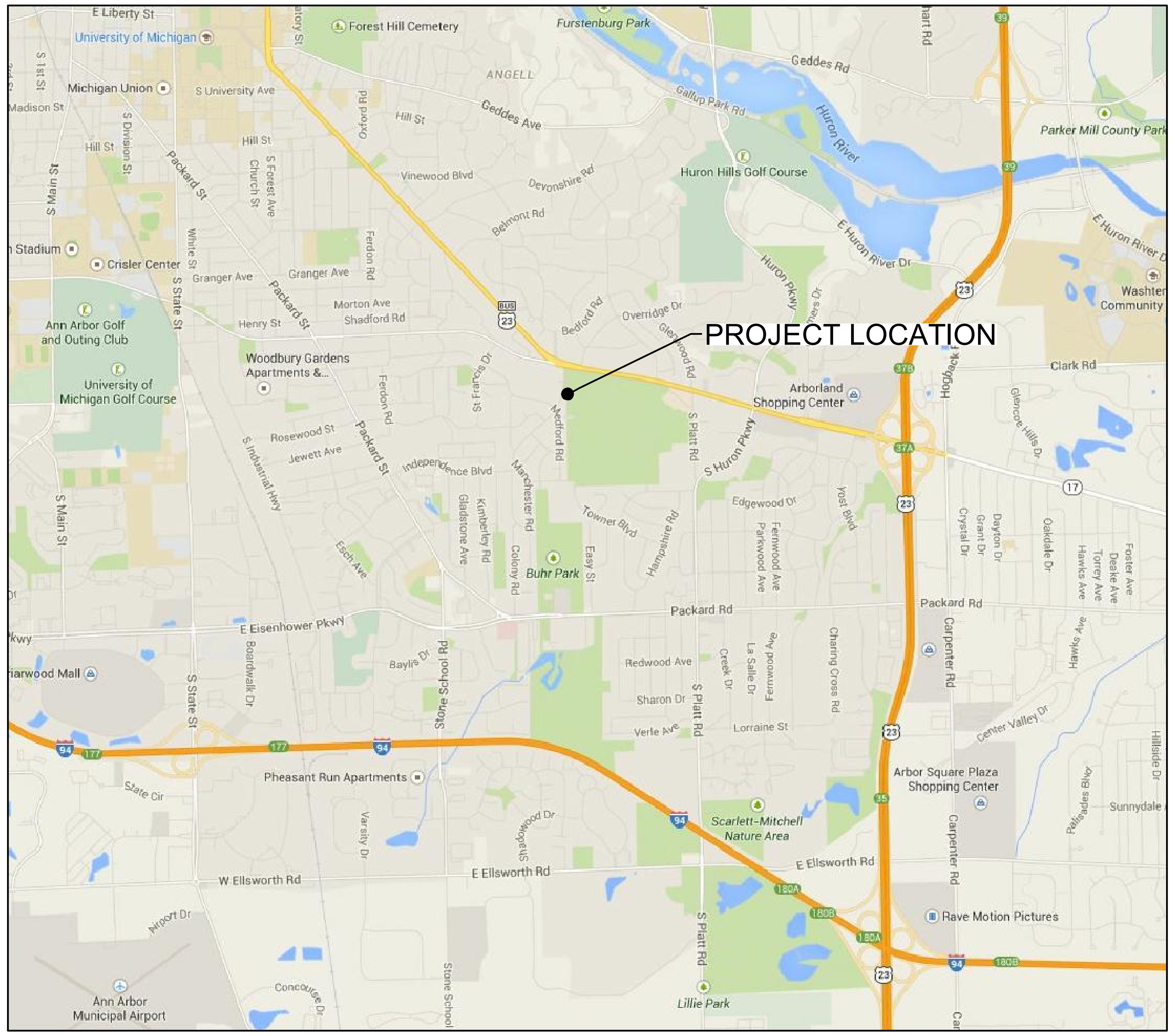
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING



LOCATION MAP

SCALE: NONE

SHEET INDEX	
SHEET NO.	**SHEET TITLE**
GENERAL	
G-000	COVER
G-001	GENERAL NOTES AND LEGEND
CIVIL	
C-101	SITE PLAN
C-301	TANK ELEVATION PROPOSED IMPROVEMENTS
C-500	SITE DETAILS
PROCESS	
D-001	PIPING LEGEND
D-101	TANK FLOOR PLAN - INTERIOR AND SITE
D-102	TANK INTERIOR GROUND LEVEL DEMOLITION
D-103	TANK INTERIOR GROUND LEVEL PROPOSED
D-500	PIPING DETAILS
STRUCTURAL	
S-101	STRUCTURAL PLAN AND SECTIONS
S-500	STRUCTURAL DETAILS
ELECTRICAL	
E-001	ELECTRICAL LEGEND
E-101	ELECTRICAL SITE PLAN
E-102	ELECTRICAL WATER TOWER PLAN
E-103	INSTRUMENTATION WATER TOWER PLAN
E-500	ELECTRICAL HEAT TRACE
E-501	ELECTRICAL HEAT TRACE
E-502	ELECTRICAL DETAILS
E-601	ELECTRICAL SCHEDULE
E-801	ELECTRICAL CONTROL PANEL
E-802	ELECTRICAL CONTROL PANEL
ED-101	ELECTRICAL REMOVAL PLAN
ED-102	ELECTRICAL DEMO PLAN

710 AVIS DRIVE, SUITE 100
ANN ARBOR, MI 48108
Tel. 734.665.6000 Fax. 734.213.3003

DIXON ENGINEERING, INC.
Ann Arbor, MI 500MG Spheroid

www.tetratech.com

TETRA TECH

PROJECT LOCATION:
2011 MANCHESTER RD
ANN ARBOR, MI 48104

CLIENT INFORMATION:
CITY OF ANN ARBOR
WATER TREATMENT SERVICES UNIT

Tt PROJECT No.:
200-31537-15001

CLIENT PROJECT No.:
ITB #: 4382, FILE #: 15001

PROJECT DESCRIPTION / NOTES:

ISSUED:

MARCH 17, 2015 - 75% DESIGN
APRIL 16, 2015 - ISSUED FOR BIDS

VICINITY MAP:

SITE LEGEND (NOTE: NOT ALL SYMBOLS MAY BE USED)

SITE SYMBOLS

FEATURES

- EXISTING SIGN
- PROPOSED SIGN
- TRASH RECEPTACLE
- PICNIC TABLE
- POST
- MAIL BOX
- POWER METER
- FLAG POLE
- ROCK
- GUY WIRE
- UTILITY POLE
- DECIDUOUS TREE
- EVERGREEN TREE
- PALM TREE
- BUSH
- STUMP

STORM / DRAINAGE

- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING CULVERT
- PROPOSED CULVERT
- EXISTING INLET BASIN
- PROPOSED INLET BASIN
- PROPOSED INLET BASIN

MISCELLANEOUS

- **MONITORING WELL**
- **SOIL BORING**
- **MANHOLE W/ ID**
- **SPOT ELEVATION**
- **SLOPE ARROW**
- **SLOPE ARROW**
- HANDICAP MARKING
- (F) FUTURE IMPROVEMENTS

SURVEY

- FOUND PROPERTY CORNER
- SET PROPERTY CORNER
- FOUND MONUMENT
- SET MONUMENT
- **OWNERSHIP TIE**
- SECTION CORNER
- BM# BENCHMARK
- KEY NOTE
- SOIL EROSION AND SEDIMENTATION CONTROL NOTE

UTILITY SYMBOLS

WATER

- DRINKING FOUNTAIN
- EXISTING VALVE IN BOX
- PROPOSED VALVE IN BOX
- EXISTING CURB STOP
- PROPOSED CURB STOP
- METER
- EXISTING VALVE MANHOLE
- PROPOSED VALVE MANHOLE
- EXISTING WELL
- PROPOSED WELL
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- SPRINKLER HEAD
- IRRIGATION BOX
- SPIGOT
- LOCATION FLAG

SANITARY SEWER

- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING AIR RELEASE STRUCTURE
- PROPOSED AIR RELEASE STRUCTURE
- **EXISTING IN-LINE FLUSH CONNECTION**
- **PROPOSED IN-LINE FLUSH CONNECTION**
- **EXISTING IN-LINE FLUSH CONNECTION**
- **PROPOSED IN-LINE FLUSH CONNECTION**
- **EXISTING CLEAN OUT**
- **PROPOSED CLEAN OUT**
- **EXISTING SEWER VALVE**
- **PROPOSED SEWER VALVE**
- **EXISTING CURB STOP**
- **PROPOSED CURB STOP**
- **PUMP STATION (SIMPLEX)**
- **PUMP STATION (DUPLEX)**
- **SEWER LATERAL**
- **LOCATION FLAG**

NATURAL GAS

- MARKER
- LOCATION FLAG
- VALVE

CABLE TV

- RISER
- LOCATION FLAG
- JUNCTION BOX

COMMUNICATIONS

- TELEPHONE
- BOX OR RISER
- JUNCTION BOX
- FIBER OPTIC BOX
- LOCATION FLAG
- FIBER OPTIC FLAG
- MANHOLE
- VAULT
- SATELLITE DISH

UTILITY SYMBOLS (CONT'D.)

ELECTRICAL

- METER
- TRANSFORMER
- BOX OR RISER
- LOCATION FLAG
- LIGHT POLE
- EXTERIOR BUILDING LIGHT
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL CONTROL (BOX)
- RAIL ROAD SIGNAL
- MANHOLE
- JUNCTION BOX

FEATURE HATCHING

- EXISTING ASPHALT TO BE DEMOLISHED
- EXISTING CONCRETE TO BE DEMOLISHED
- PROPOSED PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED LIGHT DUTY ASHPALT PAVEMENT
- PROPOSED HEAVY DUTY ASHPALT PAVEMENT
- PROPOSED GRAVEL
- WETLAND AREA
- PROPOSED SOD

FEATURES & FEATURE LINES

- GRADING LIMITS
- RIGHT OF WAY LINE
- SECTION LINE
- UTILITY EASEMENTS
- EXISTING CONTOUR - MAJOR (900)
- EXISTING CONTOUR - MINOR (899)
- PROPOSED CONTOUR - MAJOR (899)
- PROPOSED CONTOUR - MINOR (899)
- EROSION SILT FENCE (SF)
- EROSION SUPER SILT FENCE (SSF)
- FENCE (WOOD)
- FENCE (STEEL)
- FLOOD HAZARD AREA
- FLOW ARROW
- GUARD RAILING
- GRAVEL ROAD OR DRIVE
- RAIL ROAD TRACKS
- ROCK RETAINING WALL
- TREE / BRUSH LINES
- CLEARING & GRUBBING LIMITS
- WATER EDGES
- DITCH CENTER LINE
- WETLAND BOUNDARY
- PROPOSED SUPERSTRUCTURE
- EXISTING SUPERSTRUCTURE
- STRUCTURE (TANKS, ETC.)
- EXISTING UNDERGROUND STRUCTURE
- FUTURE STRUCTURE

UTILITY LINES

- CABLE TV OVERHEAD (OTV)
- CABLE TV UNDERGROUND (UTV)
- COMMUNICATION FIBER OPTIC (FO)
- COMMUNICATION OVERHEAD (OT)
- COMMUNICATION UNDERGROUND (UT)
- ELECTRIC OVERHEAD (OE)
- ELECTRIC UNDERGROUND (UE)
- NATURAL GAS (G)
- NATURAL GAS HIGH PRESSURE (HPG)
- JET FUEL (JT)
- SANITARY FORCEMAIN (FM)
- SANITARY SEWER LINE (SS)
- STORM DRAIN (SD)
- STORM ROOF DRAIN (RD)
- STEAM (SM)
- FIRE PROTECTION (F)
- WATER MAIN (W)
- UTILITY LINE 36" AND LARGER (36"SS)

NOTE: HEAVIER LINE WEIGHTS INDICATE PROPOSED WORK.

GENERAL NOTES

1. THREE FULL WORKING DAYS PRIOR TO ANY EXCAVATION; THE CONTRACTOR SHALL CONTACT MISS DIG (1-800-482-7171) FOR LOCATION OF UNDERGROUND UTILITIES LOCATED IN THE VICINITY OF THE WORK. THE CONTRACTOR SHALL MAKE ANY NECESSARY ARRANGEMENTS WITH UTILITY COMPANIES FOR RELOCATION OF EXISTING UTILITIES, IF REQUIRED.
2. UNDERGROUND UTILITIES AS SHOWN HEREON WERE TAKEN FROM EXISTING PLANS AND ARE APPROXIMATE LOCATIONS ONLY. UNDERGROUND UTILITY LOCATIONS HAVE NOT BEEN FIELD VERIFIED.
3. UNLESS SPECIFICALLY NOTED FOR REMOVAL ON THE CONSTRUCTION PLANS, ALL SIDEWALK, DRIVES, CULVERTS, GUARDRAILS AND ABOVE GROUND UTILITIES DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REMOVED AND REPLACED, INCIDENTAL TO THE COST OF CONSTRUCTION, AT NO EXPENSE TO THE OWNER.
4. EXISTING WATER MAINS, GAS MAINS AND UNDERGROUND TELEPHONE, ELECTRIC AND CABLE TELEVISION CONDUITS AND/OR LINES ARE SHOWN ONLY IN THE PLAN VIEW OF THE CONSTRUCTION DRAWINGS. THE EXACT DEPTH OF THESE UTILITIES IS NOT KNOWN AND THEREFORE, NO ATTEMPT HAS BEEN MADE TO SHOW SUCH UTILITIES IN THE PROFILE OF THE CONSTRUCTION DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THESE UTILITIES WHICH ARE NOT WITHIN THE SPACE OCCUPIED BY COMPLETED PIPES OR STRUCTURES THAT ARE A PART OF THIS CONTRACT. DURING CONSTRUCTION, IF DAMAGED OR DESTROYED DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COSTS TO REPAIR OR REPLACE THEM AT NO ADDITIONAL EXPENSE TO THE OWNER.
5. THE CONTRACTOR SHALL PROTECT EXISTING UTILITIES IN A MANNER ACCEPTABLE TO THE ENGINEER DURING THE PROPOSED CONSTRUCTION. ANY UTILITY, WHICH IS TO REMAIN IN SERVICE, THAT IS DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REPLACE BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
6. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT POINTS OF POSSIBLE CONFLICT SO THAT THESE CONFLICTS CAN BE RESOLVED.
7. CONTRACTOR SHALL INSTALL SILT FENCING ALONG THE DOWN SLOPE SIDE OF ALL EXCAVATIONS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE TELECOM COMPANIES AND THEIR EXISTING EQUIPMENT ON SITE.

SESC NOTES:

1. CONTRACTOR RESPONSIBLE FOR INSTALLATION AND MAINTENANCE OF ALL TEMPORARY AND PERMANENT SOIL EROSION AND SEDIMENTATION CONTROL (SESC) MEASURES DURING CONSTRUCTION. CONTRACTOR SHALL REMOVE ANY TEMPORARY SESC MEASURES AFTER PROJECT COMPLETION. CONTRACTOR RESPONSIBLE FOR OBTAINING, EXERCISING AND PERFORMING ALL WORK IN ACCORDANCE WITH THE CONDITIONS PROVIDED BY THE ISSUER OF THE SOIL EROSION AND SEDIMENTATION CONTROL PERMIT.
2. ENGINEER TO VERIFY PROPER INSTALLATION OF APPROVED SESC MEASURES PRIOR TO COMMENCEMENT OF EARTH DISTURBANCE ON SITE.
3. ALL TEMPORARY SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO EARTH DISTURBANCE ACTIVITY AND CHECKED DAILY FOR EFFECTIVENESS AND REPAIRED AS NEEDED.

TETRA TECH
www.tetratech.com
710 Avis Drive, Suite 100
Ann Arbor, MI 48106
Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

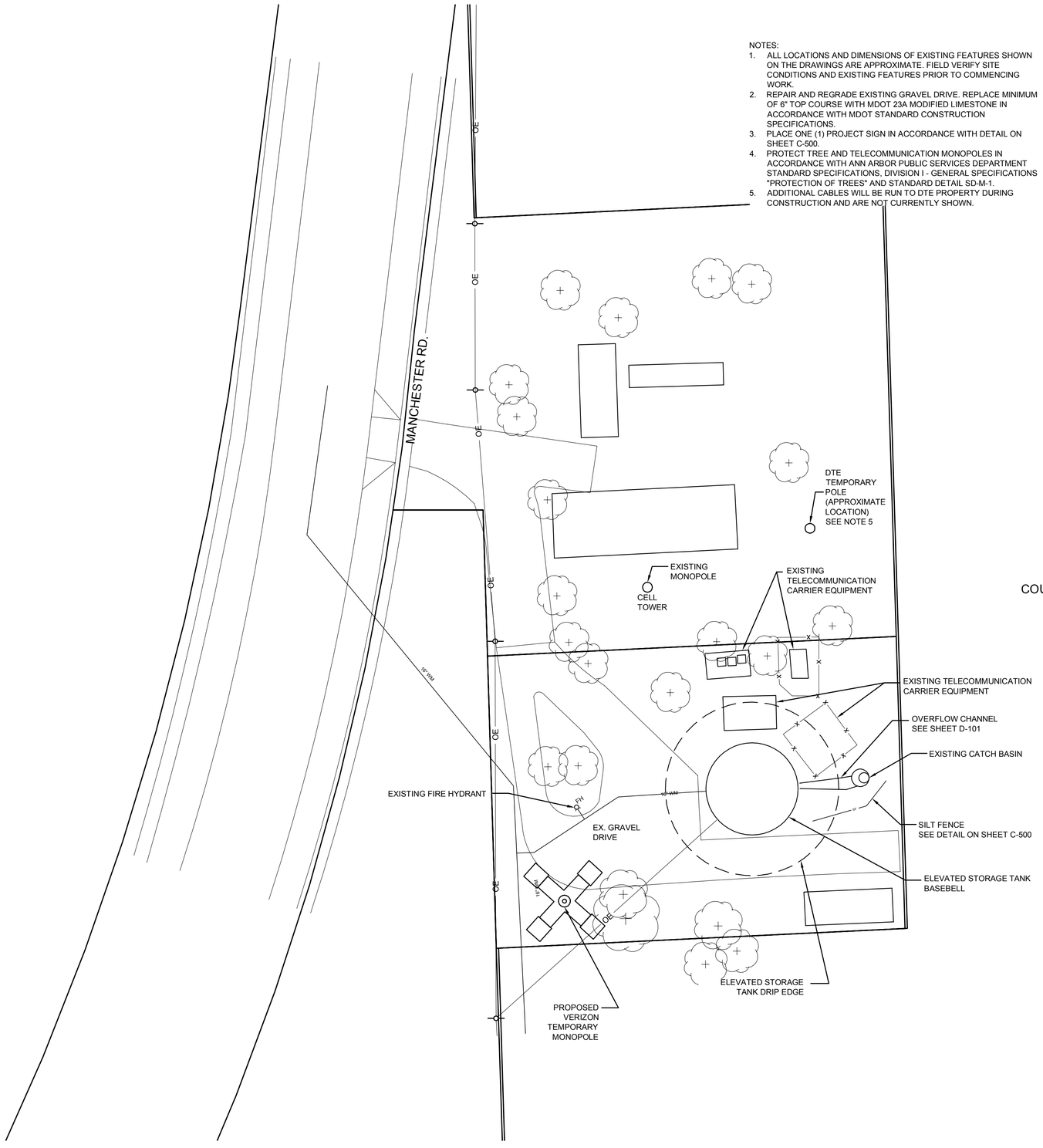
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING
GENERAL NOTES AND LEGEND

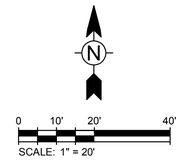
Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

G-001

Bar Measures 1 inch

NOTES:
1. ALL LOCATIONS AND DIMENSIONS OF EXISTING FEATURES SHOWN ON THE DRAWINGS ARE APPROXIMATE. FIELD VERIFY SITE CONDITIONS AND EXISTING FEATURES PRIOR TO COMMENCING WORK.
2. REPAIR AND REGRADE EXISTING GRAVEL DRIVE. REPLACE MINIMUM OF 6" TOP COURSE WITH MDOT 23A MODIFIED LIMESTONE IN ACCORDANCE WITH MDOT STANDARD CONSTRUCTION SPECIFICATIONS.
3. PLACE ONE (1) PROJECT SIGN IN ACCORDANCE WITH DETAIL ON SHEET C-500.
4. PROTECT TREE AND TELECOMMUNICATION MONOPOLES IN ACCORDANCE WITH ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS, DIVISION I - GENERAL SPECIFICATIONS "PROTECTION OF TREES" AND STANDARD DETAIL SD-M-1.
5. ADDITIONAL CABLES WILL BE RUN TO DTE PROPERTY DURING CONSTRUCTION AND ARE NOT CURRENTLY SHOWN.





