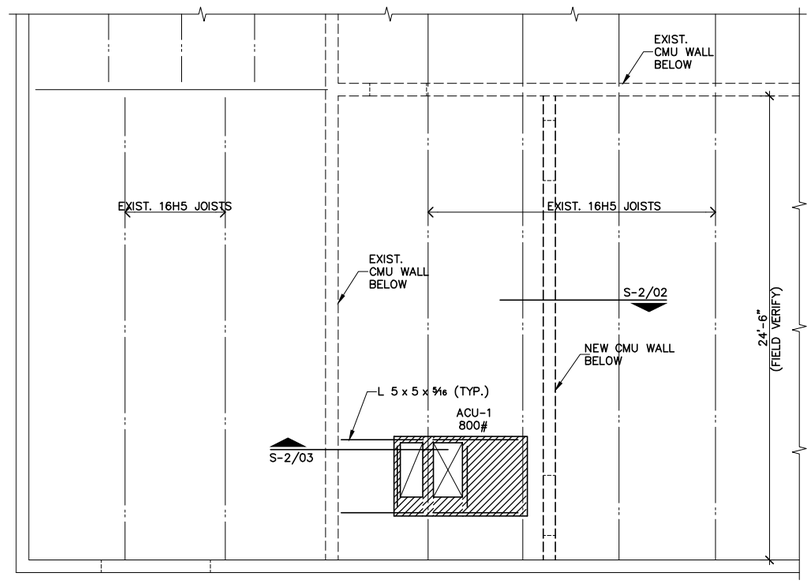
STATE OF TEXAS · JOSEPH J. KOTRLA · 56361 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 2020
date

SHEET NO. M-03
OF M-03

Z:\22.087\Dwg\Phase II\Electrical\North Plant Blower MCC Replacement\02 MCC 8 Replacement Project\H-03 MCC-8 Mechanical Details.dwg





PLAN NORTH

01 PARTIAL FOUNDATION PLAN

SCALE: ¼"=1'-0"

PLAN NORTH

02 PARTIAL ROOF FRAMING PLAN

SCALE: ¼"=1'-0"

Charles Gojer and Associates, Inc.
Consulting Engineers
Texas Firm Registration No. F-697
11615 Forest Central Dr. Suite 303
Dallas, Texas 75243 (214) 340-1199
JOB NO. 19-134

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

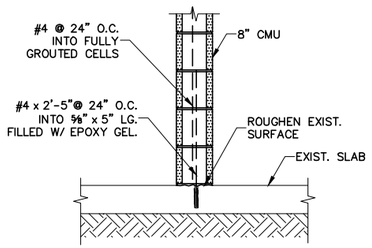
WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

