To: All Plan Holders of Record

From: CT Consultants, Inc.
For the Owner

Re: ***Addendum No. 3***
South Interceptor Equalization Facility Improvements
City of North Olmsted, Ohio

Date: October 28, 2024

This Addendum forms a part of the contract documents and modifies the original bidding documents dated October 2024 and all previous addenda, if any. Acknowledge receipt of this addendum in the space provided in the bid forms. Failure to do so may subject the bidder to disqualification.

PLANS

Sheet 10 of 53 – **REVISE** this Sheet, per the attached sketch SK-1C01, which shall be considered part of this Sheet.

Sheet 22 of 53 – **REMOVE** this Sheet from the Drawing Set and **REPLACE** it with Sheet 22 of 53 included with this Addendum, which shall be considered part of this Drawing Set.

Sheet 24 of 53 – **REMOVE** this Sheet from the Drawing Set and **REPLACE** it with Sheet 24 of 53 included with this Addendum, which shall be considered part of this Drawing Set.

Sheet 37 of 53 – **DELETE** Note 3 from this sheet.

Sheet 39 of 53– **ADD** the Standard Duty Asphalt pavement Detail, per the attached sketch SK-SD4 which shall be considered part of this Sheet.

Sheet 42 of 53– **ADD** the Equipment Pad Details, per the attached sketches SK-SD1, SK-SD2 & SK-SD3 which shall be considered part of this Sheet.

Sheet 45 of 53 – **REMOVE** this Sheet from the Drawing Set and **REPLACE** it with Sheet 45 of 53 included with this Addendum, which shall be considered part of this Drawing Set.

Sheet 46 of 53 – **REMOVE** this Sheet from the Drawing Set and **REPLACE** it with Sheet 46 of 53 included with this Addendum, which shall be considered part of this Drawing Set.

Sheet 47 of 53 – **REMOVE** "E SERIES" from the Title Block and **REPLACE** it with "00 SERIES".

Sheet 48 of 53 – **REMOVE** "E SERIES" from the Title Block and **REPLACE** it with "00 SERIES".

Sheet 49 of 53 – **REMOVE** this Sheet from the Drawing Set and **REPLACE** it with Sheet 49 of 53 included with this Addendum, which shall be considered part of this Drawing Set.

Sheet 50 of 53 – **REMOVE** "E SERIES" from the Title Block and **REPLACE** it with "02 SERIES".

Sheet 51 of 53 – **REMOVE** "E SERIES" from the Title Block and **REPLACE** it with "02 SERIES".

Sheet 52 of 53 – **REMOVE** "E SERIES" from the Title Block and **REPLACE** it with "00 SERIES".

Sheet 52A of 53 – **ADD** this Sheet to the Drawing Set, included with this Addendum, which shall be considered part of this Drawing Set.

Sheet 53 of 53 – **REMOVE** this Sheet from the Drawing Set and **REPLACE** it with Sheet 53 of 53 included with this Addendum, which shall be considered part of this Drawing Set.

SPECIFICTIONS

Specification 01 78 70 – OPERATIONAL DEMONSTRATION, Article 3.3, Paragraph A – **REMOVE** the second sentence and **REPLACE** it with the following: "Unless otherwise specified, or agreed upon by the Engineer and Owner during start-up, an Operational Demonstration for a maximum of three (3) consecutive wet weather events shall be completed over a continuous 30-day (720 hours) period during which the work is operated and maintained on-line, fully functional process status."

Specification 13 24 23 – PRECAST CONCRETE BUILDING – **ADD** this Specification Section, included with this Addendum, to the Specifications which shall be considered part of these documents.

Specification 26 00 00 – ELECTRICAL GENERAL PROVISIONS - **REMOVE** this Specification Section and **REPLACE** it with Specification 26 00 00 included with this Addendum, which shall be considered part of Section 5 Specifications of the Bid Set Documents.

Specification 26 32 00 – STANDBY ELECTRICAL GENERATOR SYSTEM - **REMOVE** this Specification Section and **REPLACE** it with Specification 26 32 00 included with this Addendum, which shall be considered part of Section 5 Specifications of the Bid Set Documents.

Specification 40 95 00 – PROCESS INSTRUMENTATION AND CONTROL SYSTEMS -
REMOVE this Specification Section and **REPLACE** it with Specification 40 95 00 included with this Addendum, which shall be considered part of Section 5 Specifications of the Bid Set Documents.

QUESTIONS

1. Regarding Dwg 20D-02, Sheet 36/53, can the 48" OD DR 32.5 solid-wall pipe be replaced/quoted with a 48" ID profile wall pipe (OD 53.4") or a 42" ID profile wall pipe (OD 46.9")? This would eliminate the flanged connection and allow for an extrusion welded connection. **ANSWER**. Yes, this alternative is acceptable.

2. Confirm that all regulatory permits, i.e. Army Corp permits 404 and 401, and a PTI, will be obtained (and paid for) by the owner prior to contract executio? Work cannot begin without these permits are issued. **ANSWER**. All fees/costs associated with the PTI, 404 and 401 permits will be paid by the City. The project is tracking to have the PTI in-hand by the Contract Execution. We are hopeful that we will have the 404 and 401 permits by the Contract Execution, but that is less certain. However, the statement that "work cannot begin until these permits are obtained" is not accurate. From our conversations with these regulatory agencies, heavy construction cannot begin, particularly within the limits of the identified wetlands, but limited work tasks can begin. i.e. surveying, clearing & grubbing, felling trees and tree removal for example. It should be noted that until the 404 and 401 permits are obtained, there are restrictions on vehicular traffic and work tasks within the wetland areas that would significantly disturb the soils, but foot traffic for surveying or felling trees with chainsaws are both examples of acceptable activities within the wetlands. Work within the upland areas can commence by any means and methods deemed appropriate by the Contractor, regardless of the status of the 404 and 401 permits. Therefore, there is a likely scenario where the City will proceed with a Contract Execution without all of the noted permits being issued/obtained to allow the commencement of the various work tasks noted above. Contract execution will proceed as quickly as possible after completion of the WPCLF loan award.

3. Spec Section 110923 Part 3.3.B states field welds shall be tested locally by manufacturer. This is also stated in Basis of Payment BD.10 that the $2,573,000 includes pressure testing as specified. However, Addendum #2 Q&A 11 does not indicate that Infrapipe Weholite includes testing in their $2,573,000 price. Please confirm that Infrapipe Weholite is including the labor/equipment to perform the specified pressure testing in their quoted price? **ANSWER.** Yes, this item should be included in the quoted price. Also, as noted in Addendum #2 Q&A 11, "the Contractor shall contact Weholite directly for further details".

4. Please confirm that Infrapipe Weholite is including the internal baffle walls and FRP Flap Check Valve shown on Sheet 35, as it was not listed in Addendum #2 Q&A 11? **ANSWER.** Yes, this item should be included in the quoted price. Also, as noted in Addendum #2 Q&A 11, "the Contractor shall contact Weholite directly for further details".

5. What is the estimated frequency that the 30" Interceptor will surcharge and the EQ basin and pump stations will be used (x per Month) so that Contractors can accurately estimate the costs of the 30-day Operational Demonstration period, and also analyze need for bypass pumping during the doghouse manhole installation? **ANSWER.** Please refer to the revisions regarding the requirements of the Operational Demonstration included as part of this addendum. Regarding bypass pumping considerations, our recommendation would be to consider a 1.0 MGD average day baseline flow with a +/- 0.2 MGD seasonal change.

6. Please clarify the limit over the Engineer's Estimate that the City can award a contract, 10% or 20% over? **ANSWER.** The City has the option, should they so choose, to award a contract up to 20% over the published EOPCC.

7. Please clarify material type for the buried 30" Fill/Drain Line and 16" Drain lines? Spec Section 333100 allows for both PVC and DIP. **ANSWER.** Per the referenced specification, either pipe material is acceptable.

8. Please advise if SCH40 or SCH80 PVC will be required for the buried 6" Odor Control Piping? **ANSWER.** Schedule 80.

9. Regarding the foot bridge on Sheet 37 of 53; please confirm, per Note 3 on Sheet 37, if the contractor is required to provide a PE stamped design for the footbridge? **ANSWER.** A PE stamp from the Contractor is not required for the footbridge, this note has been removed as part of this addendum.

10. Regarding the foot bridge on Sheet 37 of 53; since this foot bridge is located for access to the manhole and not a public walking path, please confirm that the bench detail shown on Sheet 37 will not be required? **ANSWER.** Correct, a bench will NOT be required for this project.

11. Regarding the foot bridge on Sheet 37 of 53; please indicate limits of the "stream setback" to differentiate between using drilled piers or helical anchors (Sheet 37) for the foot bridge? **ANSWER.** Utilize a stream setback of 50' from the top of the bank for the helical pile installation.

12. Please confirm that there will be no charge for a City of North Olmsted Building permit, if required? **ANSWER**. Correct, with the exception of the Contractor Registration, all other City permit fees will be waived for this project.

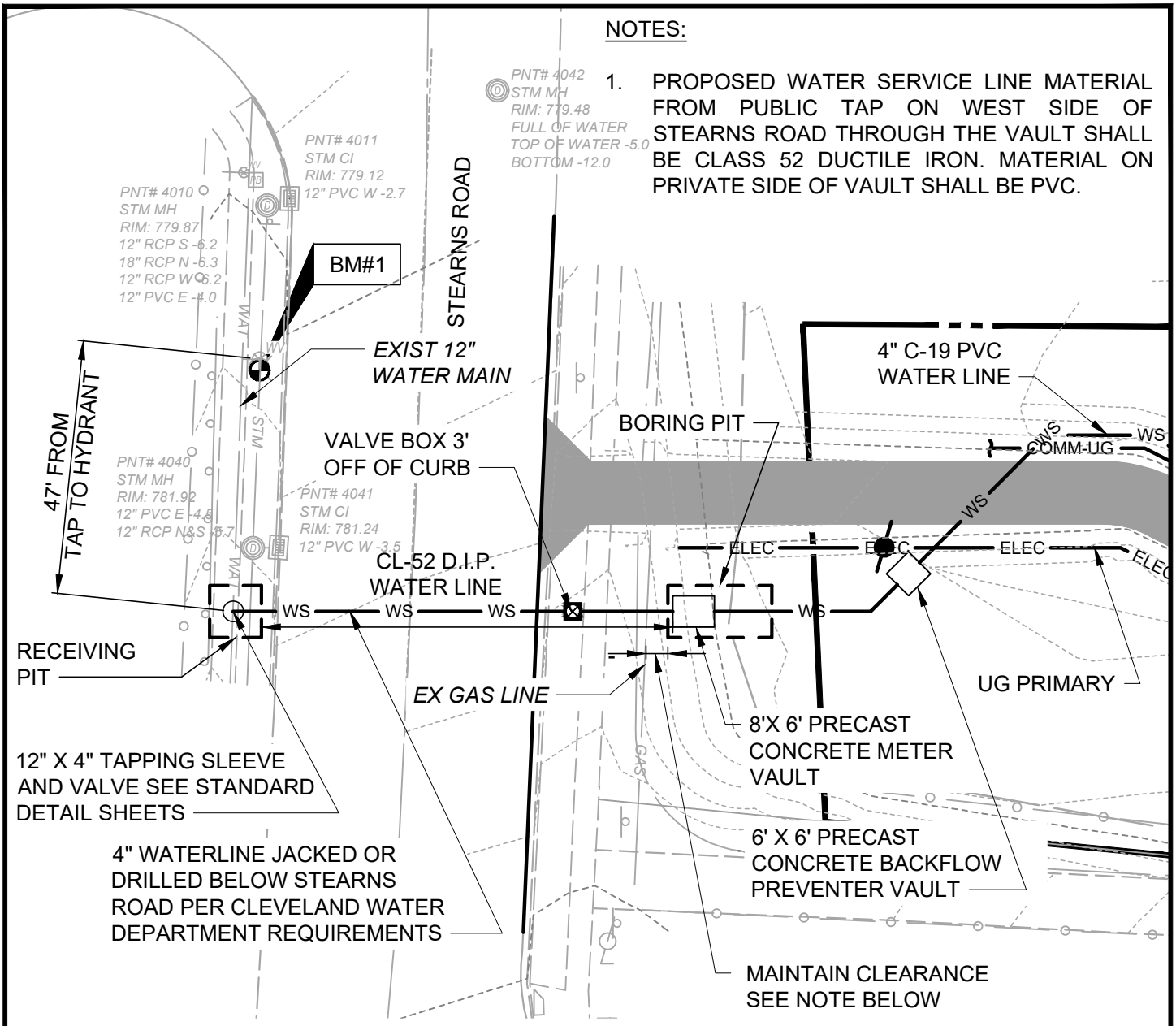
ENBRIDGE GAS OHIO

The Contractor shall be responsible for complying with the conditions of the attached letter, dated October 25, 2024.

EF:mep

Enclosures

H:\2021\210888\SPEC - NEW BID - Oct '24\Addenda\Addendum 03\Addendum 03.Doc



NOTES:

1. PROPOSED WATER SERVICE LINE MATERIAL FROM PUBLIC TAP ON WEST SIDE OF STEARNS ROAD THROUGH THE VAULT SHALL BE CLASS 52 DUCTILE IRON. MATERIAL ON PRIVATE SIDE OF VAULT SHALL BE PVC.

GAS LINE CLEARANCE NOTE:

"IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE LATERAL AND SUBJACENT SUPPORT OF ENBRIDGE'S PIPELINE(S), IN COMPLIANCE TO 29 CFR, PART 1926, SUBPART P, (SAFE EXCAVATION & SHORING). EXTREME CARE SHOULD BE TAKEN NOT TO HARM ANY ENBRIDGE FACILITY (PIPELINES, ETC.) OR APPURTENANCE (PIPE COATING, TRACER WIRE, CATHODIC PROTECTION TEST STATION WIRES & DEVICES, VALVE BOXES, ETC.). ENBRIDGE FACILITIES MUST BE PROTECTED WITH A TARP DURING BRIDGE CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE AND LIABLE FOR ENSURING THAT ALL ENBRIDGE EXISTING FACILITIES, ABOVE AND BELOW GROUND, REMAIN UNDAMAGED, ACCESSIBLE AND IN WORKING ORDER. THE CROSSING OF ENBRIDGE'S PIPELINE(S) WITH ANOTHER STEEL FACILITY MAY CREATE A POTENTIAL CORROSION ISSUE FOR THE PROPOSED FACILITY AND THE EXISTING ENBRIDGE FACILITY. PLEASE CONTACT ENBRIDGE'S CORROSION DEPARTMENT AT LEAST TWO WORKING DAYS BEFORE CONSTRUCTION AT:CORROSIONGIS@DOMINIONENERGY.COM..

MP

NOTE: THIS DRAWING SHALL BE CONSIDERED TO BE PART OF SHEET 10 OF 53 .

CONTRACT NO. 210888	CITY OF NORTH OLMSTED SOUTH INTERCEPTOR EQUALIZATION FACILITY IMPROVEMENTS	DATE	SCALE	~~ADDENDUM~~	DRAWING
CT Consultants engineers | architects | planners		10/23/24	N.T.S.	# 3	SK-1C01

BAR SCALE
40' 20' 0' 40'
SCALE: 1"= 40'

PROPOSED MAN-BRIDGE

PR. ODOT TYPE C, RIPRAP OUTLET PROTECTION

PR. 12", 40 LF CULVERT #6 @ 1.0% OUTLET INV. = 772.60'

BM#2

4' W EMERGENCY SPILLWAY ELEV. = 776.50'

PR. CB #6 RIM = 775.75' 3" ORIFICES INV. = 775.08' 12" INV. (N) = 773.00'

PR. STORMWATER POND #1 30'W x 55'L x 4'D BTM ELEV. = 773.50'

TOP OF BERM ELEV. = 777.50'

PR. 12", 35 LF CULVERT #5 @ 0.4%

PR. CB #5 RIM = 777 12" INV. (S) = 773.64' 12" INV. (N) = 773.64'

PR. INLET PROTECTION

PR. 12", 65 LF CULVERT #4 @ 0.5%

PR. INLET PROTECTION

PR. CB #4 RIM = 777.3 6" INV. (W) = TBD' 12" INV. (SW) = 773.97' 12" INV. (N) = 773.97'

PR. 12", 90 LF CULVERT #3 @ 0.5%

PR. CB #3 RIM = 778 12" INV. (W) = 774.42' 12" INV. (NE) = 774.42'

PR. 12", 220 LF CULVERT #2 @ 0.5%

PR. INLET PROTECTION

PR. CB #2 RIM = 779 12" INV. (NW) = 775.52' 12" INV. (E) = 775.52'

PR. 12", 145 LF CULVERT #1 @ 0.5%

PR. INLET PROTECTION

PR. CB #1 RIM = 778 12" INV. (SE) = 776.25'

PR. INLET PROTECTION (TYP)

PR. ROCK CONSTRUCTION ENTRANCE (50' MIN. L)

PR. CONCRETE WASHOUT AREA

PR. INLET PROTECTION

BM#1

STEARNS ROAD

PR. 40LF, 1' D, 4' W GRASSED SWALE, (MIN. 1% SLOPE)

UNDERGROUND WATER STORAGE SYSTEM

SWP

PR. ACCESS DRIVE

PR. COMPOST FILTER SOCK (TYP)

STOCKPILE 4
5129 SF
.117 ACRES

PR. SUPER SILT FENCE (TYP)

HAUL ROAD

PROPOSED 30 LF 12" HDPE STORM PIPE @ AREA WHERE HAUL ROAD CROSSES PERENNIAL STREAM. PIPE TO BE REMOVED AND AREA RESTORED AS PART OF PROJECT.

MATCH LINE

Soil Boring B-1
Soil Boring B-2
Soil Boring B-3
Soil Boring B-4
Soil Boring B-5
Soil Boring B-6
Soil Boring B-7
Soil Boring B-8
Soil Boring B-9
Soil Boring B-10
Soil Boring B-11

LEGEND:

- WETLANDS
- STOCKPILE 6 (XXXX. SF, X.XX ACRES) — TEMP. SOIL STOCKPILE AREA
- (TEMPORARY) ROCK CONSTRUCTION ENTRY / ROAD
- GRAVEL WALK PATH
- LIMITS OF DISTURBANCE
- SF — PERIMETER FILTER FABRIC FENCE (OR FILTER SOCK). TO BE PLACED ON LEVEL CONTOURS WITH ENDS UPTURNED
- SUPER SILT FENCE
- SWP — STORM WATER POND
- STABLIZED GRASS LINED SWALE
- STABILIZED RIPRAP APRON
- STREAM
- PROPERTY BOUNDRY
- FLX — INLET PROTECTION
- CONCRETE WASHOUT

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STATE OF OHIO
THOMAS E. VOLDRICH
47843
REGISTERED
PROFESSIONAL ENGINEER

CT consultants
engineers • architects • planners
A Verdantas Company

NO	REVISION	DATE
1	SWPPP ENTIRE SHEET REVISED (ADD #3)	10/21/24

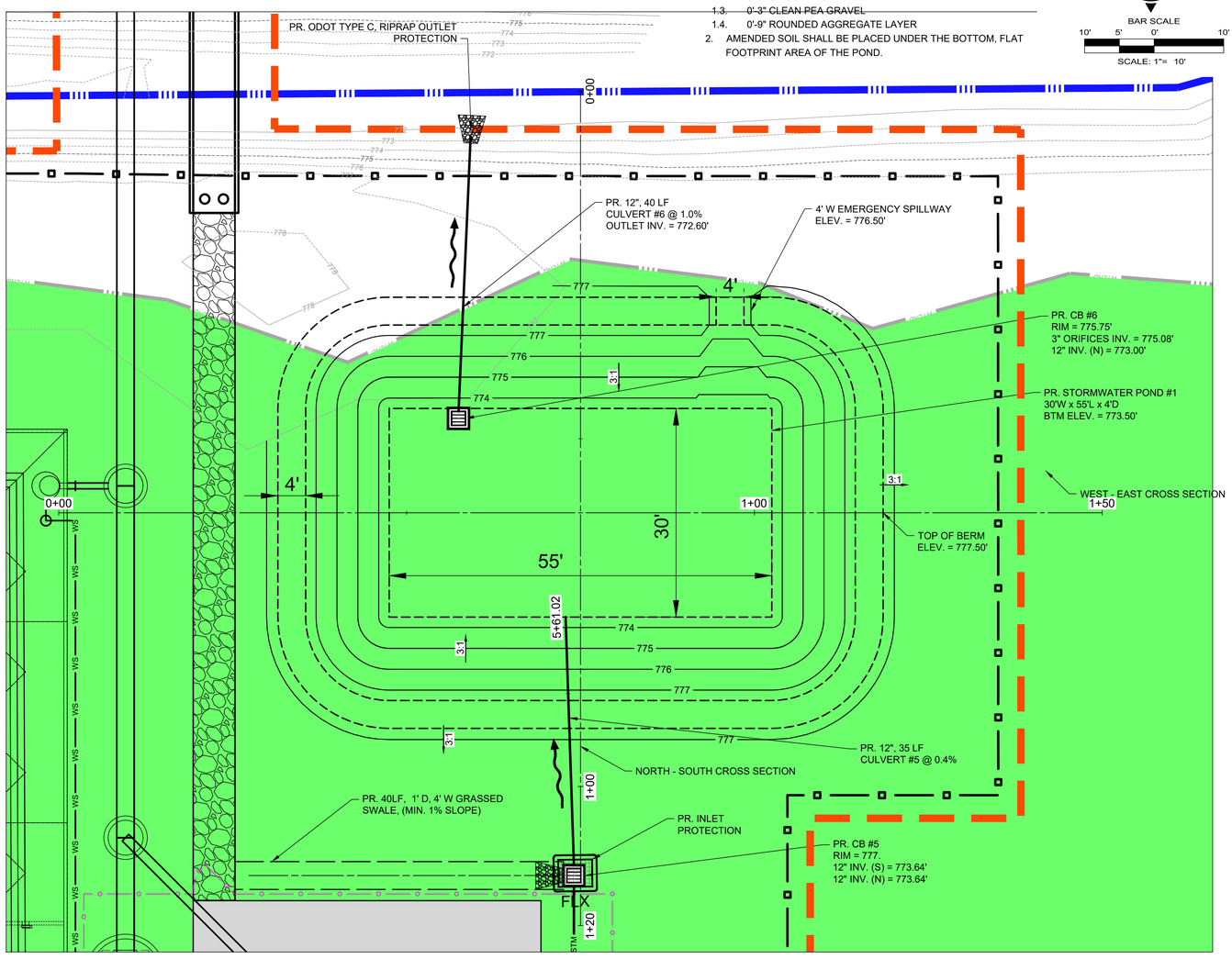
ISSUED FOR:	BID
ISSUE DATE:	10/10/24
SCALE:	AS NOTED
DESIGNED BY:	JC
DRAWN BY:	JC
CHECKED BY:	TEV

CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION FACILITY
CUYAHOGA COUNTY NORTH OLMSTED, OHIO
SITE IMPROVEMENT - 01 SERIES
SWPPP PLAN 1 OF 2

PROJECT NO.
210888
DISCIPLINE
CIVIL
SHEET NAME
SWPP-1
SHEET 22 OF 53

STORMWATER POND NOTES:

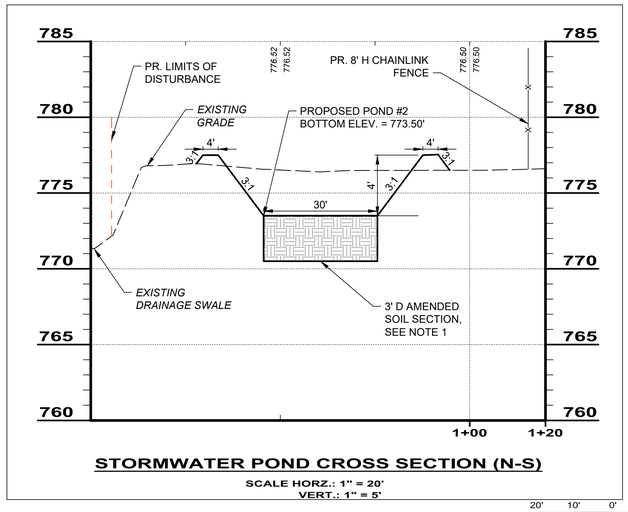
1. THE AMENDED SOIL SECTION SHALL A MINIMUM OF 3' DEEP AND CONSIST OF THE FOLLOWING LAYERS FROM TOP TO BOTTOM:
   - 1.1. 1'-9" OF MULCH & PLANTING SOIL
   - 1.2. 0'-3" OF COMPACTED SAND
   - 1.3. 0'-3" CLEAN PEA GRAVEL
   - 1.4. 0'-9" ROUNDED AGGREGATE LAYER
2. AMENDED SOIL SHALL BE PLACED UNDER THE BOTTOM, FLAT FOOTPRINT AREA OF THE POND.



STORMWATER POND PLAN VIEW

SCALE: 1" = 10'

BAR SCALE
10' 5' 0' 10'
SCALE: 1"= 10'

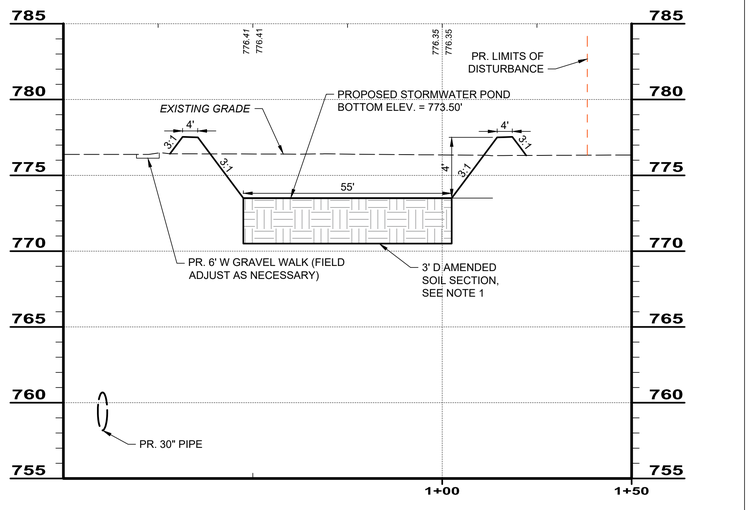


STORMWATER POND CROSS SECTION (N-S)

SCALE HORZ.: 1" = 20'
VERT.: 1" = 5'

5' 2.5' 0'
SCALE: 1"= 5'

20' 10' 0' 20'
SCALE: 1"= 20'

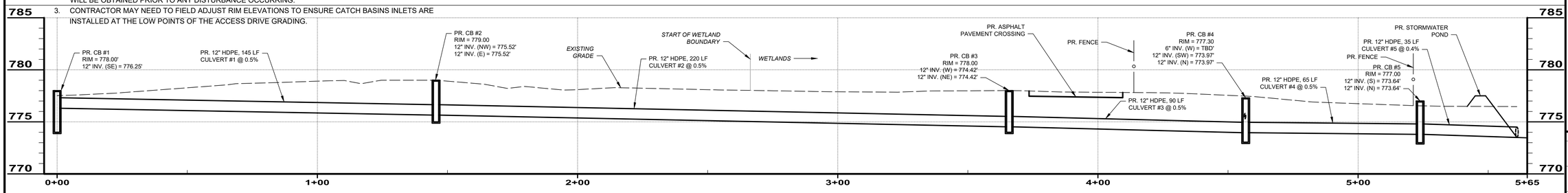


STORMWATER POND CROSS SECTION (W-E)

SCALE HORZ.: 1" = 20'
VERT.: 1" = 5'

STORM SEWER NOTES:

1. PROPOSED ELECTRICAL CONDUITS ARE NOT DISPLAYED. CONDUIT INSTALL SHALL BE COORDINATED WITH THE ELECTRICIAN, OWNER AND SITE CONTRACTOR TO BEST FIT WITHIN THE SITE CONSTRAINTS.
2. IMPACTS TO EXISTING WETLANDS ARE BEING PERMITTED THROUGH USACE AND OEPA. NECESSARY PERMITS WILL BE OBTAINED PRIOR TO ANY DISTURBANCE OCCURRING.
3. CONTRACTOR MAY NEED TO FIELD ADJUST RIM ELEVATIONS TO ENSURE CATCH BASINS INLETS ARE INSTALLED AT THE LOW POINTS OF THE ACCESS DRIVE GRADING.



