ELECTRICAL LEGEND

ABBREVIATIONS	
A	AMPERE
AC AFF	ALTERNATING CURRENT ABOVE FINISHED FLOOR
Al	ANALOG INPUT (PLC)
AIC AO	AMPERE INTERRUPTING CAPACITY ANALOG OUTPUT (PLC)
AR AUX	AS REQUIRED AUXILIARY
AWG C	AMERICAN WIRE GAUGE CONDUIT
CB	CIRCUIT BREAKER
CKT CP	CIRCUIT CONTROL PANEL
CR CPT	CONTROL RELAY CONTROL POWER TRANSFORMER
CU	COPPER DIRECT CURRENT
DI	DIGITAL INPUT (PLC)
DO EC	DIGITAL OUTPUT (PLC) ELECTRICAL CONTRACTOR
EM EMT	EMERGENCY ELECTRICAL METALLIC TUBING
EP EPR	EXPLOSION PROOF CL DIV 1 GR D ETHYLENE PROPYLENE RUBBER
EQUIP ES	EQUIPMENT EMERGENCY STOP
EX	EXTERIOR
EXTG FBO	EXISTING FURNISHED BY OTHERS
FE FIT	FLOW ELEMENT FLOW INDICATOR TRANSMITTER
FNR FS	FORWARD NEUTRAL REVERSE FLOW SWITCH
FU FVR	FUSE FULL VOLTAGE REVERSING
FVNR	FULL VOLTAGE NON-REVERSING
FWE FVNR	FURNISHED WITH EQUIPMENT FULL VOLTAGE NON-REVERSING
GND HOA	GROUND HAND-OFF-AUTOMATIC
HP HZ	HORSEPOWER HERTZ
IMC JB	INTERMEDIATE METAL CONDUIT JUNCTION BOX
K KCMIL	KILO THOUSAND CIRCULAR MILS
KV	KILOVOLT
KVA L	KILOVOLT—AMPERE LOCAL
LCP LCS	LOCAL CONTROL PANEL LOCAL CONTROL STATION
LE LI	LEVEL ELEMENT LEVEL INDICATOR
LIT LP	LEVEL INDICATOR TRANSMITTER LIGHTING PANEL
LS	LEVEL SWITCH
LT	L=LOW, H=HIGH, LL=LOW LOW, HH=HIGH HIGH LEVEL TRANSMITTER
MCC	MAIN CIRCUIT BREAKER MOTOR CONTROL CENTER
MCP MFR	MOTOR CIRCUIT PROTECTOR MANUFACTURER
MLO MS	MAIN LUG ONLY MOTOR STARTER
MTD NC	MOUNTED NORMALLY CLOSED
NEG	NEGATIVE
NEU NO	NEUTRAL NORMALLY OPEN
NTS OH	NOT TO SCALE OVERHEAD
OL P	OVERLOAD POLE
PB PE	PUSHBUTTON PRESSURE ELEMENT
PF PH	POWER FACTOR PHASE
PIT	PRESSURE INDICATOR TRANSMITTER
PLC PNL	PROGRAMMABLE LOGIC CONTROLLER PANEL
PRI PT	PRIMARY PRESSURE TRANSMITTER
PVC R	POLYVINYL CHLORIDE REMOTE
RGS RSC	RIGID GALVANIZED STEEL CONDUIT RIGID STEEL CONDUIT
S SEC	SURFACE SECONDARY
SHLD SI	SHIELDED CABLE SPEED INDICATOR
SN SP	SOLID NEUTRAL
SW	SPARE SWITCH
SYM T	SYMMETRICAL TRANSFORMER
TB TDR	TERMINAL BLOCKS TIME DELAY RELAY
TE TIT	TEMPERATURE ELEMENT TEMPERATURE INDICATING TRANSMITTER
TL TRANSF	TEMPERATURE LOW
TS	TEMPERATURE SWITCH TWISTED SHIELDED CABLE
V	VOLT
VA VFD	VOLT-AMPERE VARIABLE FREQUENCY DRIVE
W XLP	WIRE CROSS LINKED POLYETHYLENE
XFMR ZSC	TRANSFORMER LIMIT SWITCH CLOSED
ZSO	LIMIT SWITCH OPEN
CDOUNDING	
GROUNDING	