FRAMING PLANS AND GENERAL NOTES

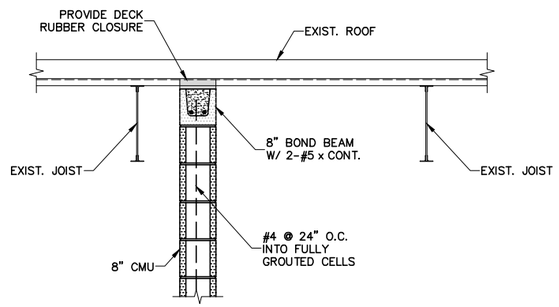
STATE OF TEXAS
CHARLES GOJER
33348
REGISTERED PROFESSIONAL ENGINEER

AUGUST 5, 2020
date

SHEET NO.
S-1
OF 4



01 SECTION
SCALE: 3/4"=1'-0"



02 SECTION
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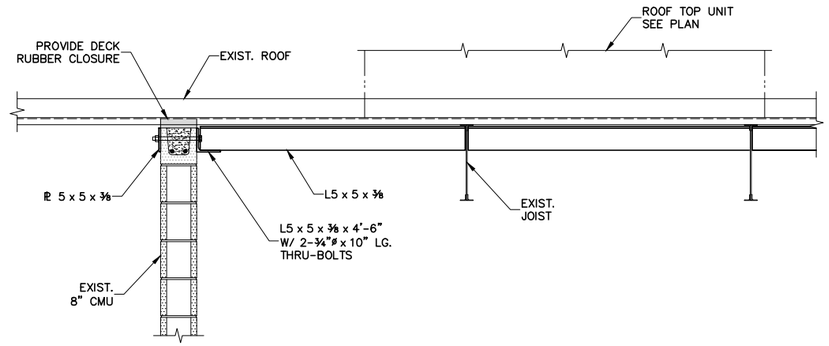

03 SECTION
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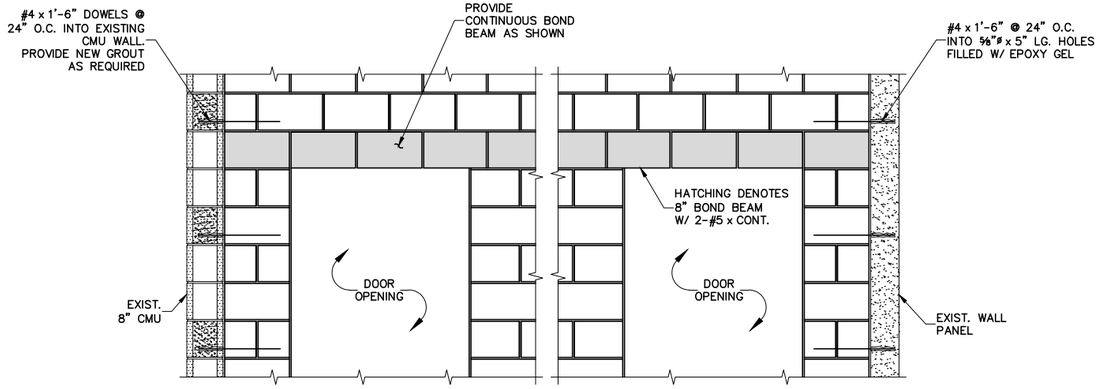
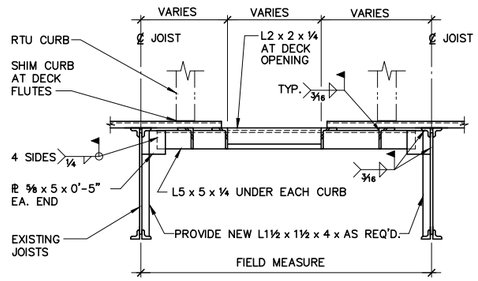
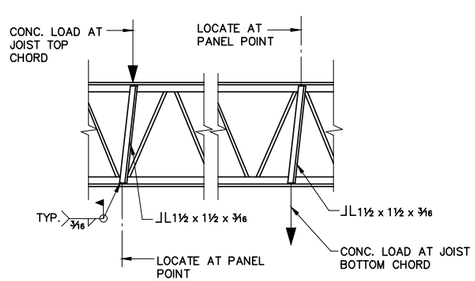