PROPOSED ACCESS DRIVE STORM SEWER PROFILE

SCALE HORZ.: 1" = 20'
VERT.: 1" = 5'

STATE OF OHIO
THOMAS E. VOLDRICH
47843
REGISTERED
PROFESSIONAL ENGINEER

BID

consultants
engineers · architects · planners
A Verdantas Company

NO	REVISION	DATE
1	SWPPP ENTIRE SHEET REVISED (ADD #3)	10/21/24

ISSUED FOR: 10/10/24
ISSUE DATE: AS NOTED
SCALE: JC
DESIGNED BY: JC
DRAWN BY: TEV
CHECKED BY:

CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION FACILITY
CUYAHOGA COUNTY NORTH OLMSTED, OHIO

SITE IMPROVEMENT - 01 SERIES

SWPPP PLAN - POND DETAIL & SECTIONS

PROJECT NO.
210888
DISCIPLINE
CIVIL
SHEET NAME
SWPP-3
SHEET 24 OF 53

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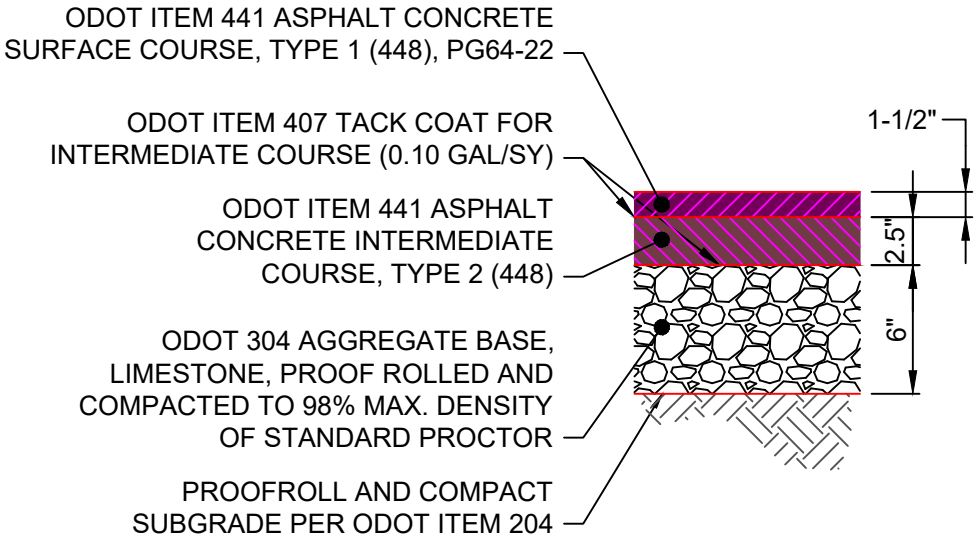
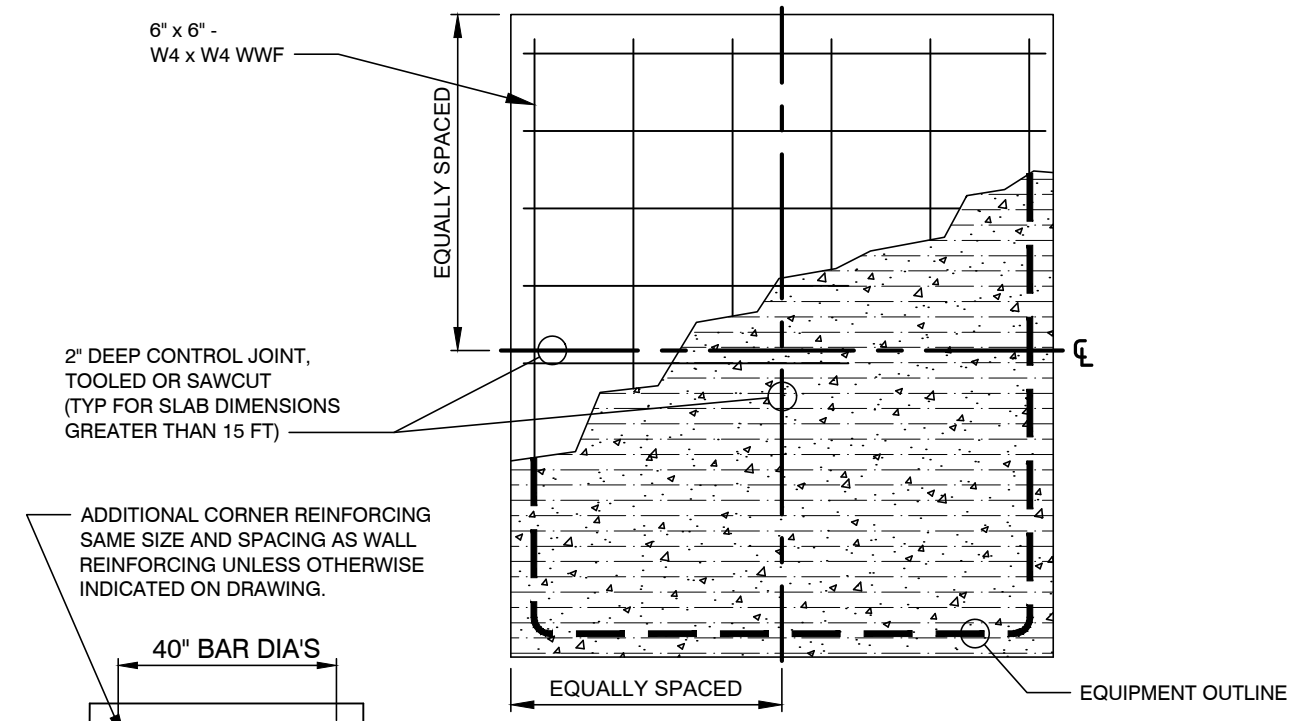


STANDARD DUTY ASPHALT PAVEMENT DETAIL

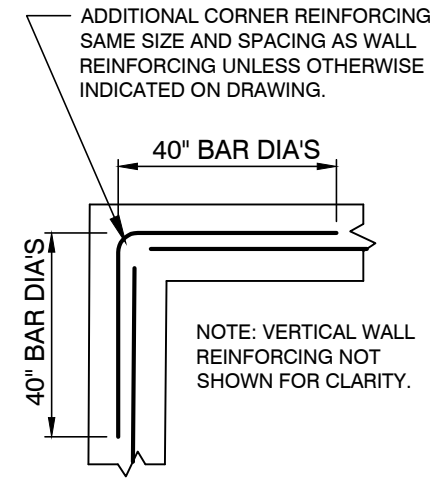
SCALE: NONE

NOTE: THIS DRAWING SHALL BE CONSIDERED TO BE PART OF SHEET 39 OF 53 .

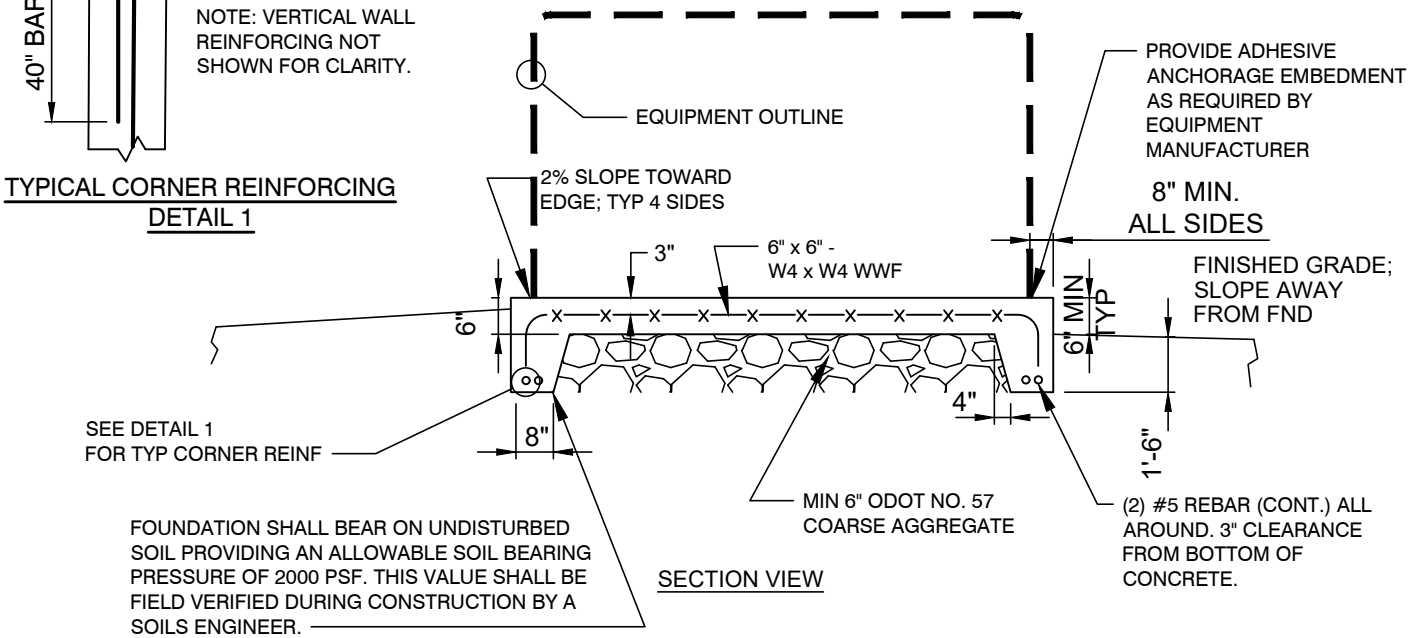
CONTRACT NO. 210888	CITY OF NORTH OLMSTED SOUTH INTERCEPTOR EQUALIZATION FACILITY IMPROVEMENTS	DATE	SCALE	ADDENDUM	DRAWING
CT Consultants engineers | architects | planners		10/23/24	N.T.S.	# 3	SK-SD4



PLAN VIEW



TYPICAL CORNER REINFORCING
DETAIL 1



SECTION VIEW

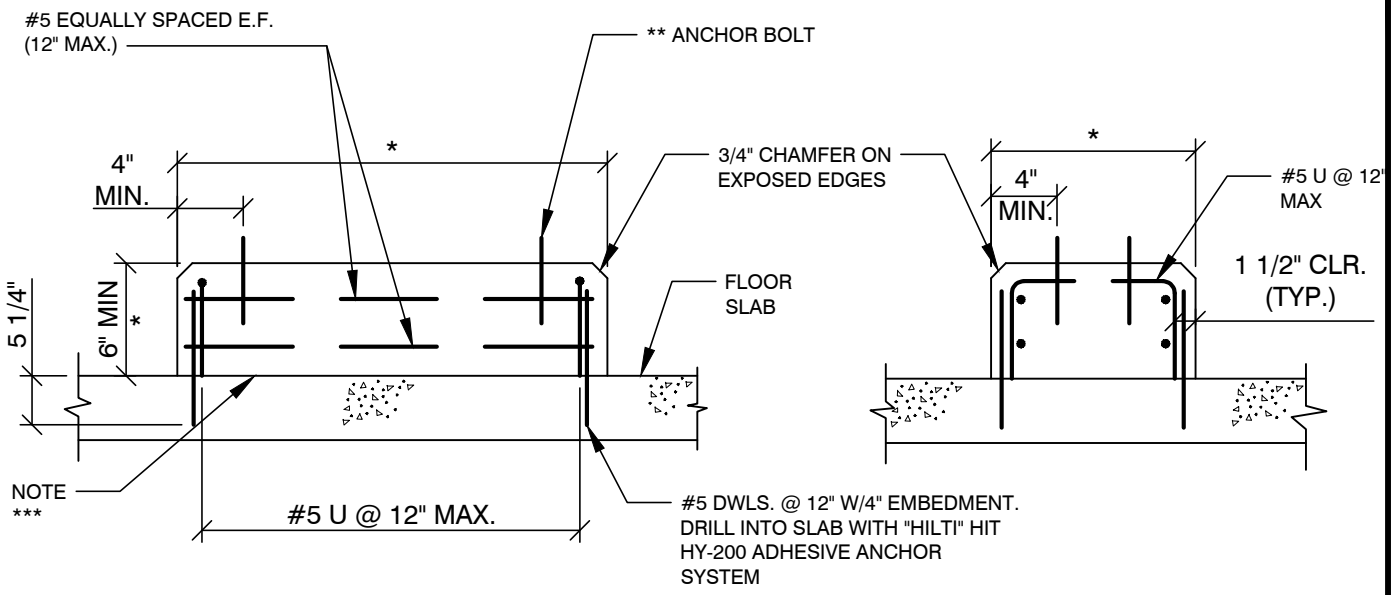
TYPE II - FLOATING EXTERIOR EQUIPMENT FOUNDATION

NOT TO SCALE

TYPE II FLOATING EQUIPMENT FOUNDATION SHALL BE USED WHERE MODEST SLAB MOVEMENT IS NOT CRITICAL AND CAN BE TOLERATED BY THE SUPPORTED EQUIPMENT. ALL UTILITY TIE-INS SHALL BE COMPRISED OF FLEXIBLE CONNECTIONS TO ACCOMMODATE MULTI-DIRECTIONAL MOVEMENT TO PREVENT OVERSTRESS/RUPTURE OF SERVICE CONNECTIONS.

NOTE: THIS DRAWING SHALL BE CONSIDERED TO BE PART OF SHEET 42 OF 53 .

CONTRACT NO. 210888	CITY OF NORTH OLMSTED SOUTH INTERCEPTOR EQUALIZATION FACILITY IMPROVEMENTS	DATE	SCALE	ADDENDUM	DRAWING
CT Consultants engineers | architects | planners		10/23/24	N.T.S.	# 3	SK-SD1



ELEVATION **SECTION**

* DIMENSION VARIES PER EQUIPMENT MANUFACTURER.

** ANCHOR BOLTS AS SPECIFIED PER EQUIPMENT MANUFACTURER.

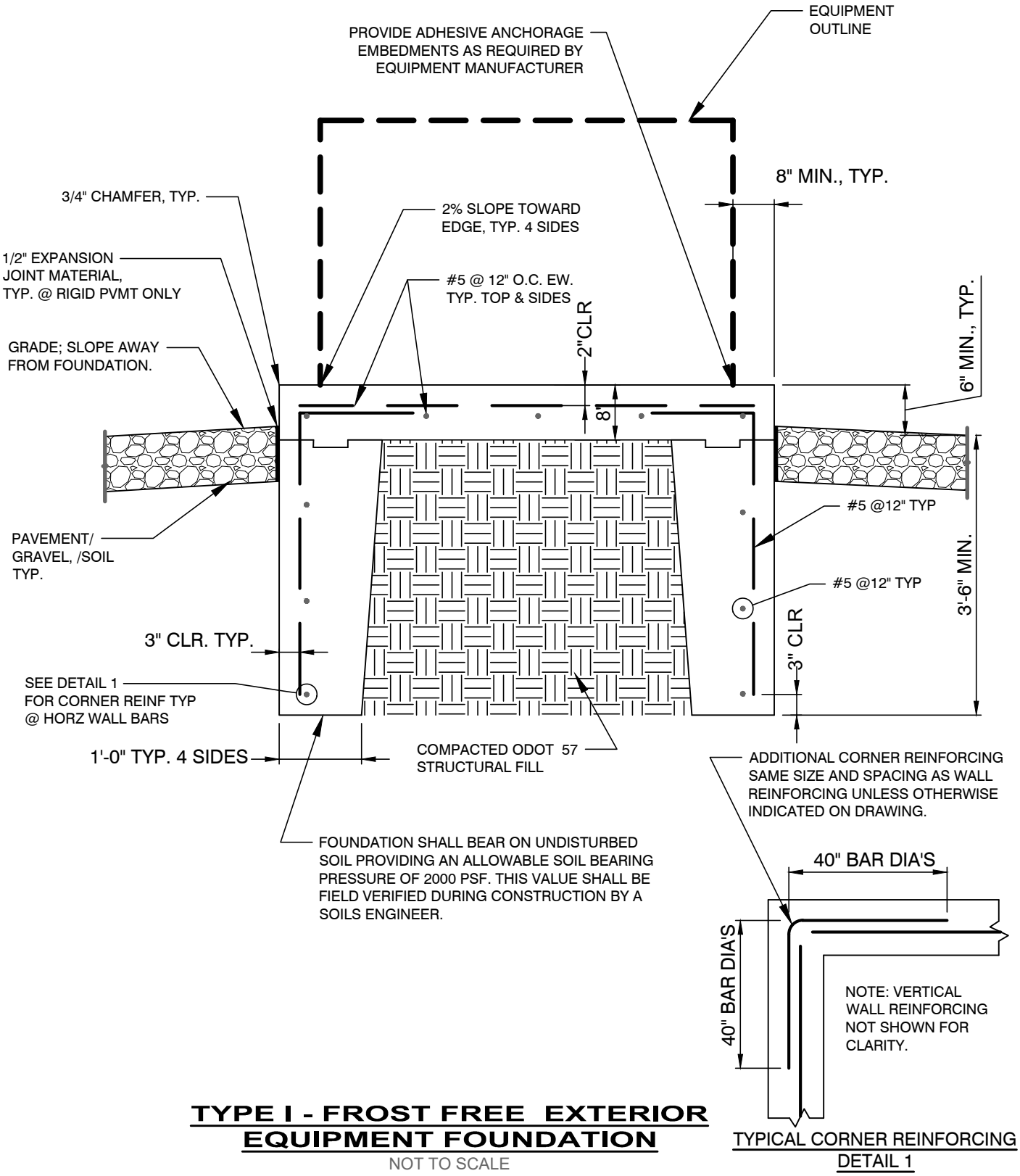
*** THE SURFACE TO WHICH NEW CONCRETE IS TO BE PLACED MUST HAVE FLOOR PAINT PROPERLY REMOVED AND BE MECHANICALLY CLEANED AND COATED WITH A BONDING AGENT AFTER ALL VERTICAL DOWELS ARE IN PLACE.

EQUIPMENT PAD ON EXISTING STRUCTURAL SLAB

NOT TO SCALE

NOTE: THIS DRAWING SHALL BE CONSIDERED TO BE PART OF SHEET 42 OF 53 .

CONTRACT NO. 210888	CITY OF NORTH OLMSTED SOUTH INTERCEPTOR EQUALIZATION FACILITY IMPROVEMENTS	DATE	SCALE	ADDENDUM	DRAWING
CT Consultants engineers | architects | planners		10/23/24	N.T.S.	# 3	SK-SD2



TYPE I - FROST FREE EXTERIOR EQUIPMENT FOUNDATION

NOT TO SCALE

TYPICAL CORNER REINFORCING
DETAIL 1

TYPE I FROST-FREE FOUNDATION SHALL BE USED WHERE MODEST FOUNDATION MOVEMENT IS CRITICAL AND CANNOT BE TOLERATED BY THE SUPPORTED EQUIPMENT AND/OR RESTRICTED BY RIGID UTILITY CONNECTIONS.

NOTE: THIS DRAWING SHALL BE CONSIDERED TO BE PART OF SHEET 42 OF 53 .

CONTRACT NO. 210888	CITY OF NORTH OLMSTED SOUTH INTERCEPTOR EQUALIZATION FACILITY IMPROVEMENTS	DATE	SCALE	ADDENDUM	DRAWING
CT Consultants engineers | architects | planners		10/23/24	N.T.S.	# 3	SK-SD3

VOLTAGE DROP SCHEDULE

120 VOLT BRANCH CIRCUITS UP TO 8 AMPS

RUN DISTANCE IN FEET	WIRE SIZE AWG
1' - 120'	#12
121' - 190'	#10
191' - 300'	#8
301' - 410'	#6

120 VOLT BRANCH CIRCUITS 9 AMPS TO 14 AMPS

RUN DISTANCE IN FEET	WIRE SIZE AWG
1' - 65'	#12
66' - 110'	#10
111' - 170'	#8
171' - 270'	#6

277 VOLT BRANCH CIRCUITS UP TO 14 AMPS

RUN DISTANCE IN FEET	WIRE SIZE AWG
1' - 160'	#12
161' - 250'	#10
251' - 390'	#8
391' - 620'	#6

ALL HOME RUNS SHALL BE #12 (MINIMUM) WIRE SIZES. CONTRACTOR SHALL UPSIZE WIRES BASED ON LOAD AND LENGTH OF RUN AS INDICATED IN SCHEDULE ABOVE.

SYMBOLS

$	20A-120/277V SINGLE POLE TOGGLE SWITCH, HUBBELL, TYPE HBL 1221
$WP	SAME AS $ WITH GASKETED SELF CLOSING WEATHER - RESISTANT COVER
$3	20A-120/277V THREE WAY TOGGLE SWITCH, HUBBELL, TYPE HBL 1223
$P	20A-120/277V TOGGLE SWITCH WITH "ON" PILOT, HUBBELL, TYPE HBL 1221 PL
$T	20A-300V MANUAL STARTING SWITCH W/ THERMAL OVERLOAD RELAY- IF NOT INTEGRAL TO MOTOR - SURFACE MOUNTED AT DEVICE IN ACCESSIBLE LOCATION. SWITCH SHALL BE LOCKABLE IN OPEN POSITION.
$OS	120/277V INFRARED WALL SWITCH OCCUPANCY SENSOR - WATTSTOPPER #PM-100. OCCUPANCY SENSORS SHALL BE SET TO OPERATE AS VACANCY SENSORS - AUTOMATIC OFF AFTER 30 MINUTES, MANUAL ON ONLY.
	20A-125 V DUPLEX RECEPTACLE, HUBBELL, TYPE 5362
	20A-125 V DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER
GFI	20A-125 V DUPLEX RECEPTACLE WITH INTEGRAL "GFI" PROTECTION, HUBBELL TYPE GF5352
	20A-125 V DUPLEX RECEPTACLE 2 MOUNTED IN 2 GANG BOX WITH SINGLE COVER PLATE.
WP	IN-USE, WEATHERPROOF COVER AND INTEGRAL GFCI WEATHER RESISTANT PROTECTION, HUBBELL REC-GFRS362566Y, COVER-RW57500
	125/250V, 3 WIRE GROUNDED TYPE OUTLET, VERIFY EXACT CONFIGURATION REQUIRED, AMPS AS SHOWN ON PLAN
	480V, 4 WIRE GROUNDED TYPE OUTLET, VERIFY EXACT CONFIGURATION REQUIRED, AMPS AS SHOWN ON PLAN
W	4" SQ x 2-1/8" DEEP BOX TO MATCH DEVICE FOR TELEPHONE AND/OR DATA OUTLET - PROVIDE 1" RGS CONDUIT AND EXTEND TO LOCATION SHOWN ON PLAN WITH PULL WIRE. PROVIDE BLANK STAINLESS STEEL COVER IF NOT USED BY OWNER. W = DENOTES MOUNTED AT WALL PHONE HEIGHT - 46" AFF
J	STANDARD JUNCTION BOX SIZED PER N.E.C. AND SUPPORTED INDEPENDENT OF CONDUIT SYSTEM
	HEVI-DUTY 3 POLE FUSIBLE DISCONNECT SWITCH W/FUSETRONS SIZED AS NOTED OR AT 125% OF ACTUAL MOTOR NAMEPLATE RATING-SWITCH SIZE AS NOTED - NEMA 4X. N.F. DENOTES NON-FUSIBLE-MOUNTED AT EQUIPMENT W.P. DENOTES WEATHERPROOF-MOUNTED AT EQUIPMENT 00/000 = DISCONNECT SIZE / FUSE SIZE - MOUNTED AT EQUIPMENT SS = STAINLESS STEEL
	PREWIRED UNIT CONTROL PANEL-CONNECT AND WIRE PER MFGRS. WIRING DIAGRAMS. PROVIDE DISCONNECT SWITCH AS REQUIRED BY N.E.C. ELECTRICIAN SHALL PROVIDE HOT DIPPED GALVANIZED CHANNEL, FITTINGS AND ACCESSORIES FOR A COMPLETE METAL FRAMING SYSTEM FOR FIELD MOUNTED PANELS AS REQUIRED. APPROVED SHOP DRAWINGS SHALL BE USED FOR MEANS AND METHODS OF INSTALLATION.
	COMBINATION MAGNETIC STARTER WITH 120V CONTROL XFMR 3 OL'S, H-O-A SELECTOR SWITCH, PUSH TO TEST "ON" PILOT LIGHT, 2 N.O. AND 2 N.C. CONTROL CONTACTS (SIZE 1 MINIMUM) FURNISHED AND INSTALLED BY E.C.
M WT	MOTOR CONNECTION AS NOTED-CONNECT WITH FLEXIBLE OR SEALTIGHT CONDUIT, M = WATER SENSOR IN MOTOR, T = WINDING TEMPERATURE SENSORS IN MOTOR
M WT	VARIABLE SPEED INVERTER DUTY MOTOR CONNECTION AS NOTED-CONNECT WITH FLEXIBLE OR SEALTIGHT CONDUIT, M = WATER SENSOR IN MOTOR, T = WINDING TEMPERATURE SENSORS IN MOTOR
T	TIMECLOCK: TORK #N200L WITH CARRY OVER OR EQUAL
TH	HVAC THERMOSTAT CONNECTION, THERMOSTAT PROVIDED BY OTHERS, WIRED & INSTALLED BY E.C.
	120/208V -3 PHASE-4 WIRE ELECTRICAL BRANCH CIRCUIT PANEL
	480V - 3 PHASE - 3 WIRE ELECTRICAL BRANCH CIRCUIT PANEL
NEUTRAL HOT GROUND	RGS CONDUIT RUN EXPOSED, OVERHEAD, ON CEILING OR ON WALL. CROSSHATCHES DENOTE NUMBER OF #12 AWG COPPER CONDUCTORS UNLESS NOTED OTHERWISE. IF NO CONDUCTORS ARE SHOWN PROVIDE 2 #12 + GND. - 3/4" RGS MINIMUM OR AS REQUIRED. PVC SCHED 80 IN THE CHEMICAL FEED BUILDING.
NEUTRAL HOT GROUND	PVC SCHED 40 CONDUIT RUN BELOW GRADE, BELOW FLOOR SLABS OR IN WETWELLS- MAINTAIN 2" MINIMUM COVER BETWEEN FLOOR SLAB AND TOP OF CONDUIT - CROSSHATCHES DENOTE NUMBER OF #12 AWG COPPER CONDUCTORS UNLESS NOTED OTHERWISE. IF NO CONDUCTORS ARE SHOWN, PROVIDE 2 #12 + GND. - 3/4" PVC MINIMUM OR AS REQUIRED.
	CONDUIT SEALING FITTING WITH DRAIN RATED FOR CLASS I, DIV. 1 APPLICATIONS FOR SEALING IN VERTICAL OR HORIZONTAL POSITIONS. PROVIDE FIBER AND SEALING COMPOUND AS REQUIRED TO MAKE THE SEAL.