DESCRIPTION

BARE COPPER CONDUCTOR ---G---EMBEDDED IN CONCRETE OR

GROUND ROD

BURIED

MECHANICAL CONNECTION

GENERAL NOTES

- 1. ALL CONDUIT AND EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE CURRENT NATIONAL ELECTRICAL CODE.
- 2. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURES. EXPOSED CONDUITS SHALL BE INSTALLED PARALLEL TO BEAMS AND WALLS.
- 3. CONDUITS SHALL BE PROPERLY TERMINATED WITH NEAT CONNECTIONS TO ALL ASSOCIATED EQUIPMENT.
- 4. CONTROL AND INSTRUMENTATION CONDUIT SIZES AND NUMBER OF CONDUCTORS ARE TO BE DETERMINED FROM SCHEMATIC DIAGRAMS, INSTRUMENTATION DIAGRAMS, AND/OR SPECIFICATIONS, IF NOT DIRECTLY SHOWN ON POWER PLANS. THE WIRING DIAGRAMS. QUANTITY AND SIZE OF WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL AND INSTRUMENTATION EQUIPMENT. MODIFICATIONS REVIEWED BY THE ENGINEER WITH NO EXCEPTIONS TAKEN, MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND SPECIFICATIONS. EACH CONTROL AND INSTRUMENTATION CONDUIT SHALL ALSO CONTAIN 10 PER CENT SPARE CONDUCTORS, WITH A MINIMUM OF TWO SPARES, UP TO THE LIMIT OF CONDUIT FILL AS SPECIFIED BY THE NATIONAL ELECTRICAL CODE. INSTRUMENTATION SHIELDED CABLES SHALL BE INSTALLED IN RGS CONDUIT. SEPARATE FROM OTHER POWER WIRING.
- 5. EACH CONDUIT TO CARRY GROUND WIRE(S) IN ADDITION TO NUMBER OF CONDUCTORS SHOWN ON DRAWINGS OR PER NOTE 4 ABOVE. ALL GROUNDING MUST CONFORM TO ARTICLE 250 OF CURRENT NATIONAL ELECTRICAL CODE.
- . MINIMUM CONDUIT SIZE SHALL BE 3/4" TRADE SIZE, UNLESS OTHERWISE NOTED ON THE ELECTRICAL DRAWINGS. GENERAL LIGHTING. RECEPTACLE AND HVAC POWER CIRCUITS MAY BE 1/2" TRADE SIZE CONDUIT INSTALLED PER NEC. MINIMUM POWER WIRING SHALL BE 2C#12 AWG WITH GROUND AND 2C#14 AWG FOR CONTROL. MINIMUM INSTRUMENTATION CABLE SHALL BE 2/C#16 AWG TWS AND 3C#16 AWG TWS FOR SPEED POTENTIOMETERS AND RTD'S. PROVIDE CONDUIT AND WIRING AS INDICATED.
- 7. ALL SURFACE MOUNTED PANELS ON THE INSIDE OF EXTERIOR WALLS ABOVE GRADE, OR IN OTHER LOCATIONS CONSIDERED AS DAMP, SHALL BE MOUNTED TO MAINTAIN A 1/4" AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.
- 8. ELECTRICAL EQUIPMENT LOCATIONS ARE APPROXIMATE ONLY. COORDINATE LOCATIONS WITH PROCESS PIPING AND OTHER DRAWINGS. CONTRACTOR SHALL COORDINATE MANUFACTURER'S EQUIPMENT REQUIREMENTS WITH SPACE AVAILABLE. FINAL CONTROL PANEL LOCATIONS SHALL BE FIELD COORDINATED.
- 9. ALL FIELD CONTROL CONDUCTORS WILL TERMINATE AT INDIVIDUAL TERMINAL BLOCKS WITHIN THE CONTROL ENCLOSURE. SERIES AND PARALLEL CONNECTION OF FIELD CONTROL CONDUCTORS WILL BE MADE ONLY AT CONTROL PANEL OR MOTOR CONTROL CENTER TERMINAL BLOCKS.
- 10. GROUND ALL CONDUCTOR SHIELDS AT CONTROL PANEL ONLY DO NOT GROUND SHIELDS AT BOTH ENDS.
- 11. AT THE FOLLOWING LOCATIONS, UNLESS OTHERWISE NOTED, PULL, JUNCTION, TERMINAL, SWITCH, AND OUTLET BOXES SHALL BE CAST IRON WHERE STEEL CONDUIT IS TERMINATED; OR SHALL BE CAST ALUMINUM WHERE ALUMINUM CONDUIT IS TERMINATED:
- A AT LOCATIONS WHERE VAPORTIGHT LIGHTING FIXTURES AND/OR
- WATERTIGHT RECEPTACLES ARE INDICATED. B - AT LOCATIONS ON OR IN ALL OUTSIDE WALLS.
- C OUTDOORS
- 12. NAMEPLATES SHALL CONFORM STRICTLY TO INSTRUCTIONS IN THE ELECTRICAL SPECIFICATIONS AND ON THE DRAWINGS. THE FOLLOWING SHALL HAVE NAMEPLATES:
 - A ALL LOCAL CONTROL STATIONS AT OR NEAR EQUIPMENT
 - B ALL PANELBOARDS C - GANGED LIGHT SWITCHES
 - D PROCESS CONTROL PANELS
- 13. PIPE SLEEVES FOR CONDUITS PASSING FROM NON-HAZARDOUS AREAS TO HAZARDOUS AREAS SHALL HAVE CAULKING APPLIED TO MAKE THE INSTALLATION
- 14. CONTRACTOR SHALL PROVIDE ALL CONDUIT, WIRING, EQUIPMENT, AND CONTROL DEVICES AS INDICATED BY SCHEMATICS, SINGLE LINE DIAGRAMS. SCHEDULES. PLANS. SPECIFICATIONS. AND VENDOR DOCUMENTATION TO PROVIDE A COMPLETE WORKING SYSTEM. SINCE NOT ALL HOME RUNS ARE SHOWN ON PLANS, THE CONTRACTOR SHALL REFERENCE ALL SINGLE LINE AND SCHEMATIC DIAGRAMS, SCHEDULES, AND VENDOR DOCUMENTATION TO DETERMINE CONDUIT AND WIRING REQUIREMENTS.
- 15. PROVIDE CONCRETE HOUSEKEEPING PADS (4" HIGH) UNDER ELECTRICAL AND INSTRUMENTATION EQUIPMENT THAT IS DESIGNED TO BE FLOOR MOUNTED. PROVIDE SUBMITTAL SKETCH FOR ENGINEER REVIEW.
- 16. CONTRACTOR SHALL PROVIDE A COMPLETE WORKING OPERATING SYSTEM IN ACCORDANCE WITH ALL DRAWINGS, SPECIFICATIONS, CODES AND STANDARDS.
- 17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEWING ALL OF THE ELECTRICAL DRAWINGS AND CONDUIT AND WIRE SCHEDULES RELATIVE TO THE CONDUIT AND WIRE TO BE PROVIDED ON THIS PROJECT. THE INTENT OF THE CONTRACT DOCUMENTS IS TO PROVIDE DETAILED INFORMATION OF SPECIFIC INDIVIDUAL RUNS OF CONDUIT AND WIRE TO SPECIFIC EQUIPMENT. THE CONTRACTOR IS DIRECTED TO COMBINE CONDUIT AND WIRE RUNS AS MUCH AS POSSIBLE. THE LIMITING FACTOR FOR COMBINING CONDUIT AND WIRE SHALL BE BASED ON THE DERATING FACTORS ALLOWED PER THE NATIONAL ELECTRICAL CODE (NEC) BASED ON EQUIPMENT RATINGS AND REQUIRED AMPACITY RATINGS. CONTRACTOR IS DIRECTED TO USE THE MOST COST-EFFECTIVE CONDUIT AND WIRE RUNS CONSISTENT WITH THESE REQUIREMENTS.
- 18. 120V CIRCUITS EXCEEDING 100 FEET IN LENGTH SHALL BE NO 10 AWG WIRING, MINIMUM.
- 19. POWER CONDUITS FOR THREE PHASE AND SINGLE PHASE CIRCUITS (DESIGNATED WITH "P" NUMBERS) ARE SHOWN ON POWER PLANS, WITH CONDUIT SIZES AND WIRING INFORMATION INDICATED IN THE CONDUIT AND WIRE SCHEDULES.
- 20. CONTROL AND INSTRUMENTATION SIGNAL CONDUITS (DESIGNATED WITH "C" AND "S" NUMBERS) ARE SHOWN ON CONTROL AND INSTRUMENTATION WIRING DIAGRAMS, WITH CONDUIT SIZES AND WIRING INFORMATION INDICATED IN THE CONDUIT AND WIRE SCHEDULES. FOR INSTRUMENTS REQUIRING 120V POWER SUPPLIES, THIS INFORMATION IS ALSO SHOWN ON THE CONTROL AND INSTRUMENTATION WIRING DIAGRAMS.
- 21. PROVIDE CONDUIT FREEZE PROTECTION FOR ALL EXTERIOR CONDUIT SYSTEMS.