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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

SITE PLAN

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

C-101

Bar Measures 1 inch

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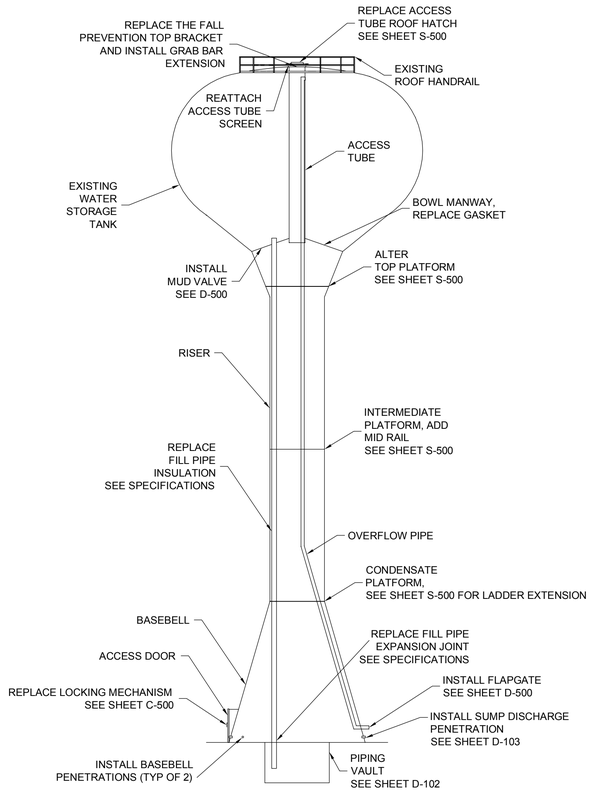

TANK ELEVATION - PROPOSED IMPROVEMENTS

SCALE: NONE

NOTES:
1. THE DRY INTERIOR IS TO BE REPAINTED AS PART OF THE PROJECT, INCLUDING THE FILL PIPE.
2. THE EXISTING PIT PIPING TO REMAIN IS TO BE REPAINTED AS PART OF THE PROJECT.
3. THE TANK EXTERIOR IS TO BE REPAINTED AS PART OF THE PROJECT.
4. DRAWING IS FOR REFERENCE ONLY. ORIENTATION OF ITEMS MAY VARY.
5. SEE SPECIFICATION SECTION 05 00 00 FOR DETAILS ON MISCELLANEOUS IMPROVEMENTS.

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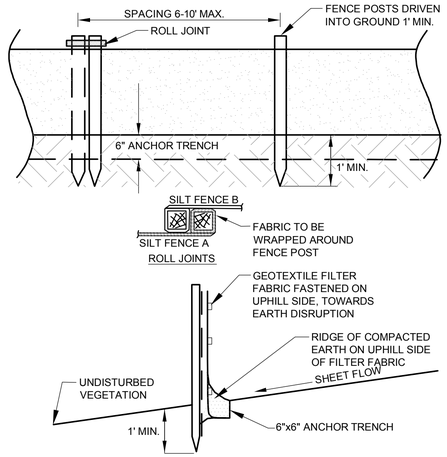
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

TANK ELEVATION
PROPOSED
IMPROVEMENTS

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

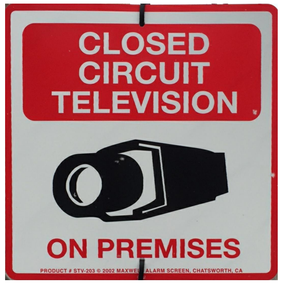
C-301

Bar Measures 1 inch



SILT FENCE

SCALE: NONE



SURVEILLANCE SIGNAGE

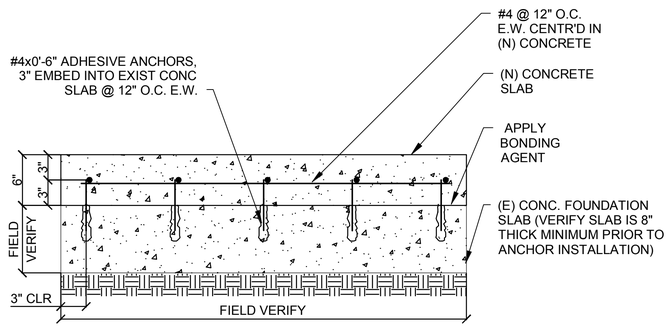
SCALE: NONE

NOTES:
1. CONSTRUCTION SIGN SHALL BE BAKED ENAMEL ALUMINUM.
2. CONSTRUCTION SIGN COLORS SHALL MATCH SIMILAR SIGNS USED AT OTHER CITY OF ANN ARBOR SITES.
3. LETTERING SHALL BE DIE CUT VINYL LAMINATED ONTO THE PANEL. VINYL SHALL BE SUITABLE FOR EXTERIOR APPLICATIONS.
4. COLORS SHALL BE AS SHOWN.
5. 1 EACH OF SIGN, LOCATION TO BE DETERMINED IN FIELD.

NORTH CAMPUS (PLYMOUTH ROAD) ELEVATED WATER STORAGE TANK LOCKING MECHANISM (FOR REFERENCE ONLY)

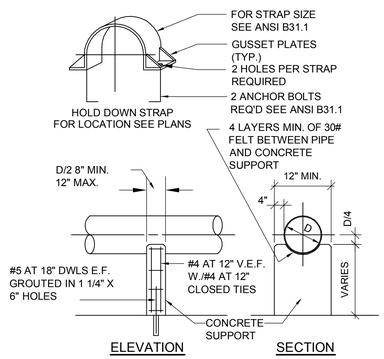
SCALE: NONE

NOTES:
1. SEE SPECIFICATION SECTION 05 00 00 FOR DETAILS.
2. PROVIDE SIMILAR LOCKING MECHANISM AND CONFIGURATION AT MANCHESTER TANK.



EQUIPMENT PAD MODIFICATION

SCALE: NONE



CONCRETE PIPE SUPPORT

SCALE: NONE

PROJECT SIGN DETAIL

SCALE: NONE

NOTES:
1. CONSTRUCTION SIGN SHALL BE BAKED ENAMEL ALUMINUM SHEET LAMINATED ONTO 2 SIDES OF A TRUSS TYPE CORRUGATED SHEET OF POLYMER CORE.
2. CONSTRUCTION SIGN SHALL BE STANDARD WHITE.
3. LETTERING SHALL BE DIE CUT VINYL (BLACK) LAMINATED ONTO THE PANEL. VINYL SHALL BE SUITABLE FOR EXTERIOR APPLICATIONS.
4. 1 EACH OF SIGN, LOCATION TO BE DETERMINED IN FIELD.
5. SECURE WITH TWO (2) 4X4 SET INTO CONCRETE.

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MARK	DATE	DESCRIPTION	BY
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CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

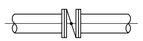
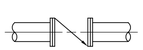
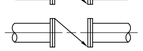
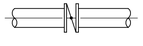
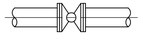
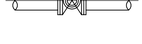
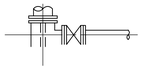
SITE DETAILS

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

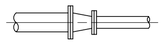
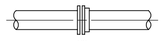
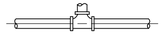
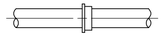
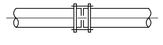
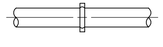
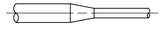
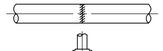
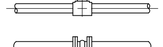
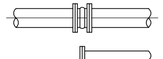
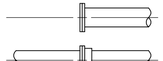
C-500

Bar Measures 1 inch

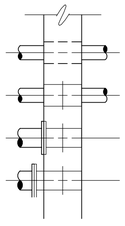
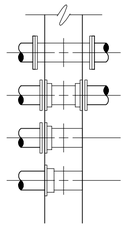
VALVE DESIGNATIONS

SYMBOLS: PIPEWORK DRAWINGS	SYMBOLS: FLOW DIAGRAMS	MARK	TYPE
		BV	BALL VALVE
		A	GATE VALVE
		B	BUTTERFLY VALVE
		C	STANDARD CHECK VALVE
		CC	CUSHION CHECK VALVE
		DC	DOUBLE VANE CHECK VALVE
		IB	INDUSTRIAL BUTTERFLY VALVE
		P	PLUG VALVE
		AL	ALTITUDE VALVE
		RA	RESILIENT SEATED GATE VALVE
		RC	RADIAL CHECK VALVE
		TPSV	TAPPING SLEEVE AND VALVE

JOINT DESIGNATIONS

SYMBOL	MARK	TYPE
	FJ	FLANGED JOINT
	MJ	MECHANICAL JOINT
	SJ	SCREWED JOINT
	POJ	PUSH ON JOINT
	BFC	BOLTED FLEXIBLE COUPLING
	GC	GROOVED COUPLING
	WJ	SHOP WELDED JOINT (STEEL PIPE)
	FWJ	FIELD WELDED JOINT (STEEL PIPE)
	STJ	SOCKET TYPE JOINT (FRP OR PVC PIPE)
	EJ	EXPANSION JOINT
	BF	BLIND FLANGE
	AFC	ADAPTER FLANGE COUPLING

SLEEVE AND WALL PIPE DESIGNATIONS

SYMBOL		SYMBOL	
	CORED HOLE IN EXISTING WALL FLANGE X PLAIN END WALL PIPE FLANGE X PLAIN END WALL PIPE		FLANGE X FLANGE WALL PIPE

PIPING AND EQUIPMENT SYMBOLS

 VTR	VENT TO ROOF
 PI	CHEMICAL SEAL W/PRESS GAUGE
 PI	PRESSURE GAUGE
PI	PULSATION DAMPENER W/PRESS GAUGE
 P	SUCTION ACCUMULATOR W/PRESS GAUGE
	ELBOW UP
	ELBOW DOWN
	TEE UP
	TEE DOWN
	REDUCER-CONCENTRIC
	REDUCER-ECCENTRIC
	WYE STRAINER
	UNION
 M	METER (TOTALIZING)
	PIPING (BELOW SLAB)
 F.D.	FLOOR DRAIN
 E.D.	EQUIPMENT DRAIN
 C.O.	CLEANOUT-FLOOR
C.O.	CLEANOUT-HORIZONTAL
D	PIPE TO DRAIN
	ELECTRIC
 BFP D	BACKFLOW PREVENTER
 PRV XX PSI	PRESSURE RELIEF VALVE SET POINT
BPV XX PSI	BACK PRESSURE VALVE SET POINT
	PUMP
	GLOBE VALVE
	PET COCK
	PLUG VALVE - GAS
	PRESSURE RELIEF VALVE
	TEMPERING VALVE
 H.B.	HOSE BIBB (3/4")
 S.C.	SILL COCK (3/4")
 F.H.B.	FLUSHING HOSE BIBB (1-1/2")
 W.H.	WALL HYDRANT (1-1/2")

PIPING LINETYPES:

GENERAL NOTES:

1. THESE GENERAL NOTES PRESENT AND/OR SUMMARIZE KEY PROJECT INFORMATION FOR THE DRAWING READER'S CONVENIENCE. SEE ALSO INDIVIDUAL DRAWING NOTES AND PROJECT SPECIFICATIONS FOR FURTHER DETAILS AND REQUIREMENTS.
2. SUBMIT SHOP DRAWINGS, PROJECT DATA AND SAMPLES AS SPECIFIED IN THE PROJECT SPECIFICATIONS.
3. ALL EXISTING DIMENSIONS SHOWN WITH THE ± SYMBOL ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.
4. CONTRACTOR MAY RE-ROUTE SUMP PUMP DISCHARGE PIPING IF A BETTER ROUTE THAN THE EXISTING IS DETERMINED. OBTAIN APPROVAL FROM ENGINEER AND OWNER PRIOR TO INSTALLATION.

TETRA TECH
www.tetratech.com
710 Avis Drive, Suite 100
Ann Arbor, MI 48106
Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

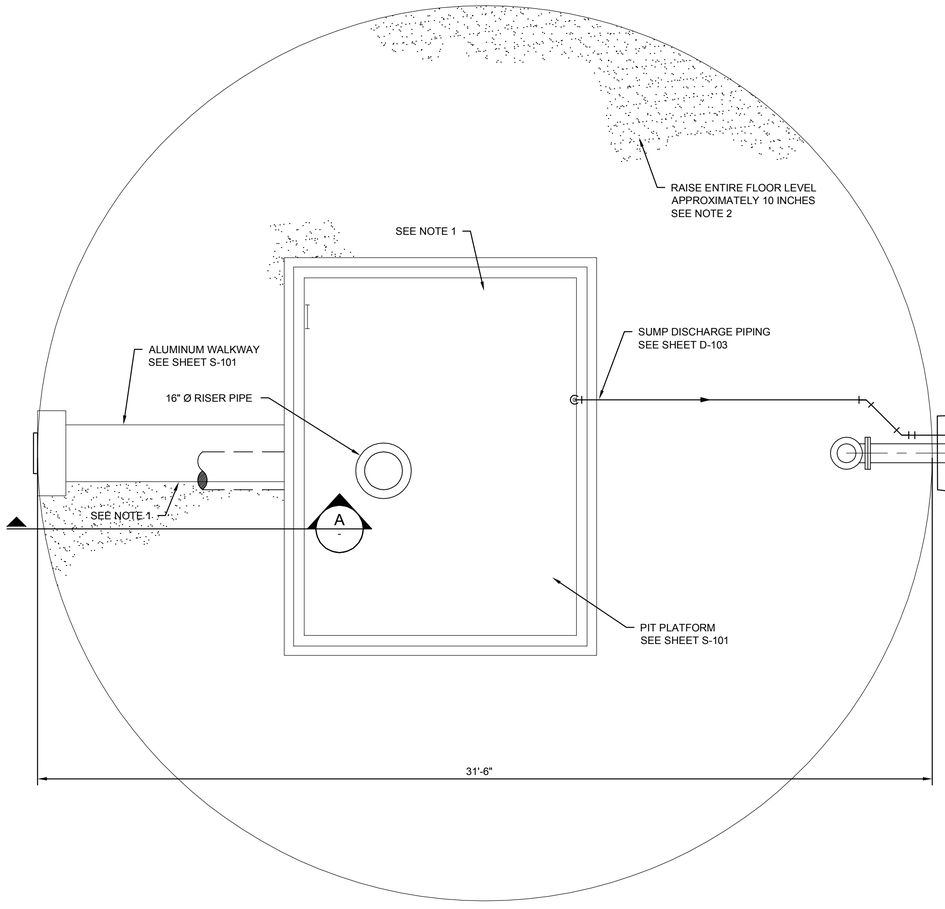
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

PIPING LEGEND

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

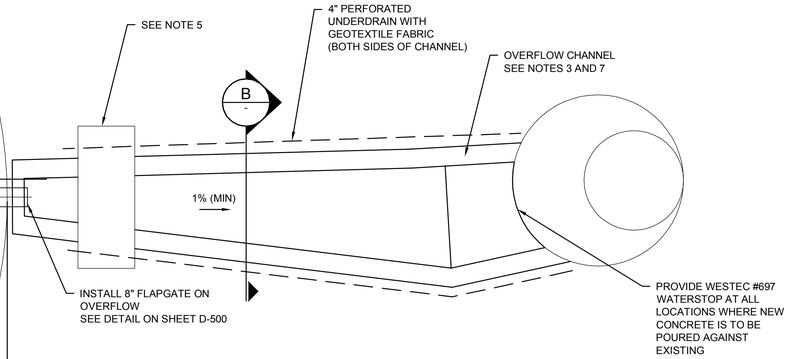
D-001

Bar Measures 1 inch



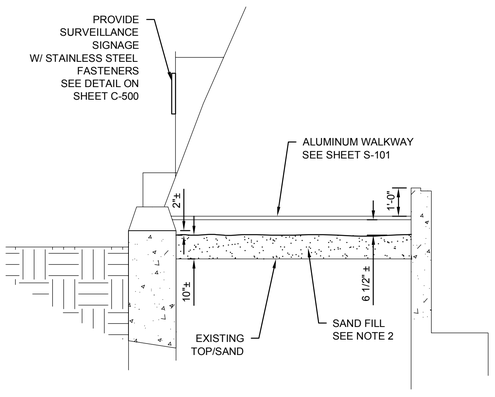
WATER TOWER FLOOR PLAN

SCALE: 3/8"=1'



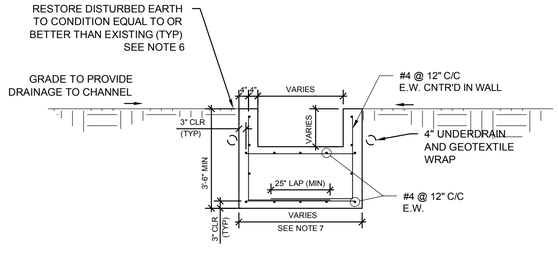
NOTES:

1. REMOVE EXISTING WOODEN PLATFORM PLANKS AND WOODEN WALKWAY FROM DOOR TO PIT.
2. PLACE SAND FILL TO APPROXIMATELY 2 INCHES BELOW TOP OF TANK RINGWALL. SAND FILL MATERIAL SHALL BE MDOT CLASS II GRANULAR MATERIAL, MODIFIED TO ALLOW 100% PASSING 2-INCH SIEVE. MATERIAL SHALL BE UNIFORMLY SPREAD AND COMPACTED BY OTHER ENGINEER-APPROVED METHOD TO MINIMUM 95% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D 1557.
3. REMOVE EXISTING MASONRY BLOCK AND CONCRETE OVERFLOW CHANNEL TO FULL EXTENT. PROTECT EXISTING CATCH BASIN AND MAKE REPAIRS AS REQUIRED DURING CHANNEL CONSTRUCTION.
4. PROTECT SUPPORT POLES, EQUIPMENT AND STRUCTURES SURROUNDING OVERFLOW CHANNEL. ANY DAMAGE TO EXISTING POLES, EQUIPMENT OR STRUCTURES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
5. TEMPORARILY RELOCATE EXISTING WALKWAY AND REINSTALL AFTER WORK TO CONCRETE CHANNEL IS COMPLETE.
6. SEED AND MULCH IN ACCORDANCE WITH THE CITY OF ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS, DIVISION VIII - LANDSCAPING AND RESTORATION. PROVIDE STRAW MULCH BLANKETS WITH NETTING THAT WILL DEGRADE. LOOSELY APPLIED STRAW SHALL NOT BE USED.
7. OVERFLOW CHANNEL TO BE REPLACED AT SAME DEPTH AND LAYOUT AS EXISTING. CONTRACTOR SHALL FIELD VERIFY EXISTING DIMENSIONS AND SUBMIT DESIGN FOR APPROVAL PRIOR TO INSTALLATION.
8. ELECTRICAL, COMMUNICATION AND SECURITY PANELS AND EQUIPMENT NOT SHOWN ON THIS SHEET FOR CLARITY. SEE E SHEETS FOR DETAIL.



