OMAR N. BRADLEY AIRPORT
MOBERLY, MISSOURI

MoDOT PROJECT NO. 15-034A-1 & AIR 156-034A

Sanitary Sewer Improvements

ADDENDUM NO. 1

May 22, 2017

TO ALL PROSPECTIVE BIDDERS:

A. You are hereby notified of the following amendments to the Contract Documents/Specifications for the subject project.

1. Section 331203 – Submersible Pump, Part 1 Section 1.1, paragraph B shall be revised as follows:

B. The pumps shall be vertical, submersible, grinder, vertical discharge, close-coupled, centrifugal type pumps suitable for continuous operation in a wet pit installation. Two (2) pump units and all equipment shall be provided, including 60' of manufacturer supplied cable connected to each pump. The pumps shall be as manufactured by Flygt, KSB, Hydromatic, ABS or equal.

Revised Section 33 1203 is included with this addendum for reference.

2. Section 331203 – Submersible Pump, Part 2 Section 2.2, paragraph H shall be revised as follows:

H. Grinder Construction: Grinder assembly shall consist of a single rotating grinder impeller and a single stationary shredding ring/plate mounted directly below pump volute inlet. Grinder impeller shall thread onto shaft and shall be locked with a screw and washer. Shredding ring shall be held in place by a steel retaining clamp. Both shredding ring and grinder impeller shall be removable without dismantling pump. No adjustment of grinder assembly shall be necessary for proper grinder operation. Multiple grinder impeller assemblies requiring initial or periodic axial adjustment for proper operation shall not be considered equal. Grinder impeller and shredding ring shall be made of 440C stainless steel hardened to 56-60 Rockwell.

Revised Section 33 1203 is included with this addendum for reference.

3. Section 33 12 04 Pump Station Construction, Part 2, Section 2.1. paragraph J, paragraph 6 was added:

6. Monitoring: Pump station monitoring shall be supplied by Mission Communications and shall be coordinated with Owner.

Revised Section 33 1204 is included with this addendum for reference.

B. You are hereby notified of the following amendments to the Construction Plans for the subject project.

1. Sheets E1 – E3 Electrical Plans have been revised.

Revised Construction Plan Sheets No. E1-E3 are included with this addendum for reference.

C. All bidders must acknowledge receipt of this addendum in the space provided on page PF-3 of the Proposal Form. **Failure to acknowledge receipt of an addendum may be cause for rejection of the bid.**

SECTION 33 1203 - SUBMERSIBLE PUMP

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers the furnishing and installation of the submersible pumps complete with mechanical and electrical equipment, electrical services for the pumping station, and all miscellaneous work and appurtenances required to complete the pumping station to be ready for operation, including start-up and check of all equipment and operation.

B. The pumps shall be vertical, submersible, grinder, vertical discharge, close-coupled, centrifugal type pumps suitable for continuous operation in a wet pit installation. Two (2) pump units and all equipment shall be provided, including 60' of manufacturer supplied cable connected to each pump. The pumps shall be as manufactured by Flygt, KSB, Hydromatic, ABS or equal.

1.2 SUBMITTALS

A. Drawings and Data: Complete assembly, and installation drawings, together with detailed specifications and data covering material used, parts, devices, and other accessories forming a part of the equipment furnished, shall be submitted in accordance with the procedure set forth in the General Conditions. The data and specifications for each unit shall include, but shall not be limited to, the following:

1. Pump:
    a. Name of manufacturer.
    b. Type and model.
    c. Rotative speed.
    d. Size of pump outlet.
    e. Type of seal.
    f. Net weight of pump only.
    g. Complete performance curves showing capacity, head, NPSH requirements, efficiency, and bhp requirements.
2. Motor:
    a. Name of manufacturer.
    b. Type and model.
    c. Rated size of motor (hp).
    d. Temperature rating.
    e. Full load rotative speed.
    f. Weight.
    g. Input-output efficiency at:
        1) Full load.
        2) Rated pump condition.
    h. Full load current.
    i. Locked rotor current.
    j. Pump cable length and conductor size.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Piping, Fittings and Valves: Piping, fittings and valves shall conform to the Sections 331113 and 331216.

B. The pump manufacturer shall be responsible for and supply of pumps, pump controls, and incidental equipment necessary for an operable system. Items supplied shall in no way void the pump manufacturer's warranty.

C. Pumps:

1. Materials for pump construction shall conform to the following specifications:

Casing	Cast Iron, ASTM A-48 Class 30
Impeller	Cast Brass or Ductile Iron
Shaft	416 Stainless Steel, AISI420
Bearings	Pre Lubricated Ball Bearing
Wear Rings	Cast Iron, ASTM A-48 Class 30
Seals	Silicon/Carbide - Lower and Carbon/Carbide - Upper

2.2 PERFORMANCE REQUIREMENTS

A. Pumping heads and other terms shall be as defined in the Standards of the Hydraulic Institute. For design and rating purposes, the water to be pumped shall be assumed to have a temperature of 68° F. The pumping units shall be designed for the following operating conditions:

1. Pump Information:

Duty Points	Single Operation
Shut-off head, feet	65.0
Design operating capacity, gpm	50
Total head at design capacity, feet	60
Maximum rotative speed of pump, rpm	3450
Maximum bhp requirement at any head above minimum for continuous operation	3.0
Minimum nominal size of discharge flange, inches	3
Minimum shop test pressure, psi	125

2.3 GENERAL REQUIREMENTS

A. Casing: Shall be manufactured from gray cast iron, ASTM A-48 Class 30. Casing design shall be centerline discharge with large radius on the cut water to prevent clogging.

B. Pump Impeller: The impeller shall be a recessed vortex type to provide an open unobstructed passage through the volute for the ground solids. Impeller shall be cast brass or ductile iron and shall be threaded onto stainless steel shaft.