04 SECTION
SCALE: 3/4"=1'-0"



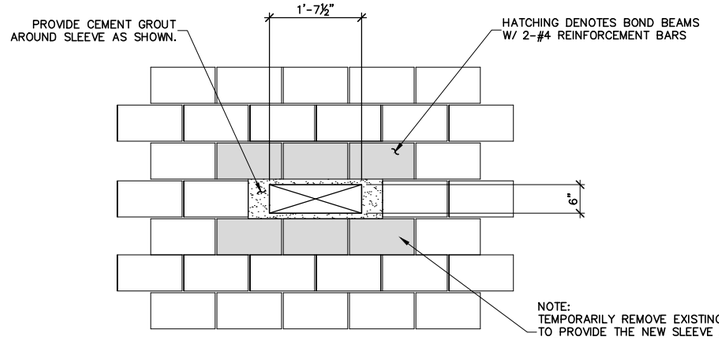
ROOF REINFORCING AT ROOF TOP UNIT

05 TYPICAL DETAIL
SCALE: 3/4"=1'-0"

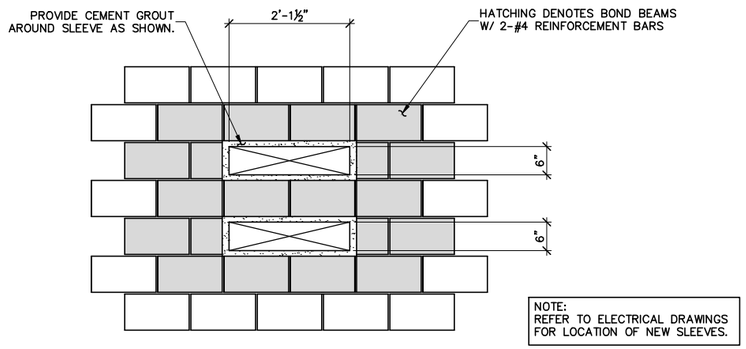


JOIST STIFFENERS AT CONCENTRATED LOADS

06 TYPICAL DETAIL
SCALE: 3/4"=1'-0"



WALL SLEEVES THROUGH EXISTING BLOCK WALL



WALL SLEEVES THROUGH NEW BLOCK WALL

07 TYPICAL DETAIL
SCALE: 3/4"=1'-0"

Charles Gojer and Associates, Inc.
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Texas Firm Registration No. F-697
11615 Forest Central Dr. Suite 203
Dallas, Texas 75243 (214) 340-1199

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS 972/458-8745
6310 LBJ FREEWAY SUITE 217 DALLAS, TEXAS 75240