SECTION A

SCALE: 3/8"=1'



SECTION B

SCALE: 3/8"=1'

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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN

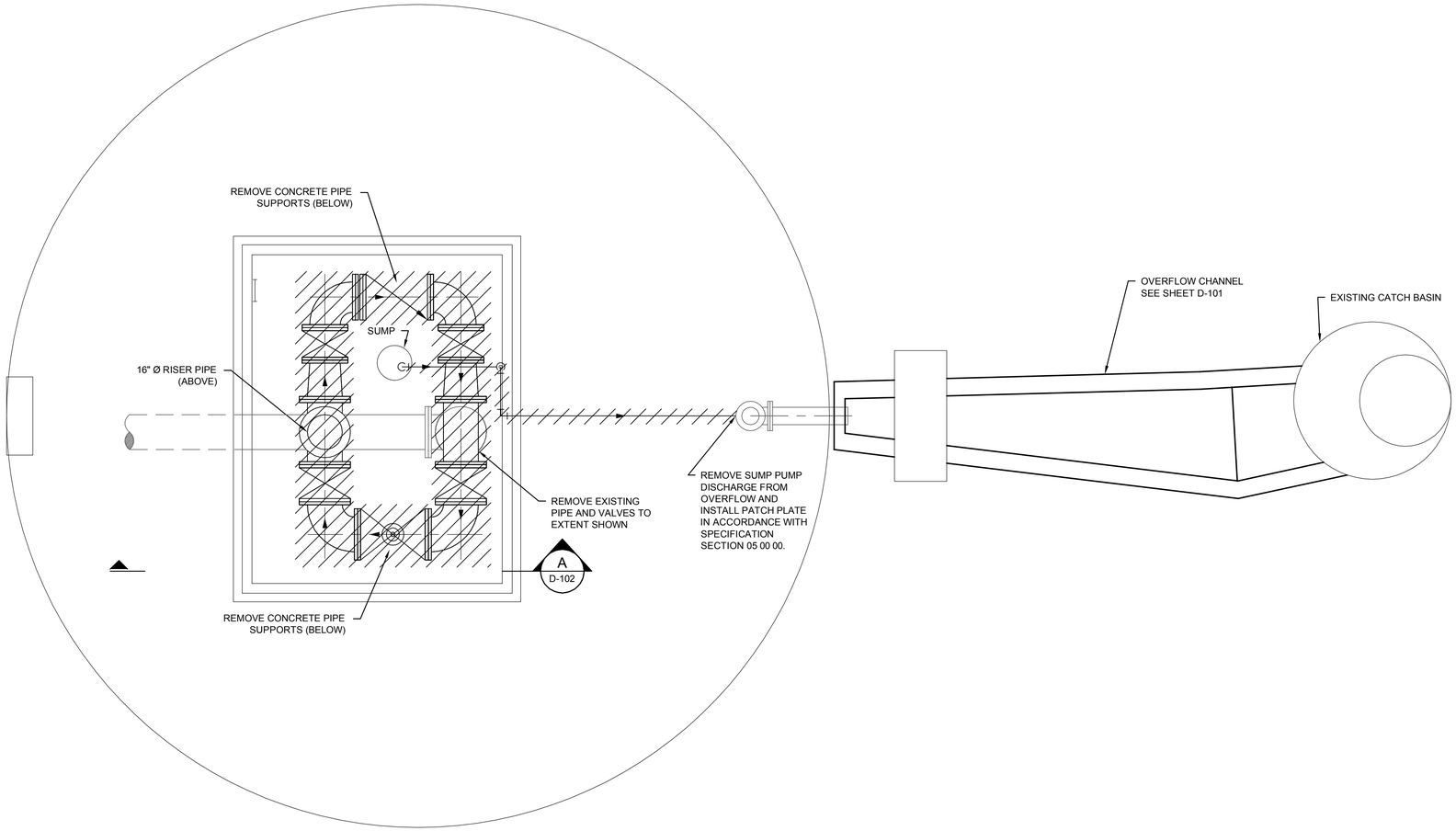
MANCHESTER TANK COATING

TANK FLOOR PLAN
INTERIOR AND SITE

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

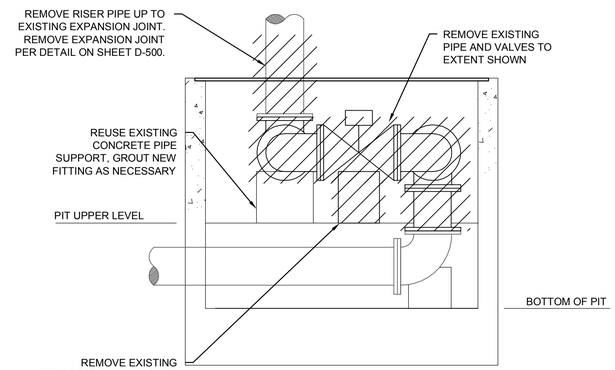
D-101

Bar Measures 1 inch



WATER TOWER DEMOLITION PIPING PLAN

SCALE: 3/8"=1'



SECTION A

SCALE: 3/8"=1'

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Ann Arbor, MI 48106
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MARK	DATE	DESCRIPTION
	4/16/15	ISSUED FOR BIDS

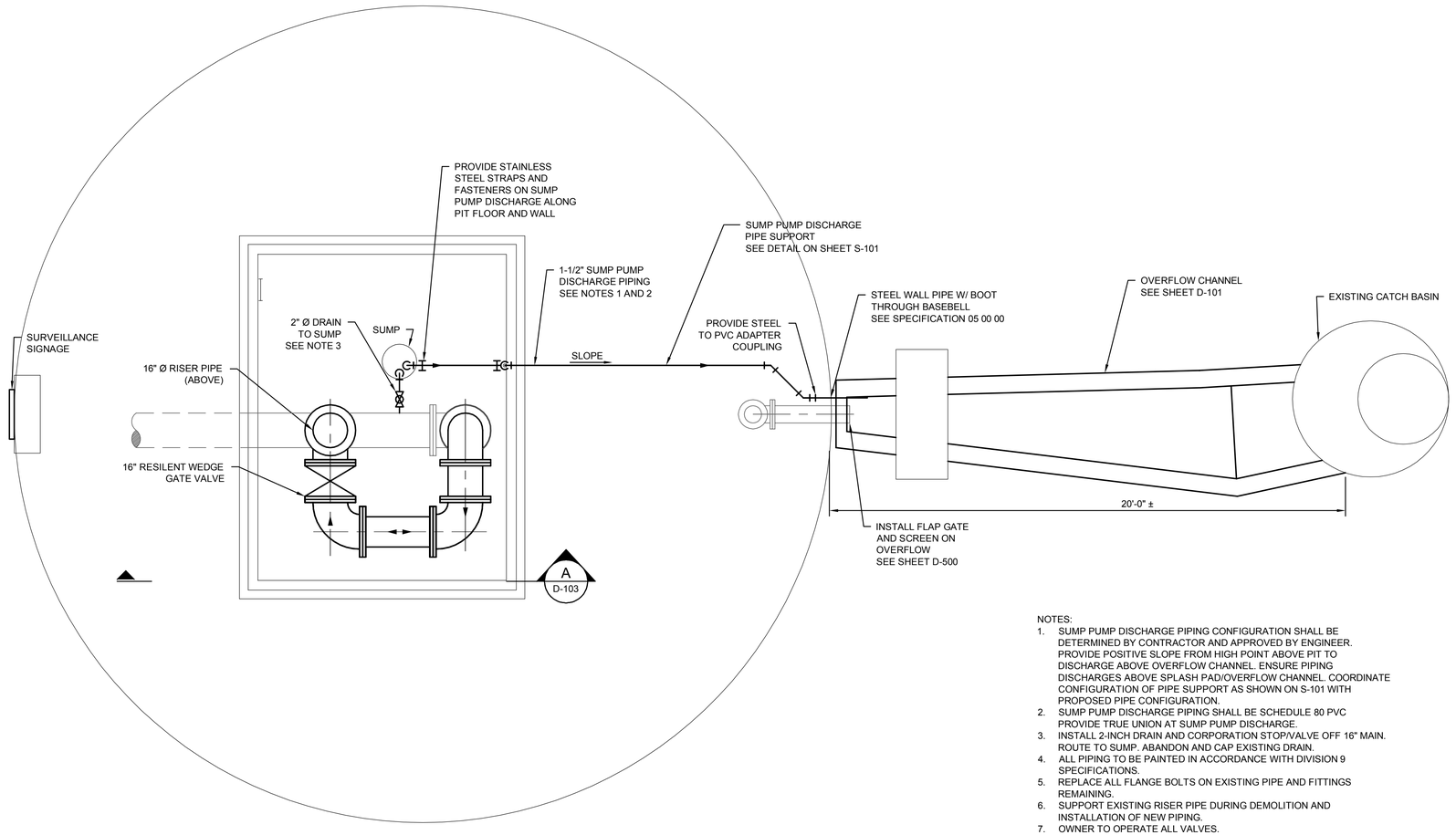
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

TANK INTERIOR GROUND LEVEL DEMOLITION

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

D-102

Bar Measures 1 inch

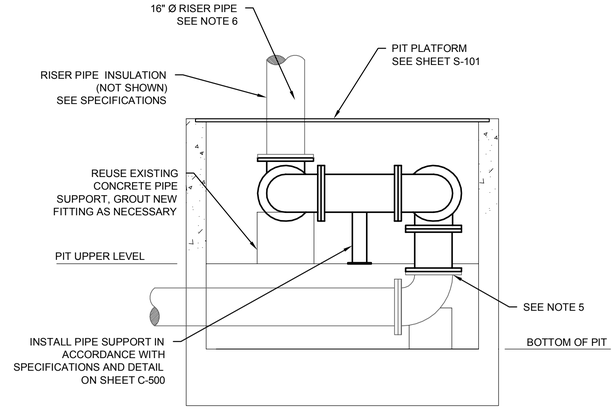


WATER TOWER PROPOSED PIPING PLAN

SCALE: 3/8"=1'

NOTES:

1. SUMP PUMP DISCHARGE PIPING CONFIGURATION SHALL BE DETERMINED BY CONTRACTOR AND APPROVED BY ENGINEER. PROVIDE POSITIVE SLOPE FROM HIGH POINT ABOVE PIT TO DISCHARGE ABOVE OVERFLOW CHANNEL. ENSURE PIPING DISCHARGES ABOVE SPLASH PAD/OVERFLOW CHANNEL. COORDINATE CONFIGURATION OF PIPE SUPPORT AS SHOWN ON S-101 WITH PROPOSED PIPE CONFIGURATION.
2. SUMP PUMP DISCHARGE PIPING SHALL BE SCHEDULE 80 PVC PROVIDE TRUE UNION AT SUMP PUMP DISCHARGE.
3. INSTALL 2-INCH DRAIN AND CORPORATION STOP/VALVE OFF 16" MAIN. ROUTE TO SUMP. ABANDON AND CAP EXISTING DRAIN.
4. ALL PIPING TO BE PAINTED IN ACCORDANCE WITH DIVISION 9 SPECIFICATIONS.
5. REPLACE ALL FLANGE BOLTS ON EXISTING PIPE AND FITTINGS REMAINING.
6. SUPPORT EXISTING RISER PIPE DURING DEMOLITION AND INSTALLATION OF NEW PIPING.
7. OWNER TO OPERATE ALL VALVES.



SECTION A

SCALE: 3/8"=1'

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Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

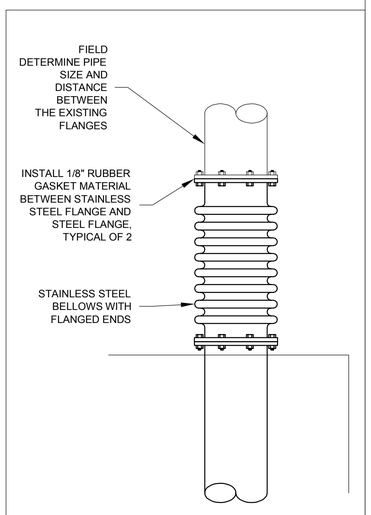
TANK INTERIOR GROUND LEVEL PROPOSED

Project No.:	200-31537-15001
Designed By:	EMS
Drawn By:	EMS
Checked By:	BMR

D-103

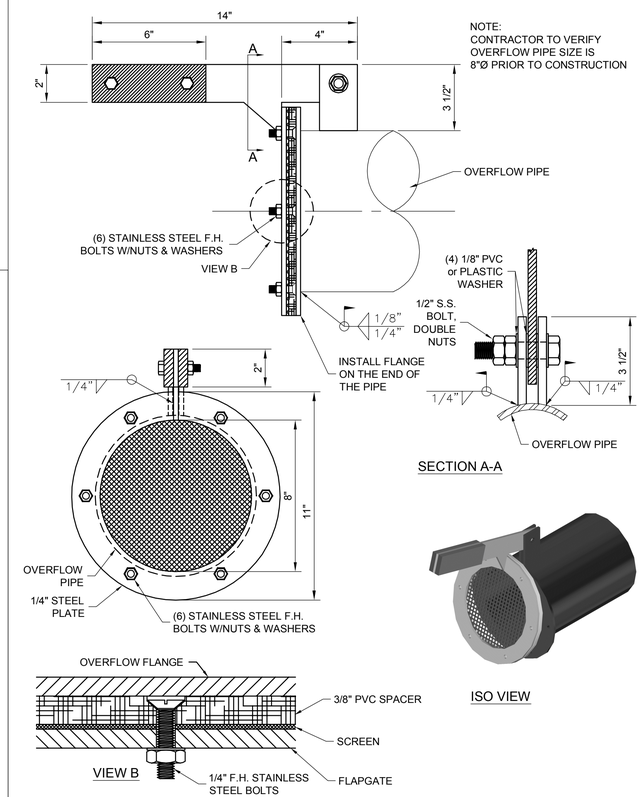
Bar Measures 1 inch

DIXON ENGINEERING, INC.
Ann Arbor, MI 500MG Spheroid



EXPANSION JOINT REPLACEMENT

SCALE: NONE



8" OVERFLOW FLAPGATE

SCALE: NONE

NOTES:
1. COUPLING IS TO BE 2 1/2" LONG SCH. 80 FEMALE THREADED

2. DRAIN PIPING IS TO BE 2.5"Ø SCH. 40 MALE THREADED LENGTH AS REQUIRED SLOPED TO OVERFLOW.

3. MUD VALVE IS TO BE BABCO "NO FREEZE" DRAIN VALVE, W/ 3"Ø DRAW AND 2.5"Ø DISCHARGE

4. THREADED CONNECTIONS ARE TO BE SEALED WITH TEFLON TAPE ON ASSEMBLY.

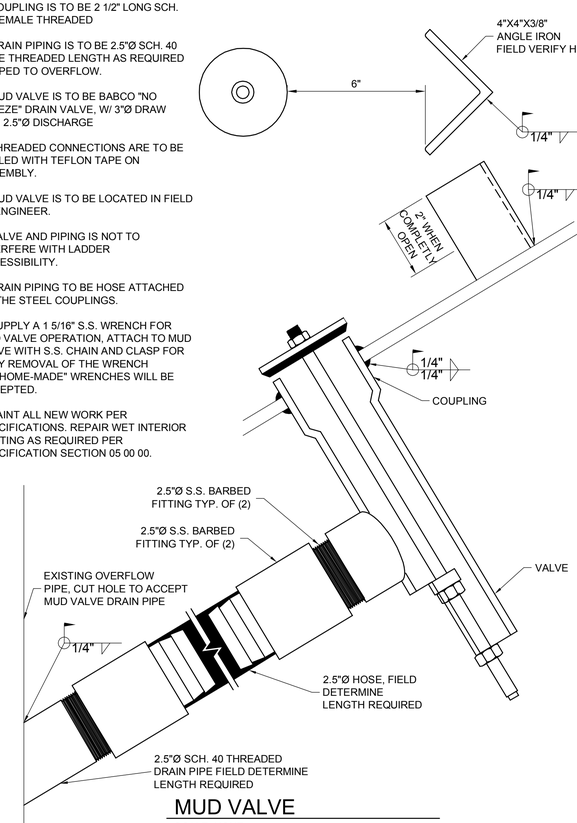
5. MUD VALVE IS TO BE LOCATED IN FIELD BY ENGINEER.

6. VALVE AND PIPING IS NOT TO INTERFERE WITH LADDER ACCESSIBILITY.

7. DRAIN PIPING TO BE HOSE ATTACHED TO THE STEEL COUPLINGS.

8. SUPPLY A 1 5/16" S.S. WRENCH FOR MUD VALVE OPERATION, ATTACH TO MUD VALVE WITH S.S. CHAIN AND CLASP FOR EASY REMOVAL OF THE WRENCH NO "HOME-MADE" WRENCHES WILL BE ACCEPTED.

9. PAINT ALL NEW WORK PER SPECIFICATIONS. REPAIR WET INTERIOR COATING AS REQUIRED PER SPECIFICATION SECTION 05 00 00.



MUD VALVE

SCALE: NONE

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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

PIPING DETAILS

Project No.:	200-31537-15001
Designed By:	####
Drawn By:	####
Checked By:	####

D-500

Bar Measures 1 inch

STRUCTURAL GENERAL NOTES

A. THESE GENERAL NOTES PRESENT AND/OR SUMMARIZE KEY PROJECT INFORMATION FOR THE DRAWING READER'S CONVENIENCE. SEE ALSO INDIVIDUAL DRAWING NOTES AND PROJECT SPECIFICATIONS FOR FURTHER DETAILS AND REQUIREMENTS.

C. ELEVATIONS. ALL ELEVATIONS ARE REFERENCED TO GRADE (TOP OF EXISTING INTERIOR SAND) EL. = 0'-0" ELEVATIONS SHOWN ON DRAWINGS ARE REFERENCED TO THIS DATUM UNLESS NOTED.

D. ALL EXISTING DIMENSIONS SHOWN WITH THE ± SYMBOL ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.

F. SUBMIT SHOP DRAWINGS TO ENGINEER OF RECORD FOR REVIEW.

G. ABBREVIATIONS

ADD'L	ADDITIONAL
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALUM.	ALUMINUM
B.M.	BEAM
B.O.	BOTTOM OF
BLDG.	BUILDING
C/C	CENTER TO CENTER
CJ	CONTROL JOINT
CLR	CLEAR
COL	COLUMN
CONT	CONTINUOUS
CTR	CENTER
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DIST	DISTANCE

E	EXISTING
EA	EACH
EJ	EXPANSION JOINT
EMB.	EMBED / EMBEDMENT
ENGR	ENGINEER
EQ	EQUAL
EW	EACH WAY
EXIST	EXISTING
GALV	GALVANIZED
GRTG	GRATING
IBC	INTERNATIONAL BUILDING CODE
LLV	LONG LEG VERTICAL
MATL	MATERIAL
MAX.	MAXIMUM
MFR	MANUFACTURER
MISC.	MISCELLANEOUS

MTL	METAL
N	NEW
O.C.	ON CENTER
OPNG	OPENING
PERIM	PERIMETER
REQ'D	REQUIRED
SS	STAINLESS STEEL
STL	STEEL
STRUCT	STRUCTURE(AL)
T.O.C.	TOP OF CONCRETE
T/	TOP OF
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V.I.F.	VERIFY IN FIELD
VB	VAPOR BARRIER
VERT	VERTICAL
W/	WITH
W/O	WITHOUT

DESIGN CRITERIA

A. REFERENCES:

1. ICC INTERNATIONAL BUILDING CODE, 2012 EDITION
   RISK CATEGORY III IN ACCORDANCE WITH TABLE 1604.5
2. STATE BUILDING CODE: MICHIGAN BUILDING CODE
3. ASCE/SEI 7-10 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES

B. DEAD LOADS = (SELF WEIGHT)

C. LIVE LOADS = 100 PSF

STRUCTURAL ALUMINUM

A. REFERENCES:
1. AA ALUMINUM DESIGN MANUAL
2. AA ALUMINUM STANDARDS AND DATA
3. ANSI/DWS D1.2 ALUMINUM WELDING CODE

B. MATERIALS:
1. PLATES AND ROLLED SHAPES: 6061-T6
2. STRUCTURAL BOLTS: 316 STAINLESS STEEL

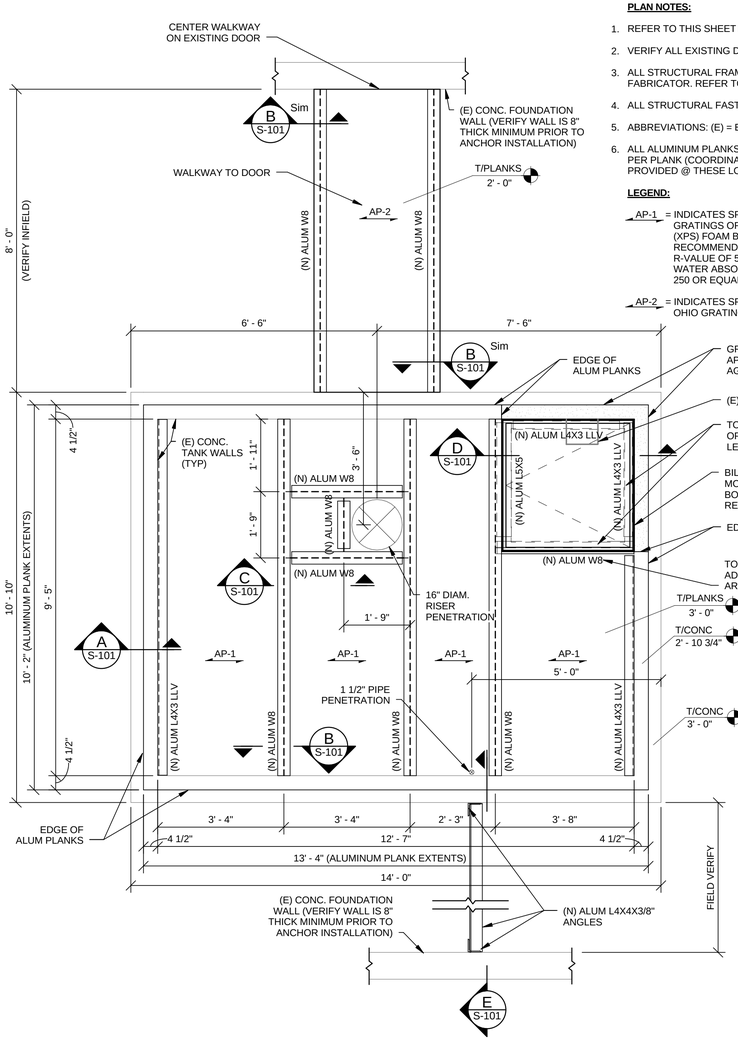
C. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER CONSTRUCTION IS FULLY COMPLETED. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIE DOWNS WHICH MIGHT BE NECESSARY. SUCH MATERIAL SHALL REMAIN THE CONTRACTOR'S PROPERTY AFTER THE COMPLETION OF THE PROJECT.