C. Pump Shafting: The pump motor shaft shall be one piece 416 SST, rotating on two permanently lubricated ball bearings.

D. Bearings: Motor shall have two heavy duty ball bearings to support pump shaft and take radial and thrust loads and a sleeve guide bushing directly above the lower seal to take radial load and act as flame path for seal chamber. Bearings to have a minimum B-10 life of 50,000 hours.

E. Seals: Motor shall be protected by two mechanical seals mounted in tandem with a seal chamber between the seals. Seal chamber shall be oil filled to lubricate seal face and to transmit heat from shaft to outer shell.

Seal face shall be carbon and ceramic and lapped to a flatness of one light band.

F. Seal Leak Detection: A mechanical seal failure protection shall be provided by a mechanical float switch located in a chamber above the seal. This switch shall be comprised of a magnetic float that actuates a dry reed switch encapsulated within the stem. Should the mechanical seal fail, liquid shall be directed into the float chamber, in which the rising liquid activates the switch opening the normally closed circuit. The float body and float shall be a polypropylene material with a 316ss stopper.

G. Temperature Protection: Motor over temperature protection shall be provided by miniature thermal protectors embedded in the windings.

H. Grinder Construction: Grinder assembly shall consist of a single rotating grinder impeller and a single stationary shredding ring/plate mounted directly below pump volute inlet. Grinder impeller shall thread onto shaft and shall be locked with a screw and washer. Shredding ring shall be held in place by a steel retaining clamp. Both shredding ring and grinder impeller shall be removable without dismantling pump. No adjustment of grinder assembly shall be necessary for proper grinder operation. Multiple grinder impeller assemblies requiring initial or periodic axial adjustment for proper operation shall not be considered equal. Grinder impeller and shredding ring shall be made of 440C stainless steel hardened to 56-60 Rockwell.

I. Discharge Connection Elbow & Guide System: The discharge connection elbow shall be permanently installed in the basin wet well along with the discharge piping. The pump shall be automatically connected to the discharge connection elbow when lowered into place, and shall be easily removed for inspection or service. Sealing of the pumping unit to the discharge connection elbow shall be accomplished by a simple linear downward motion of the pump. A sliding guide bracket shall be an integral part of the pump unit. The entire weight of the pump unit shall be guided guide bars, pipes or cables, and shall press tightly against the discharge connection elbow creating a zero leakage seal between pump and discharge connection flange. Sealing of the discharge interface shall be by means of metal-to-metal contact without use of bolts, gaskets or o-rings.

Lower guide pipe shall be integral with the discharge connection. Guide apparatus shall be of at least schedule 40 weight 304SS stainless steel of the size indicated on the drawings. The guide apparatus shall not support any portion of the weight of the pump. No portion of the pump shall bear directly on the floor of the wet well. Stainless steel pull chains shall be provided with each pump unit, which allow for removal and reinstallation without the need to enter the wet well, and without removal of bolts, nuts, or other fasteners.

J. Electric Motors: Submersible pump motor shall be squirrel-cage induction, shell type design, housed in an air-filled, watertight chamber, NEMA MG-1 Design B type, and shall be rated for 240 VAC, 1 phase, 60 Hz. The motor shall have built-in thermal overload protection and a moisture detection system. The motors shall be rated for NEC Class 1, Division 1, Group C & D (explosion proof). Provide 60' of manufacturer supplied cable connected to each pump

K. Balance: All rotating parts shall be accurately machined and shall be in as nearly perfect rotational balance as practicable. Excessive vibration shall be sufficient cause for rejection of the equipment. The mass of the unit and its distribution shall be such that resonance at normal operating speeds in avoided.

L. Shop Painting: All iron and steel parts which will be in contact with water after installation, except inside of the bowl assembly, shall be shop cleaned by sandblasting and painted with a suitable coating system. The coating system shall produce a dry film thickness of at least 10 mils and shall consist of a prime coat and one or more finish coats. Finish coat materials shall be furnished with each pump for field touch-up if necessary.

M. Shop Tests: Each pump shall be tested at the factory for capacity, power requirement, and efficiency at minimum head for continuous operation, rated head, shutoff head, and at as many other points as necessary for accurate performance curve plotting. All tests shall be made in conformity with the requirements and recommendations of the Hydraulic Institute.

N. Pump Station Controls & Equipment: Shall be as described in Section 331204.

PART 3 - EXECUTION

3.1 INSTALLATION OF PUMPS

A. After assembly and installation on the concrete foundations, each pump shall be plumbed, aligned, and wedged in place but not grouted until after the initial fitting and alignment of connecting piping. Attention is directed to the requirements of the pipe sections concerning flanged connections to pumps.

B. The base elbow shall be grouted in place with non-shrinking grout.

3.2 START-UP

A. After installation of the equipment and prior to operation of the facility, all equipment shall be checked out and calibrated by an authorized factory representative. Installation certifications, test reports and warranties shall be submitted and the operator training session shall be conducted.

END OF SECTION 33 1203

SECTION 33 1204 – PUMP STATION CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. The work in this section shall consist of items of construction for the submersible pump station, specifically including the wet well special coatings, pumps, valves and valve vault, controls and all incidentals necessary for the construction of the pump station.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The materials shall conform to the respective Specifications described herein.

B. Pumps: Submersible pumps shall conform to Section 331203.

C. Pipe: Pipe and fittings shall conform to Section 331113.

D. Valves: Valves shall conform to Section 331216.

E. Valve Vault: Precast vault shall conform to Section 331100.

F. Electrical: Electrical shall conform to Section 261000.

G. General: Shop drawings for the float equipment and coatings shall be submitted to the Engineer for approval.

H. Wet Well Coating: The interior surface of the pump station wet well shall receive a protective coating prior to operation. The coating shall conform to Section 099630.

I. Protective Pipe Coatings: The exterior of all underground and wet pit ductile iron piping shall have a bituminous coating.