SYMBOL LEGEND GENERAL NOTES:

TREATMENT PLANT DEVICES

1. ALL TOGGLE SWITCHES ARE TO BE SURFACE MOUNTED AT 46" A.F.F. TO CENTER LINE OF BOX IN A SURFACE MOUNTED "FS" CAST DEVICE BOX SUITABLE FOR RIGID GALVANIZED STEEL CONDUIT, AND BE PROVIDED WITH A STAINLESS STEEL COVER PLATE TO MATCH DEVICE UNLESS OTHERWISE SPECIFIED. COLOR OF DEVICE TO BE GRAY OR AS SELECTED BY PROJECT MANAGER. COMPLY WITH CURRENT ADA REQUIREMENTS.
2. ALL RECEPTACLES, TELEPHONE, ETC. ARE TO BE SURFACE MOUNTED AT 36" A.F.F. TO CENTER LINE OF BOX IN A SURFACE MOUNTED "FS" CAST DEVICE BOX SUITABLE FOR RIGID GALVANIZED STEEL CONDUIT, AND BE PROVIDED WITH A STAINLESS STEEL COVER PLATE TO MATCH THE DEVICE UNLESS OTHERWISE SPECIFIED. COLOR OF DEVICE TO BE GRAY OR AS SELECTED BY PLANT PERSONNEL. COMPLY WITH CURRENT ADA REQUIREMENTS.

ADMINISTRATION BUILDING DEVICES

1. ALL TOGGLE SWITCHES ARE TO BE FLUSH MOUNTED AT 46" A.F.F. TO CENTER LINE OF BOX AND BE PROVIDED WITH A THERMOPLASTIC COVER PLATE TO MATCH DEVICE UNLESS OTHERWISE SPECIFIED. COLOR OF DEVICE TO BE SELECTED BY ARCHITECT. COMPLY WITH CURRENT ADA REQUIREMENTS.
2. ALL RECEPTACLES, TELEPHONE, ETC. ARE TO BE FLUSH MOUNTED AT 18" A.F.F. TO CENTER LINE AND BE PROVIDED WITH A THERMOPLASTIC COVER PLATE TO MATCH THE DEVICE UNLESS OTHERWISE SPECIFIED. COLOR OF THE DEVICE TO BE SELECTED BY ARCHITECT. ALL BACK-TO-BACK DEVICES TO BE OFFSET HORIZONTALLY 6" MINIMUM. COMPLY WITH CURRENT ADA REQUIREMENTS.

ENTIRE FACILITY

1. THE EXACT LOCATION AND MOUNTING HEIGHT OF ALL SWITCHES, OUTLETS, ETC. ARE TO BE CONFIRMED PRIOR TO ROUGH-IN. IF LOCATIONS AND MOUNTING HEIGHTS ARE NOT SHOWN, REQUEST LOCATIONS PRIOR TO ROUGH-IN. CONFIRM EQUIPMENT OUTLET LOCATIONS WITH EQUIPMENT REQUIREMENTS. COMPLY WITH A.D.A. REQUIREMENTS.
2. SWITCHES AND DEVICES TO BE AS SPECIFIED. LEVITON AND PASS & SEYMOUR ARE ACCEPTABLE EQUALS IF SPECIFICATION GRADES.
3. NO ITEMS ARE TO BE SCALED OFF THE ELECTRICAL DRAWINGS. ALL DIMENSIONS SHOWN MUST BE VERIFIED WITH ALL TRADES PRIOR TO ROUGH-IN.

GENERAL NOTES: (APPLY TO ALL DRAWINGS)

A. ELECTRICIAN TO FIRE STOP ALL WALL AND FLOOR PENETRATIONS TO MATCH FIRE RATING.

B. ELECTRICIAN TO VISIT SITE AND VERIFY ALL EXISTING CONDITIONS PRIOR TO BID.

C. ALL ROOF PENETRATIONS TO BE SEALED PER ROOFING CONTRACTORS REQUIREMENTS. CONDUITS SHALL BE SEALED WATERTIGHT.

D. NO DUCTWORK OR PIPING TO BE RUN ABOVE ELECTRICAL PANELS OR THROUGH ELECTRICAL EQUIPMENT ROOMS. ELECTRICIAN SHALL COORDINATE WITH ALL TRADES FOR EQUIPMENT LAYOUTS PRIOR TO ROUGH-IN OF ALL SYSTEMS.

E. ELECTRICIAN TO CONFIRM LIGHT FIXTURE CATALOG NUMBERS WITH ALL LIGHT FIXTURES SPECIFIED ON PLANS FOR AREA RATING, FIXTURE VOLTAGES, LAMPS ETC.

F. ELECTRICIAN TO COORDINATE CHAIN ON PENDANT HUNG LIGHTING FIXTURES WITH ALL MECHANICAL DUCTWORK AND PROCESS PIPING. WHERE INTERFERENCES OCCUR, ELECTRICIAN TO ADJUST LOCATION OF FIXTURES BELOW ALL DUCTWORK AND PIPING. SUBMIT AN RFI FOR CORRECTIVE ACTION FROM ENGINEER. CHAINS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE STAINLESS STEEL.

G. ELECTRICIAN TO CONFIRM LOCATIONS OF ALL ELECTRICAL EQUIPMENT AND ELECTRICAL CHARACTERISTICS OF PROCESS EQUIPMENT PROVIDED BY OTHER TRADES PRIOR TO INSTALLING ROUGH-INS AS SHOWN ON THE ELECTRICAL PLANS. ALL SHOP DRAWING REQUIREMENTS WILL BE CONSIDERED AS THE MEANS AND METHODS OF INSTALLATION.

H. THE ELECTRICIAN IS REQUIRED TO REVIEW THE SPECIFICATION PACKAGE AND COMPARE IT TO THE DRAWING PACKAGE. THE ELECTRICIAN SHALL INCLUDE IN THEIR BIDS, ALL REQUIREMENTS FOUND IN SPECIFICATIONS. IN THE EVENT OF A DISCREPANCY, THE CONTRACTOR SHALL PROVIDE THE BETTER QUALITY OR GREATER AMOUNT OF WORK IN THEIR BIDS. UPON AWARD OF THE CONTRACT, THE CONTRACTOR SHALL REQUEST GUIDANCE ON HOW TO PROCEED WITH CONSTRUCTION PRIOR TO ROUGH-IN. SPECIFICATIONS RELATED TO ELECTRICAL TRADE ARE SECTIONS 260000, 260500, 262400, 262418, 264100 AND 265000.

I. THIS PROJECT INVOLVES RENOVATION OF AN EXISTING INDUSTRIAL FACILITY (WASTE WATER TREATMENT PLANT) AND THE CONTRACTOR IS EXPECTED TO PROVIDE CRAFTSMANSHIP REFLECTING THE NATURE OF THE FACILITY. CONDUITS IN PROCESS AREAS ARE TO BE SURFACE MOUNTED RIGID GALVANIZED STEEL (RGS). IN CLASSIFIED AREAS SEAL ALL CONDUITS TO RESTRICT THE PASSAGE OF GASSES AND VAPORS, AND ARRANGE SEALING FITTING DRAINS IN CONDUIT SYSTEMS TO PREVENT ACCUMULATION OF CONDENSATE ABOVE SEALS. ALL CONDUITS LARGER THAN 1 1/4" ENTERING OR LEAVING A MOTOR CONTROL CENTER, CONTROL PANEL, VALVE ACTUATOR, INSTRUMENT, A BUILDING OR PANELBOARD SHALL BE MADE WATERTIGHT USING AN INFLATABLE, SEALED, BLADDER, DUCT SEALING SYSTEM, RAYCHEM 'RAYPLATE' DUCT SEALING SYSTEM RDSS OR APPROVED EQUAL. CONDUITS 1 1/4" AND SMALLER SHALL USE A FOAM SEALANT AS MANUFACTURED BY POLYWATER FST DUCT SEALANT OR EQUAL. ALL HARDWARE IS TO BE STAINLESS STEEL UNLESS OTHERWISE DIRECTED.

ALL ENCLOSURES ARE TO BE RATED AS FOLLOWS:

- OUTDOORS: NEMA 4X (STAINLESS STEEL)
- CLASSIFIED AREAS: NEMA 7
- INDOORS (WET AREAS): NEMA 4X (STAINLESS STEEL), U.O.N.
- INDOORS (CONTROLLED ENVIRONMENT) NEMA 1, UNLESS OTHERWISE NOTED.
- INDOORS (CHEMICAL STORAGE) NEMA 4X (POLYCARBONATE).

K. ELECTRICIAN SHALL REVIEW ALL OTHER TRADES CONSTRUCTION DOCUMENTS AND/OR COORDINATE WITH OTHER TRADES AND VERIFY IF THERE ARE ANY ADDITIONAL ELECTRICAL REQUIREMENTS NOT SHOWN ON ELECTRICAL DRAWINGS. COST FOR WORK SHOWN ON OTHER TRADES DRAWINGS SHALL BE INCLUDED IN BASE BID. ALL FIELD WIRING AND TERMINATIONS OF PROCESS EQUIPMENT AND INSTRUMENTATION AND CONTROLS SHALL BE THE RESPONSIBILITY OF THE ELECTRICIAN. ALL CABLES AND WIRES PROVIDED BY VENDORS SHALL BE INSTALLED AND TERMINATED BY THE ELECTRICIAN. WIRE ALL MISCELLANEOUS POWER AND CONTROLS AS REQUIRED TO PROVIDE A COMPLETE FUNCTIONING SYSTEM.

L. A 4-20MA SIGNAL IS AN ANALOG SIGNAL USED TO TRANSMIT DATA (LEVEL, FLOW, ETC.) FOR PROCESS CONTROLS. THE ELECTRICIAN SHALL PROVIDE, INSTALL AND TERMINATE #16 TWISTED SHIELDED PAIRS (T.S.P.) WIRING IN RIGID GALVANIZED STEEL CONDUIT (RGS). RGS IS USED IN AN ATTEMPT TO REDUCE THE DISTORTION AFFECT FROM EMI AND RFI. BELOW GRADE CONDUITS SHALL BE PVC SCHED-40. PARALLEL RUNS OF DATA CONDUITS AND POWER CONDUITS SHALL BE SEPARATED BY 2 FEET. THE #16 T.S.P. SHIELD SHALL BE GROUNDED AT THE CONTROL PANEL ONLY (DO NOT GROUND AT BOTH ENDS).

M. THE ELECTRICIAN SHALL BE RESPONSIBLE FOR LAYOUT AND COORDINATION OF OPENINGS AND CHASES AND SHALL PERFORM ALL CUTTING AND PATCHING AS REQUIRED TO INSTALL THEIR WORK. ALL CONCRETE HOUSE KEEPING PADS SHALL BE FRAMED AND POURED BY THE ELECTRICIAN. PADS SHALL HAVE A 45 DEGREE, 1" CHAMFER AROUND UPPER EDGE.

N. DO NOT INSTALL DEVICES SCALED FROM THESE DRAWINGS. THE ELECTRICIAN SHALL REVIEW ALL OTHER TRADES DRAWINGS AND SHOP DRAWINGS AND PRODUCE CONDUIT/DEVICE LAYOUT DRAWINGS. SUBMIT THESE DRAWINGS TO ALL TRADES FOR COORDINATION AND APPROVAL. SEND APPROVED LAYOUT DRAWINGS TO ENGINEER FOR FINAL APPROVAL.

O. ALL ELECTRICAL EQUIPMENT, DEVICES, LIGHTING FIXTURES, CONDUIT AND WIRING SHOWN ON THE ELECTRICAL DRAWINGS IS NEW UNLESS CLEARLY CALLED OUT AS EXISTING. ALL EXISTING ELECTRICAL EQUIPMENT THAT IS CALLED OUT TO BE REUSED SHALL BE INSPECTED IN THE FIELD BY THE ELECTRICIAN AND THE CONSTRUCTION MANAGER TO DETERMINE ITS CONDITION PRIOR TO STARTING ANY WORK. PROVIDE DOCUMENTATION TO OWNER INDICATING CONDITION OF THE EXISTING EQUIPMENT, AND REUSE EXISTING EQUIPMENT ONLY IF ALL PARTIES AGREE THE CONDITION IS ACCEPTABLE. ALL EXISTING EQUIPMENT DETERMINED TO BE UNUSABLE SHALL BE REPLACED WITH LIKE KIND AS DIRECTED BY THE OWNER. ANY OF THE OWNERS EQUIPMENT DETERMINED TO BE REUSED THAT IS DAMAGED BY ANY CONTRACTOR DURING SHUTDOWN SHALL BE REPLACED BY THAT CONTRACTOR. ALL EXISTING EQUIPMENT IS THE PROPERTY OF THE OWNER (NOT THE CONTRACTOR) AND SHALL BE TREATED ACCORDINGLY.

P. IN INDUSTRIAL APPLICATIONS, SUCH AS THIS ONE WHERE QUALIFIED PERSONS WILL SERVICE EQUIPMENT, A DISCONNECTING MEANS IS NOT REQUIRED AT A MOTOR AS LONG AS THE DISCONNECTING MEANS AT THE CONTROLLER IS CAPABLE OF BEING LOCKED IN THE OPEN POSITION. THE ELECTRICIAN SHALL BE HELD RESPONSIBLE TO ENSURE ALL CONTROLLERS TO BE INSTALLED ARE CAPABLE OF LOCKOUT / TAGOUT PRIOR TO INSTALLATION. THIS IS IMPORTANT.

Q. CONFORM TO THE NEC, OSHA, FIRE MARSHAL, BUILDING DEPARTMENT AND OTHER APPLICABLE CODES AND REGULATIONS. OBTAIN PERMITS, PAY ALL FEES, AND ARRANGE FOR REQUIRED INSPECTIONS.

3

STATE OF OHIO
CHRISTIAN J. TODD
No. 71956
REGISTERED PROFESSIONAL ENGINEER
10-25-24

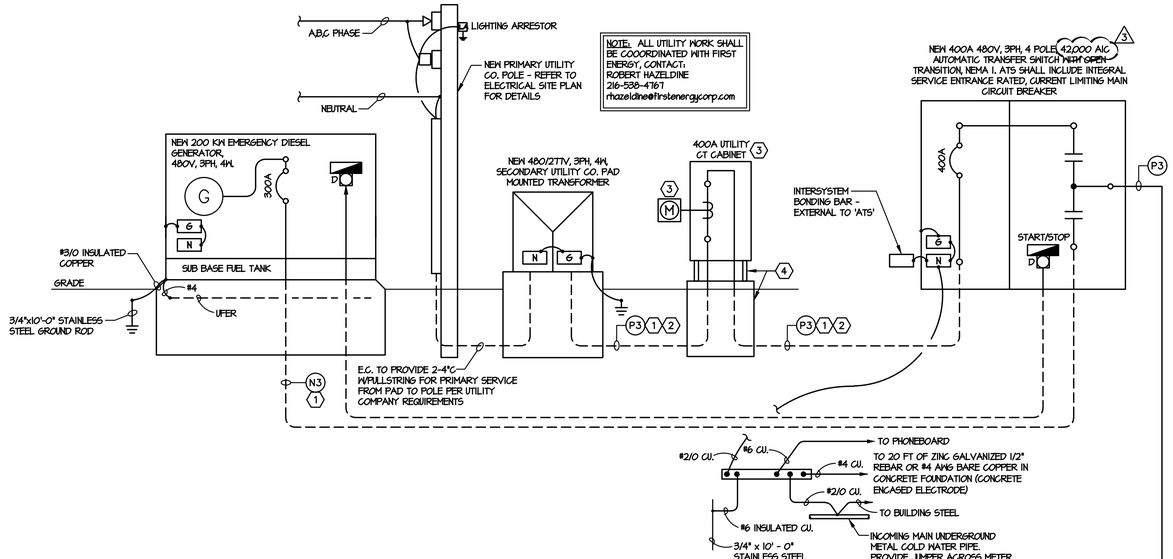
CT consultants
your trusted advisor — engineers architects planners

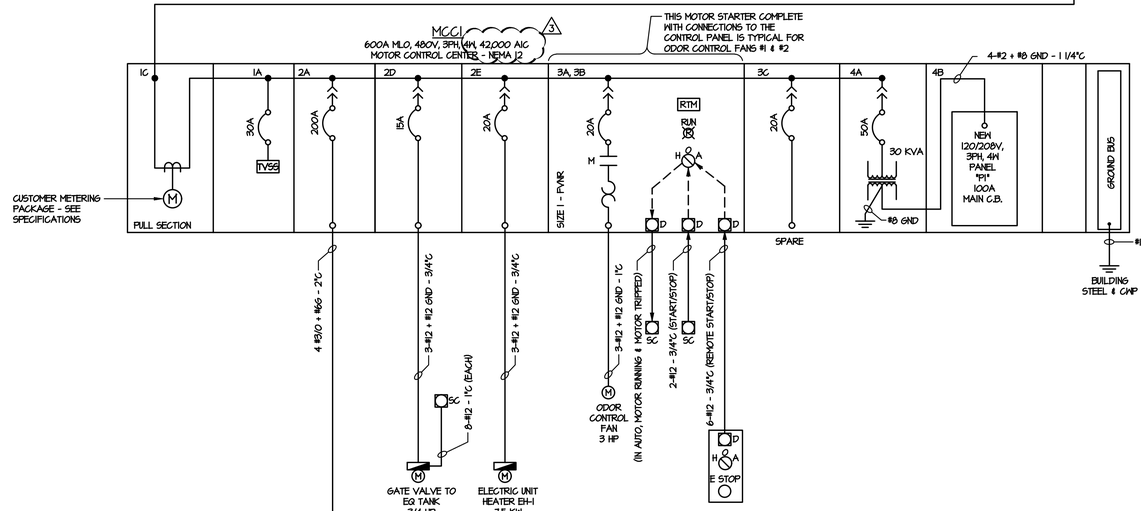
NO	REVISION	DATE
3	ADDENDUM #3	10/25/2024

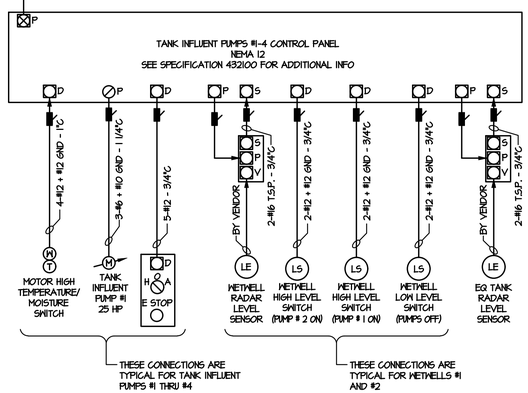
ISSUED FOR:	PROGRESS
ISSUE DATE:	09-16-2024
SCALE:	NONE
DESIGNED BY:	CAT
DRAWN BY:	CAT
CHECKED BY:	CAT

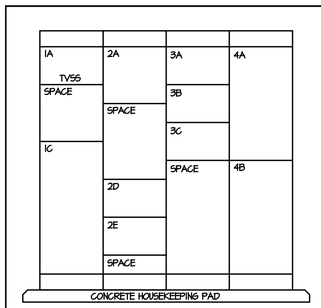
CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION TANK
CUYAHOGA COUNTY NORTH OLMSTED, OHIO
ELECTRICAL - 00 SERIES
3
ELECTRICAL LEGEND & NOTES

PROJECT NO.
190118
DISCIPLINE
ELECTRICAL
SHEET NAME
00E-01
SHEET 45 OF 53









MCC1 LAYOUT
NO SCALE

ONE-LINE CODED NOTES

1. PROVIDE FEEDER IN SCH. 40 PVC BELOW GRADE CONDUIT, AND PROVIDE (1) SPARE CONDUIT. SPARE CONDUIT TO MATCH THE CONDUIT SIZE OF THE ASSOCIATED FEEDER.
2. THIS IS THE SERVICE ENTRANCE SECONDARY FEEDER. DO NOT INCLUDE THE EQUIPMENT GROUND WITH THIS FEEDER. THIS FEEDER SHOULD INCLUDE 3 UNGROUNDED CONDUCTORS AND A GROUNDED (NEUTRAL) CONDUCTOR ONLY, SIZED PER THE SCHEDULE.
3. E.C. TO PROVIDE BUSSED 600A CT CABINET PER UTILITY COMPANY SPECIFICATIONS. ALSO PROVIDE METER SOCKET PER UTILITY COMPANY SPECIFICATIONS.
4. PROVIDE GALVANIZED UNISTRUT FRAME AND CONCRETE FOUNDATION SYSTEM TO SUPPORT CT CABINET AND METER ADJACENT TO PAD MOUNT TRANSFORMER. LOCATION MUST BE APPROVED BY UTILITY COMPANY.

ENCLOSURE NOTE:

ENCLOSURE TYPES FOR ALL ELECTRICAL EQUIPMENT INCLUDING MOTOR CONTROL CENTERS, PANELBOARDS, DISTRIBUTION PANELBOARDS, TRANSFORMERS, DISCONNECT SWITCHES, CONTROL PANELS, CONTROL STATIONS, ETC. SHALL BE BASED ON EQUIPMENT LOCATION ENVIRONMENT. REFERENCE THE GENERAL NOTES ON DRAWING 00E-01 FOR THE NEMA DESIGNATIONS OF ENCLOSURE TYPES REQUIRED.

TERMINAL BLOCK LEGEND

- ☐V = TERMINAL BLOCK FOR VENDOR SUPPLIED CABLE CONNECTION
- ☐P = TERMINAL BLOCK FOR 120 VOLT POWER CONNECTION
- ☐D = TERMINAL BLOCK FOR DRY CONTACT - INTERLOCK CONTROL / ALARM WIRING AT FIELD DEVICE
- ☒V = TERMINAL BLOCK FOR VENDOR SUPPLIED CABLE AT 480 VOLT, 3 PHASE POWER CONNECTION
- ☒P = TERMINAL BLOCK FOR 480 VOLT, 3 PHASE POWER CONNECTION
- ☐S = TERMINAL BLOCK FOR SIGNAL WIRING 4-20mA SIGNAL
- ☐T = TERMINAL BLOCK FOR TELEPHONE WIRING
- ☐SC = TERMINAL BLOCK FOR DRY CONTACT - INTERLOCK CONTROL / ALARM WIRING AT SCADA SYSTEM
- ☐C = TERMINAL BLOCK FOR CAT-6 WIRING
- ☐E = TERMINAL BLOCK FOR ETHERNET CONNECTION TCP/IP
- ⊘P = TERMINAL BLOCK FOR VFD 480 VOLT, 3 PHASE POWER CONNECTION
- ⊘D = TERMINAL BLOCK FOR VFD DRY CONTACT - INTERLOCK CONTROL WIRING AT FIELD DEVICE
- ⊘S = TERMINAL BLOCK FOR VFD SIGNAL WIRING 4-20mA SIGNAL
- ⊘E = TERMINAL BLOCK FOR VFD ETHERNET CONNECTION TCP/IP

CONTRACTOR MUST VERIFY ALL CLEARANCES AND DIMENSIONS IN FIELD

BRANCH CIRCUIT + FEEDER SCHEDULE - 1 PHASE

DESIGNATION	PHASE	QTY. OF SETS	UNGROUNDED CONDUCTORS		GROUNDED CONDUCTOR	EQUIPMENT GROUND CONDUCTOR	CONDUIT
			Qty.	Size	Size	Size	Size
A1	1	1	1	#12	#12	#12	3/4"
B1	1	1	1	#10	#10	#10	3/4"
C1	1	1	1	#8	#8	#10	3/4"
D1	1	1	1	#6	#6	#10	1"
E1	1	1	1	#4	#4	#8	1 1/4"
F1	1	1	1	#3	#3	#8	1 1/4"
G1	1	1	1	#2	#2	#8	1 1/4"
A2	1	1	2	#12	#12	#12	3/4"
B2	1	1	2	#10	#10	#10	3/4"
C2	1	1	2	#8	#8	#10	3/4"
D2	1	1	2	#6	#6	#10	1"
E2	1	1	2	#4	#4	#8	1 1/4"
F2	1	1	2	#3	#3	#8	1 1/4"
G2	1	1	2	#2	#2	#8	1 1/4"
H2	1	1	2	#1	#1	#6	1 1/2"
I2	1	1	2	#1/0	#1/0	#6	2"
J2	1	1	2	#2/0	#2/0	#6	2"
K2	1	1	2	#3/0	#3/0	#6	2"
L2	1	1	2	#4/0	#4/0	#4	2 1/2"
M2	1	1	2	#250 KCMIL	#250 KCMIL	#4	2 1/2"
N2	1	1	2	#350 KCMIL	#350 KCMIL	#4	3"
O2	1	1	2	#400 KCMIL	#400 KCMIL	#3	3 1/2"
P2	1	1	2	#500 KCMIL	#500 KCMIL	#3	4"
Q2	1	1	2	#4/0	#4/0	#2	2 1/2"
R2	1	2	2	#250 KCMIL	#250 KCMIL	#2	2 1/2"
S2	1	2	2	#350 KCMIL	#350 KCMIL	#1	3"
T2	1	2	2	#500 KCMIL	#500 KCMIL	#1/0	3 1/2"
U2	1	2	2	#600 KCMIL	#600 KCMIL	#1/0	4"

ALL WIRING ABOVE IS COPPER
FEEDER DESIGNATION SUBSCRIPTS:
n = WHEN ADJACENT TO FEEDER DESIGNATION, INDICATES THAT GROUNDED CONDUCTOR IS NOT REQUIRED FOR INDICATED FEEDER
ig = WHEN ADJACENT TO FEEDER DESIGNATION, INDICATES FEEDER SHALL INCLUDE ISOLATED GROUND CONDUCTOR SIZED EQUAL TO THE EQUIPMENT GROUND CONDUCTOR

