# ADDENDUM No. 2

## RFP No. 24-34

## Motor Control Centers E & F Replacement

## Due: Friday, June 7, 2024 at 3:00 P.M. (local time)

The information contained herein shall take precedence over the original documents and all previous addenda (if any),and is appended thereto. A mandatory pre-proposal meeting was held on May 22, 2024 and a sign-in sheet is attached herein. **This Addendum includes thirty-three (33) pages, including attachments.**

**The Proposer is to acknowledge receipt of this Addendum No. 2, including all attachments in its Proposal by so indicating in the proposal that the addendum has been received. Proposals submitted without acknowledgement of receipt of this addendum may be considered non-conforming.**

**The following forms provided within the RFP Document should be included in submitted proposal:**

- **Attachment B – General Declarations**
- **Attachment D - Prevailing Wage Declaration of Compliance**
- **Attachment E - Living Wage Declaration of Compliance**
- **Attachment G - Vendor Conflict of Interest Disclosure Form**
- **Attachment H - Non-Discrimination Declaration of Compliance**

***Proposals that fail to provide these completed forms listed above upon proposal opening may be rejected as non-responsive and may not be considered for award.***

### I. CORRECTIONS/ADDITIONS/DELETIONS

Changes to the RFP documents which are outlined below are referenced to a page or Section in which they appear conspicuously. Offerors are to take note in its review of the documents and include these changes as they may affect work or details in other areas not specifically referenced here.

**Section/Page(s)** **Change**

Pre-proposal Sign-in Sheet

**Attached** Sign-in Sheet has been provided.

01300

As updated herein:

**Revised** Section 01300 has been provided.

01400

As updated herein:

**Revised** Section 01400 has been provided.

01600

As updated herein:

**Revised** Section 01600 has been provided.

16960

As updated herein:

**Remove** Reference to 16970 in Section 3.1.B.

16980

As updated herein:

**Add** language in Section 3.1.C. to clarify number of training sessions required.

E-2

As updated herein,

**Add** Clarification for control wiring inside MCC-E and MCC-F.

**Remove** Ground conductor to equipment rack.

## II. QUESTIONS AND ANSWERS

The following Questions have been received by the City. Responses are being provided in accordance with the terms of the RFP. Respondents are directed to take note in its review of the documents of the following questions and City responses as they affect work or details in other areas not specifically referenced here.

Question 1: Confirm if SCADA connections moved from the existing MCCs to terminal cabinets and/or motor starters require functional verification and the utilization of an approved SCADA subcontractor. If required please provide contact information for facility approved SCADA subcontractor. Confirm if the SCADA verification is also to be a commissioning requirement. What documentation is required for the SCADA verification?

Answer 1: Yes, all SCADA connections moved from the existing MCCs to terminal cabinets and/or motor starters shall be functionally verified by the plant's approved SCADA subcontractor; Commerce Controls, Inc. Contact Eric Hine: 734-751-2593, ehine@commercecontrols.com Commerce Controls shall provide a checklist of points to be verified as documentation.

Question 2: Table 1 in specification section 01600 2.2.C for allowable material for metals is considered a NEMA 1 normal standard materials area in the room associated with the replacement of MCC-E & F

Answer 2: This table and associated sections will be removed from Section 01600. Refer to revised Section 01600. Note that the electrical room is an unclassified location.

Question 3: Specification section 16110 2.2 Rigid Steel Conduit and 2.3 Liquid tight Flexible Metal Conduit are the only (2) types of conduits listed under products in section 16110. However, in part 3.1 Installation of Raceways item A lists 'Steel Conduits (rigid, imc, emt)'. Confirm if IMC and EMT are not allowable and only galvanized rigid steel is permissible.

Answer 3: The full name of the NECA standard that is referenced in this note is "Installing Steel Conduits (Rigid, IMC, EMT)". The only two specified conduits are Rigid Galvanized Steel and Liquidtight Flexible Metal Conduit.

Question 4: Specification section 16050 3.3.A calls for a power system short circuit analysis to be provided with this bid proposal. Where this is to be carried from substation 2b breakers serving MCC-e and MCC-F and through the branch circuit protective devices. Please confirm that a complete existing system short circuit analysis will be provided up and through Substation 2B for reference. And no other upstream analysis is required. The last sentence in 16050 3.3.A states "The analysis shall include all existing electrical distribution system components to remain in service' Please clarify this sentence.

Answer 4: The plant has a complete existing short circuit analysis, and no upstream analysis is required. Perform the analysis from Substation 2B, for both DP-E and DP-F, through the downstream branch circuit protective devices. This shall include the distribution system components to remain in service. Some of the loads in the MCCs have been abandoned and will not be replaced/repowered from the new distribution panels; these do not need to be included in the analysis.

Question 5: Specification section 01300 part 1.9.A calls for the contractor to procure the services of a cloud-based construction documentation service to send/receive all project documents. This RFI is just confirming this requirement, where possible HRC has a platform to be utilized for this particular project that is limited to the electrical scope of work only.

Answer 5: A cloud-based construction system is not required, this will be removed from the specification. A revised Section 01300 has been provided.

Question 6: Specification section 16960 part 3.1.B states that all testing shall be performed prior to start-up of equipment or systems as specified under section 16970. There is no specification under section 16970. Please advise on the reference to specification 16970.

Answer 6: Reference to 16970 to be removed, refer to revised Section 16960. Note that cable testing shall be performed prior to energizing new equipment.

Question 7: Specification section 16980 part 3.1.C states that the contractor shall schedule demonstrations and/or training sessions. The last sentence states; "multiple sessions shall be scheduled to allow attendance by all owner's personnel", considering the MCC's e & F are to be replaced in (2) different phases, and the owners personnel involves 3-shifts, can you please provide an anticipated quantity of "Multiple Sessions"?

Answer 7: One demonstration is sufficient for each MCC replacement. Refer to revised Section 16980.

Question 8: Plan drawing E-02 contains a detail 'Typical Equipment Rack' Calling for a #2 AWG grounding conductor bonded to the equipment rack. Please provide information on where the source connection for this grounding/bonding conductor is to be

connected. With the MCC's removed, the ground bus in these units are removed. There was no exterior ground bus bar identified within the electrical room for the bonding source for the grounding conductor. Please provide information on where these grounding/bonding conductors are to connect to a grounding source.

Answer 8: Delete separate ground conductor to equipment rack.

Question 9: Drawing E-02 contains a note stating the following: "note that there are approx. (260) control wires that run through MCC-E and MCC-F, but are not terminated at the MCC. Confirm that this Approximate quantity of (260) control wires is for Each MCC for a total of (520)., HVE has located archived plans from prior project 2011 where in these drawing we have identified the following quantity of control wires: MCC-E (396)-#14 and MCC-F (264)-#14. Please provide confirmation on the quantity of existing control wires.

Answer 9: An exact quantity must be determined in the field, but based on the information available, assume approximately 260 wires per MCC for a total of (520). Revised Drawing E-2 is attached. The prior project drawings have also been attached as a reference.

Question 10: Drawing E-01 is the one-line diagram for the new panelboards DP-E & DP-F. the quantity of breakers identified on E-01 for each of these panelboards exceeds the capacity of the proposed enclosures. Attached are the BOM drawings for DP-E and DP-F. These are both full and exceed the capacity of breakers called for on E-01. Each panels exceed capacity and where DP-E is short (6) 3P20's and DP-F is short (5) 3P20's. Please identify how we should proceed.

Answer 10: Per Section 16470, 2.1.B. "Feed through lugs, sized the same as the main lugs, shall be included where space limitations require additional panelboard section(s) to accommodate the scheduled branch circuit breakers".

We anticipate that (2) sections will be required for each panelboard, with feed through lugs installed in section 1 to feed section 2.

Offerors are responsible for any conclusions that they may draw from the information contained in the Addendum.

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

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Bloomfield Hills, MI 48302-0360

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## Meeting Sign-In Sheet

**Project Name:** Motor Control Centers E + F Replacement **Date of Meeting:** 5/22/24

**Purpose of Meeting:** Pre-Bid Meeting

**For the Township/City/Village of:** Ann Arbor

**Location of Meeting:** WRRF

| No. | Name | Agency/ Company | Phone Number | Email |
|---|---|---|---|---|
| 1 | Cody Madlem | J. Renck Electric | 989-775-7393 | cmadlem@jrenck.com |
| 2 | Tim KITTEL | AnnArborElect. | 734-747 8842 | tkittel@annarborelectric.com |
| 3 | Adam Smith | AA WRRF | 734-845-0735 | asmith@a2gov.org |
| 4 | Anne Warrow | AA WRRF | 734-332-6155 | awarrow@a2gov.org |
| 5 | KEITH SANDERS | AA WRRF | 734-794-6450 | KSanders@a2gov.org. |
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SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SCHEDULE FOR SUBMISSION

A. Submittal procedures

B. Submittal Review

C. Proposed Products list

D. Shop Drawings, Product Data, and Samples

E. Manufacture's installation instructions

F. Manufacture's certificates

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control

B. Section 01700 - Contract Closeout

1.3 SCHEDULE FOR SUBMISSION

A. Prior to submitting any shop drawings, product data, portfolios, samples, etc. the Contractor shall prepare a summary, listing all items in the project which he will submit for review by the Engineer.

B. The summary shall be submitted within twenty (20) calendar days after receipt of Notice to Proceed and shall be updated once per month thereafter.

C. The summary shall include the proposed dates for submittal for each item for control purposes. The summary shall be prepared in coordination with the Project Schedule for Construction and adequate time shall be allowed therein for review and possible resubmittal.

D. The summary and schedule for submittals shall not relieve the Contractor of his obligation to comply with specification requirements for items not listed on the schedule.

E. Nothing herein shall be construed as allowing additional time for completion of the project in the event resubmittal is required for shop drawings or the other items to be submitted.

1.4 SUBMITTAL PROCEDURES

A. Transmit each submittal with Engineer approved transmittal form.

B. Sequentially number the transmittal form. Re-submittals shall have original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor and supplier; pertinent drawing and detail number, and specification section number, as appropriate.

D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and deliver to the Engineer in a manner to allow sufficient time for review and processing by the Engineer so as to not cause delays in the Work. Coordinate submission of related items.

F. All drawings, information and documentation shall be prepared and submitted with all words in the English language and dimensions in American units. No foreign language or metric units will be permitted.

G. Identify variations from Contract Documents and Products and system limitations which may be detrimental to successful performance of the completed work.

H. Provide space for Contractor and Engineer review stamps.

I. Revise and resubmit submittals as required and identify all changes made since previous submission.

J. Distribute copies of reviewed submittals to all concerned and related parties. Instruct parties to promptly report any inability to comply with provisions.

K. The Engineer reserves the right to refuse to check or review any submittal of a subcontractor or manufacturer which is not presented in compliance with the foregoing requirements.

L. Electronic Submittals:
1. All electronic submittals shall follow the procedures outlined above.
2. Electronic submittal procedures are only applicable to Shop Drawings and product data submittals.
3. Electronic submittals shall be made in a standard format the Engineer has agreed in advance to accept, JPEG, TIF, DGN, DXF, DWG, or PDF.
4. Reviewed submittals shall be returned in JPEG, TIF, or PDF electronic format for the Contractor’s printing and distribution.

1.5 SUBMITTAL REVIEW

A. All subcontractors and manufacturers' drawings shall first be sent directly to the Contractor, who shall keep a record of the drawing numbers and the dates of receipt. The Contractor shall check thoroughly all such drawings, as regards measurements, sizes of members, materials, and all other details to assure himself that they conform to the intent of the drawings and the specification, and shall promptly return to the subcontractors and/or manufacturers for correction such drawings as are found inaccurate or otherwise in error.