Dry pit ductile iron piping shall have a shop coat universal phenolic primer suitable for top coat painting.

J. Pump Station Controls and Equipment:

1. Motor Starter: Starters shall be rated in accordance with latest published NEMA standards for size and horsepower rating. Starters shall be mounted in a NEMA 1 enclosure unless otherwise indicated. Across-the-line starters shall be equipped with double break silver alloy contacts. Coils shall be of molded construction. All coils shall be replaceable from the front without removing the starter from the panel. Single-phase magnetic starters shall have solid state overload relays.

2. Pump Control Panel: Input voltage shall be 120 VAC. The wet well level shall be monitored and controlled by 4 float switches with intrinsically safe barriers. Each intrinsically safe barrier shall include an input closed LED. Red LEDs shall indicate alarm input closed. An amber LED shall indicate stop float input closed.

Form “C” output contacts shall be provided for high level alarm. Normally open contacts shall be provided for pump control. Red LEDs shall indicate alarm output “ON”. Green LEDs shall indicate pump control output “ON”. Output contacts shall be rated 10 amps at 240 VAC or 30 VDC. Selector switches shall be provided to select pump sequence (1-2/Auto/2-1) and simplex or duplex operation.

A 0-3 minute adjustable time delay shall be provided to delay the starting of each pump. The primary pump start time delay shall be factory set at 5 seconds. The backup pump start time delay shall be factory set at 10 seconds.

Oil-tight “Hand-Off-Auto” selector switches shall be mounted in the front door of the control panel, one for each pump. A Red “run”, push-to-test, 30.5 mm, indicating light shall be mounted in the front door of the control panel, one for each pump, to indicate pump activation.

Under normal conditions the pumps shall cycle between the common stop float and start lead float. If the level rises to the start backup float, the primary pump shall be stopped and the backup pump shall start and run until the stop float opens. If the level rises to the high level float, this will cause the external alarm light to flash and horn to sound along with activation of the auto-dialer. The pumps shall not restart until the primary pump start float closes.

An alarm light and horn reset pushbutton shall be provided to reset the light and horn upon correction of the level problem. The alarm reset pushbutton in the control panel shall silence the alarm horn, but keep the alarm light illuminated if the problem has not been corrected. Refer to SECTION: SUBMERSIBLE PUMPS for additional control panel requirements.

3. Nameplates: Black phenolic plates with engraved white letters shall be attached to the front of panels, starters and disconnects with screws.

4. Float Switch: The float switch for the duplex pump station (only) shall be a sealed float type mercury switch to indicate liquid level. The mercury tube switch shall be sealed in a solid 316 stainless steel float for corrosion and shock resistance. The float shall be Teflon coated and shall be 4-inch diameter (min.). The support wire shall have a heavy neoprene jacket. A weight shall be attached to the cord, or the cord shall be connected to a stainless steel wire rope, with weight, above the float to hold the switch in place.

5. Elapsed Time Meters: The meters shall be of the non-reset type suitable for panel mounting. Operating voltage shall be 120 V CA. The presentation shall be a six digit counter in hours and tenths of hours. The meters shall be equivalent to Redington Model 710-0002.

6. Monitoring: Pump station monitoring shall be supplied by Mission Communications and shall be coordinated with Owner.

PART 3 METHOD OF MEASUREMENT BASIS OF PAYMENT

A. METHOD OF MEASUREMENT

1. Pump Station: The installation of the pump station, wet well coating, piping, valve vault and controls shall be measured as a lump sum unit to include the furnishing of the submersible pump station equipment, wet well coating, piping, valves, access cover, fittings, connections, excavating, backfilling, equipment testing, furnishing and placement of concrete and reinforcing steel, startup and all other materials and other incidentals to provide a complete operable unit.

B. BASIS OF PAYMENT

1. The amount of completed and accepted work as provided above shall be paid for at the contract lump sum price bid for “New Pump Station”. Price shall be full compensation for all labor, materials, equipment, tools and incidentals necessary to complete the work.