FEEDER SCHEDULE - 3 PHASE

DESIGNATION	PHASE	QTY. OF SETS	UNGROUNDED CONDUCTORS		GROUNDED CONDUCTOR	EQUIPMENT GROUND CONDUCTOR	CONDUIT
			Qty.	Size	Size	Size	Size
A3	3	1	3	#12	#12	#12	3/4"
B3	3	1	3	#10	#10	#10	3/4"
C3	3	1	3	#8	#8	#10	3/4"
D3	3	1	3	#6	#6	#10	1"
E3	3	1	3	#4	#4	#8	1 1/4"
F3	3	1	3	#3	#3	#8	1 1/4"
G3	3	1	3	#2	#2	#8	1 1/2"
H3	3	1	3	#1	#1	#6	1 1/2"
I3	3	1	3	#1/0	#1/0	#6	2"
J3	3	1	3	#2/0	#2/0	#6	2"
K3	3	1	3	#3/0	#3/0	#6	2"
L3	3	1	3	#4/0	#4/0	#4	2 1/2"
M3	3	1	3	#250 KCMIL	#250 KCMIL	#4	2 1/2"
N3	3	1	3	#350 KCMIL	#350 KCMIL	#4	3"
O3	3	1	3	#400 KCMIL	#400 KCMIL	#3	3 1/2"
P3	3	1	3	#500 KCMIL	#500 KCMIL	#3	4"
Q3	3	2	3	#4/0	#4/0	#2	2 1/2"
R3	3	2	3	#250 KCMIL	#250 KCMIL	#2	2 1/2"
S3	3	2	3	#350 KCMIL	#350 KCMIL	#1	3"
T3	3	2	3	#500 KCMIL	#500 KCMIL	#1/0	4"
U3	3	2	3	#600 KCMIL	#600 KCMIL	#1/0	4"
V3	3	3	3	#400 KCMIL	#400 KCMIL	#2/0	3 1/2"
W3	3	3	3	#600 KCMIL	#600 KCMIL	#3/0	4"
X3	3	4	3	#600 KCMIL	#600 KCMIL	#4/0	4"
Y3	3	5	3	#600 KCMIL	#600 KCMIL	#250 KCMIL	4"
Z3	3	6	3	#600 KCMIL	#600 KCMIL	#350 KCMIL	4"
A4	3	8	3	#500 KCMIL	#500 KCMIL	#400 KCMIL	4"
B4	3	10	3	#600 KCMIL	#600 KCMIL	#500 KCMIL	4"
TRANSFORMER PRIMARY FEEDERS							
T1P	3	1	3	#10	–	#10	3/4"
T2P	3	1	3	#6	–	#10	1"
T3P	3	1	3	#4	–	#8	1"
T4P	3	1	3	#1	–	#6	1 1/2"
T5P	3	1	3	#2/0	–	#6	2"
T6P	3	1	3	#4/0	–	#4	2 1/2"
T7P	3	1	3	#500 KCMIL	–	#3	3"
T8P	3	2	3	#250 KCMIL	–	#2	2 1/2"
T9P	3	2	3	#600 KCMIL	–	#1/0	3 1/2"
T10P	3	3	3	#600 KCMIL	–	#3/0	3 1/2"
TRANSFORMER SECONDARY FEEDERS							
T1S	3	1	3	#4	#4	#8	1 1/4"
T2S	3	1	3	#1	#1	#8	1 1/4"
T3S	3	1	3	#1/0	#1/0	#6	2"
T4S	3	1	3	#250 KCMIL	#250 KCMIL	#2	2 1/2"
T5S	3	1	3	#600 KCMIL	#600 KCMIL	#1/0	4"
T6S	3	2	3	#250 KCMIL	#250 KCMIL	#2	2 1/2"
T7S	3	2	3	#600 KCMIL	#600 KCMIL	#1/0	4"
T8S	3	3	3	#400 KCMIL	#400 KCMIL	#2/0	3"
T9S	3	4	3	#600 KCMIL	#600 KCMIL	#4/0	4"
T10S	3	6	3	#600 KCMIL	#600 KCMIL	#350 KCMIL	4"

ALL WIRING ABOVE IS COPPER
FEEDER DESIGNATION SUBSCRIPTS:
n = WHEN ADJACENT TO FEEDER DESIGNATION, INDICATES THAT GROUNDED CONDUCTOR IS NOT REQUIRED FOR INDICATED FEEDER
ig = WHEN ADJACENT TO FEEDER DESIGNATION, INDICATES FEEDER SHALL INCLUDE ISOLATED GROUND CONDUCTOR SIZED EQUAL TO THE EQUIPMENT GROUND CONDUCTOR

STATE OF OHIO
CHRISTIAN A. CODD
No. 71955
REGISTERED PROFESSIONAL ENGINEER
10-25-24

your trusted advisor
consultants
engineers
architects
planners

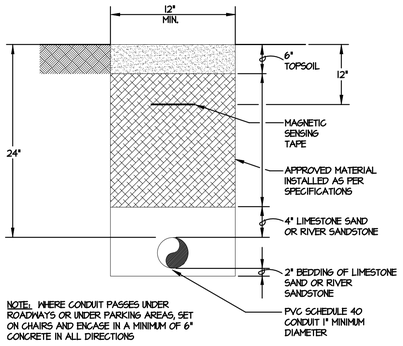
NO	REVISION	DATE
-	ADDENDUM #3	04/02/2024
3		10/25/2024

ISSUED FOR: PROGRESS
ISSUE DATE: 09-16-2024
SCALE: AS NOTED
DESIGNED BY: CAT
DRAWN BY: CAT
CHECKED BY: CAT

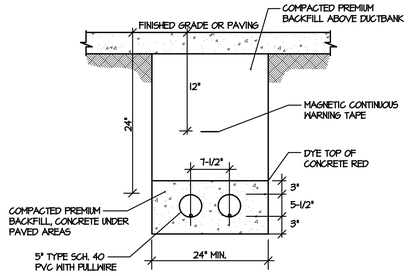
CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION TANK
CUYAHOGA COUNTY NORTH OLMSTED, OHIO
ELECTRICAL - 00 SERIES
ONE LINE DIAGRAM

PROJECT NO. 210888
DISCIPLINE ELECTRICAL
SHEET NAME 00E-02
SHEET 46 OF 53

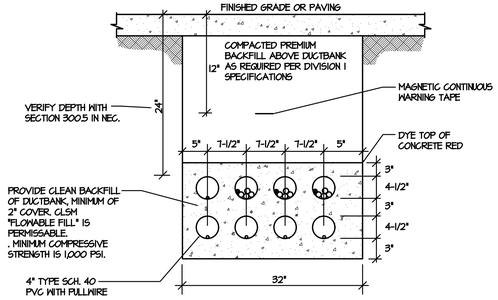
CONTRACTOR MUST VERIFY ALL CLEARANCES AND DIMENSIONS IN FIELD



TRENCH DETAIL
SCALE: NONE



UTILITY CONDUIT DUCT BANK DETAIL
SCALE: NONE



SECONDARY DUCT BANK DETAIL
SCALE: NONE

ELECTRICAL SITE NOTES:

A. ELECTRICAL CONTRACTOR TO COORDINATE ALL UNDERGROUND UTILITY SERVICE INSTALLATIONS, INCLUDING PAD MOUNTED TRANSFORMER, WITH UTILITY COMPANIES. COORDINATE TERMINATION AT PROPERTY LINE OR UTILITY POLE WITH UTILITY COMPANIES. PROVIDE TRENCH AND BACKFILL FOR UNDERGROUND SERVICES TO COMPLY WITH UTILITY COMPANY REQUIREMENTS AND DETAILS.

B. ELECTRICAL CONTRACTOR TO COORDINATE ALL UNDERGROUND UTILITIES WITH MECHANICAL CONTRACTOR'S SEWER, WATER AND GAS LINE LOCATIONS.

C. ELECTRICAL CONTRACTOR TO CONCRETE ENCASE 3" ALL AROUND ALL TELEPHONE AND ELECTRICAL SERVICE CONDUITS PASSING UNDER PAVED AREAS AS REQUIRED BY LOCAL UTILITY COMPANY. COORDINATE ALL REQUIREMENTS WITH UTILITY COMPANIES.

D. ELECTRICAL CONTRACTOR TO PROVIDE ALL TRENCH AND BACK FILL REQUIRED FOR WORK SHOWN ON PLANS. ALL WORK IS TO COMPLY WITH DIVISION 1 REQUIREMENTS FOR UNDERGROUND UTILITIES AND TRENCH AND BACKFILL ETC.

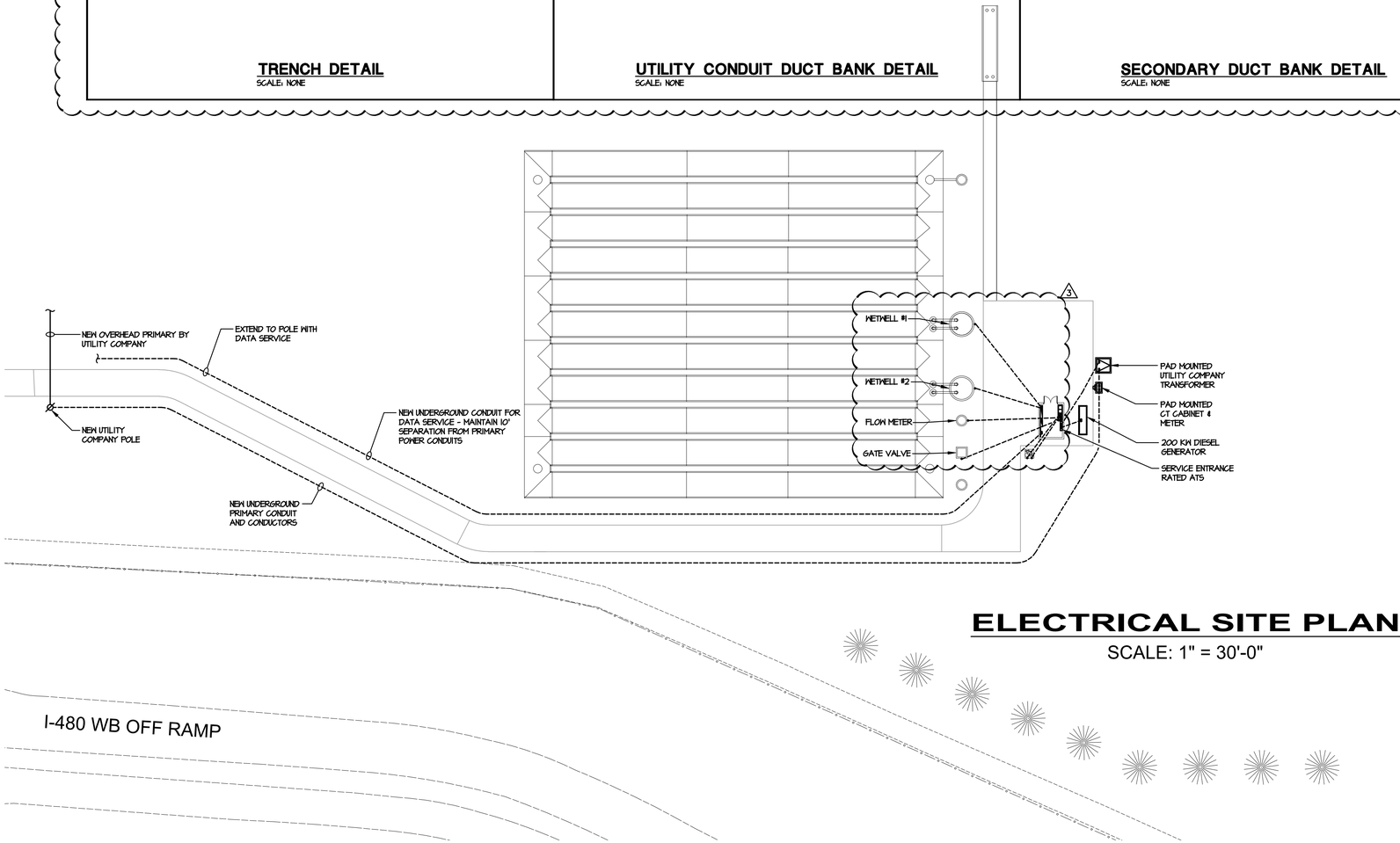
E. ALL WIRING IS TO BE #10 AHG MINIMUM THHN/THWN (90 DEG. C) IN 1" SCHEDULE 40 PVC (MINIMUM SIZE). TRENCH AND BACK FILL TO 30" DEEP. CLEAN BACKFILL USING SITE MATERIALS MAY BE USED. PROVIDE PREMIUM BACKFILL WHERE SITE MATERIALS ARE NOT ACCEPTABLE FOR USE.

F. ALL CONDUIT ENTRIES TO THE BUILDING SHALL PITCH AWAY FROM BUILDING WALLS. SEAL PENETRATIONS WATERTIGHT WITH LINK-SEAL PIPE SEALS OR APPROVED EQUIVALENT. FOR PENETRATIONS TO THE BUILDING BY ALL SERVICE CONDUITS AND CONDUITS GREATER OR EQUAL THAN 2" IN DIAMETER, PROVIDE A DUCT SEALING SYSTEM AT THE BUILDING. ACCEPTABLE DUCT SEALING SYSTEM IS RAYCHEM'S 'RDSS' OR APPROVED EQUIVALENT.

G. PROVIDE WARNING TAPE ABOVE ALL ELECTRICAL UTILITIES AND CIRCUITS. UTILITY WARNING TAPE SHALL BE AS SPECIFIED BY UTILITY COMPANY. WARNING TAPE FOR SITE LIGHTING CIRCUITS TO BE 12" BELOW GRADE, 3" WIDE, RED WITH ELECTRICAL WARNING.

H. CUT AND PATCH EXISTING PAVING AS REQUIRED FOR THE INSTALLATION OF NEW WIRING WHERE PAVING EXISTS.

I. FOR PAD MOUNTED TRANSFORMER INSTALLATIONS ON BOX TYPE PADS, FILL ALL OPENINGS AND SEAL ALL CONDUIT PENETRATIONS OF PAD WATERTIGHT. SET PAD 6" ABOVE FINISHED GRADE AND SEAL LID TO BOX. SEAL ALL CONDUITS WITH RAYCHEM RDSS BAGS IN PAD AND IN BUILDINGS AT FIRST EQUIPMENT CABINET.



ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

STATE OF OHIO
CHRISTIAN A. TODD
No. 71956
REGISTERED PROFESSIONAL ENGINEER
10-25-24

GT consultants — your trusted advisor — engineers architects planners

NO	REVISION	DATE
-		04/02/2024
3	ADDENDUM #3	10/25/2024

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CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION TANK
CUYAHOGA COUNTY — NORTH OLMSTED, OHIO
ELECTRICAL - 01 SERIES
3 ELECTRICAL SITE PLAN

PROJECT NO.
210888
DISCIPLINE
ELECTRICAL
SHEET NAME
01E-01
SHEET 49 OF 53

PROCESS AND INSTRUMENTATION SCHEDULE - PUMP STATION

ITEM	DESCRIPTION	TYPE	SPECIFIC FUNCTION/SETTING	QTY.	NAME TAG (IF APPLICABLE)	REMARKS	SPEC.	FURNISH	INSTALL	PROGRAM TAG CROSS REFERENCE
LOOP 101 - TANK INFLUENT PUMPS										
YIA 101	OPERATION INDICATION	SOFTWARE FUNCTION ON SCADA	INDICATES PUMP #X ON/OFF STATUS	4	"TANK INFLUENT PUMP #X RUNNING"	–	409500	CONTRACTOR	CONTRACTOR	
YIB 101	"IN AUTO" STATUS	SOFTWARE FUNCTION ON SCADA	INDICATES PUMP #X IN AUTO MODE STATUS	4	"TANK INFLUENT PUMP #X IN AUTO"	–	409500	CONTRACTOR	CONTRACTOR	
YIC 101	STATUS INDICATOR	SOFTWARE FUNCTION ON SCADA	INDICATES PUMP #X IN ALARM OR TRIPPED STATUS	4	"TANK INFLUENT PUMP #X IN ALARM"	–	409500	CONTRACTOR	CONTRACTOR	
SI 101	SPEED INDICATION	SOFTWARE FUNCTION ON SCADA	INDICATES PUMP #X CURRENT RUNNING SPEED %	4	"TANK INFLUENT PUMP #X SPEED PERCENTAGE"	–	409500	CONTRACTOR	CONTRACTOR	
HSA 101	SELECTOR SWITCH	3 POSITION, HAND / OFF / AUTO	HAND / OFF / AUTO SELECTION FOR INFLUENT PUMP LOCATED AT WET WELL	4	"TANK INFLUENT PUMP #X HAND / OFF / AUTO"	–	409000	CONTRACTOR	CONTRACTOR	
HSB 101	PUSHBUTTON SWITCH	2 POSITION EMERGENCY STOP SWITCH, PULL TO OPERATE	EMERGENCY STOP FOR INFLUENT PUMP LOCATED AT WET WELL	4	"TANK INFLUENT PUMP #X EMERGENCY STOP"	–	409000	CONTRACTOR	CONTRACTOR	
LOOP 102 - WET WELL										
LI 102	LEVEL INDICATION	SOFTWARE FUNCTION ON SCADA	INDICATES WET WELL LEVEL	1	"WET WELL LEVEL"	–	409500	CONTRACTOR	CONTRACTOR	
LIT 102	LEVEL INDICATING TRANSMITTER	TRANSMITTER FOR RADAR LEVEL SENSOR	WET WELL LEVEL	1	–	–	409000	CONTRACTOR	CONTRACTOR	
LAA 102	HIGH LEVEL ALARM	SOFTWARE FUNCTION ON SCADA	INDICATES HIGH LEVEL ALARM FOR WET WELL #X	2	"ALARM – WET WELL #X HIGH LEVEL CONDITION"	–	409500	CONTRACTOR	CONTRACTOR	
LAB 102	LOW LEVEL ALARM	SOFTWARE FUNCTION ON SCADA	INDICATES LOW LEVEL ALARM FOR WET WELL #X	2	"ALARM – WET WELL #X LOW LEVEL CONDITION"	–	409500	CONTRACTOR	CONTRACTOR	
LSA 102	HIGH LEVEL SWITCH	FLOAT LEVEL SWITCH	HIGH LEVEL ALARM FOR WET WELL #X	2	–	–	409000	CONTRACTOR	CONTRACTOR	
LSB 102	LEVEL SWITCH	FLOAT LEVEL SWITCH	PUMP #2 RUN	2	–	–	409000	CONTRACTOR	CONTRACTOR	
LSC 102	LEVEL SWITCH	FLOAT LEVEL SWITCH	PUMP #1 RUN	2	–	–	409000	CONTRACTOR	CONTRACTOR	
LSD 102	LEVEL SWITCH	FLOAT LEVEL SWITCH	PUMP #1 AND 2 OFF	2	–	–	409000	CONTRACTOR	CONTRACTOR	
LSE 102	LOW LEVEL SWITCH	FLOAT LEVEL SWITCH	LOW LEVEL ALARM FOR WET WELL #X	2	–	–	409000	CONTRACTOR	CONTRACTOR	
LOOP 103 - EQ TANK										
LI 103	LEVEL INDICATION	SOFTWARE FUNCTION ON SCADA	INDICATES EQ TANK LEVEL	1	"EQ TANK LEVEL"	–	409500	CONTRACTOR	CONTRACTOR	
LIT 103	LEVEL INDICATING TRANSMITTER	TRANSMITTER FOR RADAR LEVEL SENSOR	EQ TANK LEVEL	1	–	–	409000	CONTRACTOR	CONTRACTOR	
LAH 103	HIGH LEVEL ALARM	SOFTWARE FUNCTION ON SCADA	ALARM FOR EQUALIZATION TANK HIGH LEVEL	1	"ALARM – EQUALIZATION TANK HIGH LEVEL CONDITION"	–	409000	CONTRACTOR	CONTRACTOR	
LOOP 104 - EQ TANK EFFLUENT FLOW METER										
FI 104	FLOW INDICATION	SOFTWARE FUNCTION ON SCADA	INDICATES FLOW RATE FROM EQ TANK	1	"FLOW RATE FROM EQ TANK"	–	409500	CONTRACTOR	CONTRACTOR	
FIT 104	FLOW INDICATING TRANSMITTER	TRANSMITTER FOR FLOW METER	FLOW RATE FROM EQ TANK	1	–	–	409000	CONTRACTOR	CONTRACTOR	
LOOP 106 - EQ TANK GATE VALVE										
ZI 106	POSITION INDICATOR	SOFTWARE FUNCTION ON SCADA	INDICATES % OPEN OF EQ TANK GATE VALVE	1	"INTERCEPOTR GATE VALVE % OPEN"	–	409500	CONTRACTOR	CONTRACTOR	
ZC 106	POSTION CONTROLLER	SOFTWARE FUNCTION ON SCADA	CONTROLS POSITION OF EQ TANK GATE VALVE	1	"EQ TANK GATE VALVE POSITION CONTROL"	–	409500	CONTRACTOR	CONTRACTOR	
HSA 106	SELECTOR SWITCH	3 POSITION, HAND / OFF / AUTO	HAND / OFF / AUTO SELECTION FOR EQ TANK GATE VALVE	1	"EQ TANK GATE VALVE HAND / OFF / AUTO"	–	400523	CONTRACTOR	CONTRACTOR	
HSB 106	PUSHBUTTON SWITCH	MOMENTARY CONTACT PUSHBUTTON – GREEN	MANUAL LOCAL CONTROL TO OPEN GATE VALVE	1	"EQ TANK GATE VALVE OPEN"	–	400523	CONTRACTOR	CONTRACTOR	
HSC 106	PUSHBUTTON SWITCH	MOMENTARY CONTACT PUSHBUTTON – RED	MANUAL LOCAL CONTROL TO CLOSE GATE VALVE	1	"EQ TANK GATE VALVE CLOSE"	–	400523	CONTRACTOR	CONTRACTOR	
LG 106	INDICATOR LIGHT	LED, PUSH-TO-TEST, GREEN	INDICATES "OPEN" STATUS OF EQ TANK GATE VALVE	1	"EQ TANK GATE VALVE 100% OPEN"	–	400523	CONTRACTOR	CONTRACTOR	
LR 106	INDICATOR LIGHT	LED, PUSH-TO-TEST, RED	INDICATES "CLOSED" STATUS OF EQ TANK GATE VALVE	1	"EQ TANK GATE VALVE 100% CLOSED"	–	400523	CONTRACTOR	CONTRACTOR	
LA 106	INDICATOR LIGHT	LED, PUSH-TO-TEST, AMBER	INDICATES POWER ON STATUS OF EQ TANK GATE VALVE CONTROLLER	1	"EQ TANK GATE VALVE POWER ON"	–	400523	CONTRACTOR	CONTRACTOR	
LOOP 107 - ODOR CONTROL FANS										
YC 107	STATUS CONTROLLER	SOFTWARE FUNCTION ON SCADA	CONTROLS OPERATION OF ODOR CONTROL FANS #1 & 2	2	"ODOR CONTROL FAN #X CONTROL"	–	409500	CONTRACTOR	CONTRACTOR	
YI 107	STATUS INDICATOR	SOFTWARE FUNCTION ON SCADA	INDICATES ALARM CONDITION OF ODOR CONTROL FANS #1 & 2	2	"ODOR CONTROL FAN #X TRIPPED"	–	409500	CONTRACTOR	CONTRACTOR	
HSA 107	SELECTOR SWITCH	3 POSITION, HAND / OFF / AUTO	HAND / OFF / AUTO SELECTION FOR ODOR CONTROL FANS #1 & 2	2	"ODOR CONTROL FAN #X HAND / OFF / AUTO"	–	262419	CONTRACTOR	CONTRACTOR	
LR 107	INDICATOR LIGHT	LED, PUSH-TO-TEST, RED	INDICATES "RUN" STATUS OF ODOR CONTROL FANS #1 & 2	2	"ODOR CONTROL FAN #X RUNNING"	–	262419	CONTRACTOR	CONTRACTOR	
HSB 107	SELECTOR SWITCH	3 POSITION, HAND / OFF / AUTO	HAND / OFF / AUTO SELECTION FOR INFLUENT PUMP LOCATED AT PUMP	4	"TANK INFLUENT PUMP #X HAND / OFF / AUTO"	–	409000	CONTRACTOR	CONTRACTOR	
HSC 107	PUSHBUTTON SWITCH	2 POSITION EMERGENCY STOP SWITCH, PULL TO OPERATE	EMERGENCY STOP FOR INFLUENT PUMP LOCATED AT PUMP	4	"TANK INFLUENT PUMP #X EMERGENCY STOP"	–	409000	CONTRACTOR	CONTRACTOR	

3

STATE OF OHIO
CHRISTIAN A. TODD
No. 71958
REGISTERED PROFESSIONAL ENGINEER
10-25-24

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consultants

NO	REVISION	DATE
3	ADDENDUM #3	10/25/2024

ISSUED FOR:	PROGRESS
ISSUE DATE:	09-16-2024
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CHECKED BY:	CAT

CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION TANK
CUYAHOGA COUNTY NORTH OLMSTED, OHIO
INSTRUMENTATION & CONTROLS - 00 SERIES 3
P & ID SCHEDULE

PROJECT NO.
190118
DISCIPLINE
I & C
SHEET NAME
00I-02
SHEET 52A OF 53

CONTRACTOR MUST VERIFY ALL CLEARANCES AND DIMENSIONS IN FIELD

WET WELL HIGH LEVEL ALARM LAA 102
WET WELL LOW LEVEL ALARM LAB 102
INFLUENT PUMPS PERMISSIVE SIGNAL YC 101
INTERCEPTOR LEVEL LI 108
WET WELL LEVEL LI 102
PUMP RX RUNNING YIA 101
PUMP RX SPEED SI 101
PUMP RX IN "AUTO" YIB 101
PUMP RX TRIPPED YIC 101
THESE SCADA FUNCTIONS ARE TYPICAL FOR PUMPS #1 THRU 4
1
WET WELL HIGH LEVEL ALARM LAA 102
WET WELL LOW LEVEL ALARM LAB 102
FLOW SIGNAL FI 104
EQ TANK GATE VALVE POSITION CONTROLLER ZC 106
% OPEN ZI 106
EQ TANK LEVEL LI 103
EQ TANK HIGH LEVEL ALARM LAH 103
ODOR CONTROL FAN #1 RUN SIGNAL YC 107
DEVICE TRIPPED YI 107
ODOR CONTROL FAN #2 RUN SIGNAL YC 107
DEVICE TRIPPED YI 107

PLANT SCADA
MCC
PANEL
FIELD

HIGH LEVEL ALARM
LOW LEVEL ALARM
LEVEL SIGNAL
LEVEL SIGNAL
480V E5
TANK INFLUENT PUMPS #1-4 CONTROL PANEL
PUMPS OFF (LOW LEVEL)
PUMP #1 ON (HIGH LEVEL)
PUMP #2 ON (HIGH LEVEL)
WATER/TEMP SHUTDOWN
LOR SIGNAL
480V E5
WATER/TEMP SHUTDOWN
LOR SIGNAL
480V E5
LEVEL SIGNAL
WATER/TEMP SHUTDOWN
LOR SIGNAL
480V E5
WATER/TEMP SHUTDOWN
LOR SIGNAL
480V E5
LEVEL SIGNAL
PUMP #2 ON (HIGH LEVEL)
PUMP #1 ON (HIGH LEVEL)
PUMPS OFF (LOW LEVEL)
HIGH LEVEL ALARM
LOW LEVEL ALARM
EQ TANK EFFLUENT FLOW SIGNAL
POSITION CONTROL SIGNAL
POSITION SIGNAL
EQ TANK LEVEL SIGNAL
HSA 107 H-O-A RUN
480V E5
LOR SIGNAL
HSA 107 H-O-A RUN
480V E5
LOR SIGNAL
480V E5
HSA 106 H-O-A OPEN
HSB 106 CLOSE
HSC 106
LG 106 OPEN
LR 106 CLOSED
LA 106 PWR
EQ TANK GATE VALVE CONTROL STATION
POSITION SIGNAL
OPEN/CLOSE SIGNAL
M
HSB 107 H-O-A
HSC 107 E-STOP
M
ODOR CONTROL FAN #1
HSB 107 H-O-A
HSC 107 E-STOP
M
ODOR CONTROL FAN #2

120V E5
LIT 103
EQ TANK LEVEL
L
TO OVERFLOW MANHOLE
EQ TANK

OVERFLOW MANHOLE
WET WELL #1
WET WELL #2
HSA 101 H-O-A
HSB 101 E-STOP
120V E5
LIT 102
3
V
L
WET WELL LEVEL
LSA 102
LSB 102
LSC 102
LSD 102
LSE 102
T/M
M
TANK INFLUENT PUMP #1 101-1
TANK INFLUENT PUMP #2 101-2
TANK INFLUENT PUMP #3 101-3
TANK INFLUENT PUMP #4 101-4
TO / FROM INTERCEPTOR
FLOW METER MANHOLE
120V E5
FIT 104
V
M
CONTROL GATE STRUCTURE
EQ TANK GATE VALVE
DRAIN MANHOLE

STATE OF OHIO
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engineers
architects
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NO	REVISION	DATE
3	ADDENDUM #3	10/25/2024

ISSUED FOR:	PROGRESS
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CITY OF NORTH OLMSTED
SOUTH INTERCEPTOR EQUALIZATION TANK
CUYAHOGA COUNTY NORTH OLMSTED, OHIO
INSTRUMENTATION & CONTROLS (- 01 SERIES)
PROCESS & INSTRUMENTATION DIAGRAM 5

PROJECT NO.	190118
DISCIPLINE	I & C
SHEET NAME	01I-01
SHEET	53
OF	53

Oct 24, 2024 - 10:24:54 DWG Name: C:\Users\dtemplar\OneDrive - McHenry & Associates\Jobs 2024\CT Consultants\North Olmsted Pump Station - Rev\Revision\Addendum 3\19323A_01I-01.dwg Updated By: DTEMPLAR

SECTION 132423 - PRECAST CONCRETE BUILDING

PART 1 GENERAL

1.01 SUMMARY

A. Contractor to furnish a precast concrete building. Building to be field assembled by manufacturer on contractor's cast-in-place concrete foundation as indicated on contract drawings. Precast building to be EASI-SPAN® brand as manufactured by Easi-Set Industries (ESI), Midland, Virginia, or licensed manufacturer of Easi-Set Buildings. Building to be provided by manufacturer with all necessary openings as specified by contractor in conformance with manufacturer's structural requirements.