B. The Engineer will review the Contractor's, subcontractors' and manufacturers' drawings within a reasonable time after receipt thereof and will return one copy endeavoring to indicate, by notation thereon or written instructions, any correction which may be necessary to meet the Contract requirements. The Contractor shall then review such notations and/or instructions and if he concurs therein, shall make or have made such required corrections, and shall, when so noted on the drawings or requested by the Engineer, resubmit corrected drawings to the Engineer as soon as possible, for final review. Such further review by the Engineer will be limited to the corrections only, and the Contractor, by such re-submission shall be held to have represented that such drawings contain no other alterations, additions or deletions, unless the Contractor (in writing) directs the Engineer's specific attention to same. Should the Contractor question, or dissent from, such notations and/or instructions, he shall so inform the Engineer and request further clarification before resubmitting the drawings.

C. The review of Contractor's, subcontractors', and manufacturers' drawings by the Engineer is for coordination and assistance, and the Engineer does not thereby assume responsibility for errors or omissions. Such errors or omissions must be made good by the Contractor, irrespective of the receipt, review of the drawings by the Engineer, and even though the work is done in accordance with such drawings.

1.6 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Owner-Contractor Agreement submit list of all major products proposed for use, including those previously called for to be submitted in the Proposal, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

C. Substitutions: Whenever a particular brand or make or type of material, equipment, or other item is specified or is indicated on the Contract Drawings, it is for the purpose of establishing a standard of quality, design, and type desired and to supplement the detailed specifications. Any other brand or make or type which in the opinion of the Engineer is equivalent to that specified or indicated may be offered as a substitute, subject to the following provisions:
1. Contractor shall submit for each proposed substitution sufficient details, complete descriptive literature and performance data together with samples of the materials where feasible to enable the Engineer to determine if the proposed substitution is equal to that specified.
2. Contractor shall submit certified tests where applicable by an independent laboratory, acceptable to the Owner, attesting that the proposed substitution is equal.
3. A list of installations where the proposed substitution is used.
4. Requests for substitutions shall include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the Owner.
5. Where the review of a substitution requires revision or redesign of any part of the work, all such revision and redesign and all new drawings and details required, therefore, shall be provided by the Contractor at his own cost and expense and shall be subject to the review of the Engineer.
6. In all cases, the Engineer shall be sole judge as to whether a proposed substitution is to be incorporated into the project. The Contractor shall abide by the Engineer's decision when proposed substitute items are judged to be unacceptable and shall in

such instances furnish the item specified or indicated. No substitute items shall be used in the work without review of the Engineer.

1.7 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. The intent of the Contract Documents is to include in the contract price the cost of all labor and materials, water, fuel, tools, plant, equipment, light, transportation, and all other expenses as may be necessary for the proper execution and completion of the work.

B. While the contract drawings and specifications propose to be complete in all respects as to layout, type of equipment and materials, they are not intended to serve as detailed sleeve or insert drawings, and the preparation of such drawings required or necessary for this purpose, or to set equipment accurately, shall be the responsibility of the Contractor.

C. These Contract Documents shall be supplemented by other drawings, product data, samples and portfolios of all equipment, apparatus, materials, etc. furnished by the Contractor and reviewed by the Engineer. All such supplementary drawings or instructions are intended to be consistent with the Contract Documents, true developments thereof and reasonably inferable therefrom. Therefore, no extra charge will be allowed on a claim that particular supplemental drawings or instructions differed from the Contract documents, incurring extra work, unless the Contractor has first brought the matter, in writing, to the Engineer's attention for proper adjustment before starting on the work covered by such and has received from the Engineer an order in writing to so proceed.

D. These original and supplementary drawings constitute the drawings according to which the work is to be done. The Contractor shall keep at the site of the work, copies of all drawings and specifications and shall at all times give the Engineer or Owner access thereto.

E. Shop Drawings are drawings, diagrams, schedules other data specifically prepared for the Work by the Contractor or a subcontractor, Subcontractor manufacturer, supplier or distributor to illustrate some portion of the Work.

F. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of these submittals is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

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

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

I. The Contractor shall review, approve, and submit to the Engineer, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents requested by the Engineer or Owner or otherwise necessary for the proper execution of the work, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

J. The Contractor shall perform no portion of the Work requiring submittal, resubmittal, and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by the Engineer. Such Work shall be in accordance with reviewed submittals.

K. By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or contained within such submittals with the requirements of the Work and of the Contract Documents.

L. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Engineer's review of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submittal and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in the Shop Drawings, Product Data, Samples or similar submittals by the Engineer's review thereof, as the Engineer's review in intended to cover compliance with the Contract Document and not to enter into every detail of the shop work.

M. The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those required by the Engineer on previous submittals.

N. When professional certification of performance criteria of materials systems or equipment is required by the Contract Documents, the Engineer shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

O. Shop Drawings
1. Submit in the form of two legible opaque copies.
2. One reviewed copy will be returned to the Contractor for his duplication and distribution.
3. After review, produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article herein and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

P. Product Data
1. Submit two copies of the documents which the Engineer requires. One reviewed copy will be returned to the Contractor for his duplication and distribution.
2. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
3. Product data shall be bound with an index sheet containing a space at least 5" x 8" for review stamps and notes.
4. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.8 MANUFACTURER INSTALLATION INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, operating, maintaining and finishing to the Engineer in quantities specified for Product Data.

B. Identify conflicts between manufacturer's instructions and contract documents.

1.9 MANUFACTURER CERTIFICATES

A. When specified in individual sections, submit certification by manufacturer to Engineer, in quantities specified for Product Data.

B. Indicate material or Product meets or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to the Engineer.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. Tolerances

C. References.

D. Mockup.

E. Inspecting and testing laboratory services.

F. Manufacturers' field services and reports.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.

B. Section 01600 - Material and Equipment: Requirements for material and product quality.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.5 REFERENCES

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date specified in the individual specification sections, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in Contract nor those of the Architect/Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 MOCK-UP

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups are representative of the quality required for the Work.

D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

1.7 INSPECTING AND TESTING LABORATORY SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent firm to perform inspecting and testing, as required.

B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the Engineer or the Owner.

C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Engineer, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 48 hours prior to expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing or inspecting does not relieve Contractor of performing Work to contract requirements.

G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting will be charged to the Contractor by deducting inspecting or testing charges from the Contract Sum.

1.8 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 30 days of observation to Engineer for information.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

# SECTION 01600

# MATERIAL AND EQUIPMENT

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. General Provisions.

B. Transportation and handling.

C. Storage and protection.

D. "Or Equal" Clause

E. Product options.

F. Substitutions.

G. Installation of Equipment.

H. Damage during tests and instruction period.

I. Services of manufacturer's engineers.

J. Equipment manufacturer certification.

### 1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Product quality monitoring.

### 1.3 GENERAL PROVISIONS

A. Products (including all materials, machinery, equipment, and systems) shall be carefully designed and installed to ensure that all required functions are adequately performed within specified degrees of precision and that each unit shall operate with every other part, furnished or existing, to provide a complete integrated system which shall operate to the satisfaction of the Engineer. Any changes or revisions of existing work made necessary by the type and dimensions of furnished products shall be made at the expense of the Contractor, and he shall furnish detail drawings showing such changes or revisions for the approval of the Engineer.

B. Submit to the Engineer ample proof that each and every part of the products to be furnished is of a reliable make and of a type which has been in successful operation within the continental United States. Installation of any experimental or untried type of apparatus, material, or machinery will not be allowed.

C. Each major item of equipment shall have the manufacturer's nameplate securely affixed in a conspicuous place. The nameplate shall show the manufacturer's name, address, model number, rating, and any other pertinent data such as speed, horsepower, etc.

D. All materials, equipment, and accessories shall be new and unused and shall be essentially the products of a manufacturer regularly engaged in the production of such material or equipment and shall essentially duplicate material or equipment that has been in satisfactory operation at least 5 years.

E. The owner reserves the right to reject any material or equipment manufacturer who, although he meets the above requirements, does not provide satisfactory evidence indicating adequate and prompt post-installation repair and maintenance service as required to suit the operational requirements of Owner. Items of any one type of materials or equipment shall be the product of a single manufacturer.

F. All piping and equipment furnished under this contract shall be fabricated of such materials that under normal operating conditions harmful substances are not imparted to the water supply system.

G. Except as otherwise specified or required, equipment shall be primed and finish painted at the factory in accordance with the recommendations or the approved manufacturer. All equipment supplied under this contract shall include at least one quart of finish paint used for touch-up at the completion of construction.

H. Any damage to shop coating (paint) shall be corrected to the satisfaction of the Engineer.

I. Certification shall be provided that all materials which may come into contact with potable water meets the National Sanitation Foundation Standard 61 and all MDPH regulations in force at the time of submittals.

1.4 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Transport and handle all materials in such a manner to avoid breakage, inclusion of foreign materials, and/or damage by water or other causes.

C. Deliver packaged materials in original unopened containers. Packages or materials showing evidence of damage or contamination regardless of cause will be rejected.

D. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.

E. Repair or replace all items damaged or broken as a result of the Contractor's operation at no cost to the Owner.

F. When specified in the individual Section, equipment shall be made available for conditional acceptance by the Engineer at the factory prior to shipment.

G. Equipment shall not be delivered unless it can be immediately incorporated into the work or proper storage facilities are available.

H. Crate all parts of equipment carefully to facilitate shipping and handling. Crates shall completely protect the equipment and be sufficiently strong to permit lifting and skidding without additional bracing or reinforcement.

I. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

J. Notify the Engineer at least two days in advance of the delivery of equipment.

1.5 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturers' instructions, with seals and labels intact and legible.

B. Store sensitive Products in weather tight, climate controlled enclosures.

C. For exterior storage of fabricated Products, place on sloped supports, above ground.

D. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

E. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of Product.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.6 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers with the provision "No Substitutions": Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for "or Equal" or Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article and Section 01300.

1.7 “OR EQUAL” CLAUSE

A. Specifying an article, material, or piece of equipment by reference to a proprietary product or by using the name of a manufacturer or vendor followed by the clause "or equal" shall be understood to indicate the type, function, minimum standard of design, efficiency, and quality

desired and shall not be construed in such a manner as to exclude products of comparable quality, design, and efficiency.

B. Comparable products shall be capable of performing equal function and shall be compatible with other equipment, materials, or systems to which they connect or will become an integral part of.

C. The clause "or approved equal" which may appear elsewhere in the documents shall mean the same as "or equal".

D. Wherever in the documents an article, material, or piece of equipment is defined by specifying a proprietary product or using the name of a manufacturer or vendor the term "or equal" if not included shall be implied.

E. Substitutions of "or equal" products are subject to approval of the Engineer.

1.8 SUBSTITUTIONS

A. Refer also to Section 01300.

B. Engineer will consider requests for Substitutions after the date established in Notice to Proceed.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:
1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
2. Will provide the same warranty for the Substitution as for the specified Product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Also provide information required by Section 01300 for substitutions. Burden of proof is on proposer.
3. The Engineer will notify Contractor in writing of decision to accept or reject request.

1.9 INSTALLATION OF EQUIPMENT

A. General

1. Contractor shall have on hand sufficient personnel, proper equipment, and machinery of ample capacity to facilitate the work.
2. Contractor shall be responsible for locating, aligning, and leveling all equipment.
3. Complete manufacturer's installation instructions including permissible tolerances shall be furnished with each unit of equipment.
4. All equipment shall be installed in accordance with the approved manufacturer's specifications, drawings, and tolerances under the direct supervision of the required manufacturer's engineer.
5. Equipment shall be erected in a neat and workman-like manner on the foundations at the locations and elevations shown on the drawings unless directed otherwise by the Engineer during installation.