New Pump Station - Per Lump Sum

END OF SECTION 33 1204

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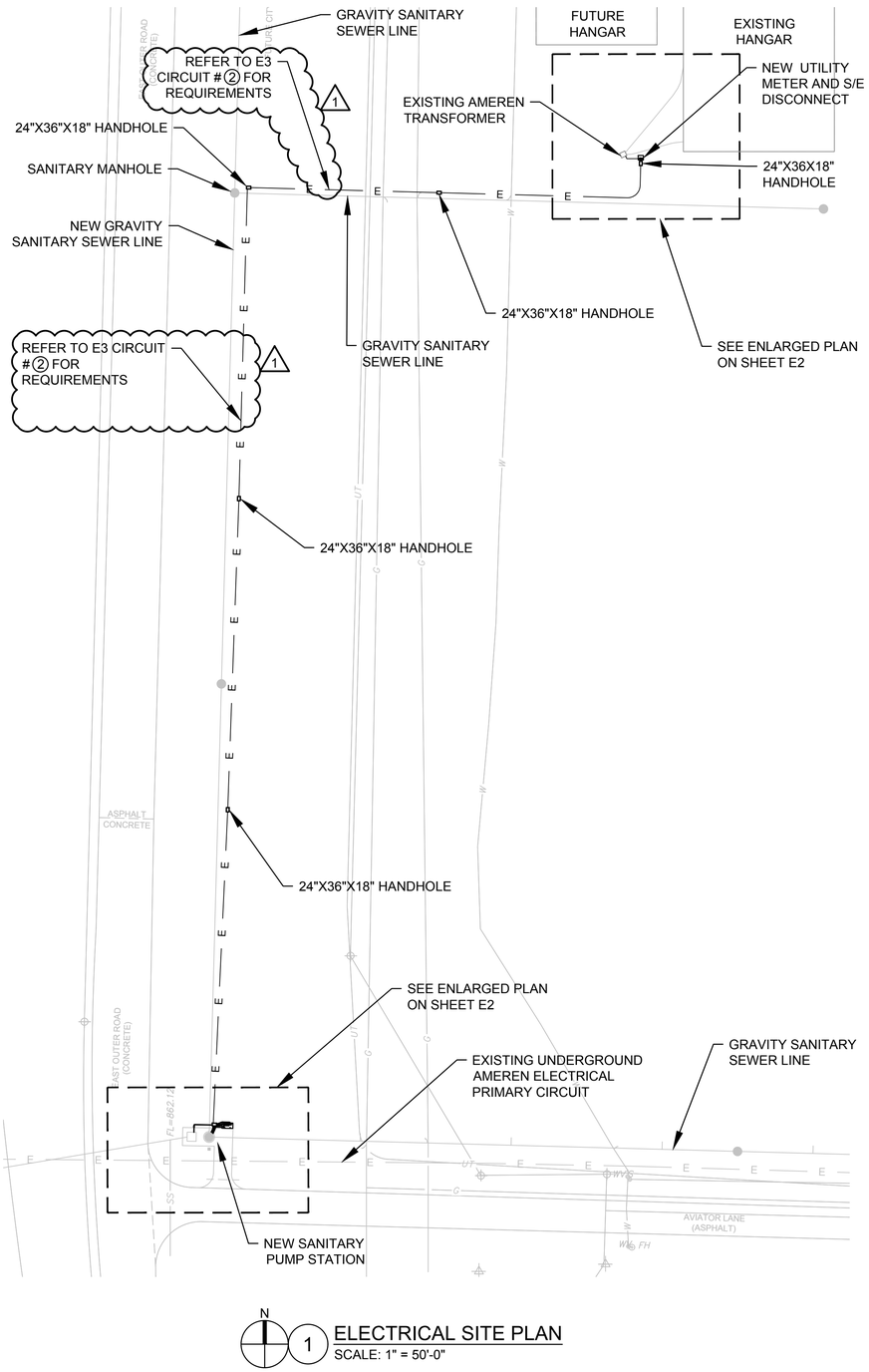


N

1 ELECTRICAL SITE PLAN

SCALE: 1" = 50'-0"

GENERAL NOTES:

1. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE USED ON THIS SPECIFIC PROJECT.
2. ALL WORK SHALL CONFORM WITH THE 2014 NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES AND ORDINANCES AND O.S.H.A. WHERE MINIMUM CODE REQUIREMENTS ARE EXCEEDED BY THE REQUIREMENTS INDICATED IN THE SPECIFICATIONS AND ON THESE DRAWINGS, THE DRAWINGS AND SPECIFICATIONS SHALL TAKE PRECEDENCE. (IN THE CASE OF CODE CONFLICT DIRECTION SHALL BE TAKEN FROM THE MORE STRICT OF THE CONFLICTING CODES).
3. CONDUIT ROUTES SHOWN ARE DIAGRAMMATIC ONLY. CONTRACTOR SHALL FIELD VERIFY AND PROVIDE CONDUIT ROUTES AS REQUIRED. CONTRACTOR IS RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO CONDUITS SHOWN ON THE ONE-LINE AND CONTROL DIAGRAMS AS WELL AS HOME RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATIONS.
4. AT THE CONCLUSION OF THIS PROJECT PROVIDE AN UPDATED TYPEWRITTEN, AS-BUILT DIRECTORY INSIDE EACH PANELBOARD/SWITCHBOARD PROPERLY IDENTIFYING EACH CIRCUIT USED & THE SPECIFIC LOAD SERVED. ALSO PROVIDE SCHEDULES ON CD DISK.
5. OPENINGS SHALL BE CUT TO THE EXACT SIZE REQUIRED IN ORDER TO MAINTAIN ANY MATERIAL RATINGS AND SEALED TO MAINTAIN RATING. PROVIDE ALL NECESSARY FLOOR CUTTING/PENETRATIONS AND ALL OF THE RE-PATCHING FOR THE COMPLETE EXECUTION OF THIS WORK.
6. CONCEAL ALL ELECTRICAL WIRING AND RACEWAYS WHERE CONSTRUCTION PERMITS. EXPOSED RACEWAY SHALL BE HELD TIGHT TO STRUCTURE & LOCATED SO AS TO KEEP IT AS INCONSPICUOUS AS POSSIBLE.
7. INSTALL ANY/ALL CORD SETS SUPPLIED WITH THE EQUIPMENT.
8. MOUNT DISCONNECT SWITCHES AND COMBINATION STARTERS AT 65" MAXIMUM ABOVE FINISHED GRADE TO TOP OF ENCLOSURE UNLESS OTHERWISE INDICATED.
9. ALL SPARE WIRES SHALL BE TAPED AND COILED.
10. PROVIDE FINAL CONNECTION, WIRING, HOOK-UP, ETC. FOR ALL EQUIPMENT AND CONTROLS REQUIRING ELECTRICAL POWER TO OPERATE. REFER TO THE I&C DRAWINGS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
11. FURNISH AND INSTALL ALL WIRE, WIREWAY, CONDUIT, CONNECTORS, OUTLETS, ETC, NECESSARY TO ACHIEVE A COMPLETE AND WORKING INSTALLATION.
12. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE CABLE CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMMODATE THE HIGHER VALUE.
13. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.

13.1. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS.

13.2. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS.