D. STRUCTURAL PERFORMANCE: DESIGN, ENGINEER, FABRICATE, AND INSTALL THE FOLLOWING METAL FABRICATIONS TO WITHSTAND THE FOLLOWING STRUCTURAL LOADS WITHOUT EXCEEDING THE ALLOWABLE DESIGN WORKING STRESS OF THE MATERIALS INVOLVED, INCLUDING FRAMING MEMBERS AND CONNECTIONS. APPLY EACH LOAD TO PRODUCE THE MAXIMUM STRESS IN EACH RESPECTIVE COMPONENT OF EACH METAL FABRICATION. SUBMIT SIGNED AND SEALED FABRICATION DRAWINGS AND DESIGN CALCULATIONS INDICATING COMPLIANCE WITH INDICATED LOADS. THE DESIGN ENGINEER SHALL BE A REGISTERED IN THE STATE OF MICHIGAN.

E. ALUMINUM PLANK SHOP DRAWINGS SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER OF RECORD.

F. ALL CONCRETE IN CONTACT WITH ALUMINUM SHALL BE PROVIDED WITH A BITUMINOUS COATING.

G. ALUMINUM PLANK LIVE LOAD DEFLECTION SHALL NOT EXCEED L/360.



PIT PLATFORM STRUCTURAL PLAN

SCALE: 1/2" = 1'-0"

PLAN NOTES:

1. REFER TO THIS SHEET FOR GENERAL STRUCTURAL NOTES.
2. VERIFY ALL EXISTING DIMENSIONS IN FIELD.
3. ALL STRUCTURAL FRAMING MEMBERS SHALL BE ALUMINUM & ENGINEERED BY THE FABRICATOR. REFER TO STRUCTURAL ALUMINUM NOTE D.
4. ALL STRUCTURAL FASTENERS SHALL BE STAINLESS STEEL.
5. ABBREVIATIONS: (E) = EXISTING & (N) = NEW CONSTRUCTION
6. ALL ALUMINUM PLANKS SHALL BE FABRICATED WITH (4) PLANK LUGS & ACCESS HOLES PER PLANK (COORDINATE LOCATION w/ ALUMINUM FRAMING. 1/4" S.S. BOLTS SHALL BE PROVIDED @ THESE LOCATIONS.

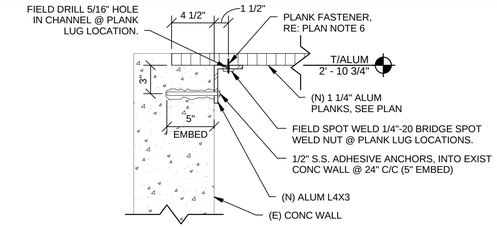
LEGEND:

AP-1 = INDICATES SPAN DIRECTION OF 1 1/4" UNPUNCHED ALUMINUM PLANKS BY OHIO GRATINGS OR APPROVED EQUAL. INSTALL 2" EXTRUDED POLYSTYRENE RIGID (XPS) FOAM BOARD INSULATION BENEATH EACH PANEL USING MANUFACTURER RECOMMENDED ADHESIVE AND METHODS. THE INSULATION SHALL BE MINIMUM R-VALUE OF 5.0 PER INCH, MINIMUM COMPRESSIVE STRENGTH OF 25PSI, AND WATER ABSORPTION LESS THAN 0.1%. PROVIDE OWENS CORNING FOAMULAR 250 OR EQUAL.

AP-2 = INDICATES SPAN DIRECTION OF 1 1/4" PUNCHED ALUMINUM PLANKS BY OHIO GRATINGS OR APPROVED EQUAL.

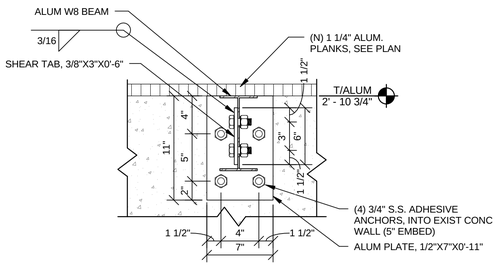
E PIPE SUPPORT FRAMING

S-101 SCALE 3/4" = 1'-0"



A TYPICAL ANGLE TO CONCRETE CONNECTION

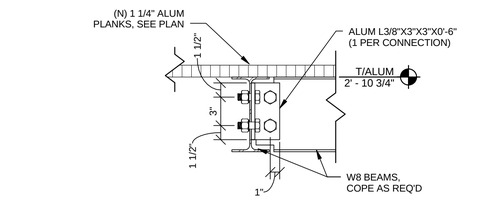
S-101 SCALE 1 1/2" = 1'-0"



NOTE: SIM SECTION HAS A DIFFERENT ELEVATION

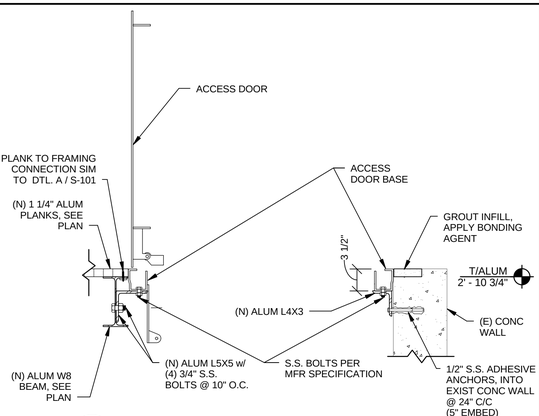
B TYPICAL FRAMING TO CONCRETE CONNECTION

S-101 SCALE 1 1/2" = 1'-0"



C TYPICAL FRAMING CONNECTION

S-101 SCALE 1 1/2" = 1'-0"



D FLOOR ACCESS DOOR SECTION

S-101 SCALE 1" = 1'-0"

0 1' 2' 4'

SCALE: 1/2" = 1'-0"

TETRA TECH
www.tetratech.com
710 AVIS DR. SUITE 100
ANN ARBOR, MI 48108
PHONE: (517) 316-3930 FAX: (517) 484-8140

MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR
MANCHESTER TANK COVER

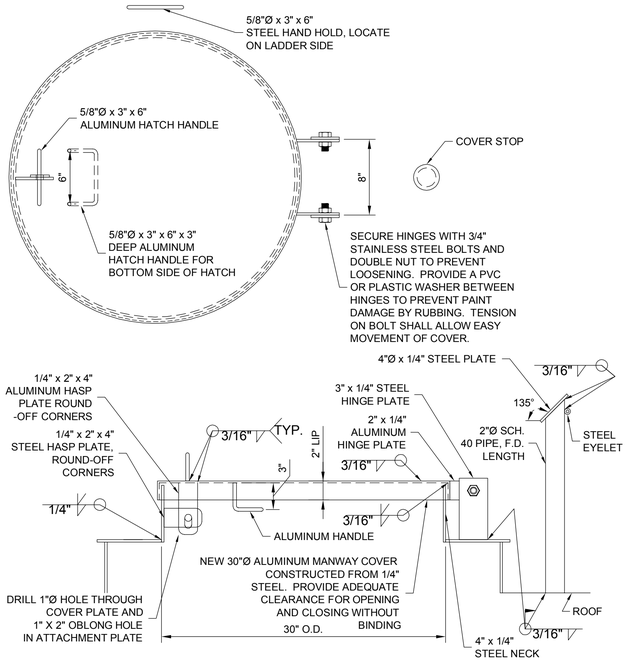
STRUCTURAL PLAN AND SECTIONS

Project No.:	200-31537-15001
Designed By:	PAF
Drawn By:	PAF
Checked By:	CDC

S-101

Bar Measures 1 inch

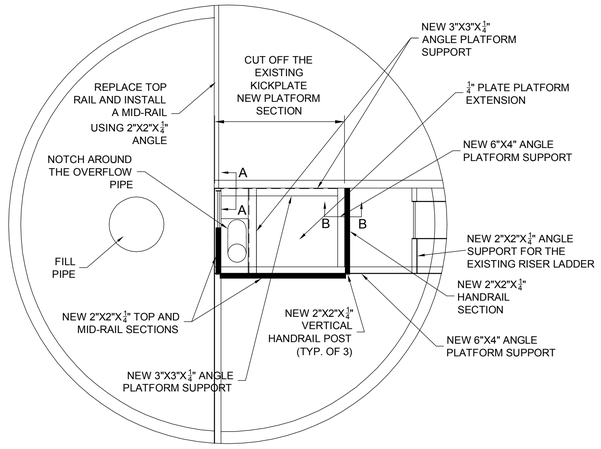
4/16/2015 10:26:56 AM C:\Users\phil.fleming\Desktop\S-PLATFORMS-PLATFORM.rvt



NOTES:
1.MANWAY ORIENTATION TO BE DETERMINED BY THE ENGINEER.
2. INSTALL A COVER STOP SO THE HATCH CAN OPEN NO MORE THAN 135°.
3. INSTALL A 3/8" STAINLESS STEEL CHAIN WITH A HOOK TO ATTACH TO THE ROOF HATCH HANDLE WHILE OPEN. ATTACH CHAIN USING A S.S. QUICK LINK.

30" ACCESS TUBE HATCH

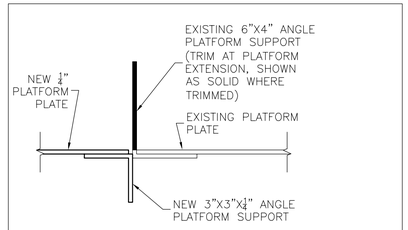
SCALE: NONE



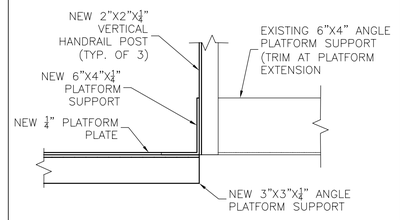
NOTES:
1. ALL WELDS TO BE 3/16" FULL FILLET.
2. NOTCH ANGLES WHERE THEY MEET TO CREATE A FLUSH SURFACE FOR THE PLATFORM FLOOR.

MODIFICATIONS TOP PLATFORM

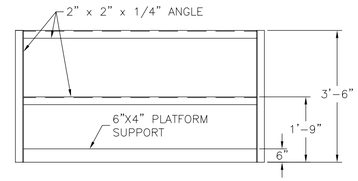
SCALE: NONE



SECTION A-A



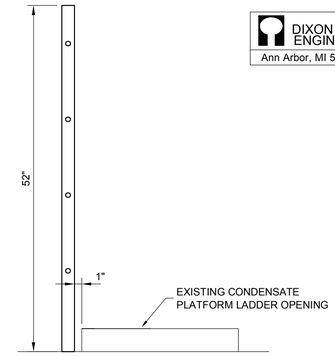
SECTION B-B



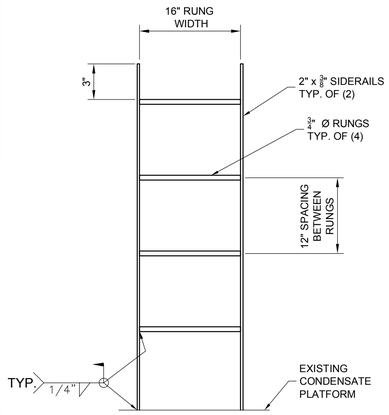
TYPICAL RAILING SECTION

DETAILS TOP PLATFORM

SCALE: NONE



SIDE VIEW

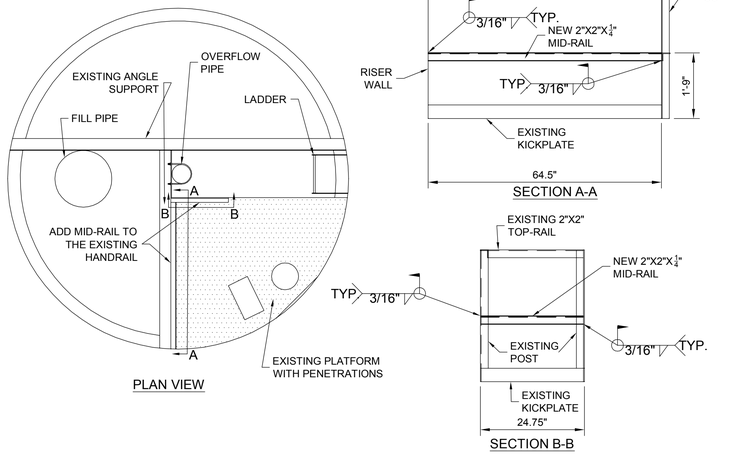


FRONT VIEW

NOTE:
PLATFORM LADDER OPENING NOT SHOWN
ON FRONT VIEW FOR CLARITY.

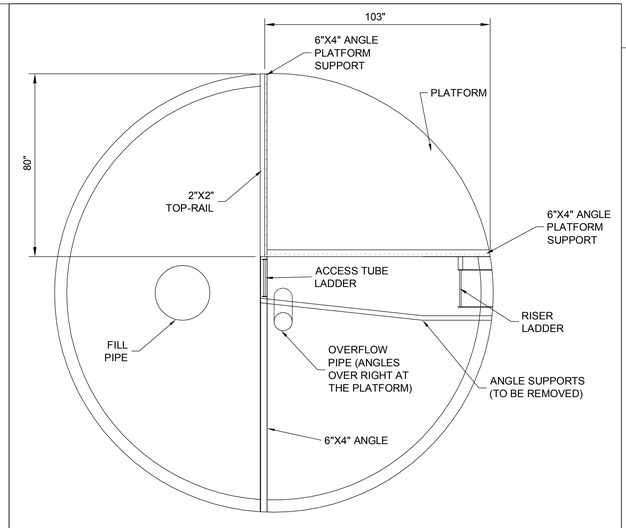
CONDENSATE PLATFORM LADDER

SCALE: NONE



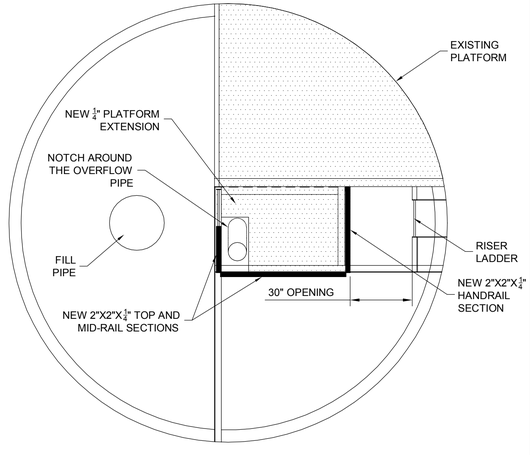
INTERMEDIATE PLATFORM

SCALE: NONE



EXISTING CONDITIONS TOP PLATFORM

SCALE: NONE



PROPOSED TOP PLATFORM

SCALE: NONE

DIXON ENGINEERING, INC.
Ann Arbor, MI 500MG Spheroid

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MARK	DATE	DESCRIPTION
	4/16/15	ISSUED FOR BIDS

BY

CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

STRUCTURAL DETAILS

Project No.:	200-31537-15001
Designed By:	T. FELTON
Drawn By:	T. FELTON
Checked By:	I. GABIN

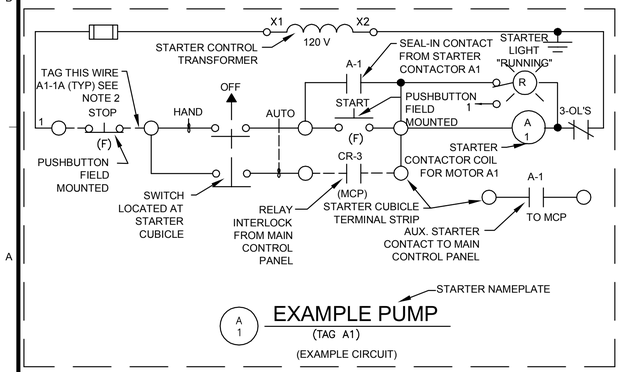
S-500

Bar Measures 1 inch

BACKGROUND PLAN AND ONE LINE SYMBOLS

SYMBOL	DESCRIPTION
	CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE
F FL	SEE CIRCUITS FOR SPECIFIC TYPE FLOAT SWITCH - FLOW SWITCH
T M	TEMPERATURE - HUMIDISTAT SWITCH (SUBSCRIPT = NO. OF STAGES)
L P V	LIMIT - PRESSURE - VACUUM SWITCH
ALT	ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING)
OS	OVERLOAD SWITCH OR DEVICE
TB	TERMINAL BOX
	SOLENOID VALVE
PC	PHOTOCELL LINE VOLTAGE
	ITEM NO. INTERCOM EQUIPMENT
A WS LB	INTERCOMMUNICATION SYSTEM AMPLIFIER - WALL STATION - LINE BALANCE
DS	INTERCOMMUNICATION DESK SET
	INTERCOM. SPEAKER (CEILING LAY-IN)
	TELEPHONE OUTLET OR JUNCTION BOX
	WELDING RECEPTACLE - NEMA L9-50R 600V, 2P, 3W, SIMPLEX
HS	INTERCOM HANDSET - SURFACE MOUNTED WITH REMOTE SPEAKER AMPLIFIER
VC	INTERCOM VOLUME CONTROL
	INTERCOM SPEAKER - SURFACE MOUNTED
HS	INTERCOM HANDSET - FLUSH MOUNTED WITH REMOTE SPEAKER AMPLIFIER
	AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL ETC.) WALL MOUNTED
JB	JUNCTION BOX
	HEATER
	TRANSFORMER
	CONDUIT WITH CONDUIT SEAL FITTING
	CONDUIT EXPOSED
	CONDUIT CONCEALED
E	DIRECT BURIED CONDUIT
UG	DIRECT BURIED CABLE
OH	OVERHEAD LINE
DB	UNDERGROUND DUCT BANK
1 2 3 4 5 6	CONCRETE ENCASED DUCT BANK, WITH CABLE LOCATIONS AND SPARE DUCTS AS INDICATED ON DRAWINGS
1	DUCT BANK CONDUIT WITH 2-4" 3-CELL MAXCELL FABRIC INNERDUCT
	CABLE REEL
CH	COMMUNICATION HANDHOLE
EH	ELECTRICAL HANDHOLE
	DEMOLISH

SYMBOL	DESCRIPTION
	LOW VOLTAGE DISCONNECT SWITCH
	LOW VOLTAGE FUSE (BELOW 600V)
1 RV 2 FVR 3 2S,2W	ALL STARTERS SHALL BE FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE INDICATED (FVR) FULL VOLTAGE REVERSING (RV) REDUCED VOLTAGE (2S,2W) TWO SPEED, TWO WINDING
	600V, 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME & RATING AS SHOWN
1/3 A-3	SINGLE PHASE, FRACTIONAL HP MOTOR TO LOCATION INDICATED (SEE GEN. NOTE 4)
A 1	THREE PHASE LOAD WITH IDENTIFICATION
	HIGH VOLTAGE FUSE (ABOVE 600 V)
FT 10	TAG NO. (BALLOON) FOR DEVICE INDICATED
A-3 FT 10 MCP OR CP-1	FOR POWER (SEE GEN. NOTE 4) 3/4"C(2/C#18 SHLD.)CONDUIT AND WIRE RUN FROM DEVICE INDICATED TO LOCATION INDICATED
	CAPACITOR, 3 PHASE, SIZE AS INDICATED
F C	DISCONNECT SWITCH (F) = FUSED (C) = CIRCUIT BREAKER, POLE QUANTITY, RATING AND FUSING AS INDICATED
	MAGNETIC STARTER (BACKGROUND DRAWINGS ONLY)
SIZE 2	COMBINATION MAGNETIC STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER)
LC	COMBINATION LIGHTING CONTACTOR WITH HAND-OFF-AUTO SWITCH
	MANUAL STARTER (R) = REVERSING
CP	CONTROL PANEL
TCP	TEMPERATURE CONTROL PANEL
1/8 UH-19	UNIT HEATER, 1/8 HORSEPOWER
BUS DUCT	600 VOLT FEEDER BUS DUCT (AMPERAGE AS INDICATED)
	LIGHTNING ARRESTOR
A-3	LOW VOLTAGE HOME RUNS 120/208 V 120/240 V (SEE GEN. NOTE 4)
NEMA 4	WATERTIGHT
NEMA 4X	WATERTIGHT AND CORROSION PROOF
NEMA 7	EXPLOSION PROOF - CLASS I, DIVISION I, GROUP D
NEMA 9	EXPLOSION PROOF - CLASS II, DIVISION 1
K	KEYLOCK
SD	SMOKE DETECTOR
	FLUORESCENT FIXTURE
	INCANDESCENT FIXTURE
	HIGH INTENSITY DISCHARGE FIXTURE
	EXIT LIGHT
EM EXIT	EMERGENCY BATTERY PACK/EXIT
	DATA JACK
	GROUND FRAME TO REBAR
	AIR TERMINAL / GROUND ROD