GENERAL DEMOLITION NOTES:

- 1. THE EXISTING ELECTRICAL PLAN FOR THIS PROJECT IS BASED ON INFORMATION PROVIDED BY OTHERS AND FIELD SURVEY OT THE SITE. GENERAL CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- 2. FIELD VERIFY ALL CONDITIONS AFFECTING THE WORK PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- 3. PROTECT ALL EXISTING ITEMS AND EQUIPMENT ADJACENT TO THE WORK AREA. ALL EXISTING ITEMS. EQUIPMENT AND MATERIALS DAMAGED OR AFFECTED BY THE WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- 4. THE EXISTING PUMP STATION SHALL REMAIN OPERATIONAL DURING CONSTRUCTION OF THE NEW PUMP STATION. BYPASS PUMPING IS TO BE USED AS NECESSARY. SEE SPECIFICATION SECTIONS 01010 AND 16000 FOR ADDITIONAL DETAILS. THE ELECTRICAL CONTRACTOR SHALL COORDINATE DEMOLITION AND CONSTRUCTION WITH THE OWNER'S REQUIREMENTS TO MAINTAIN PUMP STATION OPERATION. ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY SERVICES AS NECESSARY
- 5. PATCH, REPAIR AND REFINISH ALL EXISTING SURFACES AFFECTED BY THE WORK, TO THE SATISFACTION OF THE ENGINEER.
- 6. ALL ITEMS SHOWN ON THE PLANS WITH SHADING ARE TO BE REMOVED AND DISPOSED OF, UNLESS OTHERWISE INDICATED. THIS SHALL INCLUDE ALL ASSOCIATED CONDUIT, WIRING, BOXES, DEVICES, CONTROLS, ETC. UNLESS OTHERWISE NOTED. THE OWNER RESERVES THE RIGHT TO RETAIN ANY EQUIPMENT OR MATERIALS. THE CONTRACTOR WILL STORE ON SITE AND PROTECT SUCH ITEMS IN A MANNER ACCEPTABLE TO THE OWNER AND ENGINEER. ALSO REFER TO THE STRUCTURAL, MECHANICAL. PROCESS AND ELECTRICAL DRAWINGS FOR A COMPLETE REQUIREMENT OF DEMOLITION WORK FOR THIS PROJECT.

NEMA CLASSIFICATIONS FOR NEW ELECTRICAL EQUIPMENT AND ENCLOSURES

(UNLESS OTHERWISE NOTED)

LOCATION NEMA RATING WETWELL LOCATIONS OPEN TO ATMOSPHERE 7(CLASS I, DIV 1, GR D) - WITHIN 3 FOOT RADIUS OF WETWELL HATCHES, DOOR, VENT, ETC. 7(CLASS I, DIV 1, GR D) - ADDITIONAL 2 FOOT RADIUS OF WETWELL HATCHES, DOOR, VENT, ETC. 7(CLASS I, DIV 2, GR D) GENERAL OUTDOORS AREA WITHIN CONTROL CABINETS AND ENCLOSURES

THE AREAS NOTED SHALL BE RATED AS INDICATED. EXCEPT EQUIPMENT SUCH AT PANELBOARDS, AND TRANSFORMERS SHALL BE RATED AS SPECIFIED. PANELBOARDS AND TRANSFORMERS SHALL BE RATED AT A MINIMUM, NEMA 12 IF NOT SPECIFIED.

COMMON 60 IGTON, MA /ASTEWATE/ UPGRADE OF LEXING ROAD WASTATION

DRAWING

E-1

NOTE:

. ALL NOTES AND SYMBOL LISTS SHALL BE CONSIDERED AS APPLICABLE TO ALL ELECTRICAL DRAWINGS FOR THIS PROJECT. SYMBOLS SHOWN ON THIS SHEET ARE FOR REFERENCE ONLY AND DO NOT INDICATE THEIR INCORPORATION IN THE DESIGN.