ABBREVIATIONS:

A	AMPERE, AMPS
AC	ALTERNATING CURRENT
AF	AMPERE FRAME
AT	AMPERE TRIP
AWG	AMERICAN WIRE GAGE
C	CLOSE, CONDUIT OR CONTACTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CP	CONTROL PANEL
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DS	DISCONNECT SWITCH
E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE
EC	EMPTY CONDUIT
EX	EXISTING
G	GREEN OR GROUND
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
H	HIGH OR HUMIDISTAT
HC	HOT CIRCUIT
HH	HANDHOLE
HMT	HIGH MOTOR TEMPERATURE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HWCO	HIGH WATER CUTOFF
HZ	HERTZ (CYCLE)
I/O	INPUT/OUTPUT
INST	INSTANTANEOUS
J	JUNCTION BOX
JB	JUNCTION BOX
K	KEY INTERLOCK
kCMIL	THOUSAND CIRCULAR MIL
kW	KILOWATT
kWH	KILOWATT HOUR
L	LOW, LEVEL
LA	LIGHTNING ARRESTER
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LS	LIMIT OR LEVEL SWITCH
LWCO	LOW WATER CUTOFF
MCB	MAIN CIRCUIT BREAKER
N	NEUTRAL
O	OPEN
OD	OUTSIDE DIAMETER
OL	OVERLOAD
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
P	PRIMARY
PB	PULL BOX
PH, Ø	PHASE
PS	PUMP STATION
PVC	POLYVINYL CHLORIDE
2P	2 POLE
R	RED, RAISE, RELAY OR REVERSE
RECPT.	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RVSS	REDUCED VOLTAGE SOLID STATE STARTER
S/E	SERVICE ENTRANCE RATED
TB	TERMINAL BLOCK
TTB	TELEPHONE TERMINAL BOX
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
UG	UNDERGROUND
V	VOLTS
VA	VOLT AMPERE
VM	VOLTMETER
VS	VOLTMETER SWITCH
W	WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
WPI	WEATHERPROOF IN-USE
XP	EXPLOSION PROOF

ONE-LINE DIAGRAM AND DRAWING SYMBOLS:

75 kVA
13.2kV/7.2kV:120/240V
1Ø, 60 Hz — EXISTING TRANSFORMER WITH PRIMARY AND SECONDARY VOLTAGE, AND kVA RATING AS NOTED

1P-20 — LOW VOLTAGE CIRCUIT BREAKER 1 POLE, 20 AMPERE

FUSED DISCONNECT SWITCH

DISCONNECT SWITCH

G — GENERATOR RECEPTACLE

DOUBLE THROW SWITCH

NEW CONDUIT

EXISTING CONDUIT

AMEREN UTILITY CONTACT INFORMATION:

CONTRACTOR SHALL INCLUDE ALL AMEREN COSTS IN BID.

COORDINATE THE TRENCHING INSPECTION AND CONNECTIONS TO THE EXISTING TRANSFORMER WITH AMEREN ENGINEERING DESIGN SPECIALIST:

DEBBIE L. HALLIBURTON-DERBOVEN
501 FRANKLIN STREET
MOBERLY, MO 65270
PHONE: 660-263-8115 EXT. 50456

STATE OF MISSOURI
CRAIG KEITH BREWSTER
NUMBER E-2000150002
REGISTERED PROFESSIONAL ENGINEER
05/22/2017

LOCHNER
16105 W. 113th Street | Suite 107 | Lenexa, Kansas 66219
P 816.945.5840 | F 816.945.5841

SANITARY SEWER IMPROVEMENTS
OMAR N. BRADLEY AIRPORT
MOBERLY, MISSOURI

PROJECT NO.	000009582
DRAWN BY / DATE	MCC 05-04-17
CHECKED BY / DATE	CKB 05-04-17
DESIGNED BY / DATE	RBJ 05-04-17
REVISIONS / DATE	ADDENDUM #1 05-22-17

ELECTRICAL SITE PLAN

E1

CUSTOM ENGINEERING
MECHANICAL & ELECTRICAL ENGINEERING
12760 East 40 Highway
Independence, Missouri 64055
816.350.1473
www.CUSTOMENGR.com
MISSOURI CERTIFICATE OF AUTHORITY #000239

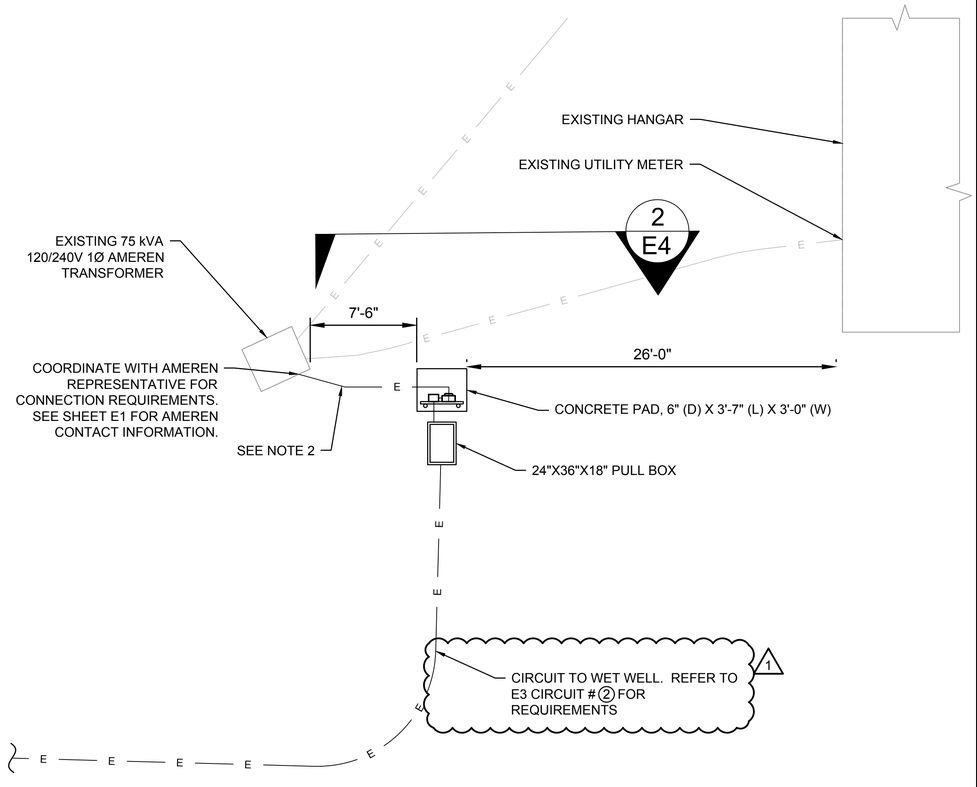
Drawing Name: P:\Proj\2017\A17026 - Sanitary Sewer Improvements - Omar N Bradley Airport\CAD\Elec\E1-Electrical Site Plan Addendum#1.dwg May 22,2017 - 10:52am