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

FRAMING SECTIONS AND DETAILS

STATE OF TEXAS · CHARLES GOJER · 33348 · REGISTERED PROFESSIONAL ENGINEER

AUGUST 5, 2020
date

SHEET NO. S-2
OF 4

19-134\STRUCT\191345Z.DWG / 3/4=1'-0" / AUG 10, 2020 / 2:20 PM / MIKE /

STRUCTURAL ABBREVIATIONS

A.B.	– ANCHOR BOLT
A/C	– AIR CONDITIONER
A/E	– ARCHITECT/ENGINEER
A.F.F.	– ABOVE FINISHED FLOOR
ADDN'L.	– ADDITIONAL
ADJ.	– ADJACENT
AHU	– AIR HANDLING UNIT
ALT.	– ALTERNATE
ALUM.	– ALUMINUM
APPROX.	– APPROXIMATE
ARCH.	– ARCHITECT
ARCH'L.	– ARCHITECTURAL
B.F.F.	– BELOW FINISHED FLOOR
B.L.	– BUILDING LINE
B.P.	– BASE PLATE
BAL.	– BALANCE
BLDG.	– BUILDING
BLK.	– BLOCK
BLKG.	– BLOCKING
BM.	– BEAM
BOT.	– BOTTOM
BRDG.	– BRIDGING
BRG.	– BEARING
BRKT.	– BRACKET
BSMT.	– BASEMENT
BTWN.	– BETWEEN
C. OR COMP.	– COMPRESSION
C.I.P.	– CAST–IN–PLACE
C.J.	– CONSTRUCTION JOINT
C.L. OR ℄	– CENTER LINE
CANT'L.	– CANTILEVER
CLG.	– CEILING
CLR.	– CLEAR
COL.	– COLUMN
CMU	– CONCRETE MASONRY UNIT
CONC.	– CONCRETE
CONN(S).	– CONNECTION(S)
CONSTR.	– CONSTRUCTION
CONT.	– CONTINUOUS
CONTR.	– CONTRACTOR
CTR.	– CENTER
D.L.	– DEAD LOAD
DBL.	– DOUBLE
DEG. OR o	– DEGREE(S)
DET.	– DETAIL
DIA. OR ⌀	– DIAMETER
DIAG.	– DIAGONAL
DIM(S).	– DIMENSION(S)
DN.	– DOWN
DWG(S).	– DRAWING(S)
DWL(S).	– DOWEL(S)
E.E.	– EACH END
E.F.	– EACH FACE
E.J.	– EXPANSION JOINT
E.S.	– EACH SIDE
E.W.	– EACH WAY
E.W.B.	– EACH WAY BOTTOM
E.W.T.	– EACH WAY TOP
E.W.T.B.	– EACH WAY TOP AND BOTTOM
EA.	– EACH
EL.	– ELEVATION
ELEC.	– ELECTRIC(AL)
EMBED.	– EMBED(DED)(MENT)
EQ.	– EQUAL
EQUIP.	– EQUIPMENT
EXIST.	– EXISTING
EXP.	– EXPANSION
EXT.	– EXTERIOR
F. TO F.	– FACE TO FACE
F.D.	– FLOOR DRAIN
F.P.	– FULL PENETRATION
F.S.	– FAR SIDE
FDN.	– FOUNDATION
FIN. FL.	– FINISHED FLOOR
FL.	– FLOOR
FLG.	– FLANGE
FT.	– FOOT (FEET)
FTG.	– FOOTING
G.C.	– GENERAL CONTRACTOR
GA.	– GAGE OR GAUGE
GALV.	– GALVANIZED
GEN.	– GENERAL
GB.	– GRADE BEAM
H.P.	– HIGH POINT
H.S.	– HEADED STUD(S)
HK.	– HOOK
H.I.F.	– HORIZONTAL INSIDE FACE
H.O.F.	– HORIZONTAL OUTSIDE FACE
HT.	– HEIGHT
HVAC	– HEATING, VENTILATION AND AIR CONDITIONING
I.D.	– INSIDE DIAMETER
I.F.	– INSIDE FACE
IN.	– INCHES
INFO.	– INFORMATION
INSUL.	– INSULATION
INT.	– INTERIOR
INTERM.	– INTERMEDIATE
JST(S).	– JOIST(S)
JT.	– JOINT
K	– KIPS (1000 LBS)
K.L.F.	– KIP PER LINEAR FOOT
K.S.F.	– KIP PER SQUARE FOOT
L.L.	– LIVE LOAD
LLH	– LONG LEG HORIZONTAL
LLV	– LONG LEG VERTICAL
L.P.	– LOW POINT
L.W.	– LONG WAY
L.W.B.	– LONG WAY BOTTOM
L.W.T.	– LONG WAY TOP
L.W.T.B.	– LONG WAY TOP AND BOTTOM
LB., #	– POUND
LG.	– LONG
LONG.	– LONGITUDINAL
LWGT.	– LIGHTWEIGHT
M.C.	– MOMENT CONNECTION
M.O.	– MASONRY OPENING
MAS'Y	– MASONRY
MAT'L	– MATERIAL
MAX.	– MAXIMUM
MECH.	– MECHANICAL
MEZZ.	– MEZZANINE
MFR.	– MANUFACTURER
MIN.	– MINIMUM
MISC.	– MISCELLANEOUS
MK.	– MARK
MTL.	– METAL
N/A	– NOT APPLICABLE
N.I.C.	– NOT IN CONTRACT
N.S.	– NEAR SIDE
N.T.S.	– NOT TO SCALE
NO. OR #	– NUMBER
NOM.	– NOMINAL
O.A.	– OVERALL
O.C.	– ON CENTER
O.D.	– OUTSIDE DIAMETER
O.F.	– OUTSIDE FACE
O.G.L.	– ON GAGE LINE
O.H.	– OPPOSITE HAND
O.S.L.	– OUTSTANDING LEG
OPNG(S).	– OPENING(S)
OPP.	– OPPOSITE
OZ.	– OUNCE
P/C.	– PRECAST CONCRETE
P–T.	– POST–TENSION(ED)(ING)
P.E.	– PROFESSIONAL ENGINEER
P.S.F.	– POUNDS PER SQUARE FOOT
P.S.I.	– POUNDS PER SQUARE INCH
PAR.	– PARALLEL
PC.	– PIECE
PERIM.	– PERIMETER
PERP.	– PERPENDICULAR
PL., ℗	– PLATE
PREFAB.	– PREFABRICATED
PTFE.	– POLYTETRAFLUOROETHYLENE
QTY.	– QUANTITY
R	– RADIUS
R.D.	– ROOF DRAIN
RCP	– REINFORCED CONCRETE PIPE
REBAR	– REINFORCING BAR(S)
REF.	– REFERENCE
REINF.	– REINFORCE(ING)(ED)(MENT)
REQ'D.	– REQUIRED
S.F.	– SQUARE FOOT (FEET)
S.O.G.	– SLAB ON GRADE
S.W.	– SHORT WAY
S.W.B.	– SHORT WAY BOTTOM
S.W.T.	– SHORT WAY TOP
S.W.T.B.	– SHORT WAY TOP AND BOTTOM
SCHED.	– SCHEDULE(D)
SECT.	– SECTION
SHT.	– SHEET
SIM.	– SIMILAR
SL.	– SLAB
SLV.	– SLEEVE
SP.	– SPACE
SPEC(S).	– SPECIFICATION(S)
SQ.	– SQUARE
SS.	– STAINLESS STEEL
STD.	– STANDARD
STL.	– STEEL
STIFF.	– STIFFENER(S)
STIR.	– STIRRUP(S)
STR.	– STRAIGHT
STRUCT'L.	– STRUCTURAL
SYM.	– SYMMETRICAL
T & G	– TONGUE AND GROOVE
T & B	– TOP AND BOTTOM
T.O.B.	– TOP OF BEAM
T.O.F.	– TOP OF FOOTING
T.O.J.	– TOP OF JOIST
T.O.P.	– TOP OF PIER
T.O.P.C.	– TOP OF PIER CAP
T.O.S.	– TOP OF STEEL
T.O.S.C.	– TOP OF STRUCTURAL CONCRETE
T.O.W.	– TOP OF WALL
TEMP.	– TEMPERATURE
TEN.	– TENSION
THK.	– THICK
THK'N(ED)	– THICKEN(ED)
TYP.	– TYPICAL
U.N.O.	– UNLESS NOTED OTHERWISE
VERT.	– VERTICAL
V.I.F.	– VERTICAL INSIDE FACE
V.O.F.	– VERTICAL OUTSIDE FACE
VOL.	– VOLUME
W/	– WITH
W/O	– WITHOUT
W.P.	– WORK POINT
W.S.	– WATERSTOP
W.W.F.	– WELDED WIRE FABRIC
WGT.	– WEIGHT
X	– EXTRA
XX	– DOUBLE EXTRA
YD.	– YARD