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections.

1.02 QUALITY ASSURANCE

A. ACI-318-14, "Building Code Requirements for Reinforced Concrete". Concrete Reinforcing Institute, "Manual of Standard Practice".

B. ANSI/ASCE-7-10 "Building Code Requirement for Minimum Design Loads in Buildings and Other Structures".

C. 2024 Ohio Building Code.

D. Mechanical: 2024 OMC.

E. Electrical: NEC 2023.

F. Energy: IECC 2021.

G. Accessibility Compliance: ICC/ANSI A117.1-2017.

H. Fabricator must be a producer/member of National Precast Concrete Association (NPCA).

I. Building fabricator must have a minimum of 5 years' experience manufacturing and setting transportable precast concrete buildings.

1.03 QUALIFICATIONS:

A. The precast concrete manufacturing plant shall be certified by the PCI or NPCA Plant Certification Program.

B. Precast manufacturer shall have not less than 10 years' experience in the design and manufacture of architectural precast concrete products similar to units required.

C. Erector shall have not less than 10 years' experience in erection of precast units similar to units required.

D. Certify welders and welding in compliance with AWS D1.1 and AWS D1.4.

E. Welders shall have been qualified within past year from date of Bid.

1.04 SUBMITTALS

A. Procedures: Section 013320.

B. Engineering calculations that are designed and sealed by a professional engineer, licensed to practice in the state where the project is located, shall be submitted for approval.

C. Prior to casting any precast elements, concrete mix design shall be submitted to the OWNER for acceptance.

D. Shop drawings:
   1. Shop drawings shall be provided showing product location, fabrication details, number identification marks, reinforcement, connection details including field installed anchor sizes and locations, if required, openings, loose or embedded items and inserts, dimensions and relationship to adjacent materials in sufficient detail to cover manufacture, handling, and erection. Shop drawings shall be accompanied by a letter signed by a Ohio Registered Engineer, certifying that, the shop drawings submitted represent construction which meets or exceeds the requirements of the Contract Documents and the requirements of codes and agencies having jurisdiction over the Work.

E. Product technical data including:
   1. Acknowledgement that products submitted meet requirements of standards referenced.
   2. Manufacturer's installation instructions.

F. Certifications:
   1. Certification of fabricator qualifications.
   2. Certification that fabricator's plant complies with PCI or NPCAMNL 117
      a. Welder and welding process certification.
      b. Certification of erector qualifications.
      c. Provide certification, on the shop drawings, stating that all items and fabrications are of sufficient strength to serve their intended function without undue distortion or deflection.
      d. Calculations shall be submitted for the building as a complete structure. Calculations shall provide a summary of loads used and section design. Calculations will not be checked or reviewed by the Engineer, and calculations will not be returned to the Contractor.
      e. All shop drawings and calculations shall be signed and sealed by the Ohio registered professional engineer who is in responsible charge for these designs.
      f. Test Reports:
         1) Compressive strength, water absorption and air content test results.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete: Steel-reinforced, 5000 PSI minimum 28-day compressive strength, air-entrained (ASTM C260).

B. Cement:
   1. Color: Selected by Owner.

C. Aggregates:
   1. Aggregate color and size:
      a. Fine aggregate 95 percent crushed black granite sand 5 percent white silica sand; coarse aggregate 5/8 inch to 1/4 inch white limestone.

D. Reinforcing Steel: ASTM A615, grade 60 unless otherwise specified.

E. Post-tensioning Strand: Roof shall be post-tensioned in field after grout keyway is filled and has cured to required PSI strength. Post-tensioning cable shall be 41K polystyrene CP50, .50", 270 KSI, 7-wire strand, enclosed within a greased plastic sheath (ASTM A416). There will be a minimum of three post-tensioning cables connecting roofs together to provide a watertight joint.

F. Caulking: All joints between panels shall be caulked on the exterior and interior surface of the joints. Caulking shall be SIKAFLEX-1A elastic sealant or equal. Exterior caulk joint to be 3/8" x 3/8" square so that sides of joint are parallel for correct caulk adhesion. Back of joint to be taped with bond breaking tape to ensure adhesion of caulk to parallel sides of joint and not the back.

G. Panel Connections: All panels shall be securely fastened together with 3/8" thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A283, Grade C and hot dipped galvanized or powder coated after fabrication. All fasteners to be ½" diameter bolts complying with ASTM A307 for low-carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior #F-63 or equal. All inserts for corner connections must be bolted directly to form before casting panels. No floating-in of connection inserts shall be allowed. Wall panels shall be connected to floor slab with 4" expansion anchors by manufacturer.

H. Sandwich walls are to have a total wall thickness of 11", 5" of bearing wall, 3" of ISOMASS Thermomass R-19 insulation with 3" of cover.

2.02 FABRICATION CRITERIA

A. Fabricate all connection anchors, angles, plates, and other items secured to or embedded in precast necessary to support and anchor precast units using all hot-dip galvanized, powder coated, and/or stainless steel materials.

B. Weld studs and anchors to steel using an automatic gun welding applicator, in accordance with manufacturer's instructions.

C. At external angles and corners, provide panels with corner post and chamfer as indicated.

D. Provide lifting hooks or similar devices on large units to facilitate handling. Lifting hooks or devices shall be located such that they will not harm the appearance of the unit in the finished position.

E. Vibrate concrete during placement to eliminate air pockets.

F. Mark each unit for identification and date of casting.

G. Roof: Roof panel shall be sloped as shown on drawings. the roof shall extend 4” beyond the wall panel and have an integrated drip edge design which extends ½” below the top edge of the wall panels to prevent water migration into the building along top of wall panels. roof shall 3" of thermomass isomass insulation with 3" of concrete cover, r-value of 19.

H. Keyway Roof Joints: grout in keyways shall be polymer concrete placed after coating keyways with a methyl methacrylate resin and isocyanate resin. The top of keyway must be coated with primer followed by one coat of a polymeric joint sealant followed by a fiberglass resin fabric followed by a second coat of polymeric joint sealant.

I. Foundation slab must have a ½” step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels, 10" in width minimum

2.03 DESIGN CRITERIA

A. Design Loads:
   1. Seismic Load performance category: B Exposure Group III.
   2. Standard Live Roof Load: 20 PSF.
   3. Standard Floor Live Load: 250 PSF.
   4. Standard Wind Loading: 120 MPH (Ultimate).
   5. Refer to Specification Section 01 73 24 for additional Wind/Seismic loads.

B. Design units in compliance with ACI 318 and the latest edition of the PCI Design Handbook - Precast and Prestressed Concrete.
   1. Stripping release strength minimum 2500 psi.
   2. Concrete compressive strength: Minimum 5,000 psi at 28-days.
   3. Concrete air content: 4 to 6 percent.
   4. Concrete mix shall be designed by the precast manufacturer to best suit fabrication of units based on minimum compressive strength specified, to minimize cracking, and to accommodate finishes specified. Mix design shall be submitted and acceptable to the Engineer.

C. Design and provide internal reinforcing and embedded connections to withstand the following:
   1. Wind pressure: per Section 01 73 24 and Drawings.
   2. Dead load of panel plus all superimposed loads.

3. Erection forces.
4. Temperature and shrinkage stresses.
5. Earthquake forces.
6. Reinforce units with welded wire reinforcement (WWR) or reinforcing bars according to design criteria.
7. For panel thickness over 4 inches: provide a minimum of two (2) layers 4 x 4 - W4.5 x W4.5 WWR.

D. When concrete cover on exterior face is less than 3/4 inch thick, provide galvanized reinforcing, otherwise, uncoated reinforcing is permissible.

E. Embedded Steel: All inserts, anchors, and other embedded steel shall be hot dip galvanized steel per ASTM A167, powder coated steel, and/or stainless steel.

F. Headed Studs:
1. Minimum tensile strength of 60,000 psi.
2. Minimum yield strength of 52,000 psi.

G. Deformed Bars Anchors:
1. Minimum tensile strength of 80,000 psi.
2. Minimum yield strength of 70,000 psi.

H. Tolerances for Panels:
1. Fabricate so faces exposed to view after erection comply with the following dimensional requirements:
2. Warpage: 1/16 inch/foot from nearest adjacent corner to maximum 1 inch.
3. Bowing: (length of bow/360) to maximum of 3/4 inch.
4. Differential bowing between adjacent members: 1/4 inch.
5. Alignment of ribbed members:
    a. 3/16 inch up to 40 feet.
    b. 1/4 inch in 40 feet or more.
6. Overall height and width:
    a. 10 feet or under: +5/16 inch.
    b. 10 to 20 feet: +5/16 inch, -3/16 inch.
    c. 20 to 30 feet: +5/16 inch, -1/4 inch.
    d. Each additional 10 feet: +1/16 inch per 10-foot length.
7. Thickness: +1/4 inch, -1/8 inch.
8. Rib thickness, rib to edge of flange, distance between ribs: +5/16 inch.
9. Angular deviation of plane of side mold: (1 in 100).
10. Deviation from square:
    a. In any length: (1 in 600).
    b. Maximum: 1/4 inch.
11. Block-outs and openings within one (1) unit: +1/4 inch.
12. Haunches: +1/4 inch.

13. Haunch bearing surface deviation: +5/16 inch.
14. Difference in relative position of adjacent haunch bearing surface: +1/4 inch.
15. Dimensions not listed above: In any length: (1 in 2000) to maximum 1/8 inch.

I. Forms:
   1. Cast units in forms with liners on casting beds of concrete or other suitable, rigid construction.
   2. Provide forms adequately braced and free of dents, gouges, or other irregularities.
   3. Coat forms with a suitable, non-staining release agent prior to placing concrete.

J. Finishes – coordinate requirements with architectural drawings:
   1. Exposed surfaces of precast concrete:
   2. Type A:
      a. Uniform smooth texture: Imperfections greater than 3/8-inch in any direction shall first be filled to achieve a solid smooth surface by applying a mortar rub to the entire surface, interior and exterior. Exterior surfaces shall subsequently be lightly sandblasted to achieve a uniform light gray color.
   3. Type B:
      a. Deep fractured fin texture (form liner) with a medium sandblasted texture at exterior surfaces where indicated.

2.04 ACCESSORIES

A. Provide all clip angles, bolts, washers, shims, nuts, and other accessories necessary for attachment of units to structure or other work. Use all stainless steel materials.

2.05 FINISHES

A. Interior of Building: Smooth trowel finish on all interior panel surfaces.

B. Exterior of Building Crushed limestone exposed aggregate finish on all exterior wall surfaces. Aggregate must be seeded into top of panel while in form, chemically retarded, and high-pressure washed to expose the aggregate to a depth of 1/8". Clear sealant to be applied after drying and curing of wall panels

2.06 SOURCE QUALITY CONTROL

A. Testing:
   1. Employ and pay for an independent testing laboratory accepted by Engineer to perform all tests.
      a. Before production of units, make, cure, and test one (1) set of cylinders and cubes for each type of concrete required.
      b. During production of units, make, cure, and test one (1) set of cylinders and cubes for each 50 CY of concrete.
      c. Each sample shall be made up of four (4) standard 6 x 12inch cylinders, and four (4) 2-inch cube specimens.

1) Cure cylinders and cubes in same manner as precast units they represent.

2. Test cylinders in accordance with ASTM C39; one (1) at 7-days and two (2) at 28-days. The 4th sample is held in reserve.
3. Test cubes in accordance with ASTM C97 for water absorption and ASTM C173 or ASTM C231 for air content.
4. Provide all test results to Engineer.
    a. Test results to indicate units they represent.
    b. Inspect quality of units prior to shipment.

B. Should products delivered to site be rejected due to materials or workmanship, discontinue delivery until defects in materials or workmanship have been corrected and certified in writing to the Engineer.

2.07 MANUFACTURER

A. Contractor to furnish a precast concrete building. to be field assembled by manufacturer on contractor's cast-in-place concrete foundation as indicated on contract drawings. Precast building to be EASI-SPAN® brand as manufactured by Easi-Set Industries (ESI), Midland, Virginia, or licensed manufacturer of Easi-Set Buildings, or approved equal. Building to be provided by manufacturer with all necessary openings as specified by contractor in conformance with manufacturer's structural requirements.

PART 3 EXECUTION

3.01 PREPARATION

A. Correct defects or conditions which may interfere with or prevent a satisfactory installation.

3.02 SITE PREPARATION REQUIREMENTS (FIELD ASSEMBLED ON CAST-IN-PLACE FLOOR SLAB)

A. Slab on grade to be minimum 6" thick and 4,000 psi steel reinforced concrete. Slab to be level within 1/8" in both directions and capable of supporting loads imposed by the structure, with a ½" step-down along the perimeter edge.

B. Provide positive drainage for the fill, pad, or slab with a minimum 2% slope for all hard surfaces and a minimum 5% slope for all landscaped soft or earth surfaces.

C. Building shall bear fully on an approved foundation that is designed to hold the full weight of the building.

3.03 ACCESS

A. Contractor must provide a level unobstructed area large enough for a crane and a tractor-trailer to park adjacent to the pad. Crane must be able to place outriggers within 5'-0" of edge of pad, and truck and crane must be able to get side by side under their own power. No overhead lines may be within 75' radius of center of pad. Firm roadbed with turns that allow 65' lowbed tractor-trailer must be provided directly to site.

3.04 ERECTION

A. Erect units in accordance with erection schedules.

B. Make joint between units 1/2 inch except as otherwise indicated on Drawings.

C. Secure units by welding and/or bolting.
   1. Provide one (1) flat and one (1) lock washer with each bolt and nut.
   2. Set units on shims where necessary for level, uniform bearing.

D. Erect units within the following tolerance limits:
   1. Maximum equal to maximum specified for structural frame.
   2. Clearances between precast and structural frame: 1-1/2 inches minimum.
   3. Joints:
      a. Face width: Plus or minus 3/16 inch.
      b. Taper in any length: (1 in 500) to maximum 1/4 inch.
      c. Step in face: 1/4 inch.
      d. Jog in alignment of edge: 1/4 inch.

3.05 FIELD QUALITY CONTROL

A. Repair all damage to units after erection in accordance with manufacturer's recommendations and to satisfaction of Engineer.

3.06 CLEANING

A. After completion of setting, repair and caulking, clean all precast work by scrubbing with fiber brushes, detergent, and clean water.

B. Start at top of building and proceed downward.

C. Leave precast units clean and free of traces of cleaning compound.

END OF SECTION

SECTION 260000

ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.01 REFERENCE

A. The provisions of the Instructions to Bidders, General Conditions, Supplementary Conditions, Alternates, Addenda, and Division 1 are a part of this specification. Contractors and Subcontractors shall examine same as well as other Divisions of the specifications which affect work under this Division.

B. The requirements of this Section shall govern all Division 25, 26, 27 and 28 work for this project. Bidders are referred to in this section as "Electrical Contractors" and all provisions apply to each contractor and their subcontractors.

C. The contractor shall be solely responsible for construction means, methods, sequences of construction and the safety of workmen.

1.02 DESCRIPTION OF WORK

A. Mechanical, Architectural, Structural, Electrical and all other project drawings, as well as the Specifications for all the Divisions, are a part of the Contract Documents. Work of this section is shown on the electrical drawings.

B. Drawings and Specifications are to be considered as supplementing each other. Work specified but not shown, or shown but not specified, shall be performed or furnished as though mentioned in both Specifications and Drawings. All systems shall be complete and fully operational upon completion of the project.

C. Contractors shall not construe any correspondence or verbal communications with or by the engineer or his representative as authorization for "extra" construction payment. All requests for additions to this contract shall be submitted in writing by the contractor to the architect for consideration by the owner's representative. Work performed without written change order from the owner will be the contractor's sole responsibility without additional compensation.

D. Contractor shall comply with and schedule work according to the schedule of construction specified in Division 1. All work shall be completed within these time constraints and the contractors for the work of this section shall provide all required temporary utilities and connections necessary to maintain the existing systems in full operation during the progress of this work. Sections of any systems may be taken out of service only when approved in writing by the owner.

1.03 RELATED WORK SPECIFIED ELSEWHERE

A. Division 1 - Project Phasing and Temporary Electrical and Telephone Service

B. Division 3 - Poured-In-Place Concrete

C. Division 9 - Finish Painting

D. Division 22 - Plumbing

E. Division 23 - HVAC

F. Division 31 - Excavation and Backfill

1.04 QUALITY ASSURANCE

A. Codes and Permits:

1) Work shall be installed in full accordance with all applicable codes, rules and regulations of public authorities and/or utilities. Included shall be National Electrical Code, NEMA, U. L. Standards, OSHA, State and local Building Codes. All these Codes, Rules and Regulations are hereby incorporated into this specification.

2) Comply with specification requirements in excess of Code requirements where no conflicts exist.

3) Prior to starting any work, electrical contractors shall secure all necessary permits and inspection certificates required.

4) Deliver official record of approval, by governing agencies, to architect for transmittal to owner, prior to starting work.

B. Standards:

1) Comply with applicable provisions of code approved editions of following National Standards:

NFPA 70E Electrical Safety in the Workplace
National Electrical Code
NFPA Life Safety Code and Standards under
Appendix B of Life Safety Code
Underwriters Laboratory
NFPA
NEMA
National Electrical Safety Code
ANSI
Americans with Disability Act

1.05 SUBMITTALS

A. Shop Drawings:

1) Contractor shall submit shop drawings of fixtures, distribution equipment, electrical devices, and communication systems for review. Submittals shall be made in a timely fashion, keeping with the project schedule described in Division 1.

2) Contractor shall review and indicate his approval of each shop drawing prior to submittal for review. Do not start work until shop drawings have been reviewed by the Engineer and returned to the Contractor. Submittals not indicating contractor approval will be returned without review.

3) Submittals will be reviewed only for general compliance with the contract documents and not for dimensions, quantities, etc. The submittal review shall not relieve the contractor of responsibility for purchase of the item in full compliance with the contract documents and its complete and proper installation.

4) Where submittals vary from the contract requirements, the contractor shall clearly indicate on submittal or accompanying documents the nature and reason for variations.

5) Refer to various sections for listing of shop drawings required on this project which are not listed in A.1 above.

6) Each manufacturer or his representative must check the application of his equipment and certify at time of shop drawing submittal that equipment has been properly applied and can be installed, serviced and maintained where indicated on drawings. Advise engineer in writing with submittal drawings of any potential problems. The manufacturer shall be responsible for any changes that might be necessary because of physical characteristics of equipment that have not been called to the engineer's attention at the time of submittal.

B. Record Drawings:

1) Each contractor or subcontractor shall keep one (1) complete set of the contract working drawings on the job site on which he shall regularly record any deviations or changes from such contract drawings made during construction.

2) These drawings shall record the location of all electrical equipment, junction and pull boxes, conduit routing and all below-grade service. All underground services shall be dimensioned from readily identifiable and accessible building elements.

3) Record drawings shall be kept clean and undamaged and shall not be used for any purpose other than recording deviations from working drawings and exact locations of concealed work.

4) After the project is completed, these sets of drawings shall be delivered to the Architect in good condition, as a permanent record of the installation as actually constructed.

5) Provide record drawing of one-line power diagram and mount in electrical equipment room.

1.06 COORDINATION AND SUPERVISION

A. Examine work of other trades which comes in contact with or is covered by the work. Do not attach to, cover, or finish against any defective, or install work of this Division in a manner

which will prevent other trades from properly installing their work. Consult all drawings, specifications and details of other Divisions of the work.

B. Proper clearances for architectural design and equipment access and service shall be maintained for all items and components.

C. Contractors shall report any interferences between their work and other work or construction as soon as discovered. If contractor proceeds without coordination, correction shall be the responsibility of the installing contractor without cost to the owner.

D. Drawings are diagrammatic and show approximate location of conduit, devices, etc. Take all measurements and establish exact locations in the field. Adapt to construction and work of other trades as required for coordination of the work.

E. Each contractor shall be responsible for layout and coordination of openings and chases required for these installations, which are provided by other trades. Provide dimensioned drawing and fully coordinate this work with the contractor providing the openings or chase.

F. Each contractor shall provide adequate competent supervision on job during all working hours with authority and instructions to answer questions and carry out instructions of Architect or his representative.

G. All light fixtures and ceiling mounted items shall be centered with regard to ceiling grid at locations shown on the architect's reflected ceiling plan. Failure to observe these requirements shall be cause for correction to be made at the contractor's expense.

H. The owner and/or architect reserve the right to make reasonable changes in the location of electrical devices, furniture feed connection points, etc. up to the time of roughing-in, without additional cost.

I. Provide necessary coordination elements, final dimensions, equipment, working clearances, major conduit runs above and below grade etc. to the Division 250000 HVAC contractor for integration into the coordination drawings.

1.07 DRAWINGS AND SPECIFICATIONS

A. Drawings and specifications are supplemental to each other. It is intended that work covered by these specifications and drawings include everything requisite and necessary to make the various systems complete and operative, irrespective of whether or not every item is specifically provided for. Any omission of direct reference herein to any essential item shall not excuse contractor from complying with the above intent.

B. In case of error or inconsistency, specifications shall take precedence over drawings. Figured dimensions supersede scaled ones. Contractor shall take no advantage of, and shall promptly call Architect's attention to any error, omission or inconsistency in specifications and drawings.

C. Special attention is directed to requirements that equipment and materials stated in specifications and/or indicated on drawings shall be furnished, completely installed, adjusted and left in safe and satisfactory operating condition. Accessories, appliances and connections

necessary for proper operation of equipment shall be provided.

D. Materials, apparatus or equipment specified or otherwise provided for on drawings, addenda, or change orders issued subsequent to award of contract, shall be same brand, type, quality and character originally specified, unless specifically approved by the architect.

E. Layout of equipment, accessories, specialties and suspended, concealed or exposed piping systems are diagrammatic, unless dimensioned. In preparing shop drawings, contractor shall check project conditions before installing work. If there are any interferences or conflicts, they shall be called to the attention of Architect immediately for clarifications.

F. The drawings indicate required size and points of termination of conduit and suggest proper routes to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets and it shall be the work of the installing contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instruction or cost to the owner.

G. It is intended that the electrical items be located symmetrical with architectural elements, and shall be installed at exact height and locations as shown on the architectural drawings. Refer to architectural details in completing and correlating work. Confirm all locations with Architect prior to rough-in.

1.08 PROVISIONS FOR LATER INSTALLATION

A. Become acquainted with nature and progress of construction against which this work attaches. Review structural drawings for coordination of openings. Cut no structural members or slabs without Architect's written approval.

B. When this work cannot be installed concurrently with the building construction, arrange for inserts, sleeves, access panels, etc., as necessary for installation at a later date.

1.09 LOCAL CONDITIONS

A. Visit site and become familiar with facilities and conditions affecting work. No additional payment will be made on claims that arise from lack of knowledge of existing condition.

B. Exercise extra care when working in areas where underground services may exist. Any costs for repair of damage to such services become responsibility of Contractor causing damage.

1.10 PROTECTION

A. When setting up equipment, protect area against staining, abrasion. Cost of correcting any such condition will be charged against the respective Contractor.

B. Protect all equipment which has been installed from construction debris and the work of other trades.

C. Protect finish floors from chips and cutting oil by use of chip receiving pan and oil proof cover.

D. Protect equipment and finished surfaces from welding and cutting spatters with baffles and spatter blankets.

E. Protect from paint droppings, insulation adhesive, by use of drop cloths.

F. Contractors shall be responsible for including and maintaining adequate precautions and safeguards related to their work during all phases of construction. Include protection, warnings and safety devices and equipment for protection of personnel, equipment and materials. Comply with all requirements of governing authorities, including OSHA.

1.11 PRODUCT HANDLING

A. Pay all costs for transportation of materials, equipment to job site.

B. Provide all scaffolding, tackle, hoists, rigging necessary for placing electrical materials and equipment in their proper place. Remove temporary work when no longer required. Comply with applicable State, Federal and local regulations.

C. Contractor shall keep materials clean and protected from weather and/or damage before and after installation until final acceptance by the owner. Protect all openings, bearings, controls, motors, etc., from dirt and moisture.

1.12 UTILITY TIE-INS

A. Make all utility tie-ins for this project in accordance with requirements of authorities having jurisdiction.

B. Fully coordinate service interruptions with all parties involved for shutdown and/or tie-ins with existing systems to minimize interruption of service. Fully coordinate and make connections to existing facilities as scheduled with the owner and governing authorities.

C. Contractor shall confirm all utility requirements for tie-in prior to bid and include all facilities required by utility for fully coordinated and complete installation.

1.13 SHUTDOWNS

A. Give five (5) working days' notice to Architect or the Owner of anticipated shutdown requirements of an operating system. Tie-ins and modifications to existing facilities and services must be done with minimum interruption of facilities operation and during hours so affecting.

1.14 TEMPORARY SERVICES

A. Temporary services shall be provided as stated in Special Conditions and Division 1. Provide all temporary services and connections as required to accommodate the phasing sequence of the project.

B. Description of System: Furnish and install temporary electrical power service for construction needs throughout construction period in accordance with the special conditions as follows:
   1) Provide power for miscellaneous tools and equipment, for pumping, for temporary

heating and ventilating and for temporary storage and construction buildings. See General Conditions for requirements of temporary service.