B. Installation

1. Special care shall be used in locating, aligning and, leveling all equipment and parts thereof to ensure that each item is in the proper position relative to other equipment and that all parts are aligned within allowable tolerances. The Contractor shall be responsible for this accuracy and shall notify the Engineer of any conditions in prior work which would prevent this alignment before proceeding with the work. The Contractor shall employ a competent surveyor to set all lines and levels of equipment to the accuracy required.
2. All blocking and wedging required for the proper support and leveling of equipment during installation shall be furnished by the Contractor. All temporary supports shall be removed except steel wedges and bronze shims which may be left in place with the approval of the Engineer.
3. Each piece of equipment or supporting base bearing on concrete foundations shall be bedded in grout. The Contractor shall provide a minimum of 1-1/2" thick grouting or as indicated on Contract Drawings.

## 1.10 DAMAGE DURING TESTS AND INSTRUCTION PERIODS

A. Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and he shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner formally takes over the operation thereof.

## 1.11 SERVICES OF MANUFACTURER'S ENGINEERS

A. The contract price shall include the cost of furnishing competent engineers or superintendents from each company manufacturing equipment for the Project to:

1. Assist the Contractor to install, adjust, and test the equipment in conformity with the Contract Documents.
2. Supervise start-up operations and adequately instruct designated employees of the Owner in the proper operation and maintenance procedures when requested by the Owner throughout the guarantee period of the equipment. A report on each visit shall be filed by the manufacturer's representative with the Engineer.

## 1.12 EQUIPMENT MANUFACTURER CERTIFICATION

A. The Contractor will provide Engineer with written certification obtained from each company manufacturing equipment for the Project that the equipment is installed and does operate in accordance with the manufacturer's recommendations.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

# SECTION 16960

# ELECTRICAL TESTING AND EQUIPMENT

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Division 16 testing requirements.

B. Sample forms.

### 1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturer's Field Reports.

B. Section 16010 - General Electrical, Instrument, and Control Requirements.

C. Section 16050 - Basic Electrical Materials and Methods.

### 1.3 REFERENCES

A. All testing methods shall be in conformance with the following documents:
1. National Electrical Code, latest approved edition.
2. Any and all Federal, State, and/or local codes, ordinances, or regulations.
3. NETA Acceptance and Maintenance Specifications and Safety Guidelines.

B. All equipment shall be tested in conformity with all requirements, as a minimum, of applicable standards of IEEE, NEMA, ISA, ANSI, ICEA, UL, and OSHA, except as modified herein.

### 1.4 SUBMITTALS

A. Submit on Products under provisions of Section 01300.

B. Product Data: Indicate electrical characteristics and specifications; including layout of switches, buttons, displays, dimensions, weights, and external power requirements; and, list cables, connections and all available accessories.

### 1.5 PROJECT RECORD DOCUMENTS

A. Submit test results under provisions of Section 01700.

### 1.6 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700.

B. Operation Data: Include bound copies of operating and programming instructions.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and use of product(s).

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.

B. Cable testing shall be performed by technicians certified in accordance with ANSI/NETA ETT-2000 Standards for the Certification of Electrical Testing Technicians. Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make an informed judgment on the continued serviceability or nonserviceability of the specific equipment. Each on-site crew leader shall hold a current certification, Level III or higher, in electrical testing.

1.8 REGULATORY REQUIREMENTS

A. Furnish Products listed and classified by Underwriters Laboratories, Inc. (UL), Factory Mutual (FM), and/or Canadian Standards Association (CSA), as specifically indicated, and as acceptable to authority having jurisdiction, as suitable for purpose specified and indicated.

B. All test instruments and devices shall be in conformance with all applicable standards and requirements of ISA, IEEE, ANSI, NEMA, and Underwriters' Laboratories. NIST – traceable certificates of calibration shall be provided with each instrument/device.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01600.

B. Accept products on site in factory containers. Inspect for damage. Turn over to Owner immediately.

PART 2 PRODUCTS

None.

PART 3 EXECUTION

3.1 TESTING

A. The Contractor shall perform all testing necessary to ensure that the work performed under the Contract is satisfactory and in conformity with the requirements of the Contract Documents.

B. All testing shall be performed prior to start-up of equipment.

C. All tests shall be witnessed by the Owner's Representative and four (4) copies of all field tests, as specified herein and in other Sections, shall be submitted to the Owner. Twenty-four (24) hours (minimum) written notice shall be given the Owner prior to performing the tests. Such tests shall be scheduled at a time agreed upon by the Owner and the Contractor.

D. Testing shall include, but shall not be limited to, the following tests:
1. Insulation resistance to ground of all conductors and equipment.
2. Continuity, connections, and integrity of the grounding system.
3. Continuity, polarity, phase sequence, and connection of all current carrying conductors and equipment.
   a. Wire insulation tests shall be made with a 1000 volt megger on 480 volt power distribution cables and/or wires. Each test shall be continued for a time sufficient to charge the cable or wire.
4. The following information shall be included in a test report on each cable:
   a. Complete identification of cable, including approximate length.
   b. Approximate average cable temperature.
   c. Megger readings versus time data, including converted values.
5. In order to be acceptable, the cable must withstand the specified high voltage without breakdown or have satisfactory megger readings.

E. All improper connections, or materials, and equipment not adapted to the purpose for which it is intended, or material, or equipment found to be faulty while performing the tests, shall be corrected; and any changes or repairs necessary to put the work in satisfactory condition and operation shall be done by the Contractor and re-tested at no additional cost to the Owner.

3.2 CONTRACTOR'S ASSISTANCE

A. Testing of Package equipment, as described in Section 16010, shall be as required in other Sections of this Specification.

B. The Contractor shall provide the services of an electrician to assist either the Contractor or the equipment manufacturer's service representatives on any and all field test and adjustments as may be made or required by equipment manufacturers or the Contractor as the equipment is put into service. The Contractor shall make equipment manufacturers' service representatives available as required to assist in testing or putting equipment into operation.

END OF SECTION

# CABLE TEST CERTIFICATE

## 1.0 TECHNICIAN INFORMATION

Company Name: _____ Contact Person: _____
Address: _____ Phone No.: _____
_____

## 2.0 CABLE IDENTIFICATION

Cable Designation or Circuit No.: _____
Cable Source _____ Air Temperature _____
Termination Point _____ Humidity _____
Connected Equipment _____ Equipment Temperature _____

Test Voltage _____ No. of Conductors _____ Age _____
Length _____ Size _____ Operating Voltage _____
Cable Type _____ Rated Voltage _____ Ground Type _____

Manufacturer _____ Insulation Type _____
Insulation Thickness _____ Installed In _____
Conductor Material _____

Phase Color Identification

Phase A: _____ Phase B: _____ Phase C: _____

## 3.0 TEST INSTRUMENT

Manufacturer _____ Model No. _____

## 4.0 POWER CABLE TEST – MEGGER TEST

| Time | Phase A Megohms | | Phase B Megohms | | Phase C Megohms | |
|---|---|---|---|---|---|---|
| Minutes | Before | After | Before | After | Before | After |
| | | | | | | |
| .25 | | | | | | |
| .50 | | | | | | |
| .75 | | | | | | |
| 1.00 | | | | | | |
| 1.25 | | | | | | |
| 1.50 | | | | | | |
| 1.75 | | | | | | |
| 2.00 | | | | | | |
| 2.25 | | | | | | |
| 2.50 | | | | | | |
| 2.75 | | | | | | |
| 3.0 | | | | | | |
| 4.0 | | | | | | |
| 5.0 | | | | | | |

## 5.0 CERTIFICATION

I certify that the above information is correct and that the cable installation and condition conforms to manufacturer and Contract Specification requirements, unless otherwise noted.

Technician Signature: _____ Date: _____

## 6.0 ENGINEER REVIEW

Test Witnessed: ☐ Yes ☐ No Reviewer Signature: _____ Date: _____

# SECTION 16980

# DEMONSTRATION AND TRAINING

## PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Requirements for Demonstration of equipment and/or systems for the Owner's personnel.

B. Requirements for Training of Owner's personnel in the operation and maintenance of the equipment/system.

C. Acceptance requirements.

### 1.2 RELATED SECTIONS

A. Section 01400 - Quality Control: Manufacturer's Field Reports.

B. Section 01700 - Contract Closeout.

C. Section 16010 - General Electrical, Instrument, and Control Requirements.

D. Section 16050 - Basic Electrical Materials and Methods.

E. Section 16960 - Electrical Testing and Equipment.

### 1.3 REFERENCES

A. All equipment and workmanship shall be in conformance with the following documents:
1. National Electrical Code (NEC), latest approved edition.
2. Any and all Federal, State, and/or local codes, ordinances, or regulations.

B. All equipment shall be designed, constructed, installed, and tested in conformity with all requirements, as a minimum, of applicable standards of IEEE, NEMA, ISA, ANSI, ICEA, UL and OSHA, except as modified herein.

## PART 2 PRODUCTS

None.

## PART 3 EXECUTION

### 3.1 DEMONSTRATION OF EQUIPMENT

A. Demonstration of equipment and systems, and training of the Owner's personnel in the proper operation and maintenance of the equipment and systems, shall be performed as required, as

described below, and per the requirements of the Section under which the equipment/system was furnished.

B. The following shall occur prior to scheduling demonstration and training of any equipment and/or system:
   1. The Contractor shall have submitted reports indicating successful completion of start-up for the equipment/system being started.
   2. Any deficiencies in the manufacturer's Operation and Maintenance (O&M) Manuals and/or "As-Built" drawings, noted during Start-up shall be corrected prior to scheduling the Owner's Demonstration and Training.
   3. The Contractor shall submit for approval a proposed agenda for said demonstration/training, and shall adhere to the approved agenda for the demonstration and training session(s).
   4. Any and all test equipment, maintenance equipment, tools, or devices, and/or spare parts required to be furnished under Division 16 shall be turned over, and stored as required under Sections 01700 and 16010.

C. After completing the above items, the Contractor shall schedule the Owner's Demonstration and Training. Seventy-two (72) hours (minimum) written notice shall be given the Owner's Representative prior to performing any Demonstration and/or Training. One session shall be scheduled for each Motor Control Center being replaced. Such session(s) shall be scheduled at a time agreed upon by the Owner and the Contractor.

D. The Demonstration shall instruct the Owner's personnel in all facets, features, and functions of the operation of the equipment and/or system. Training shall be performed using the manufacturer's Operation and Maintenance Manual and "As-Built" drawings, and shall familiarize the Owner's personnel in identifying improper operation, troubleshooting for the cause(s), and performing repair, replacement, and recalibration/setup necessary to correct the mis-operation. Use of any test equipment necessary, and a review of any recommended and/or provided spare parts shall be included in the Training.

E. Verification of the Demonstration and Training for the equipment and/or system shall be provided in the form of a report, indicating that the Owner's personnel attended and witnessed all functions and operations required of the equipment and/or system, and received the required instruction. Demonstration and Training will be witnessed by the Owner's Representative and four (4) copies of all demonstration and training reports, as specified above and in other Sections, shall be submitted to the Owner.

F. Successful and approved completion of the Demonstration and Training requirements is a prerequisite to determining whether the Work or a portion of the Work is Substantially Complete as specified under Section 16010.

## 3.2 CONTRACTOR'S ASSISTANCE

A. Demonstration and Training of Package Equipment, as described in Section 16010, shall be as required in other Sections of this Specification.