GENERAL NOTES

DESIGN LOADS

1. GRAVITY LOADS:

   A. DESIGN UNIFORM LIVE LOADS ARE AS LISTED BELOW. LIVE LOAD REDUCTIONS ARE CALCULATED IN ACCORDANCE WITH THE IBC 2015 BUILDING CODE.

   B. DESIGN UNIFORM SUPERIMPOSED DEAD LOADS ARE IN ADDITION TO THE WEIGHT OF THE BUILDING STRUCTURE.

   C. DESIGN CONCENTRATED LIVE LOADS ARE NOT COMBINED WITH UNIFORM LIVE LOADS.

   D. UNIFORM LIVE LOADS
      ROOF = 20 PSF

   F. UNIFORM SUPERIMPOSED DEAD LOADS
      ROOF = 10 PSF CEILING & MECH'L. + 10 PSF ROOFING

   G. CONCENTRATED LIVE LOADS
      2ND FLOOR = 2000 LB.
      ROOF = 200 LB.

   H. CONCENTRATED ROOF LOAD APPLIED OVER AREA OF 1'–0" x 1'–0".

2. SNOW LOAD

   A. GROUND SNOW LOAD – CITY OF WACO = 5 PSF

STRUCTURAL STEEL

1. STRUCTURAL SHAPES AND PLATES SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE ON THE DRAWINGS:

   A. ALL WIDE FLANGE BEAMS AND COLUMNS – ASTM A992, GRADE 50

   B. ALL SQUARE AND RECT. TUBULAR MEMBERS – ASTM A500, GRADE B, 46 KSI

   C. ALL PIPE MEMBERS – ASTM A53 (E OR S), GRADE B

   D. ALL ANCHOR BOLTS – ASTM F1554, GRADE 36

   E. ALL OTHER SHAPES AND PLATES – ASTM A36

2. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH A.W.S. CODE, BY CERTIFIED WELDERS. WELDING ELECTRODES SHALL BE E70 XX.