2) Provide temporary lighting of minimum 5 foot candles for safe and adequate working conditions throughout the project, for security and for temporary office and construction buildings.

C. Materials (General)

1) Comply with Electrical - Basic Materials and Methods.

2) Materials may be new or used, but must be adequate in capacity for required purposes, and must not create unsafe conditions or violate requirements of applicable codes.

3) At Contractor's option, patented specialty products may be used, if UL approved.

4) Provide required facilities, including transformers, conductors, poles, conduits, raceways, breakers, fuses, switches and lighting fixtures with lamps.

5) Provide appropriate enclosures for environment in which used, in compliance with NEMA standards.

D. Installation

1) Install work in neat and orderly manner.

2) Make structurally and electrically sound throughout.

3) Maintain to give continuous service and to provide safe working conditions.

4) Modify and extend service as work progress requires.

5) Locate so that power is available at any desired point with no more than 100' (30.00 m) extension, and with no more than 5% voltage drop at full load.

6) Provide circuit breaker protection for each outlet. Provide ground fault interrupting capacity for all circuits.

7) Provide equipment grounding continuity for entire system.

8) Removal: Completely remove temporary materials and equipment upon completion of construction. Repair damage caused by installation, and restore to specified or original condition.

1.15 OPERATING INSTRUCTIONS

A. Owner's representative shall be instructed by contractor and manufacturer's representatives on system maintenance and operation requirements. Instruction shall be complete, conducted by qualified service and maintenance specialists.

B. The following systems shall include training sessions scheduled with the owner. Allow a minimum of **two (2) one-hour** sessions per system, scheduled one week apart. Include initial programming of all time-of-day set points for operation. Include video record of training sessions.

1) Generator system.

1.16 DAMAGE AND EMERGENCY REPAIRS

A. Contractor shall be held responsible for damage to work caused by his work or through the negligence of his workmen. All patching and repairing of damaged work and the cost of same shall be paid by the contractor causing the damage. All existing facilities and installations shall be restored to their original condition when damaged by the work of this Division, using workmen skilled in each required trade.

B. The owner reserves the right to make emergency repairs as required to keep equipment in operation, without voiding Contractor's warranty or relieving him of responsibility during warranty period.

1.17 WARRANTY

A. Electrical Contractors shall warrant all material, equipment, fixtures and workmanship for a period of one (1) year from date of final acceptance.

B. Any equipment piping, fixture or other component part of system which fails during warranty period and all resulting damage shall be replaced or repaired by contractor without cost to owner.

C. Warranty on any repairs or replacements shall be extended from date of replacement or repair of that item for one (1) year.

D. All equipment and fixtures shall be warranted by the manufacturer thru the contract warranty period. Any extended manufacturers warranties shall be extended to the owner.

1.18 REQUIREMENTS FOR FINAL INSPECTION

A. All of the following items must be completed prior to final inspections. No exceptions will be made and no final payment will be made until all items are completed.

1) Each contractor's foreman shall perform his own punch list and, upon completion, notify the architect that project is ready for final punch list.

2) Thoroughly clean all parts of the apparatus and equipment. Exposed parts which are to be painted shall be thoroughly cleaned of cement, plaster and other materials and all oil and grease spots shall be removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out.

3) Exposed metal work shall be carefully brushed down with steel brushes to remove rust and other spots and left smooth and clean.

4) All labeling of system components as required in this Section and Section 260500, the drawings and the owner shall be complete.

5) All system start ups shall be complete with written certifications submitted for all systems and major equipment.

6) Certification of test and start-up and training sessions for the systems listed in operating instructions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Provide material and labor which is neither drawn nor specified but which is obviously a component part of and necessary to complete work or comply with code, and which is customarily a part of work of similar character.

B. Provide incidental concrete, trenching and backfilling, reinforcing steel, masonry, mortar, miscellaneous steel, painting and the like required to complete electrical installations; perform in manner specified in applicable Division of General Trades Specification by workmen skilled in that particular trade.

C. All equipment and material shall be new, free from defects, U.L. listed where applicable and warranted by the manufacturer and the contractor.

D. To the greatest extent possible, provide materials and products of the same kind from the same manufacturer for this project.

2.02 MATERIAL SUBSTITUTIONS

A. All changes required by substitutions, such as revisions to foundations, bases, conduit, controls, wiring, openings and appurtenances shall be made by the substituting contractor at no additional cost to the project. Notify all other contractors affected by substitution and pay all costs related to the substitution incurred by other contractors.

1) Refer to General Conditions and Division I for requirements related to material and equipment substitutions.

B. Systems have been laid out around particular fixtures and equipment considered base items. Manufacturer **first** listed is base item. Other named manufacturers in these specifications or on the drawings who can provide equivalent equipment are acceptable and may be bid, provided performance, construction, components, quality and appearance, where applicable, are equivalent to base item and can be properly installed. Acceptable alternate makes of equipment are listed in specifications or equipment schedules; however, manufacturers other than base manufacturers are substitutions and shall comply with the following paragraphs. When distribution equipment is substituted, contractor shall submit equipment room shop drawings showing dimensions of equipment and required N.E.C. clearance. It is the contractors sole responsibility that all substituted equipment fits in the allotted space and maintains all required clearances.

C. Should the contractor propose to furnish materials or equipment other than those listed in the specification, a written request for substitution shall be submitted as an alternate to the base bid at the bid opening. Refer to General Conditions Division of this specification. It is the contractor's responsibility to fully evaluate substitutions and ascertain that the substitution is equivalent in all respects to the base specification prior to submittal.

D. Substitutions are subject to approval of Architect and his decision shall be final. In submitting substitutions, include make and model number and complete literature and performance data for evaluation.

E. Substitution of items not named in these specifications or drawings may be offered for consideration on the substitution sheet included in the Proposal Form of the contract, under the following conditions:

1) The proposed substitution is proven, to the satisfaction of the Project Architect and Engineer, to be equal or superior to the specified item in all respects.

2) Extended delivery schedules on specified items, which would delay timely completion of the job, will be cause for consideration of substitutions. The Contractor must show proof of delay in delivery from the manufacturer.

3) Changes required by substitution, such as revisions to foundations, bases, conduit, controls, wiring, openings and appurtenances shall be made by the Contractor at no additional cost to the project and pay all costs related to the substitution incurred by other contractors.

4) State the amount of credit to be given to the owner if the substitution is accepted prior to contract award on the proposal form substitution sheet or if after award of contract, submit a quotation stating cost reduction resulting from acceptance of a substitution if executed through a contract change order.

5) Manufacturers of items not named in these specifications or drawings may submit a written request with supporting product information to the engineer ten (10) days prior to the project bid date for consideration at the sole determination of the engineer to become a named product. If approved, the product name will be added to the list of substitute manufacturers in a written addendum issued by the architect to bidders.

PART 3 EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Location of conduit, equipment, devices, etc., on the drawings are diagrammatic; indicated positions shall be followed as closely as possible, exact locations shall be subject to building construction and interferences with other work. Difficulties preventing the installation of any part of work as indicated shall be called to the attention of the Architect. Architect shall determine locations and changes, Contractor shall install the work accordingly. Architect reserves right to make minor changes in location of any part of the work up to the time of roughing-in without additional cost.

B. All materials and equipment shall be installed in a neat and workmanlike manner by competent specialists for each subtrade. The installation of any materials and equipment not meeting these standards may require removal and reinstallation at no additional cost to the Owner.

C. Install, connect equipment, services, materials in accordance with best engineering practice and in conformity with manufacturer's printed instructions and U.L. Listing.

D. Take all measurements and determine all elevations at the building prior to fabrication or rough-in.

3.02 CUTTING AND PATCHING

A. Perform all cutting, framing and patching in completed construction as necessary for installation of this work. Do not cut any structural member or structural floor slab without written permission from the Architect. Have cutting done by skilled mechanics as carefully as possible, and with as little damage as possible. Have patching done by first-class mechanics, skilled in the several trades.

B. In new construction, lay out location and size of all openings to be provided by other trades in advance of their work. Set sleeves, lintels, etc., for openings and provide layout dimensioned drawings as required for coordination with other contractors. If openings information and sleeves are not provided to other trades in advance of their work, this contractor shall provide all required openings as required for existing construction.

C. In existing construction, contractor shall perform all cutting, patching and framing of chases and openings required by this work. Properly sized structural lintels shall be provided above masonry wall openings and steel angle frames around panel walls, floor or roof openings. Size lintels and frames per schedule on architectural or structural plans.

D. Perform all excavation and backfill required for installation of below-grade conduits. Excavate to depth required to install conduits at required level and pitch. All backfill shall be compacted in maximum twelve (12) inch layers and conform to all bearing requirements of site and/or structure above. Trenches for utility services shall comply with the specifications and details of the utility company.

E. All conduits for below-grade entry of the building shall be pitched away from the building floor elevation and sealed to prevent water entry.

F. All openings shall be cut with lintels and frames installed by workmen skilled in the particular trade.

1) All patching shall be by a skilled general trades contractor and shall be performed in accordance with requirements of Division 9.

2) All roof cutting and patching installed under this contract shall be performed by the project roofing contractor at this contractor's expense.

G. Core drill round openings and neatly saw cut rectangular openings in floors or walls. Sleeves shall be grouted or patched to match existing wall or floor construction.

H. Sleeves for floor or wall penetrations shall extend 2" past opening and be grouted in place and sealed watertight with silicone caulk.

3.03 FIRE STOPPING

A. Where steel conduits pass through fire rated walls, set sleeve in wall, install non-shrinking grout between conduit and sleeve. Fire seal around wall sleeve with fire rated sealant. All penetrations shall be protected or rated construction in accordance with an approved method listed in the U.L. fire resistance directory.

B. Where conduits pass through floors, set steel sleeve in floor slab. Top of sleeve shall be 2" above finish floor and shall be grouted in place and sealed watertight to floor. Fire seal between sleeve and conduit.

C. Penetrations of fire rated walls and ceilings by exposed cabling system shall be made with steel conduit sleeves, fire stopped with U.L. listed sealant per U.L. assembly drawings.

D. Fire rated sealant shall be U.L. listed and applied in accordance with the U.L. assembly requirements and the manufacturer's recommendations to match the rating of the penetrated structure. Sealants shall be as manufactured by Hilti, International Protective Coatings (IPC), Specified Technologies, Inc. (STI), or 3M.

3.04 ACCESS DOORS

A. Proper access for service and maintenance shall be ascertained before installation of any item. The electrical contractor shall furnish access doors adequately sized for servicing concealed items furnished under this contract. Doors shall be fire rated where installed in rated construction and shall have concealed hinge door, screw drive latch and primed painted finish. Frames shall match the construction of adjoining surfaces.

B. Doors in new construction shall be furnished to general trades contractor for installation. In existing construction, doors shall be installed by the electrical contractor with surrounding surfaces patched and painted to match existing.

C. Access doors shall be as manufactured by Milcor or approved equivalent.

3.05 PAINTING

A. Finish painting is included under Division 9 - Finishes, except where specifically called for under this Division.

B. Certain painting specified as part of the electrical Trades Work is included herein and shall comply with Division 9.

C. Materials and equipment installed under this Division shall be left free from dirt, grease and foreign matter, ready for painting.

D. No equipment or piping shall be painted before being tested.

E. Damaged surfaces of prefinished materials and equipment shall be touch-up painted to match existing finish by the contractor.

F. All items to be painted shall be primed and painted with two (2) coats of rust inhibitive paint on exterior and enamel paint on interior in accordance with the paint manufacturer's instructions. Engineer shall select a custom color.

3.06 EQUIPMENT IDENTIFICATION

A. Equipment:

Push buttons, selector switches, safety switches, motor starters, time switches, contactors, panelboards, pull boxes, cabinets, special outlets, etc., shall be identified as to function with a phenolic engraved nameplate securely attached. Identify voltage, phase, origin and load served.

B. Panelboards:

Provide typed directories for distribution and circuit breaker panels describing load fed and location. Typed directories shall include specific load location information with final room names and numbers (i.e., Receptacles - Office 120).

C. Nameplates shall be laminated phenolic with a black surface and white core and shall be mechanically fastened with screws to each item. Use 1/16" thick material for plates up to 2"x4". For larger sizes, use 1/8" thick material. Lettering shall be minimum 1/4" height, spaced at four (4) per inch. Safety switches, motor starters, and panelboard nameplates shall include system voltage, phase and wire count, i.e. Panel "A" - 208Y/120, circuit origin and load served.

D. Wiring:

1) Color code all wiring in accordance with NEC Standards. All system and control wiring shall be labeled at each termination and splice, and continuously color coded.

2) Color coding is to be plainly labeled on all wiring diagrams submitted for approval and wire installed by this contractor shall comply with manufacturer's wiring diagram requirements.

E. Label all conduits leaving main panelboards where exposed with stick-on labels indicating circuit contained.

F. Label all junction boxes with circuits contained with indelible marker. Color code emergency and fire alarm system box covers as directed with permanent paint markings. Mark conduit at 48" intervals where visible, or use pre-finished color coded conduit, exposed or above accessible ceilings.

G. Label inside of device plates with panel and circuit number.

3.07 OPERATING AND MAINTENANCE MANUAL

A. Prepare one (1) complete operating and maintenance manual in hardback binder describing operation of the systems and recommended maintenance schedule. Turn all equipment warranties over to the Owner. Quantity of manuals shall be confirmed with the owner.

B. Manuals shall be indexed, arranged in the CSI format, and include:

1) Job name and names of contractor with address and telephone number for service. Include all major emergency service numbers for equipment and generator set particularly.

2) Manual index.

3) Identification, name, mark, number as indicated on design drawings.

4) Normal equipment operating characteristics.

5) Performance data and ratings.

6) Wiring diagrams.

7) Manufacturer's descriptive literature.

8) Manufacturer's maintenance and service manuals. Include signed copies of attendance sheets for each owner instruction session.

9) Spare parts and replacement parts list for each piece of equipment.

10) Name of service agency and installer.

11) Final accepted shop drawings.

C. Include entire manual in digital format and storage device, as required by the owner.

3.08 CLEANING UP

A. From time to time during the operations and at completion thereof, electrical contractor shall remove from the premises all debris and excess material caused by their work. Area of operation shall be left broom clean.

B. Construction materials shall be neatly stored in project areas and locations designated by the owner and architect. Construction materials must not be left scattered about construction area.

C. All electrical equipment to be painted by others shall be thoroughly cleaned by electrical contractors of grease, rust, shipping tags and construction dirt.

3.09 TEST, CHECK, START AND BALANCE

A. The electrical contractor shall test, check and start up all systems installed under this contract and place them in operating condition. Testing may be done by qualified employees of the

contractor except where independent testing company is specified (see paragraph F. below).

B. All light fixtures, panels and electrical equipment shall be cleaned and labeled.

C. Circuits shall be phased out and connected to the panel or main switch in proper manner. Loads shall be distributed within 5% between phases when all loads are energized. All wires shall be entirely free from grounds and short circuits.

D. Distribution voltages shall be checked by this contractor who shall advise the engineer in writing in the event that incoming voltages are not within a tolerance of plus or minus 5% of nominal value. Adjust taps on transformer if required to correct voltage variations or coordinate with serving utility to adjust incoming service voltage.

E. Upon completion of the work, deliver to owner all special tools, keys, fuses and other detachable portions of the electrical system. Obtain written receipt from owner's representative and submit to architect with request for final payment.

END OF SECTION

SECTION 263200

STANDBY ELECTRICAL GENERATOR SYSTEM

PART 1 GENERAL

1.01 REFERENCE

A. Drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 and 23 specification sections, apply to work of this section.

B. Division 26, Section 260000, Electrical General Provisions, and Section 260500, Basic Materials and Methods, apply to work of this section.

C. NFPA 30

D. Ohio Fire Code.

E. Ohio Building Code.

1.02 CONTENTS

A. Described herein are the requirements for the standby electrical generator systems.

1.03 SCOPE

A. The extent of generator system work is indicated on the drawing and by requirements of this section.

PART 2 PRODUCTS

2.01 STANDBY ELECTRICAL GENERATOR SYSTEM

A. <u>General</u>

1) The emergency generator system shall be a prototype tested, factory built, production tested, site tested, of the latest commercial design, together with all accessories necessary for a complete installation as shown on the plans and drawings and specified herein. The equipment supplied and installed shall meet the requirements of the national Electrical Code, U. L. and all applicable codes and regulations. All equipment shall be by a U. S. firm which manufactures the generator and controls, and assembles the standby generator sets as a matched unit so that there is one-source responsibility for warranty, parts, and service through a local representative with factory-trained service personnel.

2) Design is based on a Kohler engine/generator set. Any changes to building, ventilation fuel system, exhaust system, clearances and electrical connections required for proper operation of an engine/generator other than base manufacturer shall be the responsibility of the contractor, without additional cost to the contract.

Units manufactured by MTU or Caterpillar will be considered equal.

3) Shop drawing submittal shall include specification sheets showing all standard and optional accessories to be supplied, performance data, schematic wiring diagrams, dimension drawings, and interconnection diagrams identifying by terminal number each required interconnection between the generator set, the transfer switch, and other remote devices included elsewhere in these specifications. Include generator sizing calculations confirming selected generator is adequate for project.

4) **Testing:** To assure that the equipment has been designed and built to the highest reliability and quality standards, the manufacturer shall be responsible for design prototype tests as described herein: Components of the emergency system, such as the engine/generator set, transfer switch, and accessories shall not be subjected to prototype tests since the tests are potentially damaging. Rather, similar design prototypes which will not be sold, shall be used for these tests. Prototype test programs shall include the requirements of NFPA-110 and the following:

a. Maximum power (KW).

b. Maximum starting (KVA) at 35% instantaneous voltage dip.

c. Alternator temperature rise by embedded thermocouple and by resistance method per NEMA MG1-22.40 and 16.40

d. Governor speed regulation under steady-state and transient conditions.

e. Voltage regulation and generator transient response.

f. Fuel consumption at 1/4, 1/2, 3/4, and full load.

g. Harmonic analysis, voltage wave-form deviation, and telephone influence factor.

h. Three (3) phase line-to-line short circuit test.

i. Alternator cooling air flow.

j. Torsional analysis testing to verify that the generator set is free of harmful torsional stresses.

k. Endurance testing.

5) **Warranty:** The emergency generator system and transfer switch shall be warranted by the manufacturer for one (1) year from the date of acceptance by the owner.

6) Furnish a proposal to the owner for a service and maintenance agreement for time past the requirements of the warranty.

B. The standby electric generating sets shall include a diesel fueled liquid cooled electric plant, rated at 480/277 volt, three (3) phase, four (4) wire, 60 Hertz, 200 KW continuous standby,

250 KVA at .8 power factor. It shall be a package unit of new and current equipment consisting of a diesel fueled engine-driven electric plant with engine mounted start-stop control system, and other mounted accessories as specified. An automatic load transfer control to provide automatic starting and stopping of the plant and switching of the load shall be included.

C. The engine shall be diesel fueled with radiator and fan for cooling, alternator, governor, and oil lubrication system, designed for automatic starting upon loss of normal building power. Engine and generator shall be mounted on common structural steel base with vibration isolation. Intake and free-turn exhaust valves shall be heat resisting alloy steel with high tungsten-chrome alloy steel exhaust valve seat inserted. Full pressure lubrication shall be supplied by a gear oil pump. The engine shall have an oil filter with replaceable element, dipstick and oil drain. Engine speed shall be governed by a electronic governor to maintain alternator frequency within one-half of one percent from no-load to full-load alternator output. The engine shall have a 12 volt, DC battery charging alternator with solid state voltage regulator. Starting shall be by a 12 volt, solenoid shift electric starter. Unit shall have fuel filters and electric shut-off valve and dry-type replaceable air cleaning element.

D. The engine instrument panel shall be permanently mounted to unit with vibration isolation. Unit shall have fused DC circuit with removable plug-in circuitry. Unit shall include the following:

1) AC meters for volts, amps and frequency.
2) Meter phase selector switch.
3) DC meters for volts, engine, water temperature, and oil pressure.
4) Running time meter.
5) Alarm horn and silencing switch per NFPA-110.
6) Lamp test switch.
7) Front-mounted voltage adjusting rheostat.
8) Panel lamps (two).
9) Cyclic cranking per NFPA-110.
10) Engine cool-down timer, five (5) minutes.
11) High-Engine-Temperature safety shutdown and lamp (red).
12) Low oil pressure safety shutdown and lamp (red).
13) Overspeed safety shutdown and lamp (red).
14) Overcrank safety shutdown and lamp (red).
15) Low coolant temperature/level safety shutdown lamp (red).
16) Run-Off/Reset-Auto switch (engine start).
17) Local/Remote two (2) wire. Start/stop control

E. The electric plant shall contain a complete engine start control which operates on closing and stop control which operates on opening contact. A cranking limiter shall be provided to open the starting circuit in approximately seventy-five (75) seconds if the plant is not started within that time. The electric plant controls shall also include a three (3) position selector switch with the following positions: RUN-STOP-REMOTE. High coolant temperature, low oil pressure and overspeed shutdown with signal light and alarm terminal shall also be provided.

F. The alternator shall be a four (4) pole revolving field type with brushless exciter and solid state voltage regulator. No commutator or commutator brushes shall be allowed. The starter shall be directly connected to the engine flywheel housing and the rotor shall be driven through a

semi-flexible driving flange to ensure permanent alignment. The generator shall have a single maintenance free battery.

G. Unit Performance: Frequency regulation shall be isochronous from no load to rated load and +/- 0.5% for continuous operation. Voltage regulation shall be within plus or minus 2% of rated voltage, from no load to full load. The instantaneous voltage dip shall be less than 20% of rated voltage when full load and rated power factor is applied to the alternator. Motor starting maximum voltage dip shall be 35%. Recovery to stable operation shall occur within five (5) seconds. Stable or steady operation is defined as operation with terminal voltage remaining constant within plus or minus 1% of rated voltage. A rheostat shall provide a minimum of plus or minus 5% voltage adjustment from rated value. Temperature rise shall be within rating as defined by NEMA MG1-1.66 with Class F temperature rise and material.

On loss of normal power, the generator shall start and the electrical systems are to be on line within ten (10) seconds. The retransfer time from emergency to normal power shall be fifteen (15) minutes minimum, with an additional five (5) minutes minimum running time of the generator prior to shutdown.

H. The electric plant shall be mounted on a welded steel base which shall provide suitable mounting to any level surface. Vibration isolators shall be provided between the engine-generator and the base.

I. All accessories needed for the proper operation of the generator shall be furnished. These shall include:

1) Battery rack, battery cables, 12-volt battery(ies) capable of delivering the minimum cold-cranking amps required at zero degrees Fahrenheit per SAE Standard J-537. Provide manufacturer's float type battery charger.

2) Gas proof, seamless, stainless steel, flexible exhaust connector(s) ending in pipe thread of SAE flange.

3) Flexible fuel line(s) rated 300°F and 100 psi ending in pipe thread.

4) Engine exhaust silencer, coated to be temperature and rust resistant, rated for critical applications. Exhaust noise shall be limited to 85 dba as measured at 10 feet in a free-field environment. Silencer shall be installed within enclosure and all piping to be protected from exposure.

5) Block heater shall be selected by the manufacturer to be of proper wattage and voltage, thermostatically controlled to maintain engine coolant at proper temperature to meet the start-up requirement of NFPA-99 or NFPA-110, based on the ambient temperature conditions of the project.

6) Steel weather-protective enclosure with removable or hinged side panels to allow inspection and maintenance shall be provided for units installed outdoors. The enclosure shall be coated with ASA gray primer and two (2a) coats of high-gloss, weatherproof, sag resistant vinylac in the manufacturer's standard color through an electrical bonding process. The specified exhaust silencer shall be vibra-mounted and installed in the enclosure. Skid end caps and rodent protection shall be installed

with the housing. Provide knock-out closers on all openings in the skids to prevent rodent entry to the unit.

7) Enclosure shall be sound attenuating type. Sound pressure level performance is to be 73.8db(A) log average around unit from no-load to full load measured at 7 meters (23 ft.).

8) One (1) main line circuit breaker rated 300 amperes.

9) Two (2) N.O. engine run relay contacts.

10) One (1) N.O. engine alarm/trouble contact.

10) Radiator duct flange.

J. The battery shall be lead acid type of adequate ampere hour capacity, mounted on a suitable rack as supplied by the battery manufacturer, adjacent to the generator set. Battery to be furnished by equipment manufacturer.

K. Provide an NFPA 99 remote annunciator panel which provides the following:

1) Pre-alarm - high engine temperature.
2) Pre-alarm - low oil pressure.
3) Low water temperature.
4) Low fuel.
5) High engine temperature.
6) Low oil pressure.
7) Emergency stop.
8) Overspeed.
9) Battery charger fault.
10) Low battery voltage.
11) Auxiliary fault.
12) Overcrank.
13) Line power.
14) Generator power.
15) System ready.
16) Generator switch not in auto.
17) Alarm horn.
18) Silence switch.
19) Lamp test.

L. Provide 370 gallon (24 hour at 100% load) sub-base fuel tank with dual walls, leak detection and alarm. Tank shall be U. L. listed for above-ground use for containing flammable and combustible liquids.

1) The public shall be safeguarded from access to, or unauthorized entry to, the storage area. The genset and tank shall be enclosed in a chain link fence no less than six (6) feet in height, and there shall be as a minimum four (4) feet of clearance on all four sides of genset.

2) There shall be vehicular barrier protection, i.e., bollards, guardrail, bumper posts, located on all sides subject to vehicular damage.

3) A spill container having a capacity of not less than 5 gallons shall be provided for each fill connection.

4) Vent lines are required to be located 12 feet above ground level and outside of any enclosure.

5) The top of the foundation for the tank installation shall be six (6) inches above the expected 100-year flood plain.

6) The electrical contractor shall fill tank to 100% full after all testing has been performed. Fuel for testing requirements shall be included.

M. Automatic Transfer Switch

1. The automatic transfer switch shall be rated to withstand the rms symmetrical short circuit current available at the automatic transfer switch terminals, with the type of overcurrent protection and voltage as shown on the plans. Switch shall be 30 cycle rated switch.

2. The automatic transfer switch shall consist of a power transfer module and a control module, interconnected to provide complete automatic operation. The automatic transfer switch shall be mechanically held and electrically operated by a mechanism energized from the source to which the load is to be transferred. The switch shall be rated for continuous duty and be inherently double-throw. The switch shall be mechanically held and interlocked. The switch shall have dual operator for transfer.

3. The control module shall be supplied with a protective cover and be mounted separately from the transfer switch for ease of maintenance. Sensing and control logic shall be microprocessor based and mounted on plug-in printed circuit boards. Printed circuit boards shall be keyed to prevent incorrect installation. Interfacing relays shall be industrial control grade, plug-in type with dust covers and locking clips.

4. Automatic operation of the switch shall not require power from any source other than the line-to-line voltage of the source to which the switch is transferring.

5. Control panel shall meet ANSI C37.90c-1974 voltage surge withstand capacity.

6. The transfer switch shall be supplied with the genset and be covered by a single source of responsibility with genset for the warranty period. Transfer switch(es) shall be rated 480 volt, four (4) pole, three (3) phase, four (4) wire, NEMA 1, ampacity noted on drawings, with solid neutral. Switches shall be by generator manufacturer, Asco or Russell.

