CITY OF ANN ARBOR
WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

RFP# 23-50

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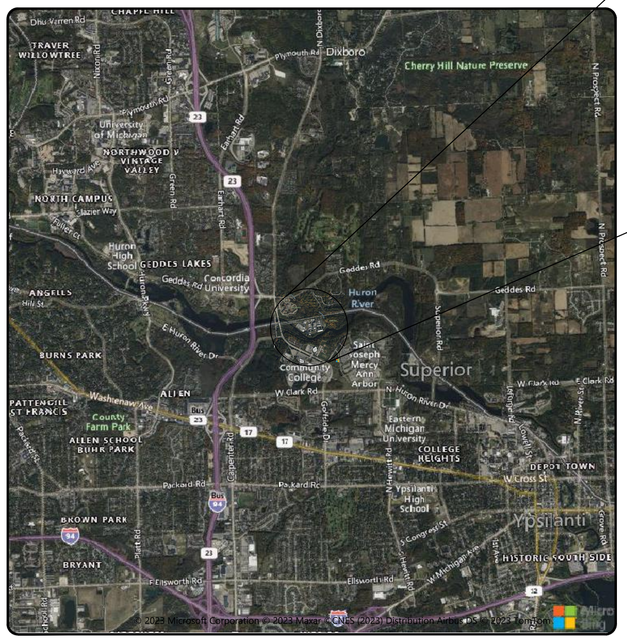

VICINITY MAP

NOTES:

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 174 OF 2013, THE CONTRACTOR SHALL CALL 811 OR 1-800-482-7171 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS, AND HOLIDAYS, PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

THE UNDERGROUND LOCATIONS SHOWN FOR NATURAL GAS, TELEPHONE, ELECTRICAL POWER, CABLE TV AND FIBER OPTIC LINES ARE APPROXIMATE. THE CITY OF ANN ARBOR ASSUMES NO RESPONSIBILITY FOR THEIR ACCURATE REPRESENTATION IN THIS DRAWING. MISS DIG MUST BE CONTACTED PRIOR TO CONSTRUCTION TO LOCATE THESE UTILITIES.

THE CONSTRUCTION COVERED BY THESE PLANS SHALL CONFORM TO THE 1994 EDITION OF THE CITY OF ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS, ITS DETAILS, WHICH ARE INCLUDED BY REFERENCE, AND THIS PROJECT'S CONTRACT DOCUMENTS. THE OMISSION OF ANY CURRENT STANDARD DETAIL DOES NOT RELIEVE THE CONTRACTOR FROM THIS REQUIREMENT.

PREPARED UNDER THE SUPERVISION OF

JEFFREY BOOS, P.E. - MI LICENSE No. 6201061814
STRUCTURAL (A-401, A-502, A-503,A-504),
BLACK & VEATCH

09/08/2023
DATE

STATE OF MICHIGAN — JEFFREY BOOS — ENGINEER — No. 6201061814 — LICENSED PROFESSIONAL ENGINEER

PREPARED UNDER THE SUPERVISION OF

HENRY BROWN, P.E. - MI LICENSE No. 6201070522
I&C, BLACK & VEATCH

09/08/2023
DATE

STATE OF MICHIGAN — HENRY BROWN — ENGINEER — No. 6201070522 — LICENSED PROFESSIONAL ENGINEER
2023.09.08 14:38:21-05'00'