3. ALL STRUCTURAL STEEL SHALL HAVE ONE SHOP COAT OF STANDARD IRON OXIDE PRIMER, WITH A MINIMUM DRY FILM THICKNESS OF 1.5 MILS. DO NOT APPLY PRIMER TO ANY STEEL PARTS THAT ARE TO BE ENCASED IN CONCRETE OR ARE TO BE FIREPROOFED USING BLOWN–UP FIREPROOFING MATERIALS.

HOLLOW CONCRETE MASONRY

1. MASONRY WALL DESIGN IS BASED ON QUALITY ASSURANCE AS PRESCRIBED IN IBC 2012 SECTION 2105 BASED ON DESIGN FOR FULL STRESSES, AND AS PRESCRIBED IN ACI–530.1 SECTION 1.14.

2. ALL HOLLOW CONCRETE BLOCK SHALL CONFORM WITH ASTM C90, TYPE N–I, AND SHALL HAVE A COMPRESSIVE STRENGTH, BASED ON THE NET AREA AND AN AVERAGE OF 3 UNITS, OF 1,900 PSI.

3. MORTAR FOR REINFORCED HOLLOW CONCRETE MASONRY SHALL BE TYPE S WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 1800 PSI.

4. GROUT FOR REINFORCED HOLLOW CONCRETE MASONRY SHALL HAVE THE FOLLOWING PROPERTIES:

   A. MINIMUM STRENGTH = 2500 PSI AT 28 DAYS

   B. MAXIMUM COARSE AGGREGATE SIZE = 3/8"

   C. SLUMP = 7" TO 11⌀

   PLACE GROUT IN LIFTS OF 4'–0" OR LESS. GROUT ALL CELLS CONTAINING REINFORCING STEEL OR EMBEDDED METALS. DO NOT USE MORTAR AS GROUT.

5. PROVIDE HORIZONTAL JOINT REINFORCEMENT AT EVERY SECOND BLOCK COURSE UNLESS NOTED IN THE SPECIFICATION. PROVIDE HORIZONTAL BOND BEAMS IN LOAD–BEARING WALLS, LOCATED AT ROOF BEARING, TOP OF PARAPET AND AT 8'–0" O.C. MAXIMUM. REQUIRED INTERMEDIATE BOND BEAMS SHALL BE SPACED UNIFORMLY THROUGHOUT THE HEIGHT OF THE WALL

6. U.N.O. REINFORCE BOND BEAMS WITH 2–#5 CONTINUOUS, AND EXTEND BOND BEAM REINFORCING CONTINUOUS THROUGH CONTROL JOINTS.

7. U.N.O. ON PLANS PROVIDE VERTICAL REINFORCEMENT AS FOLLOWS :

   A. EXTERIOR 12" CONCRETE BLOCK = #5 AT 16" O.C.
      EXTERIOR 8" CONCRETE BLOCK = #4 AT 24" O.C.
      EXTERIOR 6" CONCRETE BLOCK = #3 AT 16" O.C.

      INTERIOR 12" CONCRETE BLOCK = #4 AT 24" O.C.
      INTERIOR 8" CONCRETE BLOCK = #4 AT 24" O.C.
      INTERIOR 6" CONCRETE BLOCK = #3 AT 24" O.C.

   B. 1–#5 EACH END OF WALL
   C. 1–#5 EACH CORNER OR INTERSECTION IN WALL
   D. 1–#5 EACH SIDE OF OPENING IN WALL
   E. 1–#5 EACH OF THREE CELLS UNDER STEEL BEAM SUPPORT ON WALL
   F. 1–#5 EACH CELL IN COLUMN

HOLLOW CONCRETE MASONRY CONT.