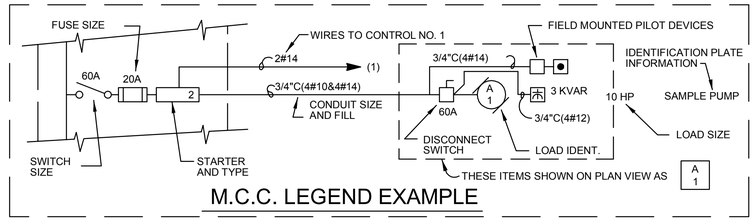
CONTROL CIRCUIT & PILOT DEVICE LEGEND

SYMBOL	DESCRIPTION
	PRESS. ACTUATED SWITCH
	FLOAT ACTUATED SWITCH
	FLOW ACTUATED SWITCH
	TEMP. ACTUATED SWITCH
	LIMIT SWITCH-NORMALLY OPEN
	LIMIT SWITCH-NORMALLY CLOSED
	LIMIT SWITCH-NORMALLY CLOSED-HELD OPEN
	LIMIT SWITCH-NORMALLY OPEN-HELD CLOSED
	LATCHING CABLE SWITCH
	TIME-DELAY FUSE
CR	CONTROL RELAY COIL
	CONTROL RELAY CONTACT-NORMALLY OPEN
	CONTROL RELAY CONTACT-NORMALLY CLOSED
CR L CR U	TWO COIL LATCHING RELAY
T	TIMING RELAY COIL
	TIMED CLOSED CONTACT ON ENERGIZATION
	TIMED OPEN CONTACT ON ENERGIZATION
	TIMED OPEN CONTACT ON DE-ENERGIZATION
	TIMED CLOSED CONTACT ON DE-ENERGIZATION
X1 X2	120 VAC TRANSFORMER

SYMBOL	DESCRIPTION
H O A	SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	MOMENTARY PUSHBUTTON OPERATOR-NORMALLY OPEN
	MOMENTARY PUSHBUTTON OPERATOR-NORMALLY CLOSED
	PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
(F)	FIELD LOCATED STOP BUTTON
	MAINTAINED PUSH-PULL OPERATOR
	MAINTAINED STOP-START PUSHBUTTON OPERATOR
	SOLENOID OR CLUTCH
R 1	PUSH-TO-TEST INDICATING LIGHT
	MAINTAINED STOP-MOMENTARY START PUSHBUTTON (JOG)
	ZERO SPEED OR ANTI-PLUGGING SWITCH
	LOCAL TERMINALS WITH EXTERNAL WIRING
ET	ELAPSED TIME INDICATOR
INST. INST.	TIMING RELAY INSTANTANEOUS CONTACTS

ABBREVIATIONS:

A	AMPERE(S)
A/C	AIR CONDITIONING
AI	ANALOG INPUT
ALT	ALTERNATE
AO	ANALOG OUTPUT
ASB	ALARM SILENCE BUTTON
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CAT	CATEGORY
CB	CIRCUIT BREAKER
CLAR	CLARIFIER
CP	CONTROL PANEL
CR	CONTROL RELAY
CSF	CARBON STORAGE & FEED
DB	DUCTBANK
DI	DISCRETE INPUT
DO	DISSOLVED OXYGEN
EFF	EFFLUENT
EM	EMERGENCY
ENET	ETHERNET
ETI	ELAPSED TIME INDICATOR
FB	FUSE BLOCK
FO	FIBER OPTIC
FOC	FIBER OPTIC CONVERTER
FOPP	FIBER OPTIC PATCH PANEL
FVNR	FULL VOLTAGE NON-REVERSING
G / GND	GROUND
GA	GAUGE
GAL	GALLON(S)
GALV	GALVANIZED
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HOA	HAND-OFF-AUTO
HORIZ	HORIZONTAL
HP	HORSEPOWER
HTR	HEATER
HZ	HERTZ
I/O	INPUT/OUTPUT
M	MOTOR
MA	MILLIAMP
MB	MAIN BREAKER
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
MIN	MINIMUM
MLO	MAIN LUG ONLY
MS	MOTOR STARTER
MTR	MASTER
N	NEUTRAL
NO.	NUMBER
O.C.	ON CENTER
OL	OVERLOAD
ORP	OXIDATION REDUCTION POTENTIAL
P	POLE
PDB	POWER DISTRIBUTION BLOCK
P.B.	PUSHBUTTON
PLC	PROGRAMMABLE LOGIC CONTROLLER
PM	PHASE MONITOR
PVC	POLYVINYL CHLORIDE
RAD	RADIANT
RL	RUNNING LIGHT
RPM	ROTATIONS PER MINUTE
SCHED	SCHEDULE
SEL	SELECTOR
SH	SHIELDED
SKD	SKID
SS	STAINLESS STEEL
STA	STATION
T	THERMOSTAT
TNK	TANK
TRN	TRAIN
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP.	TYPICAL
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTAGE
VAC	VOLTAGE ALTERNATING CURRENT
VDC	VOLTAGE DIRECT CURRENT
VERT	VERTICLE
VFD	VARIABLE FREQUENCY DRIVE
W	WATT / WIRE
W/	WITH
XFMR	TRANSFORMER
Ø	PHASE



M.C.C. LEGEND EXAMPLE

WIRING DEVICE SCHEDULE

SYMBOL	DESCRIPTION	NEMA TYPE
	125V, 2P, SIMPLEX, CLOCK HANGER	1-15 R
	125V, 2P, SIMPLEX, 3W	5-20 R
	125V, 2P, DUPLEX, 3W	5-20 R
	125/250V, 3P, SIMPLEX, 3W, RANGE TYPE	10-50 R
S	20A, 120/277 V SWITCH	SPST
S 2P	20A, 120/277 V SWITCH	2PDT
S 3	20A, 120/277 V SWITCH	3 WAY
S 4	20A, 120/277 V SWITCH	4 WAY
S D	20A, 120/277 V DIMMER SWITCH	
S WP	20A, 120/277 V WEATHERPROOF SWITCH	
	250V, 2P, SIMPLEX, 3W, 50A	6-50R
	125V, 2P, MULTI-RECEPTACLE	5-15R
	250V, 2P, SIMPLEX, 3W, 20A	6-20R
	600V, 2P, 3W, SIMPLEX WELDING	L9-50R
	208V, 3P, SIMPLEX, 4W, LOCKING	L14-20R
	277V, 2P, DUPLEX, 3W	7-15R

GENERAL NOTES:

1. THE FOLLOWING COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:
   - 1.1. (F) FIELD MOUNTED NOT AT STARTER OR OTHER CONTROL PANELS.
   - 1.2. (S) STARTER PANEL MOUNTED.
   - 1.3. (TCP) AT TEMPERATURE CONTROL PANEL.
   - 1.4. (MCP) AT MAIN CONTROL PANEL.
2. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW TO THIS CONTRACT.
3. ITEMS SHOWN IN CROSSHATCH ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED.
4. FOR ITEMS INDICATED AS 'FIELD LOCATE' CHECK DRAWINGS OF OTHER TRADES (IN PARTICULAR PIPING AND STRUCTURAL) FOR INTERFERENCES AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
5. INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. CONDUIT SHALL BE 3/4" MIN.
6. WIRE NUMBERS (1,3 & 5) ETC. SHALL BE PREFIXED WITH STARTER TAG NUMBERS. THE WIRE NUMBER AFTER THE PREFIX, MAY BE THE MANUFACTURERS WIRE NUMBERING SYSTEM. WIRE MARKERS MAY BE USED AT EACH WIRE TERMINATION POINT.
7. PROVIDE SIGNAGE/PLACARD/TAGS AS INDICATED ON THE DRAWINGS DETAILS.
8. OUTSIDE EQUIPMENT MUST BE RATED FOR -40 TO 150 DEG F.
9. CONDUIT FILL MUST MEET NFPA REQUIREMENTS. (WHERE NFPA IS SILENT CONDUIT FILL MUST NOT EXCEED 40%)
   - 9.1. INSTRUMENT SIGNAL CONDUIT: SHIELDED SIGNAL WIRES FOR 4-20 MA TYPE INSTRUMENTS OR THERMOCOUPLE WIRES ASSIGNED TO THE SAME CONTROL PANEL MAY BE RUN IN THE SAME CONDUIT. NO OTHER WIRES WILL BE PERMITTED IN AN INSTRUMENT SIGNAL/2-WIRE CONDUIT.
   - 9.2. CONTROL CIRCUIT CONDUIT (120VAC). 120VAC CONTROL CIRCUIT WIRES USED FOR DISCRETE PLC INPUT OR MCC CONTROL ASSIGNED TO THE SAME CONTROL PANEL/MCC MAY BE RUN IN THE SAME CONDUIT. NO OTHER WIRES WILL BE PERMITTED IN THE CONTROL CIRCUIT CONDUIT.
   - 9.3. CONTROL CIRCUIT CONDUIT (24VDC). 24VDC CONTROL CIRCUIT WIRES USED FOR DISCRETE PLC INPUT OR MCC CONTROL ASSIGNED TO THE SAME CONTROL PANEL/MCC MAY BE RUN IN THE SAME CONDUIT. NO OTHER WIRES WILL BE PERMITTED IN THE CONTROL CIRCUIT CONDUIT.
   - 9.4. COMMUNICATION CONDUIT (ETHERNET). COMMUNICATION WIRE USED FOR ETHERNET, FIBER OPTIC, OR MODBUS MAY BE RUN IN THE SAME CONDUIT. NO OTHER WIRES WILL BE PERMITTED IN THE COMMUNICATION CONDUIT (ETHERNET).
   - 9.5. COMMUNICATION CONDUIT (FIELD BUS). FIELD BUS WIRE USED FOR CONTROLNET OR DEVICENET MAY BE RUN IN THE SAME CONDUIT. NO OTHER WIRES WILL BE PERMITTED IN THE COMMUNICATION CONDUIT (FIELD BUS).
10. EQUIPMENT SHOWN INSIDE SHALL BE RATED NEMA 12 AND EQUIPMENT SHOWN OUTSIDE SHALL BE RATED NEMA 4X, UNLESS OTHERWISE INDICATED.
11. MINIMUM CONTROL WIRE SIZE SHALL BE EITHER #14 AWG OR 2/C#18SH AND MINIMUM POWER WIRE SIZE SHALL BE #12 AWG.
12. MINIMUM CONDUIT SIZE SHALL BE 3/4".

TETRA TECH
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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

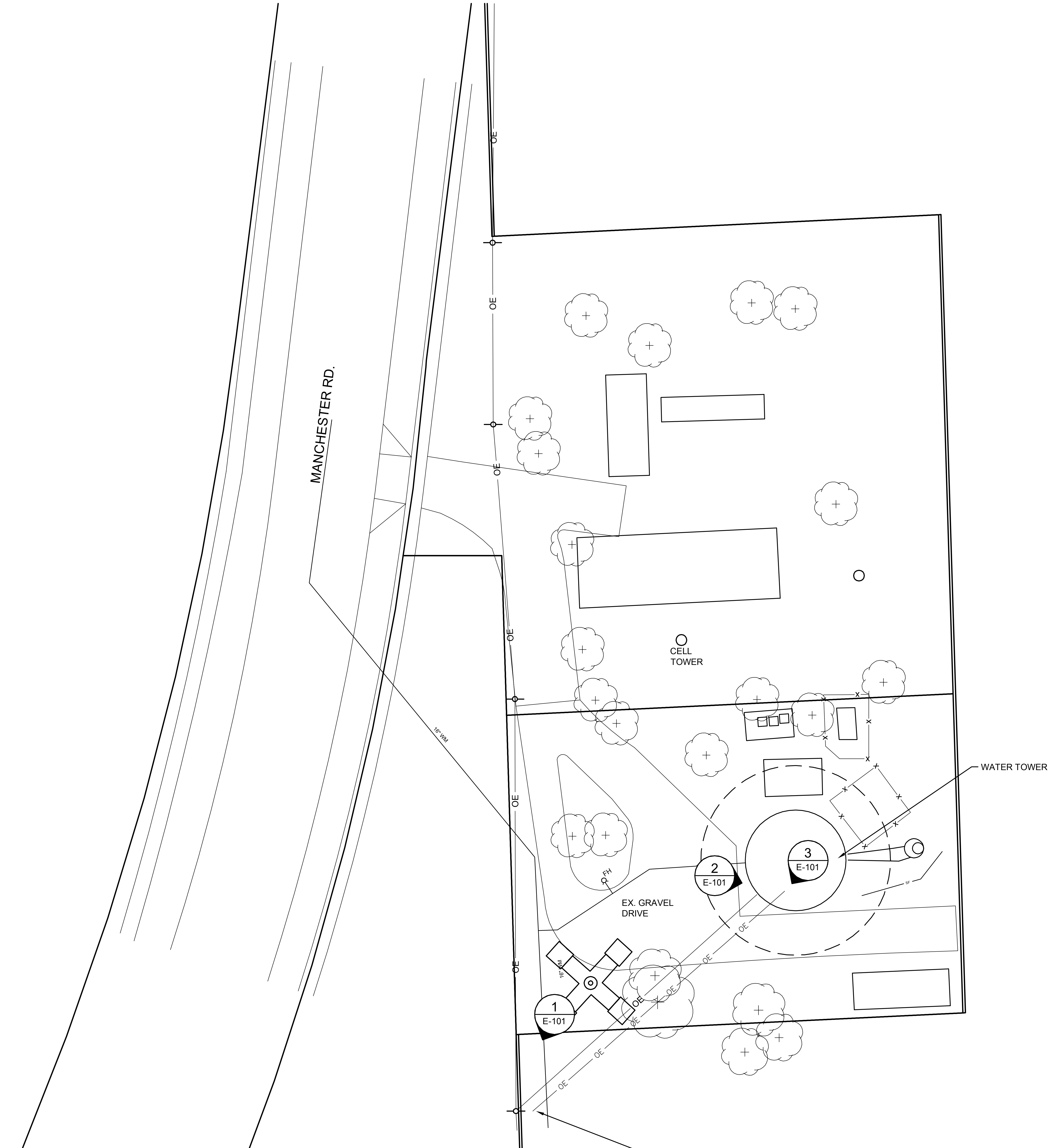
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL LEGEND

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-001

Bar Measures 1 inch



COORDINATE WITH THE UTILITY COMPANY TO TEMPORARILY DISCONNECT POWER TO THE WATER TOWER. TEMPORARILY REMOVE ELECTRICAL METER INSIDE THE TOWER. TEMPORARILY REMOVE OVERHEAD CONDUCTORS AND SUPPORTING EQUIPMENT AT THE WATER TOWER. REINSTALL REMOVED EQUIPMENT ONCE THE PAINTING IS COMPLETE.

① PHOTO POWER POLE

SCALE: NA

② PHOTO WATER TOWER CONNECTION

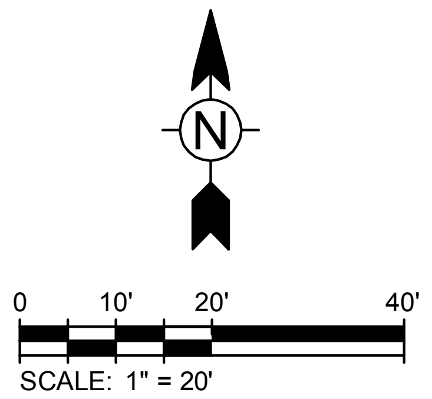
SCALE: NA

③ PHOTO UTILITY METER

SCALE: NA

NOTES:

CONTRACTOR TO PROVIDE PERIODIC DEWATERING OF SUMP AREA, WHILE POWER IS OFF TO SITE. CONTRACTOR TO ALSO SECURE SITE WHILE POWER AND SECURITY SYSTEM IS DOWN.



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MARK	DATE	DESCRIPTION	BY
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CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

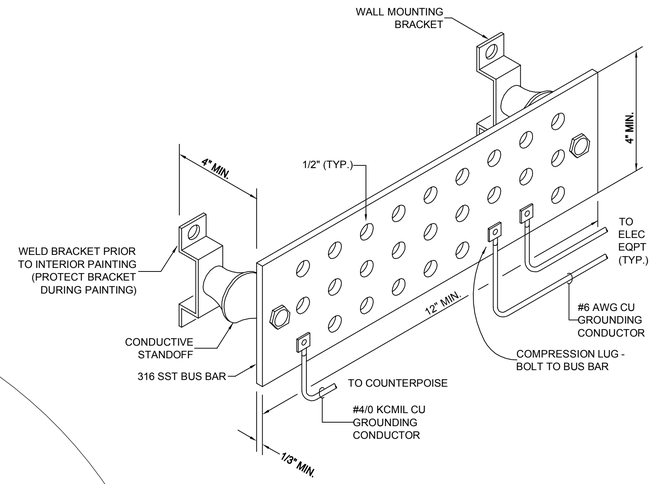
ELECTRICAL SITE PLAN

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-101

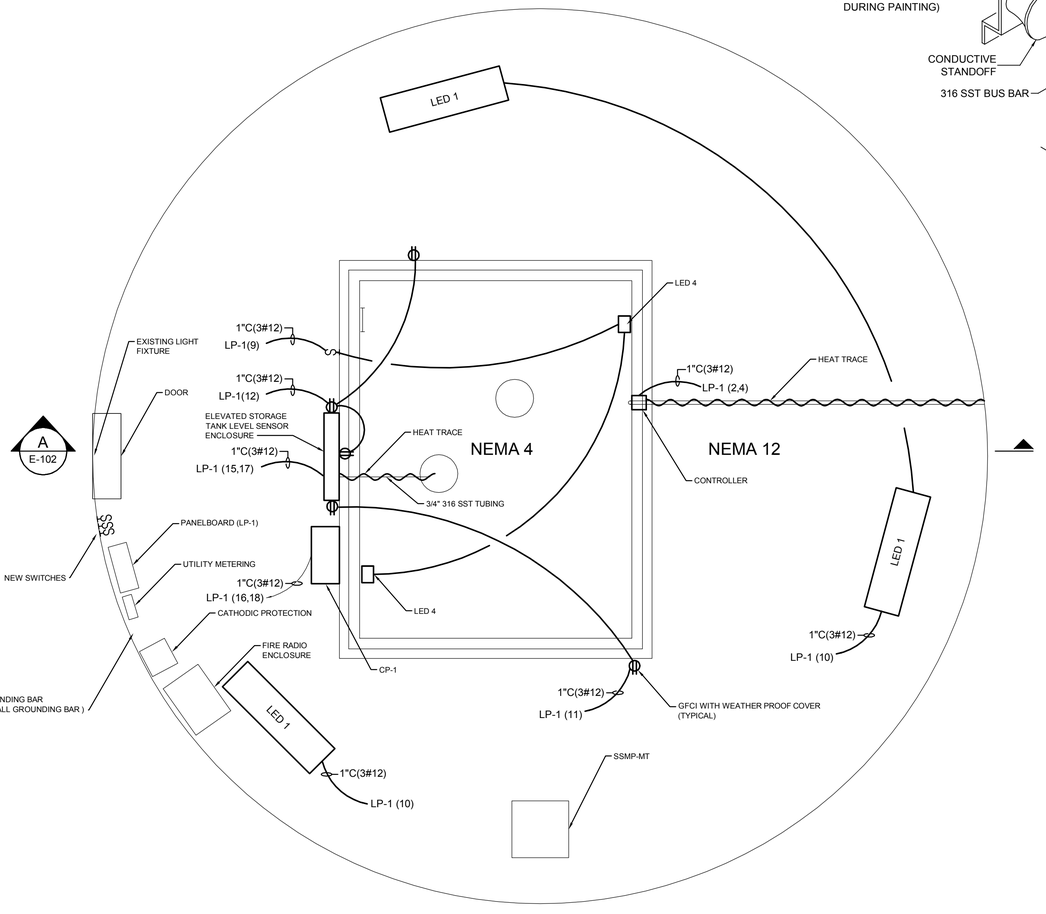
Bar Measures 1 inch

4/16/2015 9:47:22 AM - P:\IER\31537\200-31537-15001\CAD\SHEETFILES\E-101-SITE PLAN VIEW.DWG - SCHLANDERER, EMILY



GROUND BAR DETAIL

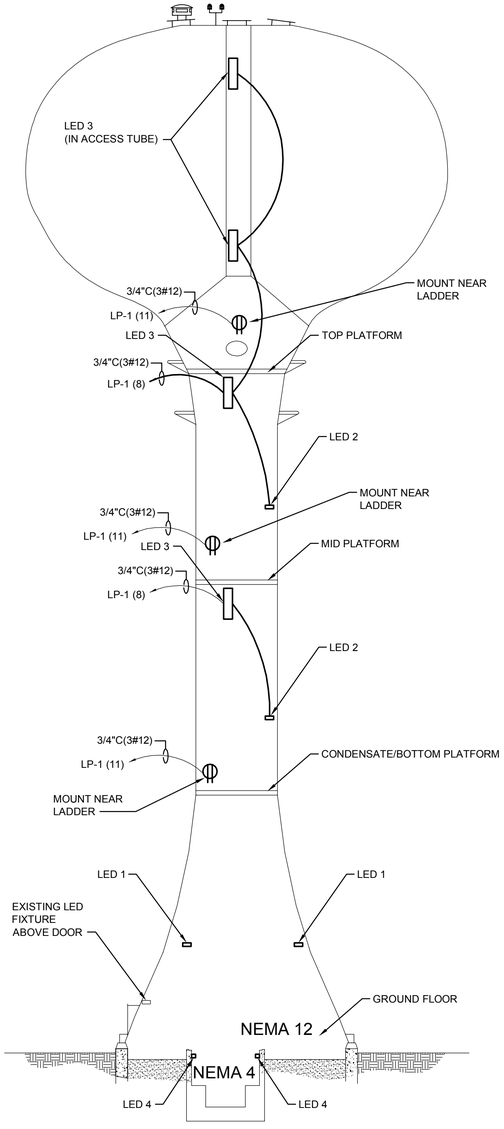
NO SCALE



ELECTRICAL GROUND FLOOR PLAN VIEW

SCALE: 3/8"=1'