PREPARED UNDER THE SUPERVISION OF

RANDY CANTRELL, P.E. - MI LICENSE No. 53907
BUILDING MECHANICAL, BLACK & VEATCH

09/08/2023
DATE

STATE OF MICHIGAN — RANDY WILLIAM CANTRELL — No. 53907 — LICENSED PROFESSIONAL ENGINEER
09/08/2023

PREPARED UNDER THE SUPERVISION OF

PATRICK POWERS, P.E. - MI LICENSE No. 6201065106
ELECTRICAL, BLACK & VEATCH

09/08/2023
DATE

STATE OF MICHIGAN — PATRICK POWERS — ENGINEER — No. 6201065106 — LICENSED PROFESSIONAL ENGINEER
09-08-2023

PREPARED UNDER THE SUPERVISION OF

BRITTON EVANS, P.E. - MI LICENSE No. 6201062035
GENERAL/CIVIL, BLACK & VEATCH

09/08/2023
DATE

STATE OF MICHIGAN — BRITTON W. EVANS — ENGINEER NO. 62035 — LICENSED PROFESSIONAL ENGINEER

PREPARED UNDER THE SUPERVISION OF

PHILIP RISHEL, R.A. - MI LICENSE No. 1301071105
ARCHITECTURAL, BLACK & VEATCH

09/08/2023
DATE

STATE OF MICHIGAN — PHILIP RISHEL — ARCHITECT — 9-8-2023 — 1301071105 — LICENSED ARCHITECT

PREPARED UNDER THE SUPERVISION OF

BRIAN HANNON, P.E. - MI LICENSE No. 6201056276
PROCESS MECHANICAL, MOORE + BRUGGINK

09/08/2023
DATE

STATE OF MICHIGAN — BRIAN HANNON — ENGINEER — No. 6201056276 — LICENSED PROFESSIONAL ENGINEER

PREPARED UNDER THE SUPERVISION OF

CRAIG TAMLYN, P.E. - MI LICENSE No. 6201050245
STRUCTURAL, JDH STRUCTURAL ENGINEERING

09/08/2023
DATE

STATE OF MICHIGAN — CRAIG TAMLYN — ENGINEER — No. 6201050245 — LICENSED PROFESSIONAL ENGINEER

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CITY OF ANN ARBOR
PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734.794.6410
www.a2gov.org

BLACK & VEATCH Ltr. of Michigan | Moore+Bruggink Consulting Engineers | JDH Structural Engineering

CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

GENERAL
COVER SHEET AND INDEX OF DRAWINGS

SCALE NTS | DRAWING No. G-001

SHEET No. 1 OF 52

RFP# 23-50

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CONSTRUCTION NOTES:

1. Driveways and entrances to buildings and the like shall not be blocked except for short durations and only when approved by the Owner. Vehicular access shall be maintained at all times. It shall be the Contractor's responsibility to coordinate all necessary access closures with the Owner.

2. The location and depth of all existing utilities and service leads are to be field verified, as needed, by the Contractor prior to construction.

3. Location and depth of utilities as depicted on the plans is approximate and shown according to the best information available. It is the Contractor's responsibility to excavate ahead and adjust depth of conflict utilities accordingly. Any damage to utilities is the Contractor's responsibility to avoid and/or repair as necessary.

GENERAL
NOTIFY THE ANN ARBOR TOWNSHIP SOIL EROSION CONTROL OFFICE 48 HOURS PRIOR TO BEGINNING WORK ON THE PROJECT. PHONE: (734) 663-3418.

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE SOIL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER AT ALL TIMES DURING CONSTRUCTION. ANY MODIFICATIONS OR ADDITIONS TO THE SOIL EROSION CONTROL MEASURES DUE TO CONSTRUCTION OR CHANGED CONDITIONS SHALL BE AS DIRECTED AND APPROVED BY THE ENGINEER.

2. ALL SOIL EROSION AND SEDIMENTATION CONTROL WORK SHALL CONFORM TO THE PERMIT REQUIREMENTS OF THE ANN ARBOR TOWNSHIP, CHAPTER 55 ANN ARBOR UNIFIED DEVELOPMENT CODE, CITY OF ANN ARBOR STANDARDS DIVISION VII, THE LAWS OF THE STATE OF MICHIGAN, AND THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

3. DAILY, OR AFTER ANY STORM EVENT, INSPECTIONS OF EROSION CONTROL MEASURES SHALL BE MADE BY THE CONTRACTOR. PERIODIC INSPECTIONS MAY BE MADE BY THE ENGINEER/OWNER TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES. ANY NECESSARY CORRECTIONS SHALL BE MADE WITHOUT DELAY, AND WITHOUT ADDITIONAL COST TO THE CITY OF ANN ARBOR.

4. EROSION AND SEDIMENTATION FROM WORK ON THE SITE SHALL BE CONTAINED ON THE SITE AND NOT BE ALLOWED TO COLLECT ON ANY OFF-SITE AREAS, ROADWAYS OR WATERWAYS.

5. ALL MUD/SOIL TRACKED ONTO ROADWAYS FROM THE SITE DUE TO CONSTRUCTION, SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR. IF SO ORDERED, THE CONTRACTOR SHALL PROVIDE AND OPERATE A VACUUM-TYPE STREET SWEEPER, AT NO ADDITIONAL COST TO THE CITY OF ANN ARBOR.

6. RESTORATION OF ALL DISTURBED AREAS, INCLUDING PLACEMENT OF TOPSOIL, SEED, FERTILIZER AND MULCH AND/OR SOD SHALL BE PERFORMED WITHIN FIVE (5) DAYS OF THE COMPLETION OF FINAL GRADE.

7. CONSTRUCTION OPERATIONS SHALL BE SCHEDULED AND PERFORMED SO THAT PREVENTATIVE SOIL EROSION CONTROL MEASURES ARE IN PLACE PRIOR TO EXCAVATION IN CRITICAL AREAS AND TEMPORARY STABILIZATION MEASURES ARE IN PLACE IMMEDIATELY FOLLOWING BACKFILLING OPERATIONS.