ALL VERTICAL REINFORCING STEEL SHALL BE CENTERED IN CELLS UNLESS NOTED OTHERWISE.

8. PROVIDE VERTICAL DOWELS TO MATCH SIZE AND LOCATIONS OF VERTICAL BARS. LAP WITH VERTICAL REINFORCING AS NOTED BELOW. WHERE NO EMBEDMENT IS SHOWN, EMBED DOWELS 30 BAR DIAMETERS INTO FOUNDATION CONCRETE.

9. LAP SPLICES IN MASONRY REINFORCEMENT:

   A. #3 BARS LAP 15"
   B. #4 BARS LAP 24"
   C. #5 BARS LAP 30"
   D. #6 BARS LAP 36⌀

   ALL HORIZONTAL REINFORCING BARS IN LINTEL BEAMS SHALL BE CONTINUOUS BARS WITH NO SPLICES. ALL OTHER MASONRY REINFORCEMENT SHALL LAP 40 BAR DIAMETERS AT SPLICES UNLESS NOTED OTHERWISE.

   VERTICAL REINFORCEMENT SHALL BE MADE CONTINUOUS AT THE BASE OF ALL PARAPETS. SPLICING REINFORCEMENT AT THIS LOCATION IS NOT ALLOWED.

   HORIZONTAL REINFORCEMENT SHALL BE MADE CONTINUOUS AT THE FACE OF ALL CANTILEVERS. SPLICING REINFORCEMENT AT THIS LOCATION IS NOT ALLOWED.

GENERAL

1. ALL MEMBERS AND MATERIALS COVERED UNDER THESE GENERAL NOTES AND THE CONSTRUCTION DOCUMENTS SHALL AS A MINIMUM BE INSPECTED IN ACCORDANCE WITH THE IBC 2015 CODE CHAPTER 17 : STRUCTURAL TESTS AND SPECIAL INSPECTIONS

2. SEE ELECTRICAL AND MECHANICAL DRAWINGS FOR EXACT LOCATION AND SIZES OF SMALL MECHANICAL OPENINGS, SLEEVES, ETC. NOT SHOWN ON THE STRUCTURAL DRAWINGS.

3. THE USE OF REPRODUCTIONS OF THE DESIGN STRUCTURAL DRAWINGS FOR SHOP DRAWING PURPOSES IS NOT ACCEPTABLE.

4. THE CONTRACTOR SHALL VERIFY, PRIOR TO CONSTRUCTION, THAT THE NEW STRUCTURE WILL NOT CONFLICT WITH ANY EXISTING UTILITIES. IF CONFLICTS ARISE, THE CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER, AND SHALL STOP THE WORK UNTIL AN APPROPRIATE SOLUTION TO THE CONFLICTS ARE FOUND, AND THE CONTRACTOR IS GIVEN WRITTEN AUTHORIZATION TO PROCEED WITH THE WORK.

Charles Gojer and Associates, Inc.
Consulting Engineers
Texas Firm Registration No. F–697
11615 Forest Central Dr. Suite 303
Dallas, Texas 75243 (214) 340–1199