NOTES:
1. INSTALL SPARE 3#12 WIRE IN EACH LIGHTING AND POWER CONDUIT (FOR FUTURE USE)



ELECTRICAL ELEVATION VIEW

A
E-102

SCALE: 3/32"=1'-0"

NOTES:
1. INSTALL SPARE 3#12 WIRE IN EACH LIGHTING AND POWER CONDUIT (FOR FUTURE USE)

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Ann Arbor, MI 48106
Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION
	4/16/15	ISSUED FOR BIDS

BY

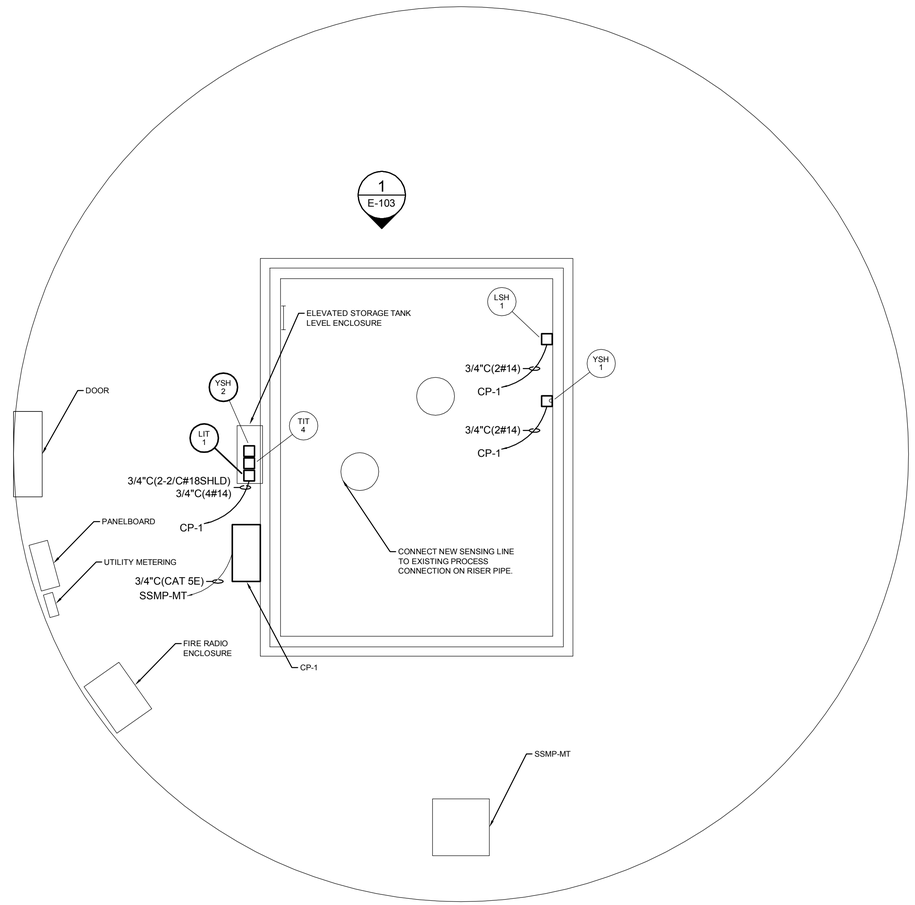
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL WATER TOWER PLAN

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

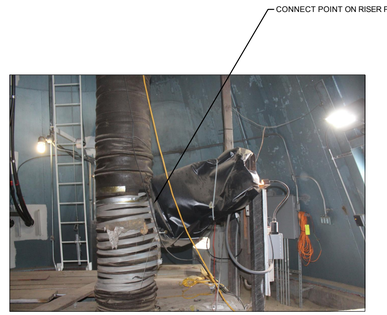
E-102

Bar Measures 1 inch



INSTRUMENTATION
GROUND FLOOR PLAN VIEW

SCALE: 3/8"=1'



1 PHOTO
SENSING LINE

SCALE: NA

NOTES:
1. PROGRAMMING OF CP-1 IS PART OF THE CONTRACTORS SCOPE OF WORK. (WORK WITH THE OWNER TO IDENTIFY ADDRESS REQUIREMENTS AND ANY PROGRAMMING REQUIREMENT)
2. CONNECTING CP-1 TO SSMP-MT IS PART OF THE CONTRACTORS SCOPE OF WORK.
3. CONFIGURING SSMP-MT, CONFIGURING PLANT NETWORK, AND CONFIGURING PLANTS SCADA SYSTEM IS BY OWNER.

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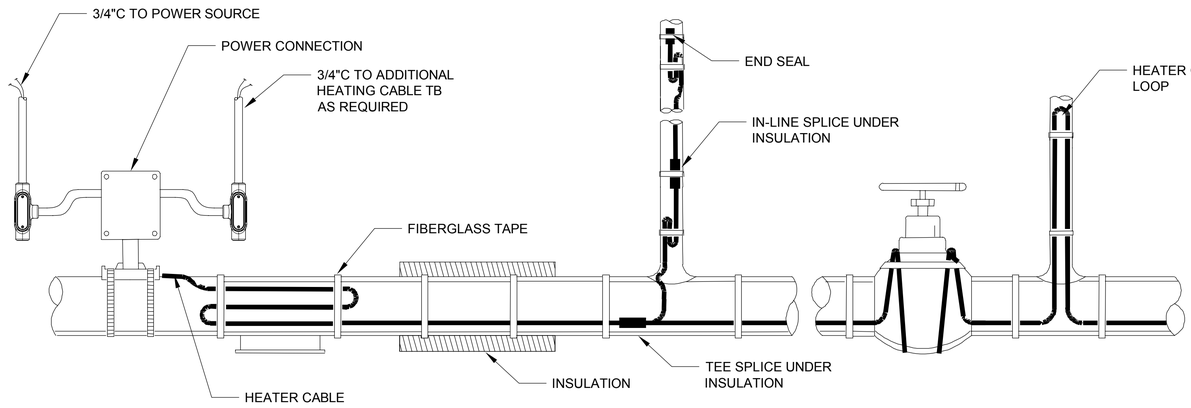
MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING
INSTRUMENTATION
WATER TOWER PLAN

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

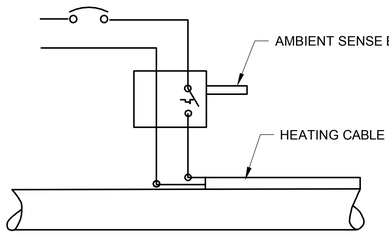
E-103

Bar Measures 1 inch

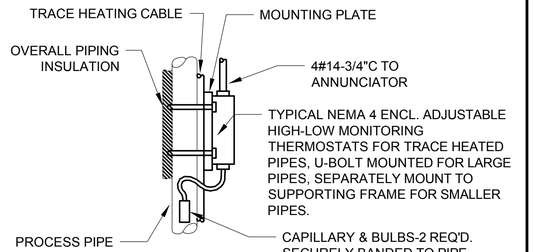


TYPICAL INSTALLATION OVERVIEW

SCALE: ?"=1'-0"



AMBIENT AIR SENSING



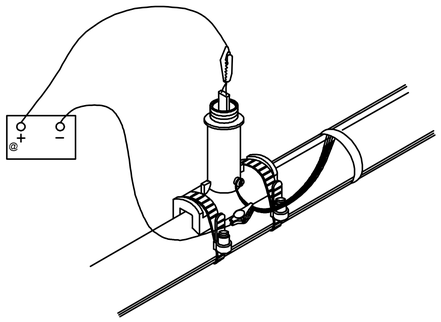
SENSOR PLACEMENT

SCALE: ?"=1'-0"

CHECKLIST FOR SELF-REGULATING AND POWER-LIMITING HEAT TRACING

GENERAL INFORMATION			
PROJECT NUMBER:		INSTALLATION CONTRACTOR:	
UNIT NUMBER:		THERMON REFERENCE NUMBER:	
CUSTOMER REF. NUMBER:		INSPECTOR:	
RECORD 1: PRIOR TO INSTALLATION			
CABLE TYPE:		REEL NUMBER:	
REEL LENGTH (M):		INSULATION RESISTANCE: (M OHMS)*	
TESTED BY/DATE:		WITNESSED BY/DATE:	
RECORD 2: AFTER CABLE INSTALLATION			
LINE NUMBER:		THERMOSTAT NUMBER:	
EQUIPMENT NUMBER:		JUNCTION BOX NUMBER:	
CIRCUIT/HEATER NUMBER:		UNUSED ENTRIES PLUGGED OFF:	
CIRCUIT SWITCH NUMBER:		HEATER LENGTH (M):	
METAL SHEATH CONNECTED TO EARTH/GROUND:		INSULATION RESISTANCE: (M OHMS)*	
TESTED BY/DATE:		WITNESSED BY/DATE:	
RECORD 3: AFTER THERMAL INSULATION IS INSTALLED			
INSULATION WATERTIGHT:		INSULATION RESISTANCE: (M OHMS)*	
TESTED BY/DATE:		WITNESSED BY/DATE:	
RECORD 4: FINAL COMMISSIONING			
PANEL NUMBER:		AMBIENT TEMP. (°C):	
BREAKER NUMBER:		PIPE TEMP. (°C):	
VOLTS:		RECORDED AMPS (AFTER 5 MIN.):	
TESTED BY/DATE:		WITNESSED BY/DATE:	

*NOTE: MINIMUM ACCEPTABLE INSULATION RESISTANCE SHOULD BE 20 MEGOHMS FOR RECORDS 1 AND 2 AND 5 MEGOHMS FOR RECORD 3.

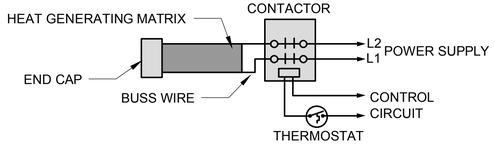


MEGGER TESTING
(FOR HEATER CABLE WITH BRAID)

NOTES:
1. TEST FROM HEATING CABLE BUS WIRES TO BRAID.
2. TEST SHOULD USE AT LEAST A 500 VDC MEGGER. DO NOT USE A MEGGER WITH AN EXCESS OF 2500 VDC MINIMUM ACCEPTABLE READINGS SHOULD BE 20 MEGOHMS PER CIRCUIT, REGARDLESS OF LENGTH.
3. A RECORD SHOULD BE KEPT OF THE READINGS TAKEN FROM THE TIME THE CABLE IS FIRST INSTALLED ON THE PIPE.

TESTING DIAGRAM

SCALE: ?"=1'-0"



SELF-REGULATING

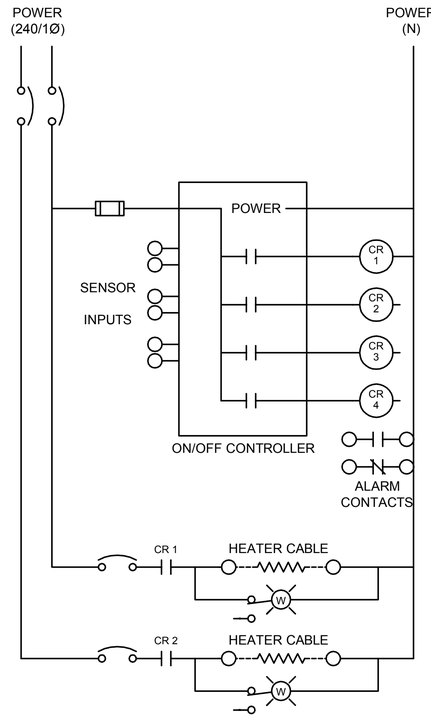
TYPICAL HEATER CIRCUIT WIRING DIAGRAM

SCALE: ?"=1'-0"

HEAT TRACED PIPE LABEL

SCALE: ?"=1'-0"

NOTES:
1. PLACE LABEL EVERY TEN (10) FEET.



LOGICAL DIAGRAM FOR HEAT TRACE PANEL

SCALE: ?"=1'-0"

TETRA TECH
www.tetratech.com
710 Avis Drive, Suite 100
Ann Arbor, MI 48106
Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION
	4/16/15	ISSUED FOR BIDS

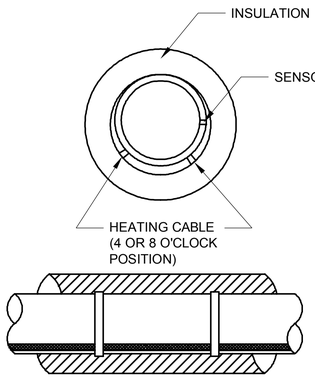
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL HEAT TRACE

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-500

Bar Measures 1 inch

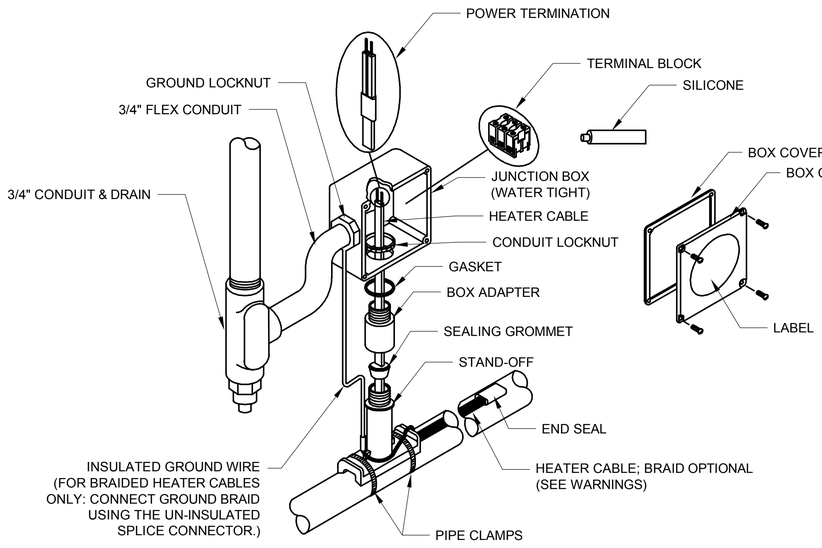


MULTIPLE STRAIGHT RUNS (TYPE 1)

STRAIGHT TRACING NOTES:
1. WHEN STRAIGHT TRACING IS USED, INSTALL THE HEATER CABLE ON THE LOWER QUADRANT OF THE PIPE. THIS HELPS PREVENT PHYSICAL DAMAGE TO THE HEATER CABLE FROM FALLING OBJECTS AND BEING WALKED ON.
2. ALTERNATIVE LOCATION IS THE 2 AND 10 O'CLOCK POSITION
3. SECURE PIPE AT 12" INTERVALS WITH FIBERGLASS TAPE.

HEATER CABLE WRAP

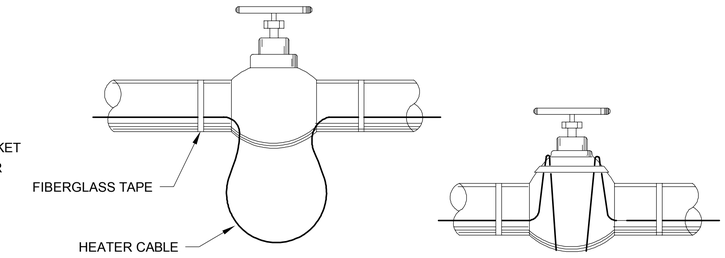
SCALE: ?"=1'-0"



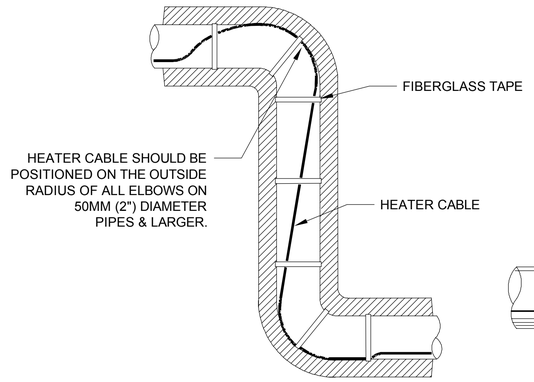
NOTES:
1. ARTICLE 427 OF THE NATIONAL ELECTRIC CODE REQUIRES THAT ALL HEATERS SHALL HAVE METAL COVERINGS AND BE PROVIDED WITH BRANCH CIRCUIT GROUND-FAULT PROTECTION.
2. IF NUISANCE TRIPPING OF GROUND FAULT BREAKERS OCCURS DUE TO CONDENSATION IN THE JUNCTION BOX, ELECTRICAL CONNECTIONS SHOULD BE MOISTURE PROOFED BY USE OF A COATING OR SEALANT.

POWER CONNECTION BOX BRAIDED CABLE

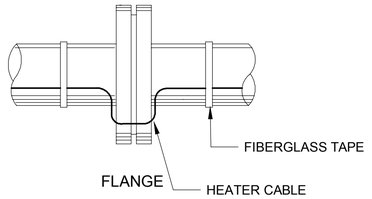
SCALE: ?"=1'-0"



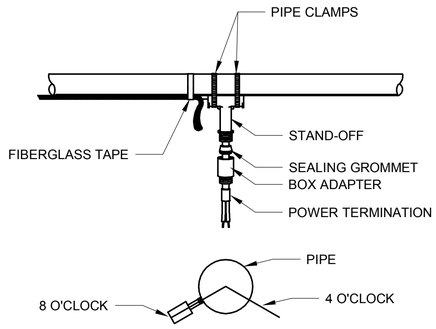
VALVE
(MAY VARY FOR DIFFERENT VALVE SHAPES)



ELBOW



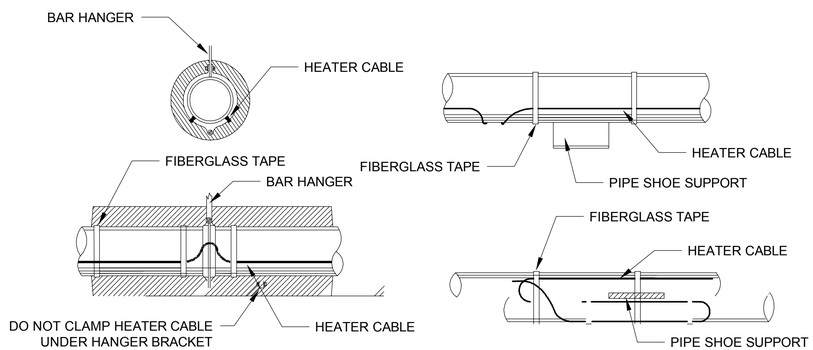
FLANGE



NOTES:
1. DO NOT PLACE PIPE CLAMPS OVER THE HEATER CABLE.
2. RECOMMEND INSTALLING AT THE 4 OR 8 O'CLOCK POSITIONS.