B. The Contractor shall provide the services of an electrician to assist either the Contractor or the equipment manufacturers' service representatives on any and all field set-ups and adjustments as may be required to demonstrate operation of the equipment or system. The Contractor shall

make equipment manufacturers' service representatives available as required to assist in demonstrating equipment operation.

3.3 CLEANUP

A. Cleanup shall occur as required under Section 01700, and as specified under Section 16010.

3.4 ACCEPTANCE

A. Acceptance shall occur after all the above requirements have been satisfied, and as per Section 01700.

B. Acceptance of equipment and/or systems shall be signified by execution of Guarantees as described below.

3.5 GUARANTEES

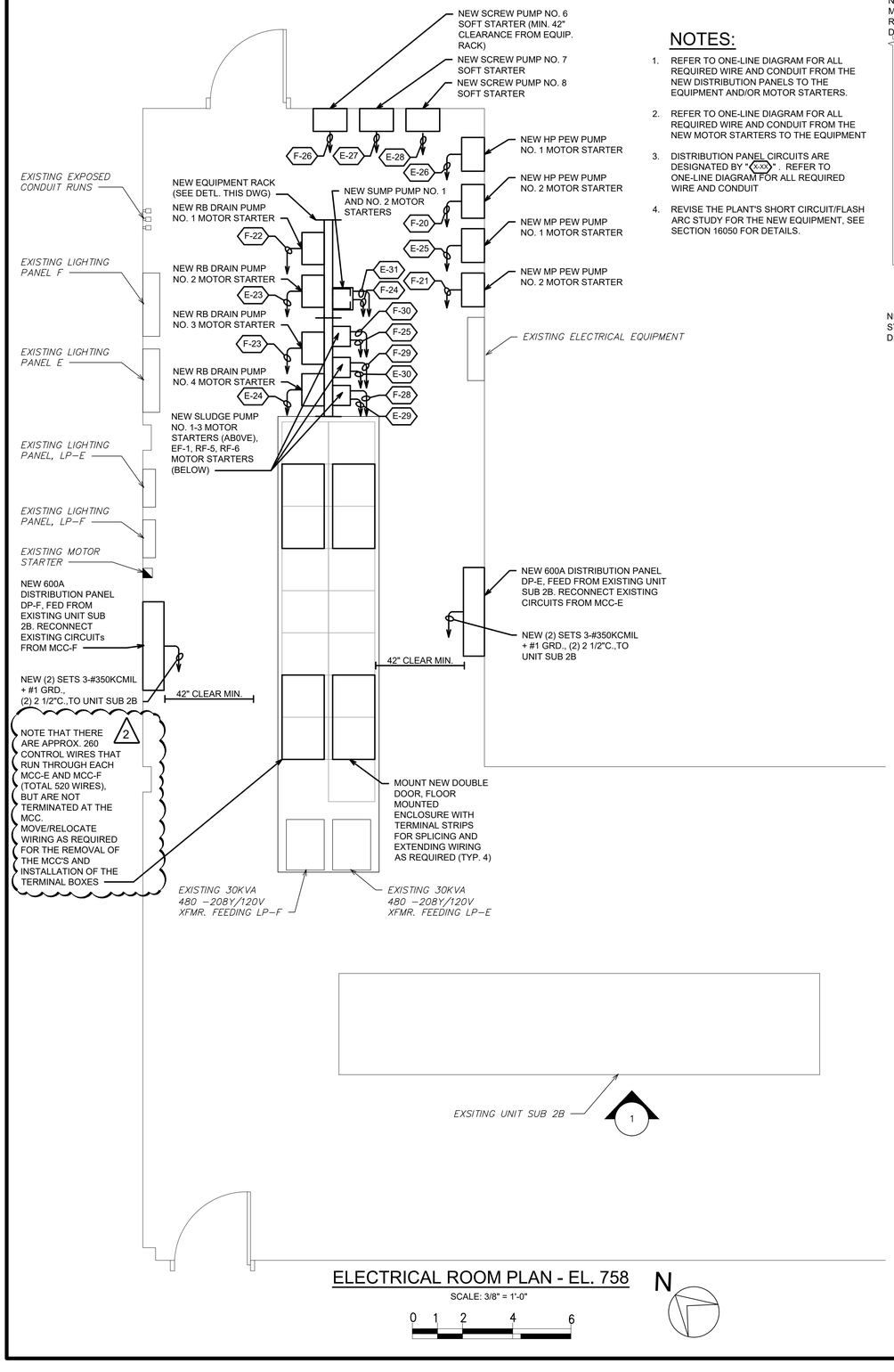
A. The equipment and installation furnished under Division 16 shall be guaranteed for a period of one (1) year as specified under Section 01700, Contract Closeout.

B. The Contractor's Guarantee shall be furnished as follows:
   1. Provide multiple copies.
   2. Execute for Owner's signature a certificate of Contractor's guarantee, listing date of acceptance as start of warranty period (except where indicated otherwise under the detailed equipment specifications), for all work and materials provided and installed under this Division.*
   3. Execute and assemble any and all transferable warranty and/or license documents from Subcontractors, suppliers, and manufacturers.
   4. Provide Table of Contents and assemble in three D, side ring binder with durable plastic cover.

* For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of Owner’s acceptance as start of warranty period.

C. The Owner's dated signature on these documents shall constitute acceptance for warranty purposes.

END OF SECTION




## ELECTRICAL ROOM PLAN - EL. 758

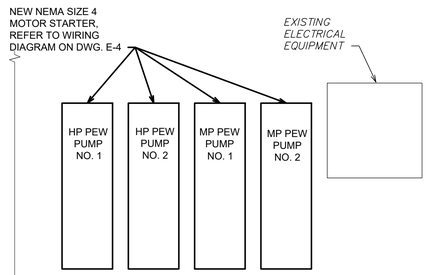
SCALE: 3/8" = 1'-0"

0 1 2 4 6

N

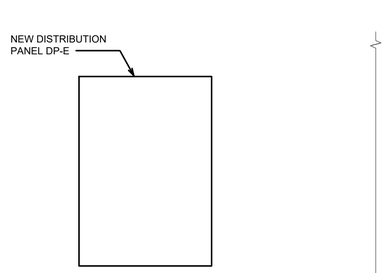
## NOTES:

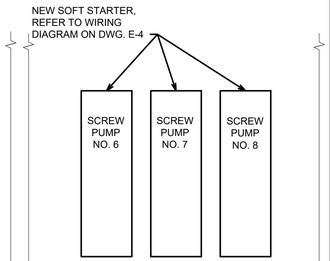
1. REFER TO ONE-LINE DIAGRAM FOR ALL REQUIRED WIRE AND CONDUIT FROM THE NEW DISTRIBUTION PANELS TO THE EQUIPMENT AND/OR MOTOR STARTERS.
2. REFER TO ONE-LINE DIAGRAM FOR ALL REQUIRED WIRE AND CONDUIT FROM THE NEW MOTOR STARTERS TO THE EQUIPMENT
3. DISTRIBUTION PANEL CIRCUITS ARE DESIGNATED BY "(X-XX)" . REFER TO ONE-LINE DIAGRAM FOR ALL REQUIRED WIRE AND CONDUIT
4. REVISE THE PLANT'S SHORT CIRCUIT/FLASH ARC STUDY FOR THE NEW EQUIPMENT, SEE SECTION 16050 FOR DETAILS.




## ELECTRICAL EQUIPMENT ON EAST WALL

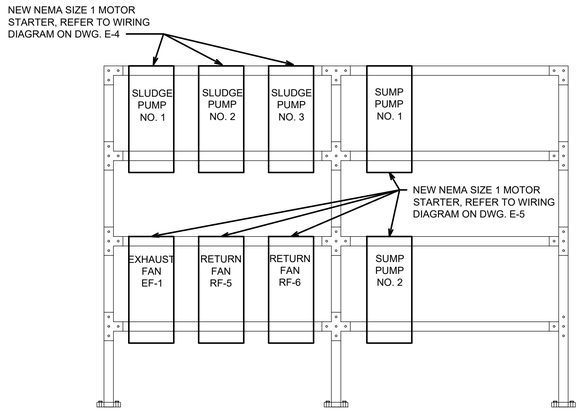
N.T.S.



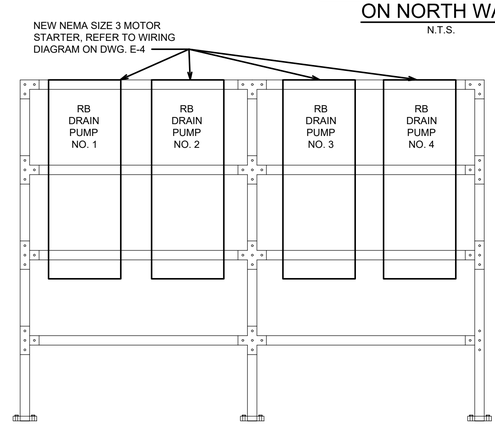

## ELECTRICAL EQUIPMENT ON NORTH WALL

N.T.S.



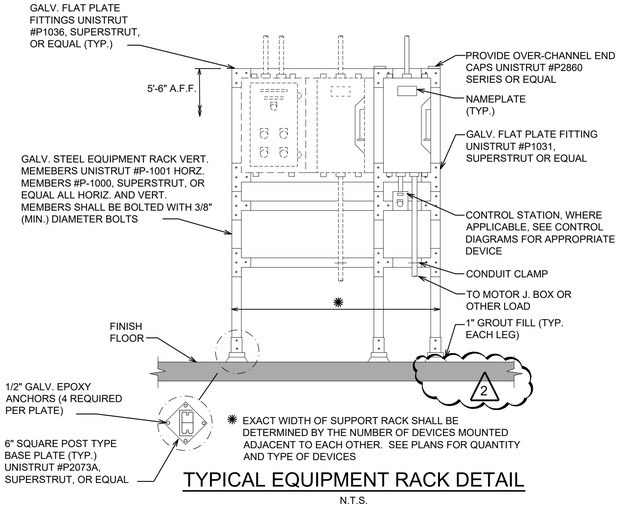

## ELECTRICAL EQUIPMENT ON EAST SIDE OF RACK

**N.T.S.**




## ELECTRICAL EQUIPMENT ON WEST SIDE OF RACK

N.T.S.




## TYPICAL EQUIPMENT RACK DETAIL

N.T.S.

CONNECT NEW DP-F TO BUCKET FEEDING MCC-E AFTER MCC-E IS REMOVED

REMOVE SPARE BREAKER, SET TO 600A TRIP, CHANGE CT SETTINGS AS REQUIRED. REINSTALL BREAKER AND FEED NEW DP-E


## PHOTO-1

X

DENOTES GENERAL LOCATION OF PHOTO.

811 Know what's below. Call before you dig.

| REV. | DESCRIPTION | DATE | DRAWN | CHECKED |
|---|---|---|---|---|
| 1 | ISSUED FOR ADDENDUM NO. 1 | 5-30-2024 | M.R.M. | M.J.R. |
| | 100% SET | 5-10-2024 | M.R.M. | M.J.R. |
| | 90% REVIEW | 4-26-2024 | M.R.M. | M.J.R. |

CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
(734) 794-6410
www.a2gov.org

WRRF - PUBLIC SERVICES - CITY OF ANN ARBOR

MOTOR CONTROL CENTERS E & F REPLACEMENT PROJECT

RETENTION BASIN BUILDING ELECTRICAL ROOM PLAN

SCALE: AS NOTED

DRAWING No.