7. The transfer switch shall include all standard sensing, status lights, and time delays required by U.L. and NFPA. The transfer switches shall include the following accessories:

a. Test push button to simulate a power failure on normal. Required by U.L.

b. Disconnect plug on wiring harness to disconnect switch control logic.

c. Main shaft auxiliary contact rated 10 ampere at 480V (one closed on normal and one closed on emergency).

d. Voltmeter, frequency meter and amp meter to monitor all phases of both normal and emergency.

e. Momentary lamp test switch.

f. Plant exerciser adjustable over a seven (7) or fourteen (14) day period in one (1) minute increments for exercising load or without load with selector switch and override. This exercise shall not send building into alarm, sound fire alarm, or send elevator into emergency recall.

g. **In-Phase Monitor:** Monitors normal and emergency sources and permits transfer when phase voltages are plus/minus two (2) degrees and plus/minus two (2) cycles. If the source supplying the load fails or drops below 70%, the monitor will permit immediate transfer.

h. For this project center off delay switching is acceptable to reduce transients resulting from switching with both sources available.

i. Provide transfer to normal or emergency source for the following parameters:

Voltage Loss
Phase Rotation
Single Phase Condition in any Phase

N. Unit shall be 100% load bank tested for four (4) hours at the site before acceptance by the owner. Factory tests are not acceptable. Tests shall include:

1) Single step load pickup.

2) Transient and steady-state governing.

3) Safety shutdown device testing.

4) Voltage regulation.

5) Complete transfer switch operation.

6) Test again under building load for one hour after all major equipment is operational. Test all variables noted above.

7) Submit all recorded test data in Operation and Maintenance Manual.

O. Submit complete shop drawings.

P. Engine Exhaust Emissions: Comply with all applicable federal, state and local government requirements at the location of the installation, as of the effective dates of regulations, and dates of manufacture and installation. Include all equipment required to comply with the regulations. In addition, in no case, shall required EPA Tier and emission levels be exceeded.

PART 3 EXECUTION

A. The equipment shall be installed as shown on the plans, in accordance with the manufacturer's recommendations and all applicable codes.

B. **Site Tests:** Installation check, start-up, load bank, and building load tests shall be performed by the manufacturer's local representative. The engineer, regular operators, and the maintenance staff shall be notified of the time and date of the site test. The tests shall include:

Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations under the environmental conditions, present and expected.

C. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. This shall include:

Engine heaters, battery charger, generator strip heaters, etc.

D. Start-up under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and phase rotation.

E. Automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper systems coordination. Engine temperature, oil pressure, and battery charge level along with generator voltage, amperes, and frequency shall be monitored throughout the test.

F. Record all test results and submit with Operation and Maintenance Manuals.

END OF SECTION

SECTION 409500 - PROCESS INSTRUMENTATION AND CONTROL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. P & ID Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Section 409000 – Field Instruments

C. Division 43 - Process Equipment

D. Division 26 - Electrical

1.02 SUMMARY

A. All work included in this section is to be part of the General Contractor's contract. All work in this section is to be performed by the owner's preferred integrator. The owner's preferred integrator is Systems Group Technologies, LLC. Refer to Division 1 specifications for direction on contacting and including Systems Group Technologies, LLC in the base bid.

B. The owner's preferred integrator, Systems Group Technologies, LLC is referred to as the "Integration Contractor" throughout the drawings and specifications. Integration Contractor is also abbreviated as "IC" on the drawings.

C. The work to be included by the Integration Contractor includes the following:

1. All work shown on the "I" drawings and necessary for engineering, furnishing, adjusting, testing, documenting, and start-up the Process Instrumentation and Control (I and C) System, as a complete computer-based supervisory control and data acquisition (SCADA) system.

2. Furnish design, construction, delivery, start up and programming of all plant SCADA system panels referred to as RTU's (Remote Terminal Units) and MTU's (Main Terminal Units). Panels shall be complete with I/O cards, PLC's, network interface cards, power supplies, terminal blocks, wire management, ventilation, heating, lighting, screens, panel mounted instrumentation, surge protection, UPS, etc. as shown on the drawings.

4. Provide software licensing, software updating and additional software packages as specified.

5. Provide all SCADA system programming, start-up, adjustment and training. SCADA system programming to be performed in order to meet the functional description of all processes as outlined in this specification section.

6. Provide coordination and direction to the Electrical Contractor for termination of structured cable wiring (category 6 and fiber optic cables).

7. Provide all flat screen monitors and televisions as specified. Program displays as specified.

8. Provide all miscellaneous network switches and media converters as shown on the drawings and specifications.

D. The following is a list of associated work that is to be performed by the Electrical Contractor.

1. Provide incoming power conduit and wiring between the SCADA equipment and the source of power.

2. Provide control signal conduit and wiring between the SCADA equipment, motor control centers, area control panels, analog panels, process interface units, control devices and instruments.

3. Provide tagging of power and signal wires and structured cabling. Provide termination of power and signal wires and structured cabling system punch downs and connections. Structured cabling termination types will be as directed by the Integration Contractor

4. Provide category 6 and fiber optic cable (structured cabling) and associated conduit.

5. Provide point-to-point testing of power and signal wiring from SCADA terminations to the field device or power source.

6. Install all SCADA RTU's and MTU's.

E. Drawings and Specifications are to be considered as supplementing each other. Work specified but not shown, or shown but not specified, shall be performed or furnished as though mentioned in both Specifications and Drawings. All systems shall be complete and fully operational upon completion of the project.

F. Contractors shall not construe any correspondence or verbal communications with or by the engineer or his representative as authorization or "extra" construction payment. All requests for additions to this contract shall be submitted in writing by the contractor to the project manager (pm) for consideration by the owner's representative. Work performed without written approval of the owner and project manager will be the contractor's sole responsibility without additional compensation.

G. Contractor shall comply with and schedule work according to the schedule of construction specified in Division 1. All work shall be completed within these time constraints and the contractors for the work of this section shall provide all required temporary utilities and connections necessary to maintain the existing systems in full operation during the progress of this work. Sections of any systems may be taken out of service only when approved in writing by the owner.

1.03 DEFINITION OF TERMS

A. Integration Contractor:

1. A single supplier, which shall assume complete responsibility for engineering and furnishing, technically advising on and certifying and correctness of installation, adjusting, documenting, testing, and starting-up the complete I and C system.

2. Integration Contractor must utilize full-time, permanent employees to provide the following services:

   a. Program/Project Management
   b. Training
   c. Quality Assurance
   d. SCADA/PLC Programming
   e. High Level Systems and Applications Programming
   f. Network Design, Installation, Testing and Validation

B. Responsibility for Complete Systems:

1. The Integration Contractor shall be ultimately responsible and shall provide for the supply, installation certification, adjustment, and start-up of a complete coordinated system which shall reliably perform the specified functions.

2. The Integration Contractor shall obtain from the General and Electrical Contractors the required information on those primary elements, valves, valve actuators, Variable Frequency Drives, Motor Starters, Vendor Control Panels, and other control equipment or devices that are required to be interfaced with, but that are not provided under this section. In particular, any major equipment items furnished by other Contracts but installed under this Contract.

C. Coordination Meetings:

1. In order to ensure timely performance of the Contract and the system's conformance with these Specifications, coordination meetings shall be held at the Engineer's Mentor, Ohio office periodically during the course of the project. The Electrical Contractor and Integration Contractor shall provide for their attendance at a minimum of 5 such meetings in his quotation.

1.04 HARDWARE SUBMITTAL

A. Before any components are fabricated, and/or integrated into assemblies, or shipped to the site, furnish to the Engineer, in accordance with the approved Submittal/Payment Schedule, and receive his review of five copies of full details, shop drawings, catalog cuts, and such other descriptive matter and documentation as may be required to fully describe the equipment and to demonstrate its conformity to these Specifications. The decision of the Engineer upon the acceptability of any submittal shall be final. Catalog information shall be submitted for all equipment.

B. Specifically, the following materials, where applicable shall be submitted:

1. Catalog information, descriptive literature, wiring diagrams and shop drawings on all controllers, panel instruments, SCADA Panels, Desktop PC’s, printers and all other components of the System.

2. Panel elementary ladder logic diagrams of prewired panels. Diagrams shall be similar to those diagrams shown on the drawings, but with the addition of all switched analog signals and all ancillary devices such as additional relays, alarms, fuses, lights, fans, heaters, etc.

3. Interconnecting wring diagrams, showing all component and panel terminal board identification numbers. This diagram shall be coordinated with the Electrical Contractor and shall bear his mark showing that this has been done. Diagrams, device designations, and symbols shall be in accordance with NEMA ICS 1-101.

4. Symbology for software logic functions should utilize the following methods.

    a. Ladder diagram format: This method may be used for programmable controllers only. The use of the ladder diagrams to show logic in computer or microprocessor that cannot be programmed in ladder logic is not acceptable.

    b. Structured logic format (scripts): This method shall utilize structured logic statements: if-and, and-or, etc.

5. Color schedule with color samples for the control panels.

6. Power requirement and heat dissipation summary for all control panels. Power requirements shall state required voltages, currents, and phases (s). Heat dissipations shall be maximums and shall be given in Btu/hr. Summary shall be supplemented with calculations.

1.05 SYSTEM SOFTWARE SUBMITTAL

A. The Software Functional Design submittal shall provide a complete description of the system on a functional level. The software shall be organized into functional subsystems. The intent of the Software Functional Design submittals shall be to describe, in detail, what functions are to be performed by each subsystem. It is not the intent of this documentation to describe the individual programs that support these functions.

1.06 QUALITY ASSURANCE

A. Maintain quality in both design and workmanship as well as materials used in the manufacture of the equipment. Use new equipment and materials.

1.07 SPARES AND EXPENDABLES RECOMMENDATIONS

A. A list of recommended spares and expendable items in sufficient quantities to sustain the Process Instrumentation and Control System for a period of 1 year after acceptance shall be provided. A total purchase cost for the recommended list shall be provided in addition to the unit cost for each item.

1.08 DOCUMENTATION

A. Documentation for the complete Process Instrumentation and Control System shall be provided. This documentation shall include Record Drawings.

B. The Integration Contractor shall furnish clear, typewritten, easy-to-understand, tightly bound, hard cover instruction manuals for daily operation and maintenance of system. Specifically, the manuals shall contain explicit instructions and well-diagrammed procedures for process operations, loop tuning, and systems maintenance. The instruction manuals shall include as a minimum the following information.

1. Photographs and data sheets of major system components.
2. Input/Output terminal diagrams.
3. Logic and block diagrams.
4. Manufacturer published operation and maintenance instructions on all equipment.
5. Description of systems operation.
6. Configuration language description.
7. Names, addresses, and telephone numbers of local equipment manufacturer representatives for each device in the system.
8. Listing of expendable materials by form, stock, or model number (e.g. paper, magnetic discs, ribbons, etc.).

1.09 TESTS

A. All elements of the Instrumentation and Control System shall be tested to demonstrate that the total system satisfies all of the requirements of this Specification.

B. All special testing materials and equipment shall be provided. Where it is not practical to test with real process variables, other suitable means of simulation shall be provided. These simulation techniques shall be subject to the approval of the Engineer.

1.10 TEST PROCEDURE DEVELOPMENT AND TEST DOCUMENTATION

A. Within 12 months after award of the Contract, a detailed description of the proposed test procedures to be performed to demonstrate conformance of the complete system of instrumentation and controls to this Specification shall be prepared and submitted to the Engineer for review. The decision of the Engineer upon the acceptability of the test procedures shall be final.

B. It is recommended that test procedures be in two steps by first submitting general descriptions and outlines of the tests and then, upon receipt of approval, submit the required detailed procedures and forms.

C. It is required that this be a two-step submittal, outlines first followed by specific test descriptions. Test descriptions shall be in sufficient detail to fully describe the specific tests to be conducted to demonstrate conformance with this specification.

1.11 OPERATIONAL ACCEPTANCE TESTS

A. Prepare check-off sheet (s) for each loop and an instrument calibration sheet for each active I and C element (except simple hand switches, lights, etc.) These check-off and data sheets shall

form the basis for these operational tests and this documentation. The engineer shall be present when tests are performed.

1.12 ON-SITE SUPERVISION

A. Provide an on-site resident engineer to supervise and coordinate installation, adjustment, testing, and start-up of the Process Instrumentation and Control System. The resident engineer shall be present during the total period required to effect a complete and operating system.

B. Provide a minimum of 2 weeks system start-up assistance by engineering personnel. One (1) week of start-up assistance shall constitute 40 hours of on-site work. During this start-up period, the Integration Contractor's personnel are to thoroughly check all of the equipment and perform the on-site tests specified above.

1.13 TRAINING

A. Prior to the on-site demonstrations, provide training in the operation and maintenance of the System for two (2) of the Owner's personnel.

B. Training shall be provided by Integration Contractor's employees involved in the installation, design, implementation and start-up of this project. The exception will be training provided by Equipment Manufacturers or authorized Factory trainers.

C. Provide a single, in-house Training Administrator that has experience in on-site industrial O & M training. All facility (in house) training shall be recorded and shall reside on the SCADA System for future use.

1.14 DEFINITION OF ACCEPTANCE

A. System acceptance shall be defined as that point in time when the following requirements have been fulfilled:

1. All submittals and documentation have been submitted, reviewed and marked by the Engineer to the effect that resubmittal is not required.

2. The complete system of instrumentation and controls has successfully completed all testing requirements cited herein.

3. All Owner's staff personnel training programs have been completed.

1.15 QUALITY ASSURANCE

A. Codes and Standards. Perform all work in compliance with applicable requirements of governing agencies having jurisdiction and in accordance with the plans and as specified herein.

1. National Electrical Manufacturers Association (NEMA) Compliance.
2. National Electric Code (NEC) Compliance.
3. Instrument Society of America (ISA).
4. Institute of Electrical and Electronic Engineers (IEEE).

5. Underwriters' Laboratories, Inc. (UL) Compliance and Labeling. Comply with provisions of UL safety standards pertaining to process controller equipment. Provide products and components which have been UL listed and labeled.

1.16 EXPANDABILITY

A. The system proposed shall be configurable to provide for minor changes and additions during manufacturing, installation, and commissioning phases, and on-site by the Owner's operating personnel.

Functional Description Starts Here

1.17 FUNCTIONAL DESCRIPTION

The following set of control descriptions shall be incorporated in the Plant SCADA System designed and provided by the Integration Contractor. The following descriptions have been prepared based on specified equipment. The Integration Contractor shall modify this document as required to accommodate actual approved equipment shop drawings.

GENERAL REQUIREMENT FOR AUTOMATIC / REMOTE / LOCAL CONTROL SWITCHES, INDICATING LIGHTS AND TRENDING

The requirements listed here shall be adhered to for all motor operated devices controlled by the SCADA System unless specifically stated otherwise elsewhere in this specification. Motor operated devices shall be equipped with locally mounted switches that provide “HAND-OFF-AUTO” capability. The “AUTO” position shall allow operation through SCADA or the associated control panel PLC. The “HAND” position shall allow local operation of the device. The “OFF” position shall disable all operation of the device. Additional local controls such as “FORWARD-REVERSE”, if required, will be identified with the control requirements of the specific device.

All devices controlled by SCADA shall have locally mounted indicating lights that identify the status of the device such as open-closed or on-off.

All devices controlled by SCADA shall have their status recorded, and total run time or total elapsed time shall be trended. The SCADA shall allow totalizing of trended data.

A. WET WELL AND EQUALIZATION TANK LEVEL CONTROL

A system will be provided to control the fluid level in the wet well using four tank submersible influent pumps and a modulating equalization tank gate valve. The system integrator shall provide a system to measure, indicate, control, log and trend the wet well level control process.

Under normal operation, the pump station is dry and each of the gate valves is normally open. In a surge event, influent will begin to flow from the interceptor and fill the wet well. This will be detected by the wet well level sensor. Back-up float switches will also be used in case the wet well level sensor fails. Once the presence of influent in the wet well is sensed and rises to approximately 1 to 2 feet, the equalization tank gate valve will be closed.

Next, the influent tank pumps will be started one at a time to begin moving influent from the wet well to the equalization tank. Each of the four pumps will be cycled through in order to maintain maximum life from each pump. The control variable will be the wet well level. A maximum level will be operator selectable. This maximum wet well level will be maintained by modulating the speed and operation of the four tank influent pumps which are each VFD controlled.

The influent tank pumps will continue to run until the wet well level is satisfied and ceases to rise indicating that the surge event is complete. If level begins to rise again, the pumps will restart and continue to maintain the maximum wet well level as before. Once the surge event is complete, the process of draining the equalization tank will be next and this will only start upon manual initiation made by plant personnel.

In the event that the wet well level continues to hold steady while the pumps are in operation and the maximum level in the equalization tank is reached, then the pumps will be shut down and an alarm signal sent to the main plant via the telemetry equipment.

Draining of the equalization tank will be initiated manually by the plant. It can be initiated once the wet well level is low enough. Both a low level signal from the wet well and manual plant permission will be necessary to initiate equalization tank draining.

The first step of drainage will be opening the equalization tank gate valve to drain the equalization tank. The valve position will be modulated by the SCADA system in order to maintain an operator set flow rate for draining the equalization tank. This flow rate will be measured by the flow meter installed on the interconnecting line between the equalization tank and the wet well.

Once the tank is emptied, the gate valve will be set to full open and the pumping station will return to normal dry operation.

Manual override of all equipment will be possible locally. Each pump will have a local HOA and emergency stop control station. Each tank valve will also have a local HOA and manual open/close control station. Each of the level sensors and flow meters will have a local transmitter that also indicates the variable being measured.

High level alarms shall be programmed into the SCADA system for both the wet well and equalization tanks. These alarms will annunciate locally at the pump station as well as at the plant.

The SCADA System shall indicate, control and trend the following:

- Tank Influent Pump #1 Running
- Tank Influent Pump #1 Speed
- Tank Influent Pump #1 in Auto status
- Tank Influent Pump #1 Fail
- Tank Influent Pump #2 Running
- Tank Influent Pump #2 Speed
- Tank Influent Pump #2 in Auto status
- Tank Influent Pump #2 Fail
- Tank Influent Pump #3 Running
- Tank Influent Pump #3 Speed
- Tank Influent Pump #3 in Auto status
- Tank Influent Pump #3 Fail
- Tank Influent Pump #4 Running
- Tank Influent Pump #4 Speed
- Tank Influent Pump #4 in Auto status
- Tank Influent Pump #4 Fail

- Wet Well #1 Level
- Wet Well #1 High Level Alarm
- Wet Well #1 Pump #1 Run
- Wet Well #1 Pump #2 Run
- Wet Well #1 Pumps stop signal

- Wet Well #1 Low Level Alarm
- Wet Well #2 Level
- Wet Well #2 High Level Alarm
- Wet Well #2 Pump #3 Run
- Wet Well #2 Pump #4 Run
- Wet Well #2 Pumps stop signal
- Wet Well #2 Low Level Alarm
- Equalization Tank Level
- Equalization Tank High Level Alarm (from radar sensor)

- Equalization Tank Gate Valve Position Control Signal
- Equalization Tank Gate Valve % open indication

- EQ Tank Effluent Flow Signal

B. ODOR CONTROL FAN CONTROL

A system will be provided to control the operation of the odor control fans.

The SCADA system shall simply work to interlock the operation of the constant speed odor control fans with the operation of any of the tank influent pumps. If any single pump is in operation at any speed, the odor control fans shall both be interlocked to run.

Manual override of the fans will be possible locally. Each fan will have a local HOA and emergency stop control station.

Fan failure alarms shall be programmed into the SCADA system for both of the fan starters. These alarms will annunciate locally at the pump station as well as at the plant.

The SCADA System shall indicate, control and trend the following:

- Odor Control Fan #1 Run Signal
- Odor Control Fan #1 Alarm
- Odor Control Fan #2 Run Signal
- Odor Control Fan #2 Alarm

End of Functional Description

PART 2 PRODUCTS

2.01 MATERIAL FUNCTIONAL REQUIREMENTS

A. General:

1. The system shall provide all of the functions described hereinafter and as indicated in specifications and drawings, furnish all items of equipment, whether indicated or not, that are necessary to effect the required performance.

2.02 SIGNAL CHARACTERISTICS

A. All process variable (Analog) signals shall be 4-20 mAdc. Transmitters shall have a load resistance capability conforming to Class L. Transmitters and receivers shall be fully isolated.

B. Discrete signals are two-state logic signals (on/off) signals shall utilize 120V ac sources and interposing relays to provide dry contacts to the I/O system.

2.03 ENVIRONMENTAL CONDITIONS

A. Unless otherwise noted, equipment shall be suitable for the following environmental conditions:

1. Conditioned Air Environment (Electrical Room / Office):

a. Temperature: 40 to 105 degrees Fahrenheit
b. Relative Humidity 10 to 80 percent
c. Enclosure Rating: NEMA Type 12
d. Classification Nonhazardous

2. Corrosive Air Environment (Process Area):

a. Temperature: 40 to 105 degrees Fahrenheit
b. Relative Humidity 10 to 100 percent
c. Enclosure Rating: NEMA Type 4X
d. Atmosphere: Corrosive (H2S and salt spray)
e. Classification Nonhazardous

3. Rated Area Environment:
a. Temperature: 40 to 105 degrees Fahrenheit
b. Relative Humidity 10 to 100 percent
c. Enclosure Rating: NEMA 7
d. Classification Class 1, Division 1 or 2

2.04 SCADA SYSTEM

A. This section details the functional attributes of the pump station control/SCADA System including all remote terminal units and necessary peripheral equipment for the monitoring and automatic operation of specified equipment. The Integration Contractor shall provide all equipment, functions and services detailed in this specification. Minimal functional requirements are:

1. Automatic collection of operating data from remote and local sensors in a continuous polling mode of communications.

2. Execution of manual and automatic control commands, Alarm/Event detection, annunciation and recording, operating on a network utilizing distributed system and database concepts using an operator P.C. based system.

3. Provide intelligent operation interface with multi-user security levels, performing multi-tasking functions in a real-time environment.

4. Display system information via a color graphic display.

5. Trending and logging of requested data for historical records.

6. Download on-line control functions and database configuration.

B. The primary task of this system shall be to gather data, and to control equipment responsible for liquid levels, pressures and flows. It shall be the means by which operators monitor the remote and local facilities and are alerted to equipment failures, power outages, and other emergencies. The computer system shall be able to monitor the operation and provide capability to control the entire system. It shall provide color graphic displays of operational status and printed logs and reports of all digital information of varying types from different sites, both remote and local, and supply control output signals when required. It shall provide the ability to record data and provide access to that data in real-time as well as historical fashion.

C. The computer system shall also be able to support a remote operator station with communications to the central system over an Ethernet - TCP/IP plant wide local work area. This allows an operator to have the same interface and functions (such as alarming, eventing, trending, historical searches and supervisory control) at a remote location.

The remote operator station shall obtain display and trend data from the central system database in a transparent mode without affecting the operating programs or devices running on the central system.

Security, in the form of usernames and passwords, shall be in the same format as the central system. The remote operator station will have central system files, disk, programs and devices at the local location.

Diagnostics shall be incorporated in the design to support data link statistics via an on-line display or utility program to flag any communication errors.

D. The system shall utilize standard, modular, software to be fully debugged and provided with certified operational status. Software shall be the "off-the-shelf" variety with no special programming necessary. All software shall be stored on the included hard drives provided for the highest level of performance and security. All data base modifications, additional and control set points shall be easily modified in the field by the operator and downloaded on-line to the system when revisions or expansions are required with minimum interruption to data acquisition. User level commands shall be available to provide necessary system backup and archiving of data files.

E. Operator Stations (HMI)

One human machine interface station shall be provided for this project and it will be located in the control room as shown on plan.

F. Software

1. Provide software for the new SCADA node that is the same as the existing plant software. Include all necessary licensing for a minimum period of 2 years.

G. HMI Screen Programming

1. The following screens shall be configured at the HMI operator stations:

a. Main menu.
b. One screen for each process. Described in the "Functional Description" portion of this specification. The screens shall include information specified in the Functional Description.
c. Screens for all process set points.
d. Screens for last 24-hour alarms.
e. Help screen.

2.05 PROGRAMMABLE LOGIC CONTROLLER

A. Acceptable Manufacturers:

1. Schneider – M340 platform

B. Description: Provide programmable controllers that are compatible to the existing operating system with input/output modules, power supplies, cable connectors, mounting racks, and appurtenant equipment.

C. Service Conditions:

1. Temperature: (Operating) 32 to 140 degrees F, 0 to 60 degrees C.
2. Humidity: 5 to 95% without condensation.

D. Configuration:

1. Processor Unit: Include processor, power supply, random access erasable-programmable read only memory, input/output modules and all required hardware and software for a complete and functioning system. Memory size and operating speeds shall be best available at shop drawing submittal.
2. Remote Input/Output Unit: Include input/output modules, interface module and power supply for system inputs and outputs.

E. Power Supply:

1. Input Voltage: 120 volts, 60-Hz.
2. Surge Protection: Provide a transient voltage surge suppression system (TVSS) as sized by equipment manufacturer.

F. Application Software:

1. The Integration Contractor shall be responsible for all application logic development and programming.

G. Communication

1. The PLC's shall be configured to communicate (via Cat 6 and fiber optic cables) with all other PLC's, RTU's and OS's, printers and other peripheral equipment on the system's Ethernet. Communication shall be Ethernet (TCP/IP) (1000 Base-T).

2. Ethernet switches shall be unmanaged for this application, manufactured by:
   a. Phoenix Contact
   b. Wago

3. I/O status, alarm status and register data may be exchanged between PLC's and outputs of one PLC may be controlled by another PLC.

4. Provide modem for external communication with main plant. Modem shall be Red Lion DA50.

H. Input/Output Units

1. Digital Input Characteristics: 24-120 volts, dry contact from interposing relay.
2. Analog Input Characteristics: 4-20 milliamperes DC.
3. Digital Output Characteristics: 24-120 volts, dry contact from interposing relay.
4. Analog Output Characteristics: 4-20 millamperes DC.
5. Remote Input Output Communications Unit: Ethernet (TCP/IP) (1000 Base-T)
6. I/O point quantity:
   a. Digital Inputs: As required, plus 20 percent spare.
   b. Analog Inputs: As required, plus 20 percent spare.
   c. Digital Outputs: As required, plus 20 percent spare.
   d. Analog Outputs: As required, plus 20 percent spare.
7. Rack Assemblies
   a. Racks shall be sized such that at each different location, there is 20% spare register and I/O slots.

2.06 STRUCTURED CABLING SYSTEM

A. The Electrical Contractor is responsible for the structured cabling system cable and terminations.

B. The Integration Contractor shall coordinate the installation and termination types with the Electrical Contractor.

2.07 PANEL-MOUNTED INSTRUMENTATION

A. Type:

1. All instrumentation supplied shall be of the manufacturer's latest design and shall produce or be activated by signals which are established standards from the water and wastewater industries.

2. All electronic instrumentation shall be of the solid-state type and shall utilize linear transmission signals of 4 to 20 mAdc (milliampere direct current).

3. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission. No zero based signals will be allowed.

4. Equipment installed in a hazardous area shall meet class, group and division as shown on the contract electrical drawings, to comply with the National Electric Code.