STAND-OFF INSTALLATION

SCALE: ?"=1'-0"



TYPICAL HEATER CABLE INSTALLATION

SCALE: ?"=1'-0"

TETRA TECH
www.tetratech.com
710 Avis Drive, Suite 100
Ann Arbor, MI 48106
Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

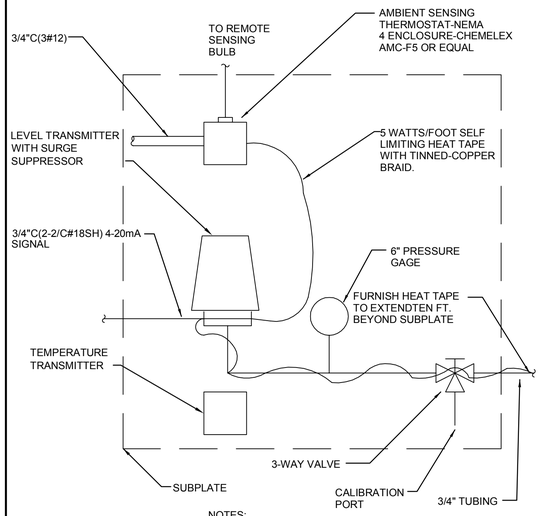
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL
HEAT TRACE

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-501

Bar Measures 1 inch

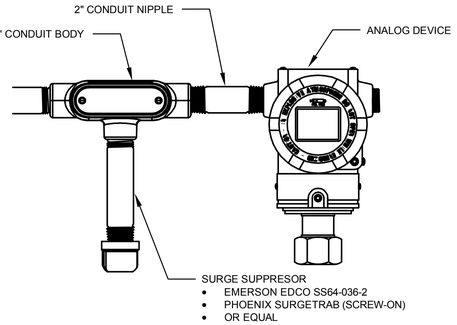


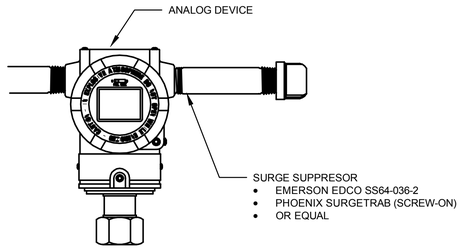
NOTES:
1. HEAT TRACE THE ISOLATION VALVE AND SENSOR PIPE.
2. ALL PIPING, VALVES, AND FITTINGS TO BE 316L SST.
3. MOUNT SUBPLATE IN NEMA 4X TYPE 316 SST ENCLOSURE USING RACK MOUNTED EQUIPMENT DETAIL.
4. PIPING TO BE INSULATED WITH ARMAFLEX 1/2" INSULATION. TAPE INSULATION.

LIT 1

ELEVATED STORAGE TANK LEVEL SENSOR DETAIL

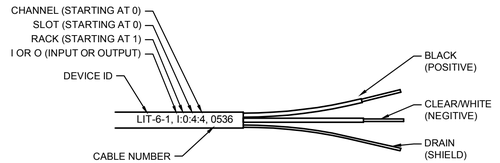
NO SCALE





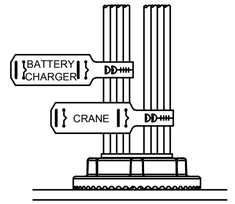
ANALOG SURGE SUPPRESSOR

NO SCALE



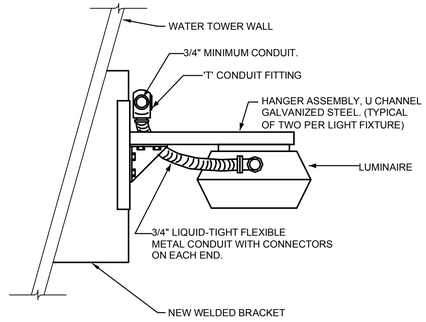
TWO CONDUCTOR CABLE

NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND



WIRE/CABLE BUNDLE TAG

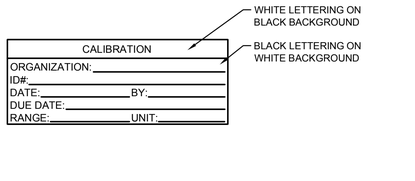
NOTE:
1. BLACK LETTERING ON WHITE BACKGROUND (POWER)
2. BLACK LETTERING ON YELLOW BACKGROUND (SIGNAL)
3. BUNDLE AND LABEL WIRES/CABLES GOING TO A COMMON PANEL/EQUIPMENT/DEVICE
4. LABEL IN PANELS, MCC, MANHOLES, HAND HOLES, AND BOXES OVER 8 CUBIC FEET.



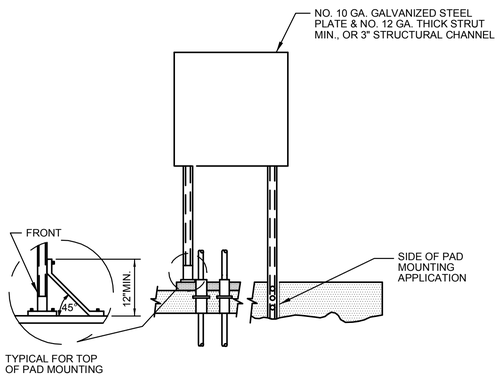
LED 1
LED 2

WALL MOUNTED LED LIGHT DETAIL

NO SCALE

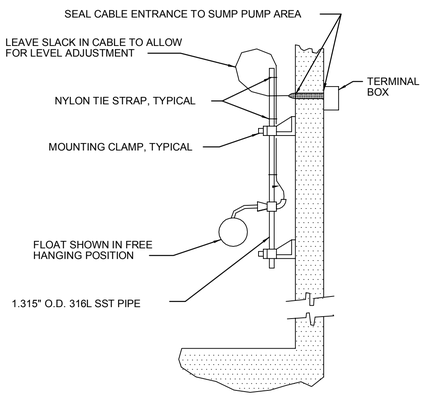


INSTRUMENT CALIBRATION



RACK MOUNTED EQUIPMENT DETAIL

NO SCALE

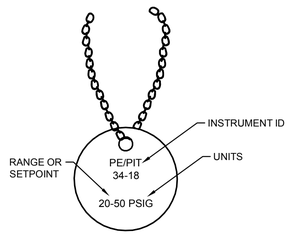


NOTE:
1. MOUNTING HARDWARE TO BE 316 SST.

LSH 1

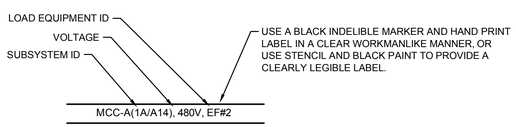
CORD TYPE SINGLE FLOAT SWITCH

NO SCALE



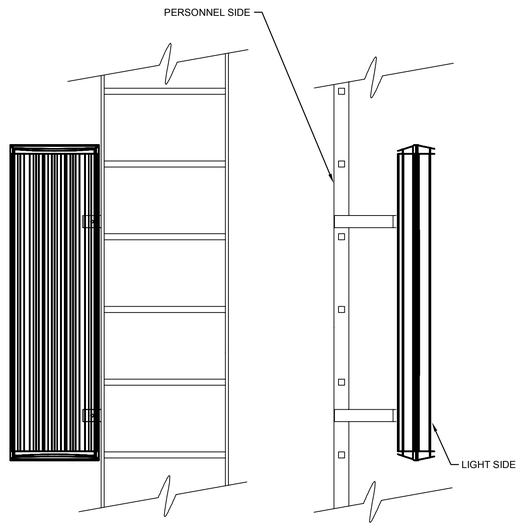
INSTRUMENT TAG

NOTE:
1. STAINLESS STEEL TAG
2. STAINLESS STEEL CHAIN
3. BLACK LETTERING
4. INSTALL TAG ON ELEMENTS AND INSTRUMENTS.



FEEDER & BRANCH CIRCUIT RACEWAY LABELS

NOTE:
1. NO LABELING REQUIRED FOR RACEWAYS WITH READILY IDENTIFIABLE TERMINATIONS WITHIN THE SAME ROOM
2. IN ACCESSIBLE CEILING SPACES AND EXPOSED IN UNFINISHED AREAS, LABEL CONDUIT WITH PANEL AND CIRCUIT NUMBERS OF CONDUCTORS ROUTED THROUGH THE CONDUIT. LABEL CONDUIT AT WALL PENETRATIONS AND CONNECTIONS TO ALL PANELS, JUNCTION BOXES, AND EQUIPMENT SERVED.



LED 3

LADDER MOUNTED LED LIGHT DETAIL

NO SCALE

TETRA TECH
www.tetratech.com
710 Avis Drive, Suite 100
Ann Arbor, MI 48106
Tel 734-665-6000, Fax 734-213-3003

MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL DETAILS

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-502

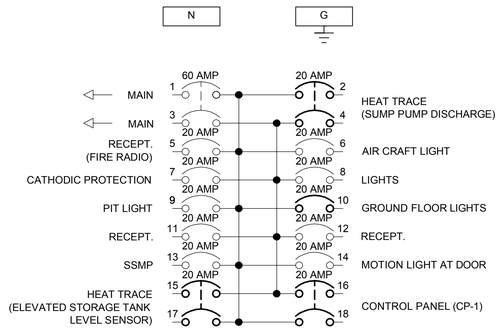
Bar Measures 1 inch

PANELBOARD LP-1

LOCATION:

VOLTAGE:

BUS RATING:



NOTES

1. PROVIDE THREE (3) DOUBLE POLE 20 AMP CIRCUIT BREAKERS IN EXISTING LP.
2. PROVIDE ONE (1) SINGLE POLE 20 AMP CIRCUIT BREAKERS IN EXISTING LP.
3. EXISTING PANELBOARD IS A SQUARE D, NQ18L1C.
4. MOVE EXISTING CIRCUIT BREAKER AND CIRCUIT FROM 16 TO 14.

LUMINAIRE SCHEDULE

SYMBOL	DESCRIPTION	MOUNTING	LAMPS			MANUFACTURERS (OR EQUAL)	
			NO.	WATTAGE	TYPE	NAME	MODEL OR SERIES
LED 1	15" X 52" ONE-PIECE 5VA RATED FIBERGLASS ENCLOSED AND GASKETED LUMINAIRE WITH CLEAR ACRYLIC LENS, 4100K (WITH WET LOCATION FITTINGS)	WALL BRACKET (12' A.F.F.)	1	118	LED	LITHONIA OR APPROVED EQUAL	FHE LED 9L/35 PLC OR APPROVED EQUAL
LED 2	15" X 52" ONE-PIECE 5VA RATED FIBERGLASS ENCLOSED AND GASKETED LUMINAIRE WITH CLEAR ACRYLIC LENS, 4100K (WITH WET LOCATION FITTINGS)	WALL BRACKET 6' A.F.F.)	1	118	LED	LITHONIA OR APPROVED EQUAL	FHE LED 9L/35 PLC OR APPROVED EQUAL
LED 3	15" X 52" ONE-PIECE 5VA RATED FIBERGLASS ENCLOSED AND GASKETED LUMINAIRE WITH CLEAR ACRYLIC LENS, 4100K (WITH WET LOCATION FITTINGS)	LADDER BRACKET	1	118	LED	LITHONIA OR APPROVED EQUAL	FHE LED 9L/35 PLC OR APPROVED EQUAL
LED 4	THE LUMINAIRE SHALL CONSIST OF A LM6 MARINE GRADE CAST ALUMINUM BODY WITH A ROUND 316 GRADE STAINLESS STEEL SURFACE BEZEL. SHALL BE BE SEALED TO IP68.	WALL BRACKET/ STIRRUP	12	1.2	LED	HOLOPHANE OR APPROVED EQUAL	TRAILBLAZER LT, 120VAC 45 DEG BEAM WARM WHITE OR APPROVED EQUAL

HEAT TRACING FOR PIPING

1. SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES
   - 1.1. COMPLY WITH IEEE 515.
   - 1.2. HEATING ELEMENT: PAIR OF PARALLEL NO. 16 AWG, TINNED, STRANDED COPPER BUS WIRES EMBEDDED IN CROSSLINKED CONDUCTIVE POLYMER CORE, WHICH VARIES HEAT OUTPUT IN RESPONSE TO TEMPERATURE ALONG ITS LENGTH. TERMINATE WITH WATERPROOF, FACTORY-ASSEMBLED, NON HEATING LEADS WITH CONNECTORS AT ONE END, AND SEAL THE OPPOSITE END WATERTIGHT. CABLE SHALL BE CAPABLE OF CROSSING OVER ITSELF ONCE WITHOUT OVERHEATING.
   - 1.3. ELECTRICAL INSULATING JACKET: FLAME-RETARDANT POLYOLEFIN.
   - 1.4. CABLE COVER: STAINLESS-STEEL BRAID.
   - 1.5. MAXIMUM OPERATING TEMPERATURE (POWER ON): 150 DEG F.
   - 1.6. MAXIMUM EXPOSURE TEMPERATURE (POWER OFF): 185 DEG F.
   - 1.7. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
   - 1.8. CAPACITIES AND CHARACTERISTICS:
     - 1.8.1. MAXIMUM HEAT OUTPUT: 3 W/FT.
     - 1.8.2. ELECTRICAL CHARACTERISTICS FOR SINGLE-CIRCUIT CONNECTION:
       - 1.8.2.1. VOLTS: 240.
       - 1.8.2.2. PHASE: SINGLE.
       - 1.8.2.3. HERTZ: 60.
       - 1.8.2.4. FULL-LOAD AMPERES: 12 AMPS.
       - 1.8.2.5. MINIMUM CIRCUIT AMPACITY: 16 AMPS.
       - 1.8.2.6. MAXIMUM OVERCURRENT PROTECTION: 20 AMPS.
2. CONTROLS
   - 2.1. PIPE-MOUNTED THERMOSTATS FOR FREEZE PROTECTION:
     - 2.1.1. REMOTE BULB UNIT WITH ADJUSTABLE TEMPERATURE RANGE FROM 30 TO 50 DEG F. UNIT SHALL INCLUDE ALARM CONTACTS FOR REMOTE MONITORING.
     - 2.1.2. SNAP ACTION; OPEN-ON-RISE, SINGLE-POLE SWITCH WITH MINIMUM CURRENT RATING ADEQUATE FOR CONNECTED CABLE.
3. ACCESSORIES
   - 3.1. CABLE INSTALLATION ACCESSORIES: FIBERGLASS TAPE, HEAT-CONDUCTIVE PUTTY, CABLE TIES, SILICONE END SEALS AND SPLICE KITS, AND INSTALLATION CLIPS ALL FURNISHED BY MANUFACTURER, OR AS RECOMMENDED IN WRITING BY MANUFACTURER.
   - 3.2. WARNING TAPE: CONTINUOUSLY PRINTED "ELECTRICAL TRACING"; VINYL, AT LEAST 3 MILS THICK, AND WITH PRESSURE-SENSITIVE, PERMANENT, WATERPROOF, SELF-ADHESIVE BACK.
     - 3.2.1. WIDTH FOR MARKERS ON PIPES WITH OD, INCLUDING INSULATION, LESS THAN 6 INCHES: 3/4 INCH MINIMUM.
4. INSTALLATION
   - 4.1. INSTALL ELECTRIC HEATING CABLE ACROSS EXPANSION, CONSTRUCTION, AND CONTROL JOINTS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS; USE CABLE-PROTECTION CONDUIT AND SLACK CABLE TO ALLOW MOVEMENT WITHOUT DAMAGE TO CABLE.
   - 4.2. ELECTRIC HEATING-CABLE INSTALLATION FOR FREEZE PROTECTION FOR PIPING:
     - 4.2.1. INSTALL ELECTRIC HEATING CABLES AFTER PIPING HAS BEEN TESTED AND BEFORE INSULATION IS INSTALLED.
     - 4.2.2. INSTALL ELECTRIC HEATING CABLES ACCORDING TO IEEE 515.
   - 4.3. INSTALL WARNING TAPE ON PIPING INSULATION WHERE PIPING IS EQUIPPED WITH ELECTRIC HEATING CABLES.
   - 4.4. SET FIELD-ADJUSTABLE SWITCHES AND CIRCUIT-BREAKER TRIP RANGES.
5. FIELD QUALITY CONTROL
   - 5.1. PERFORM THE FOLLOWING TESTS AND INSPECTIONS:
   - 5.2. PERFORM TESTS AFTER CABLE INSTALLATION BUT BEFORE APPLICATION OF COVERINGS SUCH AS INSULATION, WALL OR CEILING CONSTRUCTION, OR CONCRETE.
   - 5.3. TEST CABLES FOR ELECTRICAL CONTINUITY AND INSULATION INTEGRITY BEFORE ENERGIZING.
   - 5.4. TEST CABLES TO VERIFY RATING AND POWER INPUT. ENERGIZE AND MEASURE VOLTAGE AND CURRENT SIMULTANEOUSLY.
   - 5.5. REPEAT TESTS FOR CONTINUITY, INSULATION RESISTANCE, AND INPUT POWER AFTER APPLYING THERMAL INSULATION ON PIPE-MOUNTED CABLES.
   - 5.6. CABLES WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS.
   - 5.7. PREPARE TEST AND INSPECTION REPORTS.
   - 5.8. REMOVE AND REPLACE DAMAGED HEAT-TRACING CABLES.

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Ann Arbor, MI 48106
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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN

MANCHESTER TANK COATING

ELECTRICAL SCHEDULE

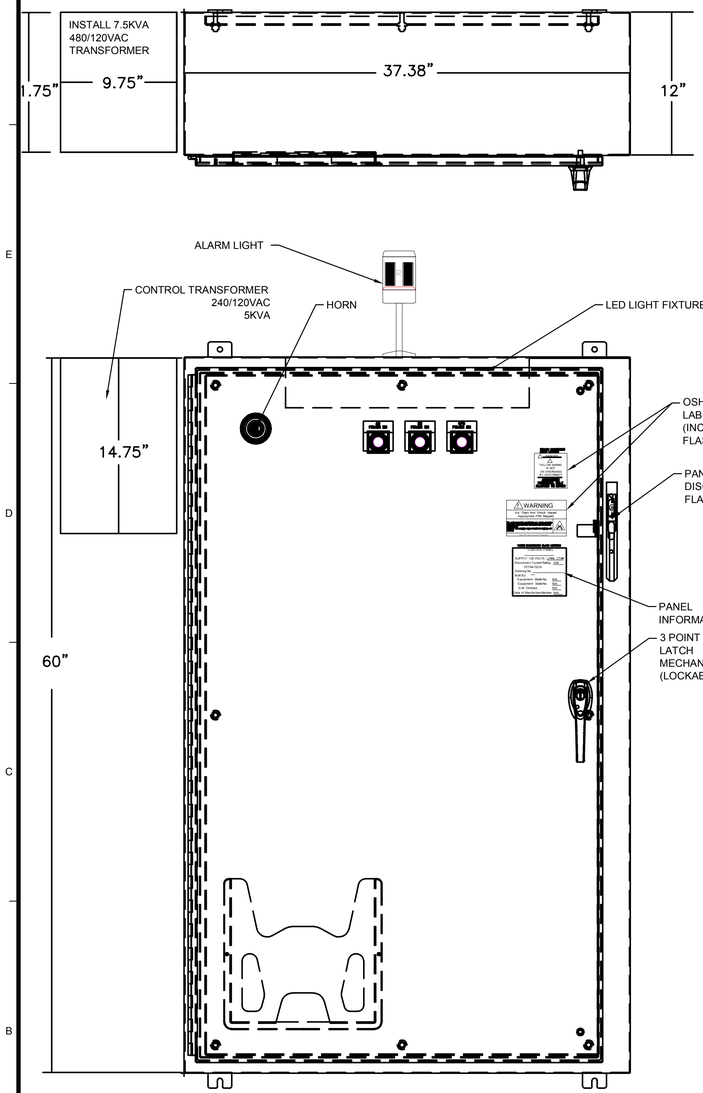
Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-601

Bar Measures 1 inch

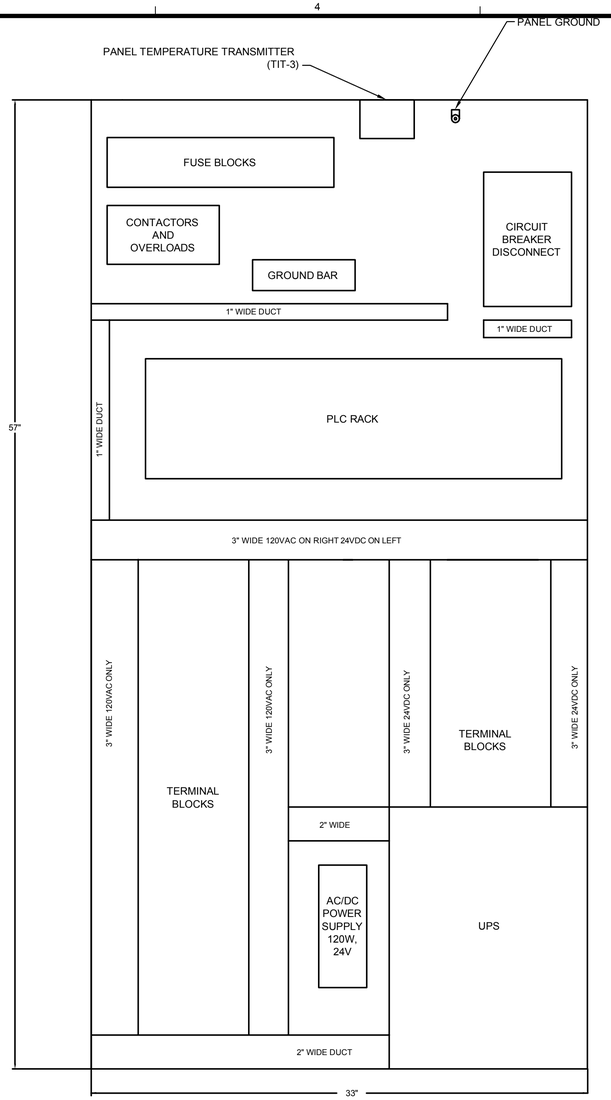
NAMEPLATE LEGEND

QTY.	NO.	LETTER HEIGHT	NOMENCLATURE
1	N-1	1"	MAIN CONTROL PANEL (CP-1)