NO.	DATE	REVISION	BY

CENTRAL WASTEWATER TREATMENT PLANT
PHASE I - NORTH PLANT
BLOWER MCC REPLACEMENT

McCREARY & ASSOCIATES, INC.
CONSULTING ENGINEERS *972/458-8745*
6310 LBJ FREEWAY SUITE 217 *DALLAS, TEXAS 75240*

WACO METROPOLITAN AREA REGIONAL SEWERAGE SYSTEM
ELECTRICAL IMPROVEMENTS, PHASE I

GENERAL NOTES AND ABBREVIATIONS

STATE OF TEXAS 33348 REGISTERED PROFESSIONAL CHARLES GOJER 8-5-20

AUGUST 5, 2020
date

SHEET NO.
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OF 4

STEEL LINTEL SCHEDULE

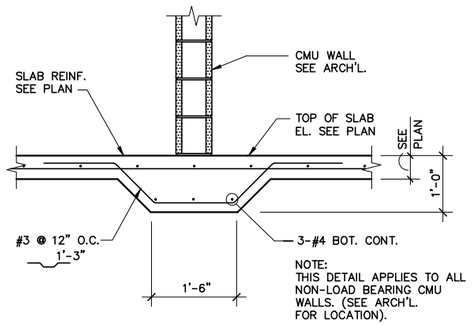
MASONRY OPENING	SIZE	DETAIL	MINIMUM BEARING LENGTH (IN.)
UP TO 4'-0"	2 - L 3½ x 3½ x ¼	⌟⌞	8
TO 6'-0"	2 - L 4 x 3½ x ¼	⌟⌞	8
TO 6'-8"	2 - L 4 x 3½ x 5/16	⌟⌞	8
TO 8'-0"	2 - L 5 x 3½ x 5/16	⌟⌞	8
TO 8'-6"	2 - L 6 x 3½ x ⅜	⌟⌞	8
TO 12'-0"	W8 x 10 W/5/16 x 7 ℄	I	8

NOTES:

1. SCHEDULED LINTEL IS FOR 8" THICK WALL. FOR OTHER THICKNESSES, PROVIDE ONE ANGLE FOR EACH 4" OF WALL THICKNESS OR PORTION THEREOF.
2. STEEL LINTELS MAY BE PROVIDED BY CONTRACTOR IN LIEU OF CMU LINTELS.
3. REF. TYP. DETAIL FOR BEARING OF STEEL LINTELS.
4. REINFORCE CMU JAMBS/SIDE CORES BENEATH STEEL LINTEL BEARING SIMILAR TO MASONRY LINTELS.
5. PLACE ANGLES WITH LONG LEG VERTICAL, U.N.O.
6. HOT-DIP GALVANIZE ALL STEEL LINTELS.

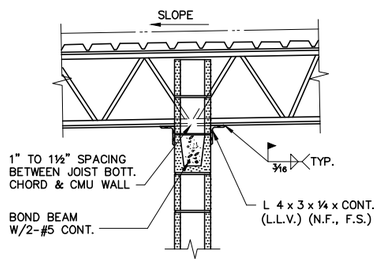
STEEL LINTEL SCHEDULE

01 TYPICAL DETAIL
SCALE: NO SCALE



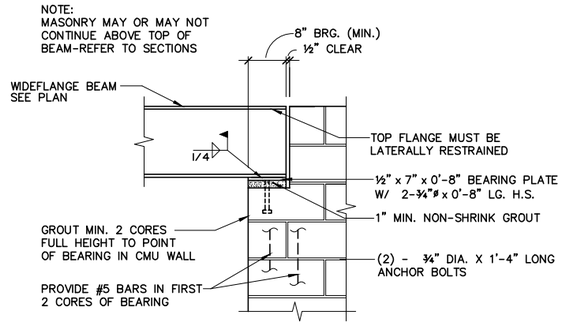
THICKENED SLAB UNDER NON-LOAD BEARING CMU WALL

02 TYPICAL DETAIL
SCALE: NO SCALE



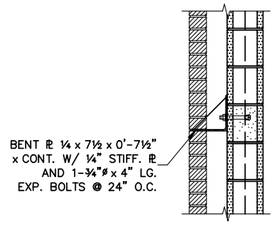
BRACING OF NON-LOAD BEARING CMU WALL

03 TYPICAL DETAIL
SCALE: NO SCALE



WIDE FLANGE BEAM BEARING ON PARALLEL CMU WALL

04 TYPICAL DETAIL
SCALE: NO SCALE



STEEL LINTEL DETAIL

05 TYPICAL DETAIL
SCALE: NO SCALE

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STATE OF TEXAS · CHARLES GOJER · 33348 · REGISTERED · PROFESSIONAL · ENGINEER

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