SHEET No. E-02

## FIRE ALARM SYSTEM

- A/V 110 — AUDIO/VISUAL ALARM INDICATOR (HORN/STROBE) NUMBER INDICATES STROBE CANDELLA RATING WHEN OTHER THAN 15
- H — HORN
- F — MANUAL PULL STATION
- FACP — FIRE ALARM CONTROL PANEL
- B — BELL
- FAAS — FIRE ALARM ANNUNCIATOR STATION
- FS — FLOW SWITCH
- TS — VALVE TAMPER SWITCH
- END OF LINE RESISTOR
- FD — FLAME DETECTOR
- SD — SMOKE DETECTOR, MULTISENSOR
- FS — SPRINKLER SYSTEM FLOW SWITCH
- SD I — SMOKE DETECTOR IONIZATION
- SD P — SMOKE DETECTOR PHOTOELECTRIC
- SD D — DUCT MOUNTED SMOKE DETECTOR
- SD H — THERMAL DETECTOR (FIXED AND RATE OF RISE) H–HIGH TEMPERATURE
- CT — SIGNAL INPUT MODULE
- CC1 — SIGNAL MODULE

## AUXILIARY SYSTEMS

- DC — DOOR CONTACT
- GD — GLASS–BREAK DETECTOR
- MS — MOTION SENSOR
- CR — CARD READER
- IACP — INTRUSION ALARM CONTROL PANEL
- ACP — ALARM CONTROL PANEL
- FOPP — FIBER OPTIC PATCH PANEL
- OR CCTV — CAMERA
- R — ALARM BEACON LETTER INDICATES COLOR
- X — SPEAKER\HORN
  - H = HORN
  - PS = PAGING SPEAKER
  - G = GAS MONITORING HORN
  - C = CEILING MOUNTED SPEAKER
- C — C = CEILING MOUNTED SPEAKER
- A — A = AMPLIFIER
- X1234 — EXISTING EXTENSION NUMBER
- COMMUNICATION/TELEPHONE
  - D = DESK HANDSET AND SYSTEM OUTLET JACK
  - W = WALL HANDSET AND SYSTEM OUTLET JACK
  - EX = EXPLOSION PROOF
  - WP = WEATHERPROOF
  - (K) = KEYSET
  - (I) = INTERCOM
- DATA OUTLET
- FLOOR MOUNTED DATA OUTLET
- SOUND POWERED TELEPHONE
- TB — FLAT CABLE TRANSITION BOX
- TELEPHONE PUNCH DOWN BLOCK
- PBX — PRIVATE BRANCH EXCHANGE
- EPN — EXTERNAL PORT NODE
- F/C — FIBER CONVERTER
- LE — LINE EXTENDER
- PCC — PAGING CONTROL CABINET
- MUX — MULTIPLEXOR
- XCR — TRANSCEIVER
- MONITOR
- T1 DEMARCATION
- UPS — UNINTERRUPTIBLE POWER SUPPLY

## ABBREVIATIONS

| | |
|---|---|
| A | AMPERES |
| A/I | ANALOG INPUT |
| A/O | ANALOG OUTPUT |
| A/C | AIR CONDITIONING |
| AC | ALTERNATING CURRENT |
| ACB | AIR CIRCUIT BREAKER |
| AFC | ABOVE FINISHED CONCRETE |
| AFF | ABOVE FINISHED FLOOR |
| AFG | ABOVE FINISHED GRADE |
| AL | ALUMINUM |
| ANNUNC | ANNUNCIATOR |
| ATC | AUTOMATIC TEMPERATURE CONTROL |
| ATS | AUTO TRANSFER SWITCH |
| AUX | AUXILIARY |
| AUTO | AUTOMATIC |
| AWG | AMERICAN WIRE GAUGE |
| BD | BOARD |
| BKR | BREAKER |
| BLDG | BUILDING |
| BV | BUTTERFLY VALVE |
| C OR CND | CONDUIT OR CONTROL CONDUIT |
| CAB | CABINET |
| CBV | CABLE BY VENDOR. INSTALLED BY CONTRACTOR |
| CB | CIRCUIT BREAKER |
| CKT | CIRCUIT |
| CL2 | CHLORINE |
| CLG | CEILING |
| CO | CONDUIT ONLY |
| COMPT | COMPARTMENT |
| COND | CONDUCTOR(S) |
| CONTR | CONTRACTOR(S) |
| CNTRL | CONTROL |
| CONDTD | CONTINUED |
| CP–1 | CONTROL PANEL, NUMBER AS NOTED |
| CPT | CONTROL POWER TRANSFORMER |
| CT | CURRENT TRANSFORMER |
| CU | COPPER |
| CPFT | CONTROL PROCESSOR FAULT TOLERANT |
| D/I | DISCRETE INPUT |
| D/O | DISCRETE OUTPUT |
| DA | DATA MODULE |
| DB | DECIBELS |
| DC | DIRECT CURRENT |
| DCS | DISTRIBUTED CONTROL SYSTEM |
| DIAG | DIAGRAM |
| DISC | DISCONNECT |
| DISC SW | DISCONNECT SWITCH |
| DM | DIGITAL METER |
| DN | DOWN |
| DPDT | DOUBLE POLE DOUBLE THROW |
| DP | DISTRIBUTION PANEL |
| DPL | DISTRIBUTION PANEL LOW |
| DPH | DISTRIBUTION PANEL HIGH |
| DWG | DRAWING |
| EC | EMPTY CONDUIT |
| EDB | ELECTRICAL DUCTBANK |
| EHH | ELECTRICAL HANDHOLE |
| EL, ELEV | ELEVATION |
| EMH | ELECTRICAL MANHOLE |
| EMT | ELECTRICAL METALLIC TUBING CONDUIT |
| EO | ELECTRICALLY OPERATED |
| EP | EXPLOSION PROOF |
| ETM | ELAPSED TIME METER |
| EXIST | EXISTING |
| FDR | FEEDER |
| FIXT | FIXTURE |
| FIN | FINISHED |
| FLEX | FLEXIBLE |
| FOS | FAST/OFF/SLOW STATION |
| FP | FEED PUMP |
| FS | FLOW SWITCH |
| FT | FEET OR FOOT |
| FUT | FUTURE |
| FVNR | FULL VOLTAGE NON–REVERSING |
| GALV | GALVANIZED |
| GFCT | GROUND FAULT CURRENT TRANSMITTER |
| GFI | GROUND FAULT INTERRUPTOR |
| GND | GROUND |
| H/A | HAND/AUTO |
| HDG | HOT DIPPED GALVANIZED |
| HH–1 | HANDHOLE, AS NUMBERED |
| HOA | HAND/OFF/AUTO |
| HTR | HEATER |
| HZ | HERTZ |
| IC | INTERRUPTING CURRENT |
| ID | INTERIOR DIMENSION |
| IMT | INTERMEDIATE METAL GALVANIZED STEEL CONDUIT |
| IN OR " | INCHES OR INCH |
| IND | INDICATING |
| INSTANT | INSTANTANEOUS |
| INSTR | INSTRUMENT |
| INTLK | INTERLOCK |
| IRRCP | INTERIM REGULATING RESERVOIR CONTROL PANEL |
| ITB | INSTRUMENT TERMINAL BOX |
| JB OR J | JUNCTION BOX, CONDULET, FITTING AS REQUIRED BY NEC, UNLESS NOTED OTHERWISE |
| KAIC | THOUSAND AMPERE INTERRUPTING CAPACITY (SYMMETRICAL) |
| KCMIL or MCM | THOUSAND CIRCULAR MILS |
| KVA | KILOVOLT AMPERES |
| KW | KILOWATTS |
| KW–HR | KILOWATT HOURS |
| KWHM | KILOWATT HOUR METER |
| KWM | KILOWATT METER |
| LEV | LEVEL |
| LIM | LIMIT |
| LA | LIGHTNING ARRESTOR |
| LCP | LOCAL CONTROL PANEL |
| L–R | LOCAL–REMOTE |
| LS | LEVEL SWITCH |
| LT | LIGHT |
| LTG | LIGHTING |
| LV | LOW VOLTAGE |
| MA | MILLIAMPERE |
| MAINT | MAINTAINED |
| MAN | MANUAL |
| MC | MAINTAINED CONTACT |
| MCC | MOTOR CONTROL CENTER |
| MTS | MANUAL TRANSFER SWITCH |
| MCP | MOTOR CIRCUIT PROTECTOR |
| MFR | MANUFACTURER |
| MH–1 | MANHOLE, NUMBER AS NOTED |
| MIN | MINIMUM |
| MINT | MINUTE |
| MOV | MOTOR OPERATED VALVE OR GATE |
| MPM | MOTOR PROTECTION MODULE |
| MS | MANUAL MOTOR STARTER |
| MSH | MOTOR SPACE HEATER |
| MTG | MOUNTING MOTOR |
| MTR | MOTOR |
| MV | MEDIUM VOLTAGE |
| NA | NON–AUTOMATIC |
| N/A | NOT APPLICABLE |
| NC | NORMALLY CLOSED |
| NCTC | NORMALLY CLOSED TIME CLOSE |
| NCTO | NORMALLY CLOSED TIME OPEN |
| NEC | NATIONAL ELECTRIC CODE |
| NG | NATURAL GAS |
| NIC | NOT IN CONTACT |
| NO. or # | NUMBER |
| NO | NORMALLY OPEN |
| NCTC | NORMALLY CLOSED TIME CLOSE |
| NOTC | NORMALLY OPEN TIME CLOSE |
| NOTO | NORMALLY OPEN TIME OPEN |
| NP | NAMEPLATE |
| NTS | NOT TO SCALE |
| OCA | OPEN/CLOSE/AUTO SWITCH |
| OL | OVERLOAD RELAY |
| OLP | OUTDOOR LIGHTING PHOTOCELL |
| OL(MA) | OVERLOAD RELAY MAINTAINED |
| P | POWER CONDUIT |
| PB | PUSHBUTTON |
| P/B | PULLBOX |
| PCP | PROCESS CONTROL PANEL |
| PDS | PRESSURE DIFFERENTIAL SWITCH |
| PFC | POWER FACTOR CORRECTION CAPACITORS |
| PFD | PULL FUSE DISCONNECT |
| PNL | PANEL |
| POS | POSITION |
| PR | PAIR |
| PRI | PRIMARY |
| PS | PRESSURE SWITCH |
| PV | PLUG VALVE |
| PT | POTENTIAL TRANSFORMER |
| PVC | POLYVINYL CHLORIDE |
| REC | RECOMMENDATION |
| RECEP | RECEPTACLE |
| REQ | REQUIRED |
| RGS | RIGID GALVANIZED STEEL CONDUIT |
| RVNR | REDUCED VOLTAGE NON–REVERSING |
| SEC | SECONDARY |
| SEL | SELECTOR |
| SP | SPARE |
| SPEC | SPECIFICATION |
| SS | STAINLESS STEEL |
| S/S | STOP/START STATION |
| SPC | SPARE CONDUIT |
| SPCS | SLUDGE PUMP CONTROL STATION |
| SPDT | SINGLE POLE, DOUBLE THROW |
| SPST | SINGLE POLE, SINGLE THROW |
| ST | SPEED TACHOMETER |
| STA | STATION |
| STL | STEEL |
| STR | STARTER |
| SV | SOLENOID VALVE |
| SW | SWITCH |
| SWBD | SWITCHBOARD |
| SWGR | SWITCHGEAR |
| (S) (SH) | SHIELDED CABLE |
| T | TRIP |
| TB | TERMINAL BOX |
| TCOND | TEE CONDUIT |
| TDAD | TIME DELAY AFTER DEENERGIZATION (OFF DELAY) |
| TDAE | TIME RELAY AFTER ENERGIZATION (ON DELAY) |
| TDR | TIME DELAY RELAY |
| TEL | COMMERCIAL TELEPHONE |
| TEMP | TEMPERATURE |
| TERM | TERMINAL |
| TEW | THERMOCOUPLE EXTENSION WIRE |
| TS | TEMPERATURE SWITCH |
| TWSH | TWISTED SHIELDED PAIR |
| TYP | TYPICAL |
| TPR | THREE PAIR |
| TRANSF | TRANSFER |
| UON | UNLESS OTHERWISE NOTED |
| UNGND | UNDERGROUND |
| USE | UNDERGROUND SERVICE EXTRANCE CABLE |
| V | VOLTS |
| VAC | VOLTS ALTERNATING CURRENT |
| VDC | VOLT DIRECT CURRENT |
| VIB | VIBRATION |
| VFD | VARIABLE FREQUENCY DRIVE |
| W | WATTS |
| W/ | WITH |
| W/O | WITHOUT |
| WM | WATTMETER |
| WT | WINDING TEMPERATURE RELAY |
| WP | WEATHERPROOF |
| WPU | WEATHERPROOF WHILE IN USE |
| XDER | TRANSDUCER |
| XFMR | TRANSFORMER |
| XR | EXISTING TO REMAIN |
| XS | LIMIT SWITCH |
| 1PH | SINGLE PHASE |
| 3PH | 3 PHASE |
| 3W | THREE WIRE |
| 4W | FOUR WIRE |