GENERAL NOTES:

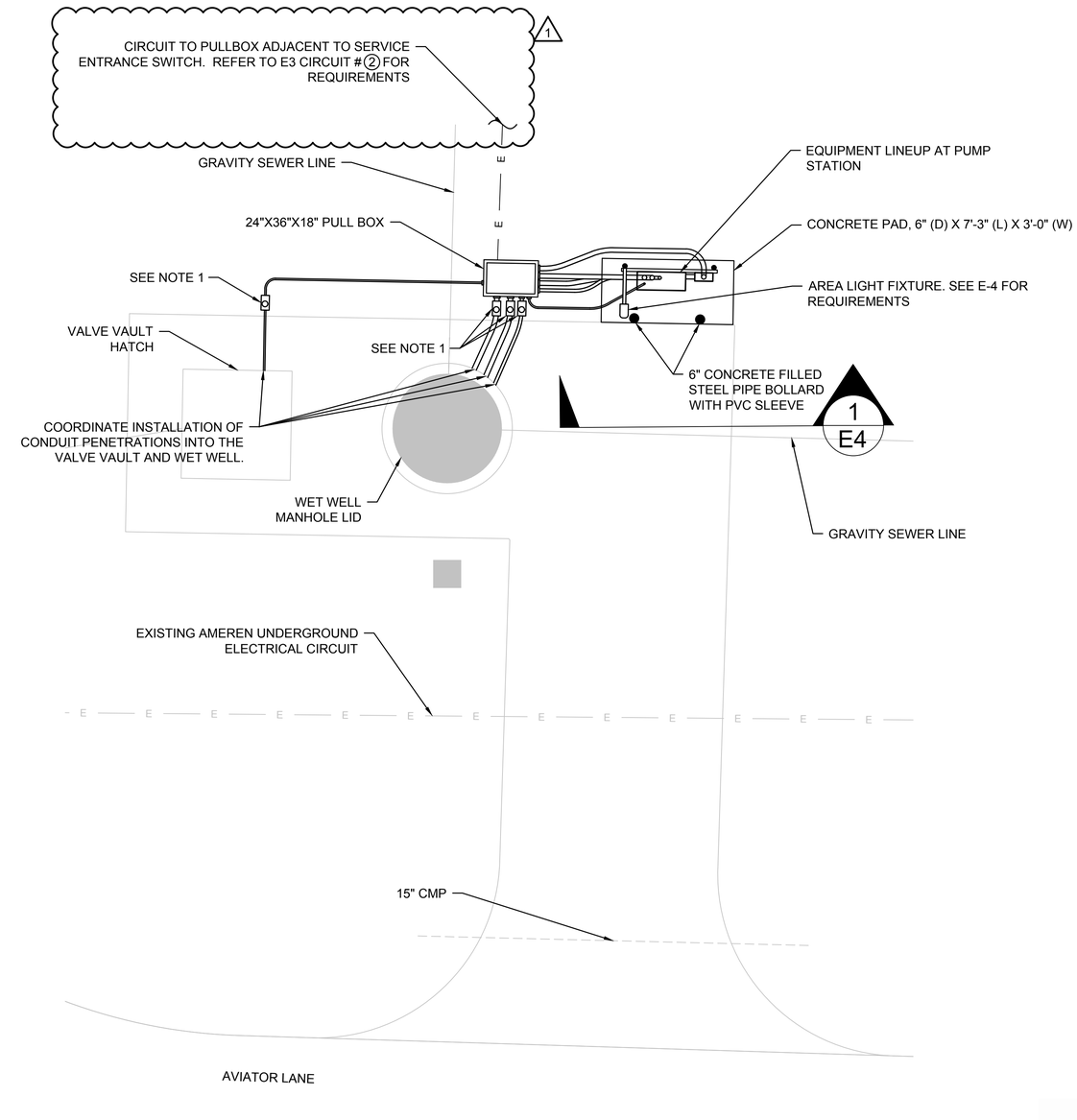
1. SEE SHEET E1 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.

PLAN NOTES:

1. PROVIDE PVC COATED STEEL CONDUIT SEAL OFFS FOR ALL CONDUIT PENETRATIONS ENTERING THE WET WELL AND VALVE VAULT. INSTALL SEAL OFFS IN AN ACCESSIBLE LOCATION INSIDE OR WITHIN 10' OF THE WET WELL AND VALVE VAULT. COMPLY WITH NEC 501.15 FOR CLASS 1 DIVISION 1 SEALING REQUIREMENTS.
2. 3"C. FOR AMEREN SECONDARY CABLES. SEE ONE-LINE DIAGRAM ON SHEET E3 FOR CONDUCTOR SIZE AND DETAIL 3 ON SHEET E4 FOR TRANSFORMER TO METER INSTALLATION DETAIL.