MAIN CONTROL PANEL (CP-1)
OUTSIDE I/O PANEL LAYOUT WITH TRANSFORMER

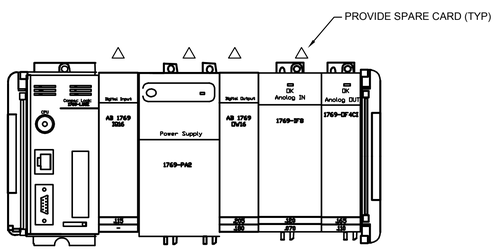
NEMA 12 (NOT TO SCALE)



ALL 240VAC MUST BE COVERED WITH NON-CONDUCTING CLEAR SHIELD

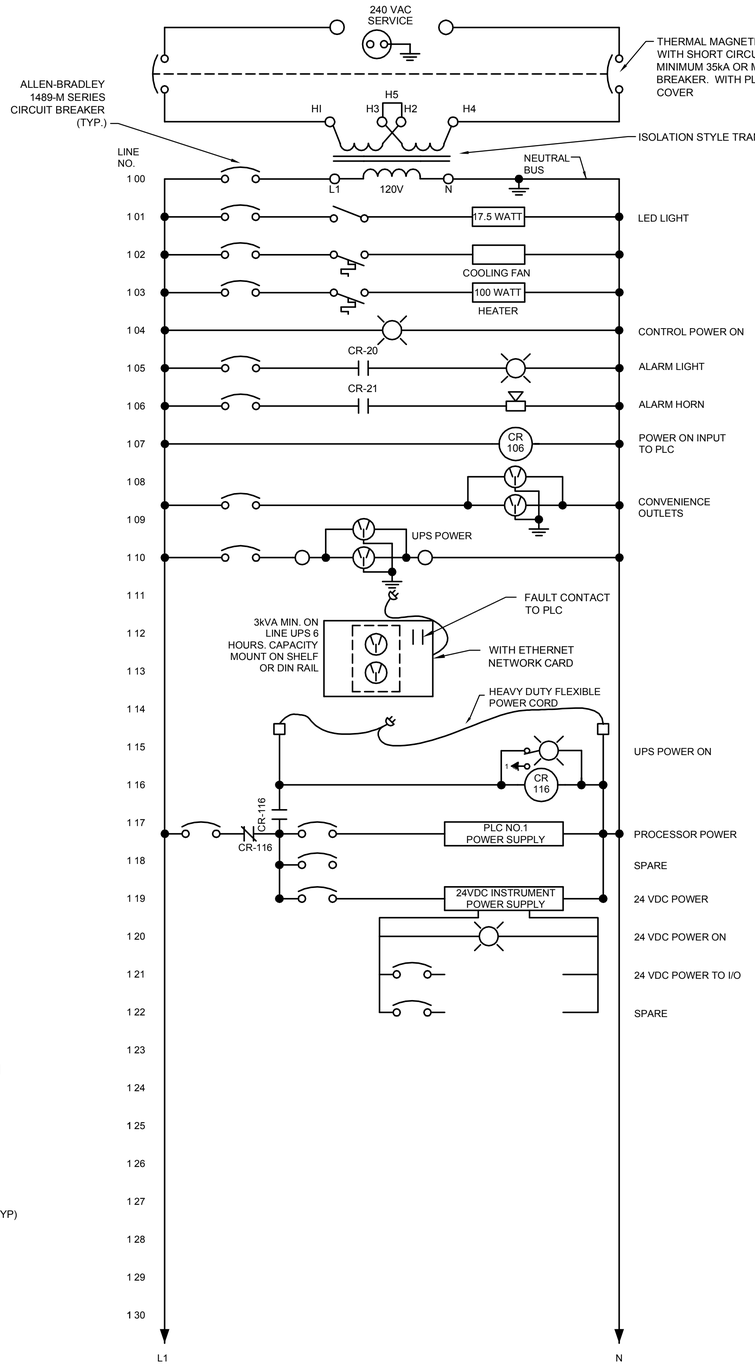
MAIN CONTROL PANEL (CP-1)
INSIDE I/O PANEL LAYOUT

NEMA 12 (NOT TO SCALE)



CP-1 I/O PLC LAYOUT

(NOT TO SCALE)



CP-1 I/O PANEL LAYOUT

120V AC

TETRA TECH
www.tetratech.com
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Ann Arbor, MI 48106
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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

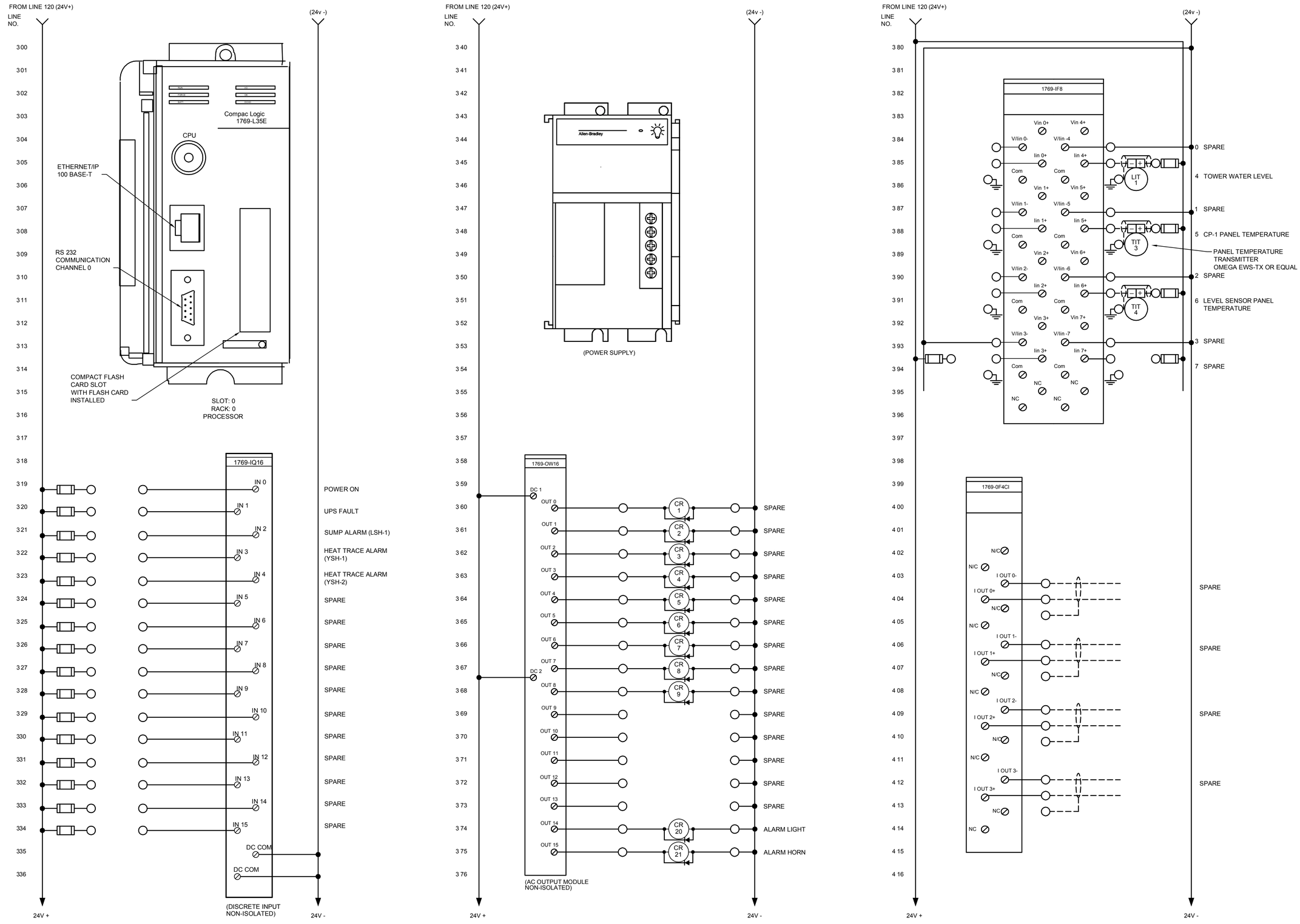
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL CONTROL PANEL

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-801

Bar Measures 1 inch



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MARK	DATE	DESCRIPTION	BY
	4/16/15	ISSUED FOR BIDS	

CITY OF ANN ARBOR, MICHIGAN

MANCHESTER TANK COATING

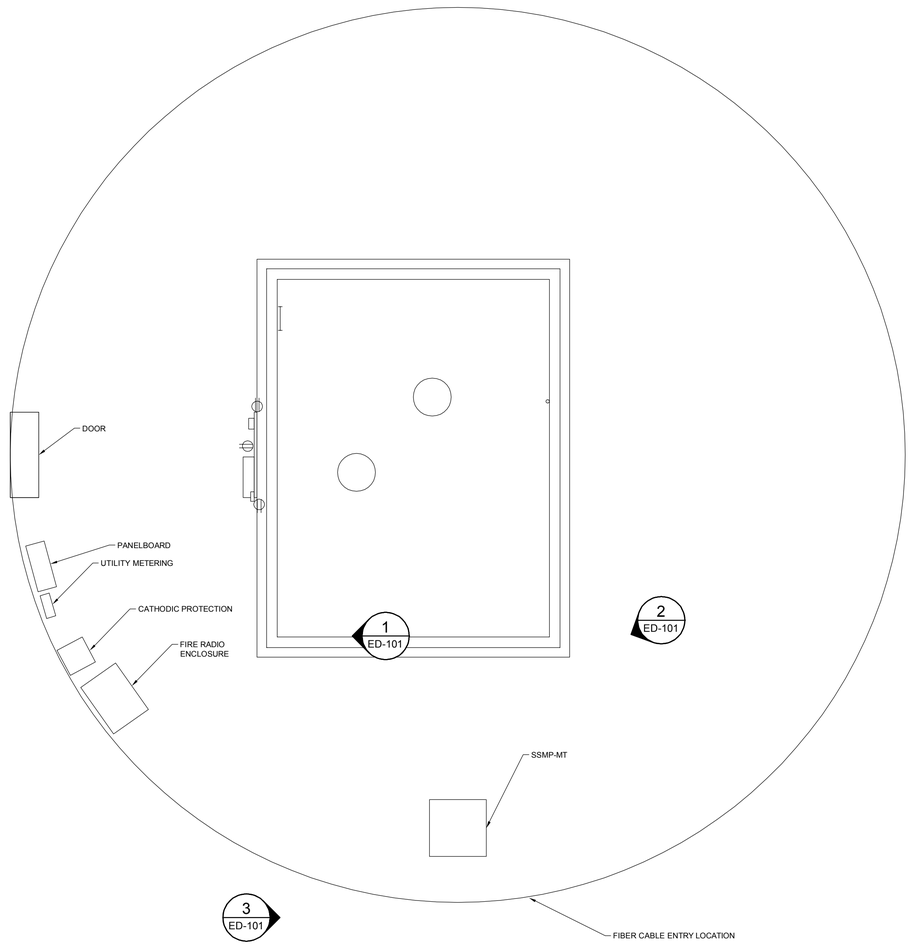
ELECTRICAL CONTROL PANEL

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

E-802

Bar Measures 1 inch

4/16/2015 9:50:10 AM - P:\IER\31537\200-31537-15001\CAD\SHEETFILES\E-801 - CONTROL PANEL.DWG - SCHLANDERER, EMILY



WATER TOWER 1ST FLOOR PLAN VIEW

SCALE: 3/8"=1'

1 PHOTO CONTROL PANELS

SCALE: NA

2 PHOTO IT PANEL (SSMP-MT)

SCALE: NA

3 PHOTO CITY FIBER

SCALE: NA

NOTES:

1. TEST AND DOCUMENT THE CONDITION OF THE FOLLOWING PANELS:
   - 1.1. PANELBOARD
   - 1.2. UTILITY METER (WORK WITH UTILITY COMPANY)
   - 1.3. FIRE RADIO ENCLOSURE (WORK WITH FIRE DEPARTMENT)
   - 1.4. FIRE RADIO ANTENNA, CABLE AND ASSOCIATED HARDWARE
   - 1.5. CITY FIBER CONNECTION
2. TEMPORARY REMOVE AND STORE THE FOLLOWING EQUIPMENT:
   - 2.1. PANELBOARD
   - 2.2. UTILITY METER (WORK WITH UTILITY COMPANY)
   - 2.3. FIRE RADIO ENCLOSURE (WORK WITH FIRE DEPARTMENT)
   - 2.4. FIRE RADIO ANTENNA, CABLE AND ASSOCIATED HARDWARE
   - 2.5. DOOR SWITCH
   - 2.6. HATCH SWITCH
   - 2.7. CAMERA AND CAMERA LIGHT
   - 2.8. LIGHT ABOVE DOOR
   - 2.9. MOTION SWITCH
   - 2.10. SECURITY BADGE SCANNER
   - 2.11. TOWER BEACON
   - 2.12. AND ALL OTHER RELATED ITEMS
3. REMOVE CITY FIBER CABLE FROM PANEL (SSMP-MT) AND WATER TOWER. PROTECT CABLE AND FIBER ENDS FROM DAMAGE DURING CONSTRUCTION. REINSTALL CITY FIBER CABLE IN NEW TOWER PENETRATION TO TOWER AND SECURITY PANEL (SSMP-MT) AFTER PAINTING.
4. STORAGE SHALL BE PROTECTED FROM WEATHER, DUST, AND DEBRIS.
5. ONCE PAINTING IS COMPLETE AND THE FLOOR ELEVATION HAS BEEN RAISED, REINSTALL EQUIPMENT TO ORIGINAL CONDITION. MODIFY EXISTING CONCRETE PAD. SEE C-500 "EQUIPMENT PAD MODIFICATION" DETAIL FOR CONCRETE PAD INFORMATION.

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MARK	DATE	DESCRIPTION	BY
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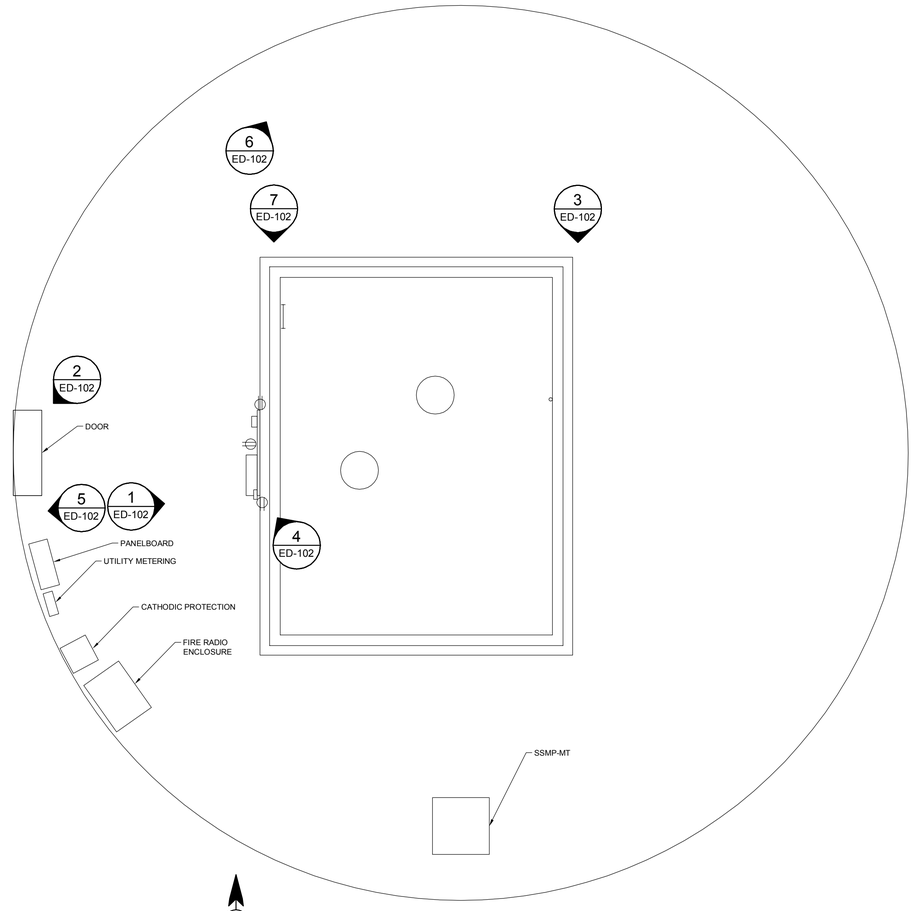
CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL REMOVAL PLAN

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

ED-101

Bar Measures 1 inch



WATER TOWER
1ST FLOOR PLAN VIEW

SCALE: 3/8"=1'

PHOTO
CONTROL PANEL SUBPLATE

1 SCALE: NA

PHOTO
DOOR CONTACT (SWITCH)

2 SCALE: NA

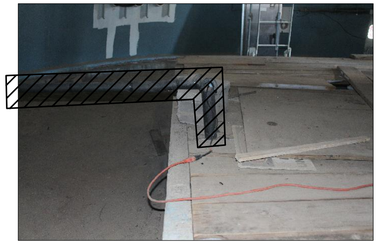


PHOTO
HEAT TRACE & SUMP DISCHARG

3 SCALE: NA

PHOTO
RECEPTACLES

4 SCALE: NA

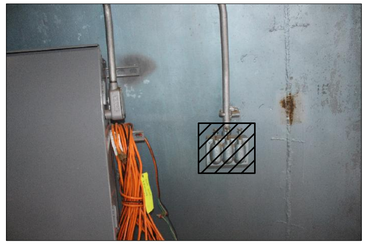


PHOTO
LIGHT SWITCHES

5 SCALE: NA

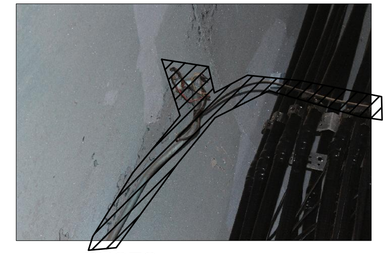


PHOTO
MOSCAD RADIO ANTENNA

6 SCALE: NA

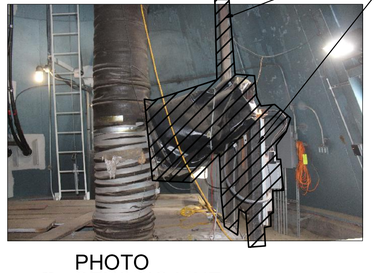


PHOTO
SENSING LINE

7 SCALE: NA

NOTES:
1. REMOVE AND REPLACE RECEPTACLES WITH GFCI STYLE RECEPTACLES WITH WEATHERPROOF COVERS.
2. REMOVE AND REPLACE LIGHT SWITCHES WITH WEATHERPROOF STYLE LIGHT SWITCHES.
3. REMOVE CATHODIC PROTECTION PANEL.
4. REMOVE TELEPHONE CIRCUITS.
5. REMOVE AND REPLACE HEAT TRACING (SALVAGE FOR OWNER).
6. REMOVE AND REPLACE LIGHT FIXTURES.
7. REUSE CONDUIT WHERE APPROPRIATE.
8. REMOVE AND REPLACE LEVEL INSTRUMENT. REMOVE LEVEL INDICATOR.
9. REMOVE MOSCAD RADIO PANEL. REPLACE WITH NEW CONTROL SCADA PANEL.
10. REMOVE RADIO DOOR SWITCH, CONDUIT AND WIRE. (LEAVE SECURITY DOOR SWITCH IN PLACE)
11. REMOVE WOODEN SUPPORTS AND BACKBOARD ASSOCIATED WITH INSTRUMENT PANEL.

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MARK	DATE	DESCRIPTION	BY
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CITY OF ANN ARBOR, MICHIGAN
MANCHESTER TANK COATING

ELECTRICAL
DEMO PLAN

Project No.:	200-31537-15001
Designed By:	CSW
Drawn By:	CSW
Checked By:	AJK

ED-102

Bar Measures 1 inch