### LETTERED CONDUIT-CABLE SCHEDULE

| | | | | |
|---|---|---|---|---|
| AA | 2#14, 1#12G, 3/4"C | | EA | 1-3/C#16, 3/4"C |
| AB | 4#14, 1#12G, 3/4"C | | EB | 2-3/C#16, 1"C |
| AC | 6#14, 1#12G, 3/4"C | | EC | 3-3/C#16, 1"C |
| AD | 8#14, 1#12G, 3/4"C | | | |
| AE | 10#14, 1#12G, 3/4"C | | FA | 1-2/C#16SH, 3/4"C |
| AF | 12#14, 1#12G, 3/4"C | | FB | 2-2/C#16SH, 3/4"C |
| AG | 18#14, 1#12G, 1"C | | FC | 3-2/C#16SH, 1"C |
| AH | 24#14, 1#12G, 1"C | | FD | 4-2/C#16SH, 1"C |
| AJ | 36#14, 1#12G, 1 1/2"C | | FE | 5-2/C#16SH, 1 1/2"C |
| AK | 48#14, 1#12G, 1 1/2"C | | FF | 6-2/C#16SH, 1 1/2"C |
| AL | 60#14, 1#12G, 2"C | | FG | 7-2/C#16SH, 1 1/2"C |
| AM | 72#14, 1#12G, 2"C | | FH | 8-2/C#16SH, 1 1/2"C |
| AN | 84#14, 1#12G, 2"C | | FJ | 9-2/C#16SH, 1 1/2"C |
| AP | 96#14, 1#12G, 2 1/2"C | | FK | 10-2/C#16SH, 2"C |
| AQ | 108#14, 1#12G, 2 1/2"C | | FL | 11-2/C#16SH, 2"C |
| AR | 135#14, 1#12G, 2 1/2"C | | FM | 12-2/C#16SH, 2"C |
| | | | FN | 13-2/C#16SH, 2"C |
| BA | 2#12, 1#12G, 3/4"C | | FP | 14-2/C#16SH, 2"C |
| BB | 3#12, 1#12G, 3/4"C | | FQ | 15-2/C#16SH, 2"C |
| BC | 4#12, 1#12G, 3/4"C | | FR | 20-2/C#16SH, 2 1/2"C |
| BD | 5#12, 1#12G, 3/4"C | | | |
| BE | 6#12, 1#12G, 3/4"C | | GA | CBV, 3/4"C |
| BF | 7#12, 1#12G, 1"C | | GB | CBV, 1"C |
| | | | GC | CBV, 1 1/2"C |
| CA | 2#10, 1#10G, 3/4"C | | GD | CBV, 2"C |
| CB | 3#10, 1#10G, 3/4"C | | | |
| CC | 4#10, 1#10G, 3/4"C | | HA | FIBEROPTIC CABLE, 1"C |
| CD | 5#10, 1#10G, 3/4"C | | HB | FIBEROPTIC CABLE, 2"C |
| CE | 6#10, 1#10G, 1"C | | | |
| | | | JA | 1-CAT6 ETHERNET CABLE, 3/4"C |
| DA | 3/4"C WITH PULLSTRING | | JB | 2-CAT6 ETHERNET CABLE, 3/4"C |
| DB | 1"C WITH PULLSTRING | | JC | 3-CAT6 ETHERNET CABLE, 1"C |

### GENERAL NOTES

1. THE SYMBOLS AND ABBREVIATIONS LISTED REPRESENT A COMPREHENSIVE STANDARD GUIDE INTENDED FOR GENERAL USE ON ALL PROJECTS. THEREFORE, NOT ALL OF THE SYMBOLS AND ABBREVIATIONS CONTAINED ON THESE SHEETS ARE NECESSARILY USED ON THIS PARTICULAR CONTRACT.

MALCOLM PIRNIE


CONFORMED SET
JULY 2012

REVISIONS

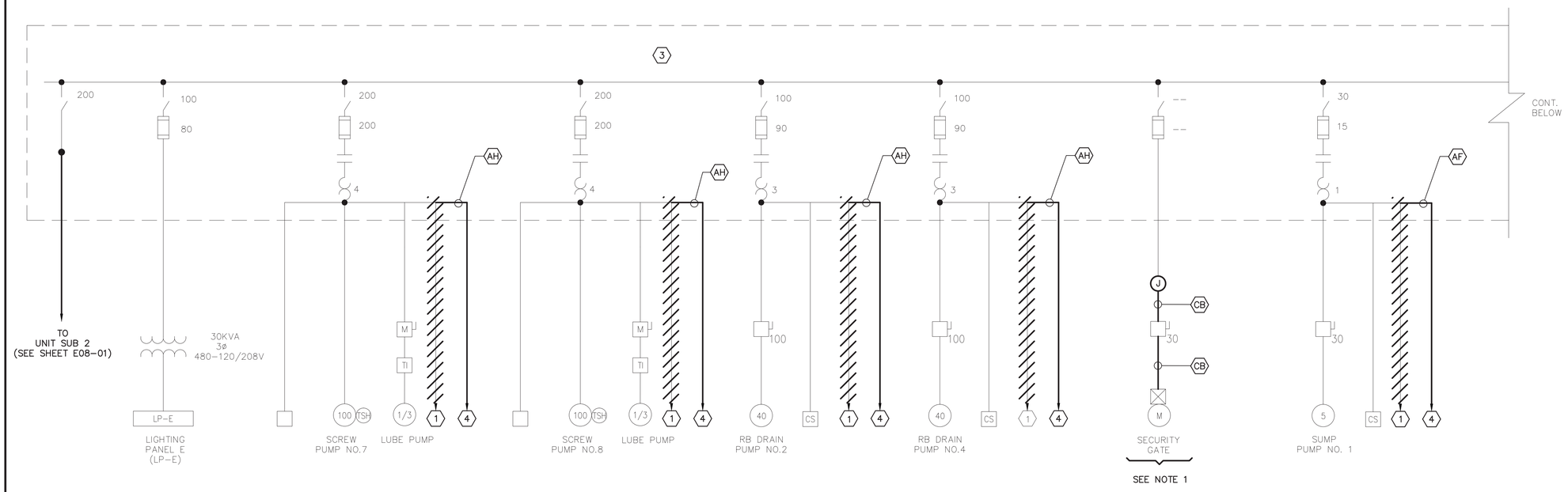
| NO. | BY | DATE | REMARKS |
|---|---|---|---|
| | | | |

DES DVC/JRS
DWN MEM
CKD GPM

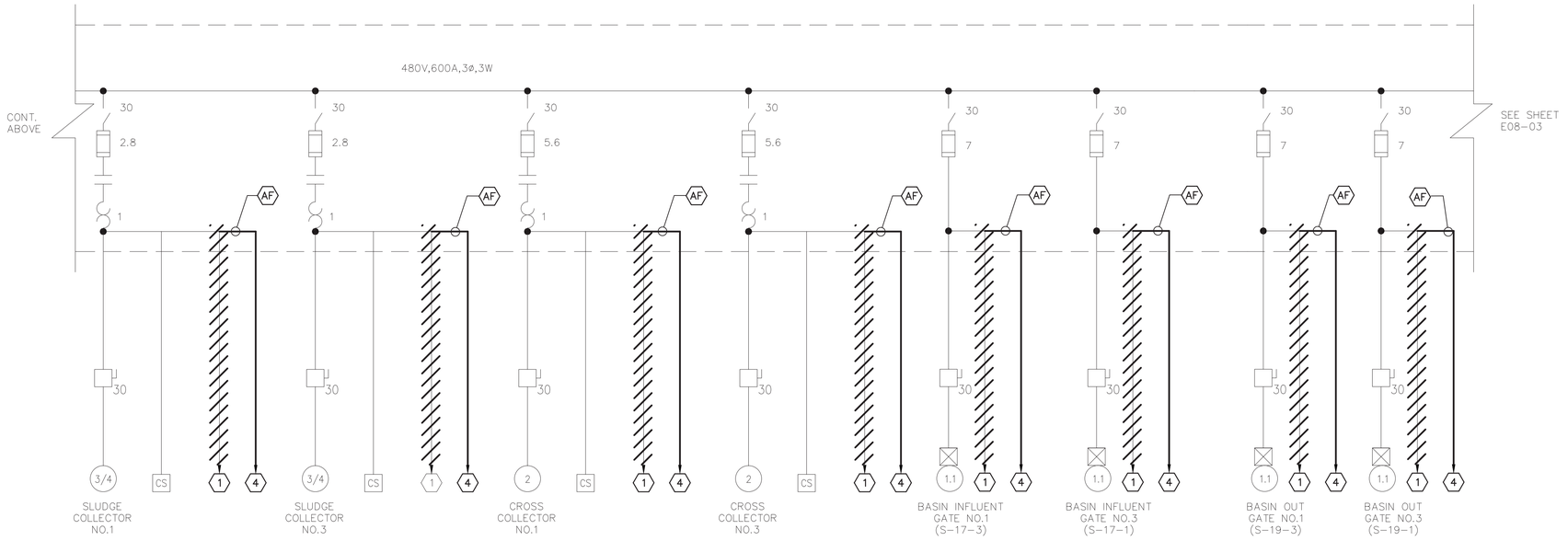
CITY OF ANN ARBOR, MICHIGAN
ANN ARBOR WASTEWATER TREATMENT PLANT FACILITIES RENOVATIONS

ELECTRICAL
LEGEND, SYMBOLS AND ABBREVIATIONS – SHEET 3

ISSUED STATUS: BID SET
DATE NOVEMBER 2011
SHEET E00–03
CAD REF. NO. 3185004_779




EXISTING MCC-E ONE LINE DIAGRAM




EXISTING MCC-E ONE LINE DIAGRAM

NOTES:

1. EXISTING GATE TO BE RELOCATED. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING POWER AND CONTROL REQUIREMENTS PRIOR TO RELOCATION. CONTRACTOR SHALL EXTEND POWER AND CONTROL CABLES AS REQUIRED TO NEW GATE LOCATION. AFTER RELOCATION OF GATE IS COMPLETE CONTRACTOR SHALL DEMONSTRATE TO OWNER THAT GATE IS FUNCTIONING IN THE SAME MANNER AS PRIOR TO RELOCATION.