N 1 ENLARGED ELECTRICAL UTILITY METER AND S/E DISCONNECT PLAN
SCALE: 3/16" = 1'-0"



N 2 ENLARGED PUMP STATION ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"

STATE OF MISSOURI
CRAIG SMITH BREWSTER
NUMBER E-2000150002
REGISTERED PROFESSIONAL ENGINEER
5/22/2017

LOCHNER
16105 W. 113th Street | Suite 107 | Lenexa, Kansas 66219
P 816.945.5840 | F 816.945.5841

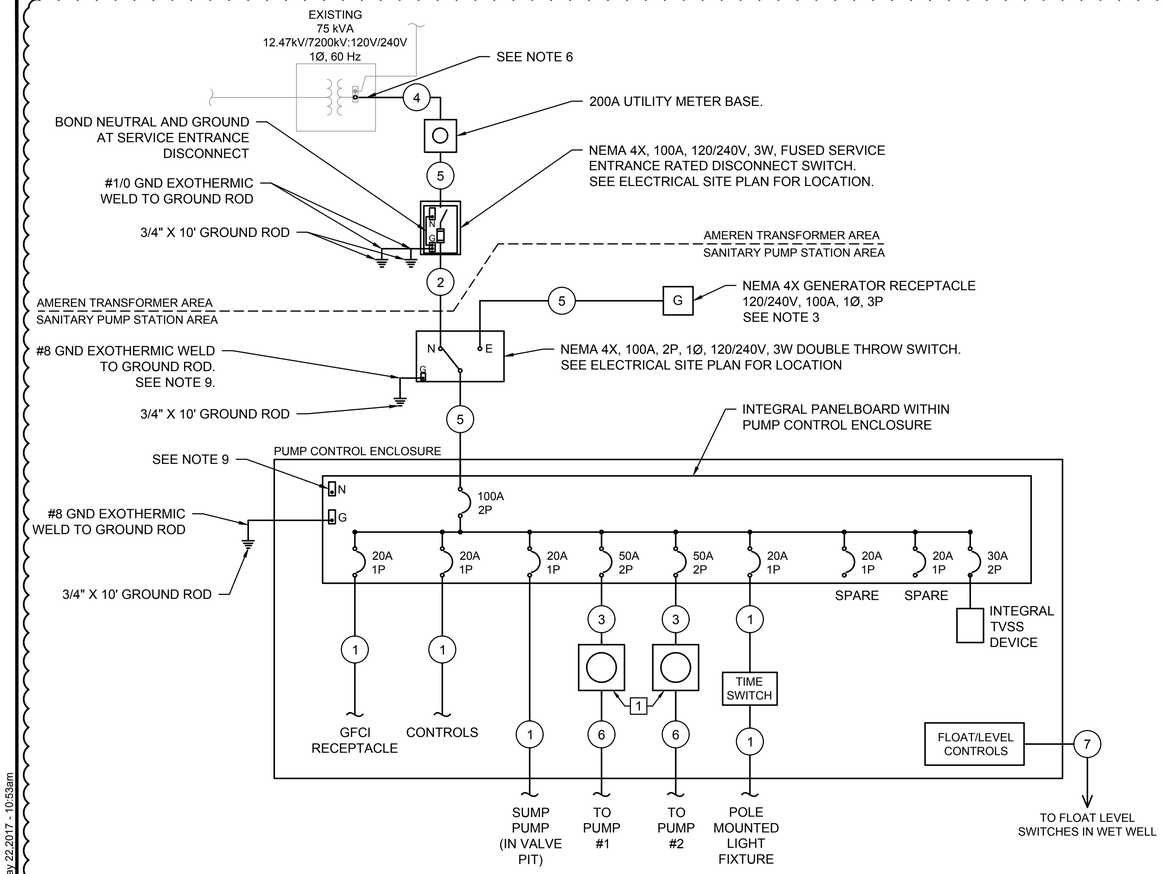
SANITARY SEWER IMPROVEMENTS
OMAR N. BRADLEY AIRPORT
MOBERLY, MISSOURI

PROJECT NO.	000009582
DRAWN BY / DATE	MCC 05-04-17
CHECKED BY / DATE	CKB 05-04-17
DESIGNED BY / DATE	RBJ 05-04-17
REVISIONS / DATE	ADDENDUM #1 05-22-17

ENLARGED ELECTRICAL PLANS

E2

CUSTOM ENGINEERING
MECHANICAL & ELECTRICAL ENGINEERING
12760 East 40 Highway
Independence, Missouri 64055
816.350.1473
www.CUSTOMENGR.com
MISSOURI CERTIFICATE OF AUTHORITY #000239



1 ELECTRICAL ONE-LINE DIAGRAM
NO SCALE

GROUND CONDUCTOR (2) SIZING DUE TO VOLTAGE DROP	
ORIGINAL POWER CONDUCTOR SIZE	NEW POWER CONDUCTOR SIZE
#1	#3/0
83690 CIR MILS	167800 CIR MILS
167800 / 83690 = 2.0	
ORIGINAL GROUNDING CONDUCTOR SIZE	NEW GROUNDING CONDUCTOR SIZE
#8	16510 x 2.0 = 33020
16510 CIR MILS	#4

FEEDER (2) VOLTAGE DROP CALCULATION	
DISTANCE	1090
CONDUCTOR SIZE	#3/0
CONDUCTOR Ω / 1000'	0.077
42 A x 0.077 x 2180	7.1
% voltage drop = 7.1 / 240 =	2.90%

CONDUIT/CABLE SCHEDULE			
CKT #	AMPERE	CONDUIT AND WIRE (COPPER) 1Ø, 2W	GROUND
1	20	3/4"C, 2#12	1#12
2	100	2.5"C, 3#3/0 2.5"C. SPARE	1#4
3	60	2"C, 2/#6 2"C. SPARE	1#8
4	100	3"C, 2#1	1#6
5	100	2"C, 3#1	1#6
6	N/A	3"C, PUMP MOTOR CABLES SEE NOTE 7	N/A
7	N/A	3"C, FLOAT CABLES SEE NOTE 8	N/A