5. All indicators and recorder readouts shall be linear in process units, unless otherwise noted.

6. Electronic equipment shall be of the manufacturer's latest design, utilizing printed circuitry and suitably coated to prevent contamination by dust, moisture and fungus. Solid state components shall be conservatively rated for their purpose, to assure optimum long term performance and dependability over ambient atmosphere fluctuations and 0 to 100 percent relative humidity. The field mounted equipment and system components shall be designed for installation in dusty, humid and slightly corrosive service conditions.

7. All equipment, cabinets and devices furnished hereunder shall be heavy-duty type, designed for continuous industrial service. The system shall contain products of a single manufacturer, insofar as possible, and shall consist of equipment models which are currently in production. All equipment provided shall be of modular construction and shall be capable of field expansion.

8. The field mounted equipment and system components shall be designed for installation in dusty, humid and slightly corrosive service conditions. Field cabinets and enclosures shall be suitable for environment or as a minimum, a NEMA 4x gasketed with multi-purpose latching doors and shall be provided with thermostatically controlled strip heaters to prevent condensation.

B. Electrical:

1. All equipment shall be designed to operate on a 60 Hertz alternating current power source at a nominal 120 volts, plus or minus 10%, except where specifically noted. All regulators and power supplies required for compliance with the above shall be provided between power supply and interconnected instrument. All power supplies shall have TVSS protection.

2. All analog transmitter and controller outputs shall be 4-20 milliamps.

3. All switches shall have double-pole double-throw contacts rated at a minimum of 600 VA, unless specifically noted otherwise.

4. Materials and equipment used shall be U.L. approved wherever such approved equipment and materials are available.

5. All equipment shall be designed and constructed so that in the event of a power interruption, the equipment specified hereunder shall resume normal operation without manual resetting when power is restored.

2.08 PANEL CONSTRUCTION (APPLIES TO SCADA RTU'S, RTU'S, MTU'S AND CONTROL PANELS SHOWN ON THE DRAWINGS):

A. Control Panels:

1. Panels shall be completely fabricated, instruments installed, and wired in the manufacturer's factory. All wiring shall be completed and tested prior to shipment. All external connections shall be by way of numbered terminal blocks.

B. Freestanding Panel Construction:

1. Freestanding panels shall be provided with switched fluorescent back-of-panel lights. One light shall be provided for every 4 feet of panel width and shall be mounted inside and in the top of the back-of-panel area.

2. Freestanding panels shall be provided with a 20-amp, 120-volt, duplex receptacle within the back-of-panel area. One duplex receptacle shall be provided for every three feet of panel width and spaced evenly along the back-of-panel area.

3. All panels shall be designed to permit continuous operation of all components mounted therein with panel ambient temperatures of up to 105 degrees Fahrenheit. Panels shall be provided with louvers and/or forced ventilation as required to prevent temperature build-up due to electrical devices mounted in or on the panel. Except for panels mounted with their back directly adjacent to a wall, louvers shall be in the rear of the panels, top and bottom and shall be stamped sheet metal construction. For panels mounted with their backs directly adjacent to a wall, louvers shall be on the sides. Forced ventilation fans, where used, shall be provided with washable or replaceable filters. Fan motors shall operate on 120-volt, 60-Hz power.

4. In addition to all NEMA standards, the smaller panels shall conform to the following requirements:

a. Minimum metal thickness shall be 14-gauge.

b. All doors shall be rubber-gasketed with continuous hinge.

c. Wherever practical, enclosures shall be a manufactured item, Hoffman, or approved equal.

d. All panels manufactured or fabricated shall be summarized, and the summary together with catalog cuts and/or shop drawings shall be submitted to the Engineer for review and marked by the Engineer to the effect that resubmittal is not required prior to purchase or fabrication.

e. Smaller panels shall be so sized as to adequately dissipate heat generated by equipment mounted in or on the panel.

f. Where panels are mounted outside or in unheated areas, they shall be provided with thermostatically controlled heaters that will maintain their inside temperature above 40 F.

g. Provide a door switch controlled, fluorescent light and a breaker protected, 120 V 15A amp duplex receptacle within each panel.

C. Control Panel Electrical:

1. Power Distribution Within Panels:

a. Each panel will be provided with a 120V ac, 60-Hz feeder circuit from the associated circuit breaker distribution panel provided under Electrical. On each panel, make provisions for feeder circuit conduit entry and provide a terminal board for termination of the wires. Panel shall have TVSS protection.

b. Provide master circuit breaker and a circuit breaker on each individual circuit distributed from the panel as shown. The circuit breakers shall be grouped on a single subpanel. Provide subpanel placement so that there is a clear view of and access to the breakers when the door is open. Opening the main breaker will interrupt all 120 VAC circuits (there shall be no 120 VAC on terminal blocks from remote devices).

D. Wiring:

1. All electrical wiring shall be in accordance with the applicable requirements of the NEC. Wires shall be 600-volt class, PVC insulated stranded copper and shall be of the sizes required for the current to be carried, but not below 12 AWG enclosed in either sheet metal raceway or plastic wiring duct. Wiring for 4 to 20 mA signal circuits shall be twisted shielded pairs not smaller than No. 16 AWG, and be separated at least 6 inches from any power wiring.

2. All interconnecting wires between panel mounted equipment and external equipment shall be terminated at numbered terminal blocks.

3. All wires shall be identified per the requirements of Electrical section.

E. Terminal Blocks:

1. Terminal blocks shall be one-piece molded plastic blocks with screw type terminals and barriers rated for 300 volts. Terminals shall be double sided and supplied with removable covers to prevent accidental contact with live circuits. Terminals shall have permanent, legible identification, clearly visible with the protective cover removed.

2. Wires shall be terminated at the terminal blocks with crimp type, preinsulated, ring-tongue lugs. Lugs shall be of the appropriate size for the terminal block screws and for the number and size of the wires terminated.

3. Terminal blocks shall be Allen-Bradely Bulletin 1492, Style CD-3 or approved equal.

F. Relays:

1. Signal circuit switching shall be accomplished with analog signal switching relays shall be provided to switch either 4 to 20 mA dc signals. Units shall have double-throw dry circuit contacts in a break-before-make configuration rated for 10 amps at 120 volts minimum. The number of poles and coil energization voltage shall be as required. Signal switching relays shall be sealed to prevent entry of contamination in the form of dust, dirt or moisture.

2. Control circuit switching shall be accomplished with relays. These relays, for interfacing and control applications, shall be the compact general-purpose plug-in type having low coil inrush and holding current characteristics. Contact arrangements shall be as shown, and shall be rated for not less than 10 amperes at 120 Vac. Coil voltage shall be as shown. Nonlatching relays shall have a single coil. Latching relays shall have two coils, unlatching being accomplished by energizing one coil, and latching being accomplished by energizing the other coil. Relays shall have plain plastic dust covers, test buttons, and mounting sockets with screw terminals and hold-down springs. Relays shall be Allen-Bradley Bulletin 700, Square "D" Class 8501, Cutler-Hammer General Purpose or approved equivalent.

3. Time delay functions shall be accomplished with time delay relays. Units shall be adjustable time delay relays with the number of contacts and contact arrangements as shown. Contacts shall be rated for 10 amperes at 120V Ac. Integral knob with calibrated scale shall be provided for adjustment of time delay. Initial setting shall be as shown with time delay range approximately three items the initial setting. Time delay responsibility shall be at least ten to one. Operating voltage shall be 120V ac, plus 10 percent, minus 15 percent at 60 Hz. Operating temperature shall be minus 20 F to 165 F. Repeat timing accuracy shall be plus or minus 10 percent over the operating range. Units shall be Allen-Bradley Bulletin 700, Square "D" Class 9050 or Cutler-Hammer; Eagle Signal controls; or equivalent.

4. All relays shall have a screw terminal interface with the wiring. Terminals shall have a permanent, legible identification Relays shall be mounted such that the terminal identifications are clearly visible and the terminals are readily accessible.

G. Panel Touch Screens:

1. Screens shall be 12" color.
2. Screens shall have Ethernet communication compatibility.
3. Screens shall be 120V AC.
4. Screens shall be Schneider Magellis HMI.

2.09 NAMEPLATES, NAME TAGS, AND SERVICE LEGENDS

A. All components provided under this section shall be provided with permanently mounted name tags bearing the entire ISA tag number of the component. Panel mounted tags shall be plastic.

B. The panel drawings refer to nameplates and service legends; nameplates are defined as inscribed laminated plastic plates mounted under or near a panel face mounted instrument. Service legends are defined as inscribed laminated plastic integrally mounted on a panel face mounted instrument.

C. Service legends and nameplates shall be engraved, rigid, laminated plastic type with adhesive back. Unless otherwise noted, color shall be black with white letters and letter height shall be 3/16-inch.

D. Each panel shall be provided with a face mounted laminated nameplate as specified above. Unless otherwise noted, color shall be black with white letters 1/2-inch high.

E. Standard Light Colors and Inscriptions.

Unless otherwise noted in the individual Loop Specifications, the following color code and inscriptions shall be followed for the lenses of all indicating lights:

1.

TAG	INSCRIPTIONS	COLOR
ON	ON	RED
OFF	OFF	GREEN
CLOSED	CLOSED	RED
OPEN	OPEN	RED
LOW	LOW	RED
FAIL	FAIL	RED
HIGH	HIGH	AMBER
AUTOMATIC	AUTO	WHITE
MANUAL	MAN	BLUE
LOCAL	LOCAL	WHITE
REMOTE	REMOTE	AMBER

2. Lettering shall be black on white, yellow and amber lenses. Lettering shall be white on red and green lenses.

F. Unless otherwise noted in the individual Loop Specifications, the following color code and inscriptions shall be followed for all pushbuttons:

1.

TAG	INSCRIPTIONS	COLOR
OO	ON	RED
	OFF	GREEN
OC	OPEN	RED
	CLOSE	GREEN
OCA	OPEN	RED
	CLOSE	GREEN

	AUTO	WHITE
HOA	HAND	RED
	OFF	GREEN
	AUTO	WHITE
MA	MANUAL	YELLOW
	AUTO	WHITE
SS	START	RED
	STOP	GREEN
RESET	RESET	BLACK

2. All unused or noninscribed buttons shall be black. Lettering shall be black on white for yellow buttons. Lettering shall be white on black for red and green buttons.

3. All push buttons, pilot lights, selector switches shall be 30.5 mm, watertight/oiltight, or as indicated, as manufactured by Allen-Bradley Bulletin 800T or approved equal.

G. Electrical Transient Protection:

1. All control equipment mounted outside of protective structures (field mounted equipment) shall be equipped with suitable surge-arresting devices to protect the equipment from damage due to electrical transients induced in the interconnecting lines from lighting discharges or nearby electrical devices. Protective devices used on 120 Vac inputs to field mounted equipment shall be secondary valve surge protectors conforming to the requirements of IEEE Standard 28-1972 (ANSI C62.-1-1971).

2.10 UNINTERRUPTIBLE POWER SYSTEM (UPS)

A. All desktop PC's, RTU's and MTU's shall be protected electrically by an on-line UPS. The UPS shall have (as a minimum) the following features:

1. During normal operation the UPS shall convert line power into clean, regulated, on-line, computer grade power. When line power is unacceptable or gone completely, the UPS shall create pure sine wave power with no interruptions to the computer. UPS shall be provided by Liebert or approved equal.

2. The UPS shall conform to the following specifications:

a. Lightning and surge protection: shall meet ANSI/IEEE C62.41 Cat A & B

b. Input: 0-138 Vac

c. Output: 120 Vac

d. Output waveform less than 5% THD

e. UL listed

f. Warranty: one full year

B. UPS's shall be manufactured by Phoenix Contact or Wago.

2.11 DC LOOP POWER SUPPLIES

A. Each power supply shall be enclosed in a NEMA type 1 enclosure, vertical surface mounting type, with surface barrier screw terminals for load connection. Each power supply shall be equipped with a power on/off circuit breaker.

B. Power supplies shall meet the following specifications:

1. Input Power: 115 V AC ±10 percent, 60 Hz.
2. Output Voltage: 24 V DC.
3. Output Voltage Adjustment: 5 percent.
4. Line Regulation: 0.05 percent for 10 percent line change.
5. Load Regulation: 0.15 percent to no load to full load.
6. Ripple: less than 3 millivolt RMS.
7. Operating Temperature: 32-140 degrees F.

C. Size power supplies to accommodate present load plus 25 percent spare capacity.

D. Provide a relay contact to indicate the on/off status of the power supply.

E. Provide power supply output overvoltage and overcurrent protective devices to protect the instruments from damage due to power supply failure and to protect the power supply from damage due to external failures.

F. Mount power supplies such that dissipated heat does not adversely affect other components.

2.12 PANEL INSTRUMENTS

A. Indicators

1. Acceptable Manufacturers:
   a. Dixson, Inc.
   b. or approved equal.
2. Indicator, Electronic, Bar Graph
   a. Function: Receive a process variable signal and display the value in engineering units, both digitally and in a vertical bar graph.
   b. Type: Single-station, panel-mounted, liquid crystal display (LCD) digital/bar-graph indicator.
3. Performance
   a. Scale Range: As noted.
   b. Accuracy: 0.1 percent ±1 count on digital indicator.
   c. Resolution:

1) Bar-Graph (101 Segments): 1.0 per full scale.
2) Digital (Three Digits, 0.2 Inch High): 0.1 percent of full scale.

d. Linearity: 0.1 percent of full scale.
e. Operating Temperature: 0-60 degrees C.

4. Features
   a. LCD bar-graph and three-digit display.
   b. Electroluminescent backlighting.
   c. End-zero bar graph.
   d. Vertical orientation.
   e. Under and over range indication.
5. Signal Interface
   a. Hardwired Analog Input Signal: 4-20 mA, isolated input.
   b. Detachable screw terminal connector.
6. Enclosure
   a. Type: Integral metallic DIN-sized housing.
   b. Mounting: Front panel.
   c. Dimensions: 1.5 inch by 6 inch face by 6 inches deep.
7. Power
   a. Voltage: 120V AC, 60-Hz.

2.13 DIGITAL PAPERLESS RECORDING STATION

A. The recorder shall be microprocessor based providing continuous trending for up to four inputs. The unit shall contain an integrally mounted alphanumeric display for sequential or continuous indication of recorder values. The unit shall be field configurable via an integral multi-function keypad. Configuration and calibration information shall be password protected and stored in nonvolatile memory.

B. Recording shall be continuous. Speed shall be configurable from 1 to 4096 hours per revolution.

C. The recorder shall accept a 4-20 mA dc input signal with field configurable ranges. Input and display resolution shall be 0.01% of full scale. Display and recording accuracy shall be +/-0.1% and +/-0.25% full scale, respectively. Repeatability shall be 0.02% of span. Output accuracy shall +/-0.1% of engineering unit span.

D. The unit shall be provided with the capability to totalize up to four (4) configured channels. The totalizer shall be configurable as a nonresettable or resettable totalizer, with continuous, preset up, of preset down capabilities. Contact outputs shall be available for remote totalization of the selected channels.

E. The recorder shall be powered by 120 V ac, 60 Hz. Unit shall provide isolated 28 V dc, 22mA power for up to four remote-mounted, 2-wire transmitters.

F. The recorder shall be suitable for surface mounting as required. The enclosure shall be of stainless steel, NEMA 4X, with locking door, tamper evident feature and shatterproof glass window.

G. The Digital Recorder shall be as manufactured by Eurotherm, Honeywell, the Foxboro Company, or approved equal.

2.14 ALARM INDICATION LIGHTS

A. The alarm indication light shall be a red, LED, 100,000 hour, strobe light capable of providing 80 high-intensity flashes per minute. The housing shall be UL listed, NEMA 4X, watertight and corrosion resistant, suitable for outdoor use and IP65 rated.

B. The alarm indicating light shall operate on 120 VAC and shall incorporate a voltage in-rush limiting printed circuit board.

C. The alarm indicating light shall use a 1/2 inch pipe mount and bracket as required to mount indicating light 3 feet above building.

D. The alarm lights shall be manufactured by Federal Signal Corporation, Edwards-Signals, Square D, or approved equal.

2.15 ALARM INDICATION HORNS

A. The alarm horn shall be a heavy-duty, high volume, 30 watt, 110 db minimum, industrial signaling device capable of producing volume controlled, high-decibel tones. The horn shall use a microprocessor circuit to create 20 different tones. A single tone shall be selectable using an integral selector switch. Provide a list of tones to the plant operator for selection and set tones in field.

B. The alarm horn shall operate from a field-wired, normally open contact on a 120 VAC external voltage source.

C. The alarm horn shall be UL listed for outdoor use and as a minimum be NEMA 3R and IP44 rated. Mount speaker to bracket system 3 feet above building, rotate speaker in direction as directed in field.

D. The alarm horn shall be manufactured by Federal Signal Corporation, Edwards-Signals, Square D, or approved equal.

2.16 ANNUNCIATOR

A. Power Supply: 120 V.
B. Internal Supply Voltage: 24-48 V DC.
C. Illuminated Indicators and nameplates for 18 alarm points.
D. Module for power on and pushbuttons for alarm acknowledge, test, and reset.
E. Panel mount modular configuration with 2 high by five wide. Modules shall accommodate two lenses each.
F. Integral alarm horn with on/off selector switch.
G. Integral reflash relay.
H. Annunciator shall include all necessary equipment to interfacewith the PLC and transmit area alarm conditions to the main OS.

2.17 ACCESSORIES

A. Plastic Raceway

1. Carlon, Hoffman Engineering Co., or approved equal.
2. Description: Open slot wiring duct.
   a. Rigid vinyl (PVC) bodies.
   b. Smooth edges with side holes opposite each other.
   c. Hi-impact rigid vinyl snap-on covers.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. General:

1. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.

2. Coordinate I and C work with the Owner, the General Contractor and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the plant during construction.

3. Provide a qualified Field Service Engineer (FSE) to guide and assist in the handling, placement, installation and checkout and to be on-site whenever any equipment is being installed.

4. Cooperate with the Electrical Contractor to provide a complete exchange of information as necessary to install equipment provided.

5. Forward copies of correspondence between you and the Electrical Contractor to the project manager.

B. Protection during Construction:

1. Throughout this Contract, provide protection for materials and equipment against loss or damage and the effects of weather. Prior to installation, store items in indoor, dry locations. Provide heating in storage areas for items subject to corrosion under damp conditions. Specific storage requirements shall be in accordance with the Engineer-reviewed I and C Subcontractor's recommendations.

C. Material and Equipment Installation:

1. Follow manufacturer's installation instructions explicitly. Wherever any conflict arises between manufacturer's instructions, and these Contract Documents, verify with manufacturer the proper way to install the equipment. Shop drawings shall be considered as means and methods of installation. Keep copy of manufacturer's installation instructions on the jobsite available for review at all times.

D. Removal or Relocation of Materials and Equipment:

1. Where existing materials and equipment are removed or relocated, remove and deliver to the Owner all materials no longer used unless otherwise directed by the project manager. Repair affected surfaces to conform to the type, quality, and finish of the surrounding surface in a neat and workmanlike manner Follow any specific instructions given by the project manager.

E. Equipment Finish:

1. Provide materials and equipment with manufacturer's standard finish system in accordance with Painting Specifications. Provide manufacturer's standard finish color, except where specific color is indicated. If manufacturer's has no standard color, finish equipment with light gray color.

F. Cleaning and Touch-up Painting:

1. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris form premises and from interior and exterior of all devices and equipment. Touch-up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish.

G. Panels and Panel-Mounted Equipment:

1. Panels and panel-mounted equipment shall be assembled as far as possible at the Integration Contractor's plant. No work, other than correction of minor defects of minor transit damage, shall be done on the panels at the jobsite.

H. Equipment Furnished by Integration Contractor and Installed by Electrical/General Contractor:

1. I and C Supplier shall observe and advise on the installation, to the extent required to certify in writing that the equipment will perform as required.

3.02 CONTROL VALVES

A. Verify correctness of installation. Calibrate and adjust all positioners and I/P transducers and verify correct control action. Adjust limit switch settings. Adjust opening and closing speeds and travel stops.

3.03 ELECTRICAL POWER AND SIGNAL WIRING

A. Control and signal wiring external to the control panels and all power wiring shall be by the Electrical Contractor. Parallel runs of Power (120 Vac) and signal (4-20 mA) shall be separated by 2 feet.

B. Control and signal wiring in control panels shall be restrained by plastic ties or ducts. Hinge wiring shall be secured at each end so that any bending or twisting will be around the longitudinal axis of the wire and the bend area shall be protected with a sleeve.

C. Arrange wiring neatly, cut to proper length, and remove surplus wire. Provide abrasion protection for any wire bundles which pass through holes or across edges of sheet metal.

E. Use manufacturer's recommended tool with the proper sized anvil, for all crimp terminations. No more than one wire may be terminated in a single crimp lug and no more than two lugs may be installed on a single screw terminal. Wiring shall not be spliced or tapped except at device terminals or terminal blocks.

E. All signal wiring shields shall be grounded at control panel only.

3.04 INSPECTIONS

A. All materials, equipment, and workmanship shall be subject to inspection at any time by the Engineer or his representatives. Correct any work, materials, or equipment not in accordance with these Contract Documents or found to be deficient or defective in a matter satisfactory to the Engineer at no additional cost to the Owner.

B. Perform the following inspections of the installed equipment:

1. Certify in writing that the equipment has been installed per drawings and recommended installation procedures. Report any discrepancies.

2. Certify in writing that the equipment power and grounding requirements have been satisfied. Report any discrepancies.

3. Certify in writing that terminations to the equipment are property installed. Report any discrepancies.

4. Certify that the system is ready for field testing.

C. In addition to installation assistance required by the Electrical Contractor, provide other on-site services for:

1. Process meetings

2. Pre-shipment site visits

3. Field testing

4. Training

5. Operational availability demonstration

6. Time to repair or correct shipping defects and additional trips as a result of shipping problems.

END OF SECTION

Enbridge Gas Ohio
320 Springside Drive
Akron, OH 44333

10/25/2024

Thomas Voldrich
CT Consultants, Inc.
8150 Sterling Court
Mentor, OH 44060

Mr. Voldrich:

Project: South Interceptor Equalization Tank Imp – 500009051-0002, North Olmsted, Cuyahoga County

The East Ohio Gas Company d/b/a Enbridge Gas Ohio (Enbridge) appreciates this opportunity to work with you in the planning stages of your development (or construction activity), and we look forward to working with you proactively. Enbridge's primary concern when activities are taking place near our pipeline is public safety and environmental protection. The intent of this correspondence is to provide a clear and consistent set of requirements that will: (1) reduce the risk of damage to our pipeline and related facilities; (2) ensure unencumbered access to our right-of-way and pipeline facilities and the availability of adequate workspace for routine maintenance, future inspection, and/or repair work on our pipeline; and (3) enable the effective corrosion protection of our pipeline.

At this time, Enbridge does not approve the above reference project as provided by your office on 10/11/2024. For Enbridge to continue with the approval process, please review the attached conflict sheet (if applicable) and requirements set forth in this correspondence and make necessary corrections to the plans previously submitted to this office for Enbridge's review and approval. No construction may take place until approval is granted.

Upon review of the documentation submitted into Enbridge, please see the following:

- Enbridge retains the rights for the existing Enbridge facilities and appurtenances within the limits of this project. Enbridge requests that you design your proposed work around its facilities, if possible. Enbridge will require 100% reimbursement for any and all costs associated with the relocation of Enbridge facilities and/or appurtenances from the public authority responsible for the project including, but not limited to, the following instances:

  1. Public or private proprietary utility construction including, but not limited to, electric power, regional transit authority, steam, sanitary sewer, telecommunications, or water.

  2. Where multiple relocations are required to facilitate the public authority construction phasing.

  3. Enbridge reserves the right to require payment before beginning the design and construction of the relocation project. If you wish to proceed with the billable relocation, a letter of commitment will be required and sent to you for review. After Enbridge receives the signed letter of commitment and payment, Enbridge will begin to prepare the necessary plans and cost estimate.

- All facilities and easement areas will be depicted, dimensioned, and identified on all survey plats, improvements, development plans and plats. Where Enbridge holds undefined rights, all plans and the final recordable plat will dedicate these areas as being restricted areas.

- **You are required to contact OHIO811.org Call Before You Dig (1-800-362-2764) or 811, prior to your excavation or hand digging and submit an excavation ticket.** In addition to hand digging, you may use non-destructive pipeline location methods, such as vacuum potholing and ground penetrating radar (GPR). As required by statute, Enbridge acknowledges its pipelines, as a rule, were installed at approximately thirty-six (36) inches deep. At concerned points where you need to know the location and elevation of Enbridge's pipeline, you may excavate by hand digging to temporarily expose the pipeline enabling you to obtain the necessary information.

- That the following note shall be added to your plans for the benefit of your contractor:

"It is the contractor's responsibility to maintain the lateral and subjacent support of Enbridge's pipeline(s), in compliance to 29 CFR, Part 1926, subpart P, (safe excavation & shoring). Extreme care should be taken not to harm any Enbridge facility (pipelines, etc.) or appurtenance (pipe coating, tracer wire, cathodic protection test station wires & devices, valve boxes, etc.). Enbridge facilities must be protected with a tarp during bridge construction. The contractor will be responsible and liable for ensuring that all Enbridge existing facilities, above and below ground, remain undamaged, accessible and in working order. The crossing of Enbridge's pipeline(s) with another steel facility may create a potential corrosion issue for the proposed facility and the existing Enbridge facility. Please contact Enbridge's Corrosion Department at least two working days before construction at: CorrosionGIS@dominionenergy.com.

- Enbridge will pursue reimbursement for all costs associated with the event including, but not limited to, excavation services, inspection services, pipeline repairs, and loss of operations caused by the requesting party or its contractors.

Since over 1000 gas companies now operate in Ohio, proper pipeline identification is necessary to assure minimum critical response time. We request that you add the following general note to your construction plans: EGO = Enbridge Gas Ohio, 1-800-362-7557. Enbridge's facilities should be identified appropriately on your construction plans.

Enbridge's response is based on the project information you or others provided for this project. The location of Enbridge facilities within the project area are based on the records of the original installation, and are therefore approximate, and not guaranteed. Enbridge has no knowledge or information of changes that may have been made to the site after the original installation. Any reliance on the information provided is solely at the risk of the user, who agrees to indemnify, defend, and hold Enbridge, its shareholders, officers, directors, employees, representatives, agents, parent, affiliates, and subsidiaries harmless, to the fullest extent permitted by law, from and against any and all loss, claims, demands, damages, injuries, or suits in anyway arising out of or incident to its use.

To avoid personal injuries, property damages, legal actions, etc., no construction, grading or excavating should begin within thirty (30) feet of any Enbridge high pressure natural gas pipeline without written approval from Enbridge. No improvements of any kind should be made by any party other than Enbridge within one hundred (100) feet radius of a Enbridge Gas Well and/or Enbridge Brine/Oil Tank.

Enbridge requests electronic files for this project in AutoCAD 2018 format for use in preparing our relocation plan. AutoCAD files cannot contain XREFS, AutoCAD civil 3d or AEC objects. MicroStation files will need to be converted to AutoCAD.

Enbridge will not be liable for nor accept any contractor delay costs that the company has not had an opportunity to review, dispute and/or resolve.

Please maintain communication with this office regarding the project and its schedule. Contact me if you have any questions.

Sincerely,

ENBRIDGE GAS OHIO

Joshua Joseph Mis
Engineering Department
Email: joshua.j.mis@dominionenergy.com
Phone: 330-571-9135