CODED NOTES:

(1) TO CONTROL PANEL 15 (CP-15)

(2) TO AIR COMPRESSOR ALTERNATOR IN MCC-F (SEE SHEET E08-05)

(3) GE 7700 LINE CONTROL CENTER
CAT NO: 435X719M07
DIAGRAM NO: 213B9202 SH.7.7A
AMPS SUPPLY 600A SECT. 300A
460V 3 PHASE 3 WIRE 60HZ

(4) TO PLC-EQ (WW-CP-EQ)
(SEE SHEET E08-11)
TERMINATE NEW CONTROL WIRES IN SAME LOCATION AS EXISTING CONTROL WIRES IN EXISTING STARTER. ROUTE ALL SIGNALS FROM ACTUATORS THAT RUN THROUGH MCC-E TO PLC-EQ. SEE INPUT/OUTPUT LIST IN DIVISION 13 SPECIFICATIONS FOR INPUT/OUTPUT ALLOCATIONS. PROVIDE 2-2" CONDUITS FOR ALL CONTROL WIRES FROM MCC-E TO PLC-EQ.

⬡ LETTERED CODED NOTES ON THIS SHEET INDICATE CONDUIT FILLS. SEE LETTERED CONDUIT-CABLE SCHEDULE ON SHEET E00-03.



CONFORMED SET
JULY 2012

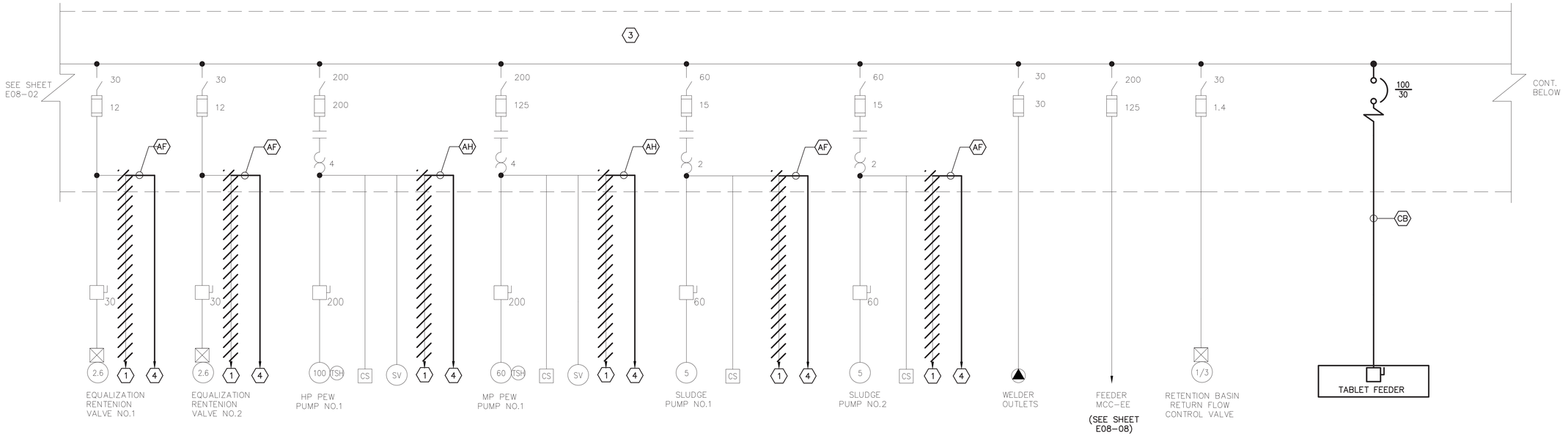
| REVISIONS | | | |
|---|---|---|---|
| NO. | BY | DATE | REMARKS |
| | | | |

DES DVC
DWN MSD
CKD GPM

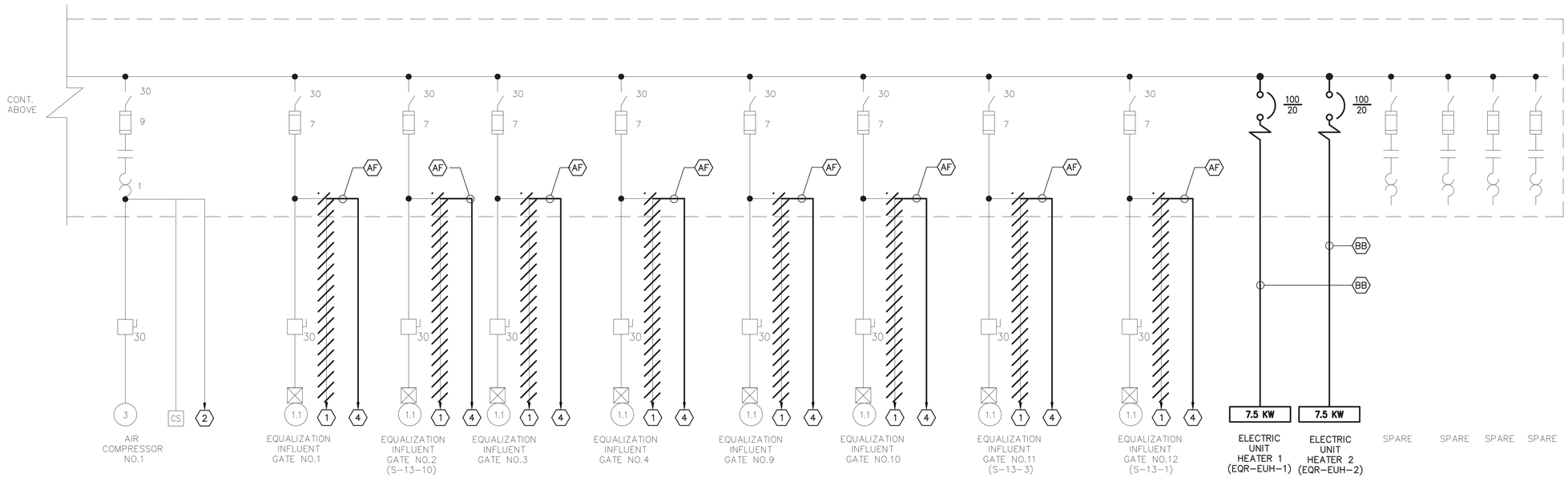
CITY OF ANN ARBOR, MICHIGAN
# ANN ARBOR WASTEWATER TREATMENT PLANT FACILITIES RENOVATIONS

FLOW EQUALIZATION AND RETENTION BASIN
## MCC-E
## ONE-LINE DIAGRAM SHEET 1
SCALE: NONE

ISSUED STATUS: BID SET
DATE NOVEMBER 2011
SHEET E08-03
CAD REF. NO. 3185004_750




EXISTING MCC-E ONE-LINE DIAGRAM




EXISTING MCC-E ONE-LINE DIAGRAM

CODED NOTES:

1. TO CONTROL PANEL 15 (CP-15) IN MCC-F SHEET 2 (SEE SHEET E08-05)
2. TO AIR COMPRESSOR ALTERNATOR IN MCC-F SHEET 2 (SEE SHEET E08-05)
3. GE 7700 LINE CONTROL CENTER
   CAT NO: 435X719M07
   DIAGRAM NO: 213B9202 SH.7.7A
   AMPS SUPPLY 600A SECT. 300A
   460V 3 PHASE 3 WIRE 60HZ
4. TO PLC-EQ (WW-CP-EQ) (SEE SHEET E08-11)
   TERMINATE NEW CONTROL WIRES IN SAME LOCATION AS EXISTING CONTROL WIRES IN EXISTING STARTER. ROUTE ALL SIGNALS FROM ACTUATORS THAT RUN THROUGH MCC-E TO PLC-EQ. SEE INPUT/OUTPUT LIST IN DIVISION 13 SPECIFICATIONS FOR INPUT/OUTPUT ALLOCATIONS. PROVIDE 2-2" CONDUITS FOR ALL CONTROL WIRES FROM MCC-E TO PLC-EQ.

⬡ LETTERED CODED NOTES ON THIS SHEET INDICATE CONDUIT FILLS. SEE LETTERED CONDUIT-CABLE SCHEDULE ON SHEET E00-03.



CONFORMED SET
JULY 2012

| REVISIONS | | | |
|---|---|---|---|
| NO. | BY | DATE | REMARKS |
| | | | |

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DWN MSD
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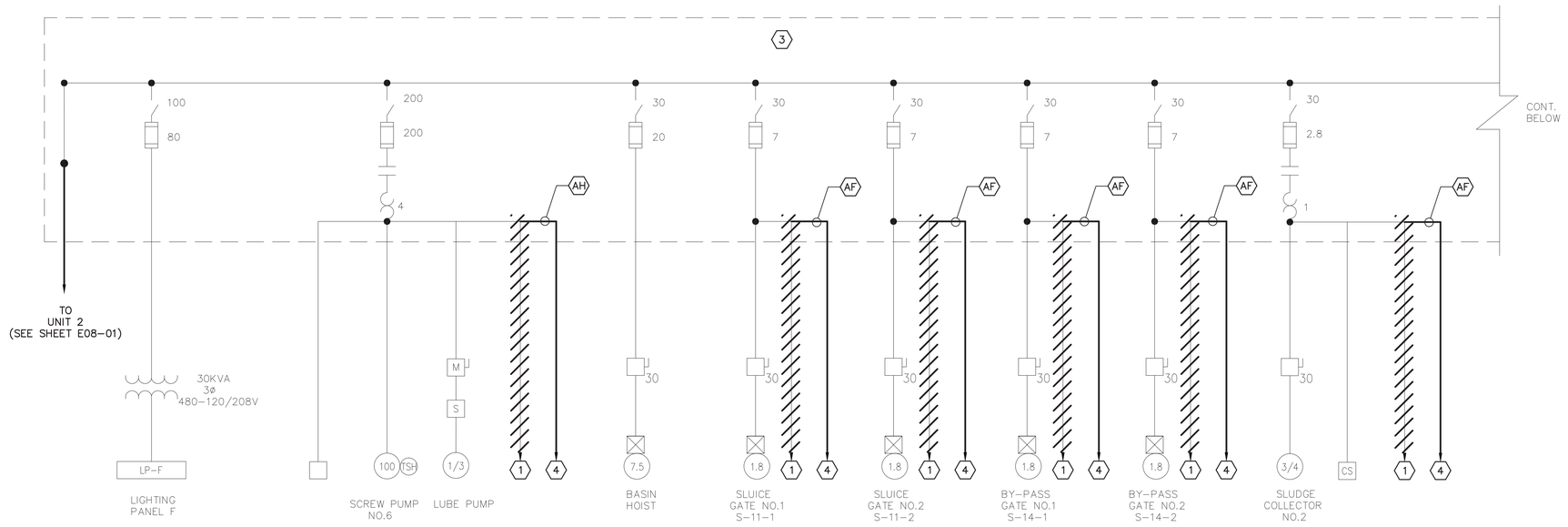
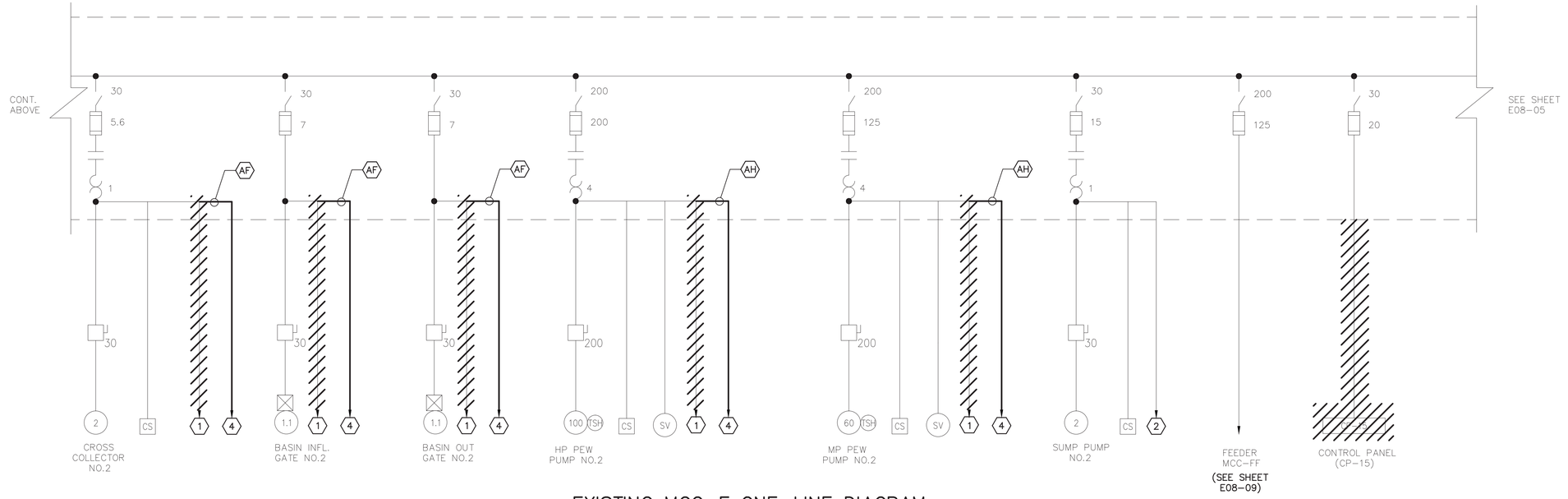
CITY OF ANN ARBOR, MICHIGAN
# ANN ARBOR WASTEWATER TREATMENT PLANT FACILITIES RENOVATIONS