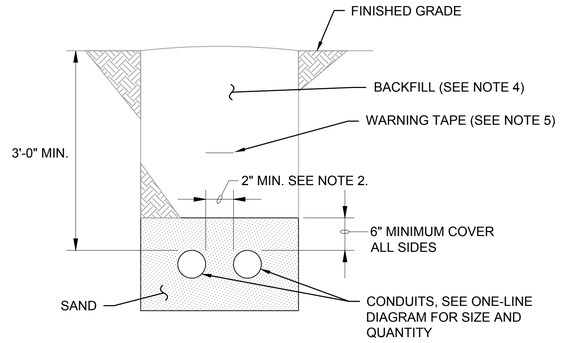
2 ELECTRICAL CONDUIT & CABLE SCHEDULE
NO SCALE

NOTES:

1. SEE SHEET E1 FOR GENERAL NOTES, LEGEND, & ABBREVIATIONS.
2. IN TRENCHES WHERE ELECTRICAL CONDUITS ARE INSTALLED PARALLEL TO OTHER UTILITIES, PROVIDE 24" MINIMUM HORIZONTAL AND VERTICAL SEPARATION.
3. 100A 120/240V, 1Ø, 3W MELTRIC RECEPTACLE FOR PORTABLE GENERATOR CONNECTION. COORDINATE RECEPTACLE WITH CITY PERSONNEL TO TO MATCH GENERATOR PLUG CONFIGURATION.
4. PROVIDE BACKFILL CLEAR OF FROZEN MATERIAL, DEBRIS/TRASH, ROCKS, OR DIRT CLODS. MATERIAL LARGER THAN 3" IN DIAMETER SHALL NOT BE USED FOR TRENCH BACKFILL.
5. INSTALL YELLOW CAUTION TAPE 12" BELOW FINAL GRADE TO WARN OTHERS OF CABLE INSTALLATION.
6. COORDINATE AMEREN UTILITY INSPECTIONS AND CONDUCTOR TERMINATIONS AT EXISTING TRANSFORMER WITH AMEREN REPRESENTATIVE. SEE SHEET E1 FOR CONTACT INFORMATION.
7. PUMP CABLES FURNISHED BY PUMP SUPPLIER.
8. FLOAT CABLES FURNISHED BY PUMP CONTROL PANEL SUPPLIER.
9. DO NOT BOND NEUTRAL TO GROUND AT PANELBOARD OR DOUBLE THROW SWITCH.

KEYED NOTES:

1 3 HP MOTOR STARTERS INTEGRAL TO PUMP CONTROL ENCLOSURE.



3 TYPICAL DIRECT BURIED CONDUIT DETAIL
NO SCALE

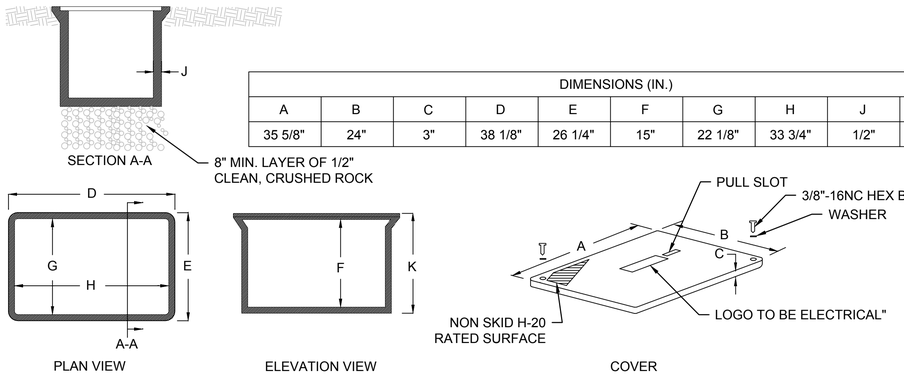
NAME: P-1
OMAR N. BRADLEY AIRPORT
LOCATION: PUMP STATION
INSIDE PUMP CONTROL
MOUNTING: ENCLOSURE
NEMA 4X

VOLTAGE: 120/240V, 1PH
MAINS: 100A MAIN BREAKER
kAIC RATING: 22

BREAKER P	BREAKER A	DESIGNATION	VA	CKT #	PHASE LOADS (VA) A	PHASE LOADS (VA) B	CKT #	VA	DESIGNATION	BREAKER A	BREAKER P
1	20	VALVE VAULT SUMP PUMP	1000	1	3000		2	2000	PUMP #1	50	2
1	20	CONTROL PANEL RECEPTACLE	250	3		2250	4	2000			
1	20	CONTROL PANEL POWER	750	5	2750		6	2000	PUMP #2	50	2
1	20	POLE MOUNTED LIGHT FIXTURE	175	7		2175	8	2000			
1	20	SPARE	0	9	0		10	0	TVSS	30	2
							12	0			
							14	0	SPARE	20	1
					5750	4425	VA CONNECTED LOAD				

10 kVA DIVERSIFIED LOAD
42 AMPS

5 PANELBOARD 'P-1' SCHEDULE
NO SCALE



DIMENSIONS (IN.)									
A	B	C	D	E	F	G	H	J	K
35 5/8"	24"	3"	38 1/8"	26 1/4"	15"	22 1/8"	33 3/4"	1/2"	18 1/2"

4 FIBERGLASS REINFORCED POLYMER CONCRETE HANDHOLE DETAIL
NO SCALE

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SANITARY SEWER IMPROVEMENTS
OMAR N. BRADLEY AIRPORT
MOBERLY, MISSOURI

PROJECT NO.	000009582
DRAWN BY / DATE	MCC 05-04-17
CHECKED BY / DATE	CKB 05-04-17
DESIGNED BY / DATE	RBJ 05-04-17
REVISIONS / DATE	ADDENDUM #1 05-22-17

ELECTRICAL DETAILS

E3