FLOW EQUALIZATION AND RETENTION BASIN
## MCC-E ONE-LINE DIAGRAM SHEET 2
SCALE: NONE

ISSUED STATUS: BID SET
DATE NOVEMBER 2011
SHEET E08-04
CAD REF. NO. 3185004_758




EXISTING MCC-F ONE-LINE DIAGRAM




EXISTING MCC-F ONE-LINE DIAGRAM

CODED NOTES:

1. TO CONTROL PANEL 15 (CP-15)
2. TO AIR COMPRESSOR ALTERNATOR IN MCC-F (SEE SHEET E08-05)
3. GE 7700 LINE CONTROL CENTER
   CAT NO: 435X719M07
   DIAGRAM NO: 213B9202 SH.7.7A
   AMPS SUPPLY 600A SECT. 300A
   460V 3 PHASE 3 WIRE 60HZ
4. TO PLC-EQ (WW-CP-EQ) (SEE SHEET E08-11)
   TERMINATE NEW CONTROL WIRES IN SAME LOCATION AS EXISTING CONTROL WIRES IN EXISTING STARTER. ROUTE ALL SIGNALS FROM ACTUATORS THAT RUN THROUGH MCC-E TO PLC-EQ. SEE INPUT/OUTPUT LIST IN DIVISION 13 SPECIFICATIONS FOR INPUT/OUTPUT ALLOCATIONS.
   PROVIDE 2-2" CONDUITS FOR ALL CONTROL WIRES FROM MCC-F TO PLC-EQ.

⬡ LETTERED CODED NOTES ON THIS SHEET INDICATE CONDUIT FILLS. SEE LETTERED CONDUIT-CABLE SCHEDULE ON SHEET E00-03.

MALCOLM PIRNIE


CONFORMED SET
JULY 2012

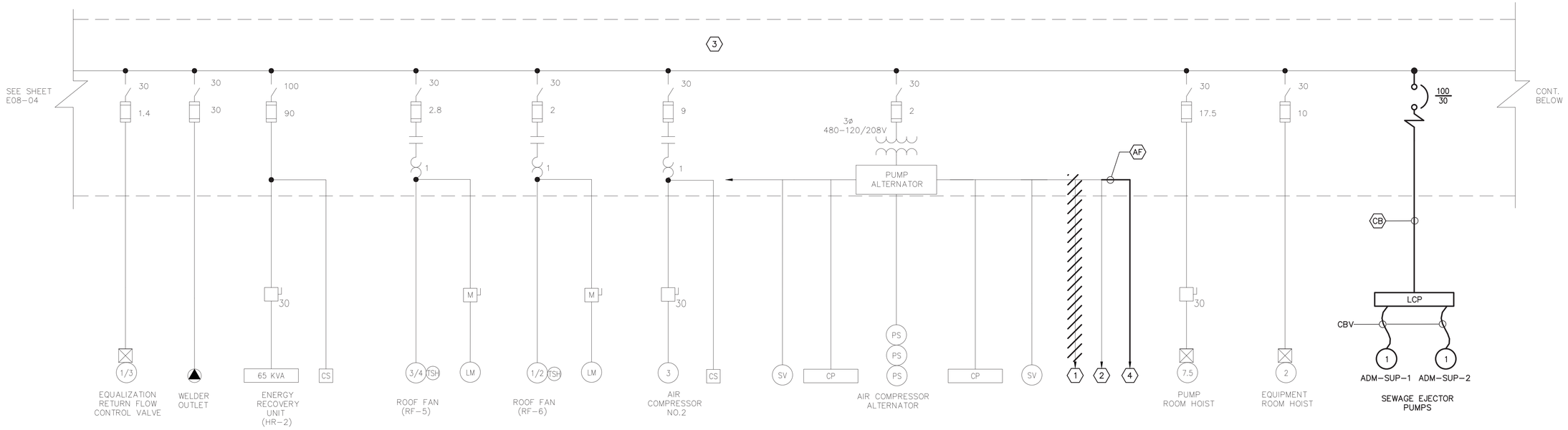
| REVISIONS | | | |
|---|---|---|---|
| NO. | BY | DATE | REMARKS |
| | | | |

DES DVC
DWN MSD
CKD GPM

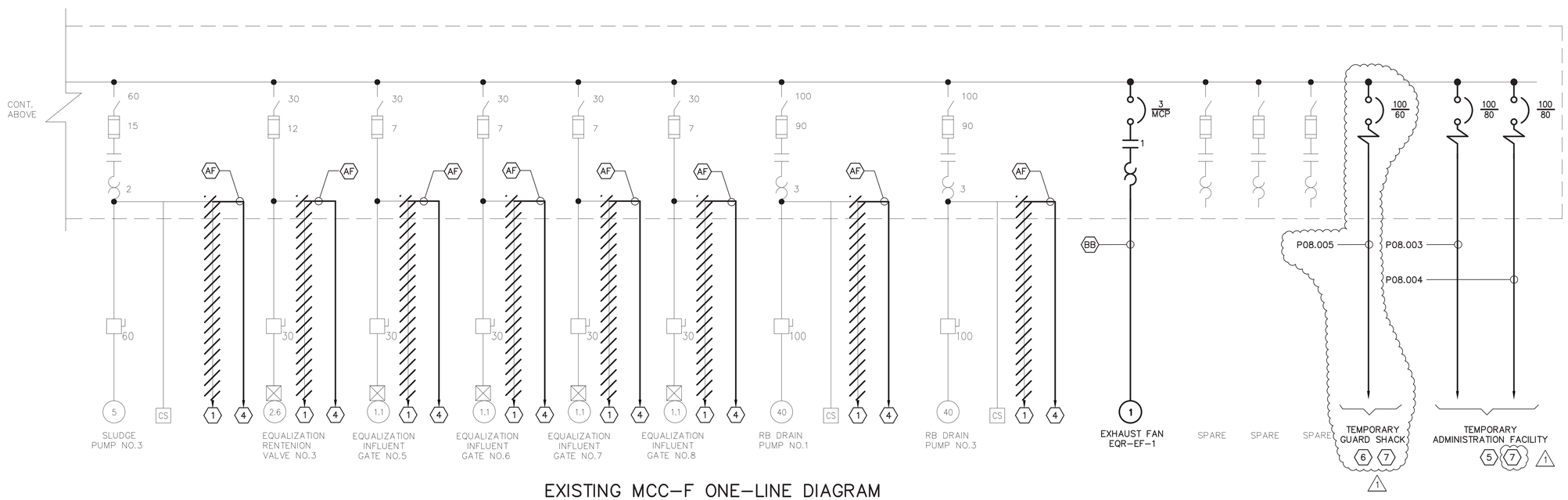
CITY OF ANN ARBOR, MICHIGAN
# ANN ARBOR WASTEWATER TREATMENT PLANT FACILITIES RENOVATIONS

FLOW EQUALIZATION AND RETENTION BASIN
## MCC-F ONE-LINE DIAGRAM SHEET 1
SCALE: NONE

ISSUED STATUS: BID SET
DATE NOVEMBER 2011
SHEET E08-05
CAD REF. NO. 3185004_751




EXISTING MCC-F ONE-LINE DIAGRAM




EXISTING MCC-F ONE-LINE DIAGRAM

CODED NOTES:

1. TO CONTROL PANEL 15 (CP-15)
2. TO AIR COMPRESSOR NO.1 IN MCC-E SHEET 2 (SEE SHEET E08-03)
3. GE 7700 LINE CONTROL CENTER
   CAT NO: 435X719M13
   DIAGRAM NO: 213B9202 SH.13
   AMPS SUPPLY 600A SECT. 300A
   460V 3 PHASE 3 WIRE 60HZ
4. TO PLC-EQ (WW-CP-EQ) (SEE SHEET E08-11)
   TERMINATE NEW CONTROL WIRES IN SAME LOCATION AS EXISTING CONTROL WIRES IN EXISTING STARTER. ROUTE ALL SIGNALS FROM ACTUATORS THAT RUN THROUGH MCC-E TO PLC-EQ. SEE INPUT/OUTPUT LIST IN DIVISION 13 SPECIFICATIONS FOR INPUT/OUTPUT ALLOCATIONS. PROVIDE 2-2" CONDUITS FOR ALL CONTROL WIRES FROM MCC-F TO PLC-EQ.
5. PROVIDE FEEDERS TO TEMPORARY ADMINISTRATION FACILITY NORTH OF RETENTION BASIN. (SEE SITE PLAN FOR LOCATION) RUN POWER FEEDS ON TOP OF RETENTION BASIN TO TEMPORARY FACILITY.

⬡ LETTERED CODED NOTES ON THIS SHEET INDICATE CONDUIT FILLS. SEE LETTERED CONDUIT-CABLE SCHEDULE ON SHEET E00-03.

1 6. PROVIDE FEEDER TO TEMPORARY GUARD SHACK NORTH OF RETENTION BASIN. (SEE SITE PLAN FOR LOCATION) RUN POWER FEED ON TOP OF RETENTION BASIN TO NORTH CORNER, DROP DOWN, THEN EXTEND 2" DUCTBANK TO TEMPORARY GUARD SHACK.

7. PROVIDE GROUND TRIAD AT EACH TEMPORARY STRUCTURE AND BOND TO STRUCTURE DISCONNECT PER NEC.

MALCOLM PIRNIE


CONFORMED SET
JULY 2012

| REVISIONS | | | |
|---|---|---|---|
| NO. | BY | DATE | REMARKS |
| 1 | AK | 1/03/12 | REVISED PER ADDENDUM 5 |

DES DVC
DWN MSD
CKD GPM

CITY OF ANN ARBOR, MICHIGAN
# ANN ARBOR WASTEWATER TREATMENT PLANT FACILITIES RENOVATIONS

FLOW EQUALIZATION AND RETENTION BASIN
## MCC-F ONE-LINE DIAGRAM SHEET 2
SCALE: NONE

ISSUED STATUS: BID SET
DATE NOVEMBER 2011
SHEET E08-06
CAD REF. NO. 3185004_759