8. SPECIAL PRECAUTIONS WILL BE TAKEN IN THE USE OF CONSTRUCTION EQUIPMENT TO PREVENT SITUATIONS THAT PROMOTE EROSION.

9. PROPER DUST CONTROL SHALL BE MAINTAINED DURING CONSTRUCTION BY USE OF WATER TRUCKS AND/OR DUST PALLATIVE AS REQUIRED.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND REMOVAL OF SOME MEASURES UPON AUTHORIZED COMPLETION OF THE PROJECT. FINAL COMPLETION OF PROJECT WILL NOT BE AUTHORIZED UNTIL ALL SITE WORK AND UTILITY CONSTRUCTION IS COMPLETE AND ALL SOILS ARE STABILIZED.

11. THE CONTRACTOR SHALL NOT GRADE INTO ADJACENT PROPERTIES. SILT AND PROTECTIVE FENCE SHALL BE INSTALLED AND MAINTAINED TO PREVENT GRADING, EROSION AND SEDIMENTATION INTO THE ADJACENT PROPERTIES.

12. TREE PROTECTION FENCING MUST REMAIN INTACT UNTIL RESTORATION OF THE SITE IS COMPLETE.

13. SILT FENCE TO BE INSTALLED PER WASHTENAW COUNTY WATER RESOURCE COMMISSION (WCWRC) DETAIL.

SEQUENCE OF EROSION CONTROL MEASURES:

1. THE CONTRACTOR IS TO SUBMIT TO THE ENGINEER, A SEQUENCE OF CONSTRUCTION WITH RESPECT TO THE SOIL EROSION CONTROL MEASURES FOR REVIEW, COMMENT AND APPROVAL. THIS SCHEDULE IS TO INCLUDE INSPECTION AND REPAIR OF ALL TEMPORARY EROSION CONTROL MEASURES DAILY AND WITHIN 24 HOURS OF A STORM EVENT.

SAMPLE SOIL EROSION AND SEDIMENTATION CONTROL INSTALLATION MINIMUM REQUIREMENTS:

1.1. INSTALL SILT FENCE, TREE PROTECTION FENCING, MUD MATS, INLET FILTERS ON EXISTING DRAINAGE FEATURES, AND ALL OTHER TEMPORARY SOIL EROSION CONTROLS, PRIOR TO ANY CLEARING OR EARTH MOVING OPERATION.

1.2. STRIP AND STOCKPILE TOPSOIL. STABILIZE STOCKPILE AS REQUIRED.

1.3. PERFORM MACHINE GRADING OPERATIONS AND CONSTRUCT PAVEMENTS (MAINLINE, SIDEWALKS, DRIVES, ETC.).

1.4. CONTINUALLY MAINTAIN EROSION AND SEDIMENTATION CONTROL MEASURES, AS REQUIRED TO ALLOW DRAINAGE AND SEDIMENT REMOVAL. REMOVE ANY ACCUMULATED SEDIMENT IMMEDIATELY.

1.5. COMPLETE ALL FINE GRADING.

1.6. TEMPORARY SEED AND INSTALL EROSION CONTROL BLANKET IN ALL DISTURBED AREAS.

1.7. CLEAN OUT STORM SEWER SYSTEMS.

1.8. REMEDY ANY NOTED DEFECTS TO THE SATISFACTION OF THE ANN ARBOR TOWNSHIP'S SOIL EROSION AND SEDIMENTATION CONTROL OFFICIAL.

1.9. ALL TEMP. SOIL EROSION CONTROL MEASURES MUST BE REMOVED, WITH ENGINEERS/OWNERS APPROVAL, PRIOR TO FINAL INSPECTION

NOTE: THIS SEQUENCE IS FOR INFORMATION ONLY. IT IS INTENDED TO SHOW THE SEQUENCE OF CONSTRUCTION WITH RESPECT TO THE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR SUBMITTING THEIR OWN DETAILED CONSTRUCTION SEQUENCE AND SCHEDULE TO THE ENGINEER FOR REVIEW, COMMENT, AND APPROVAL.

TEMPORARY SEEDING:

1. SEED IN ACCORDANCE WITH WASHTENAW COUNTY WATER RESOURCE COMMISSION (WCWRC) RULES AND DESIGN STANDARDS.

2. ANY DISTURBED AREA NOT PAVED, SEEDED, MULCHED, SODDED OR BUILT UPON BY NOVEMBER 15TH OR JUNE 30TH IS TO BE TEMPORARILY STABILIZED PER SPECIFICATIONS.

THE ESTIMATED COST OF SOIL EROSION AND SEDIMENTATION CONTROL MEASURES, TOPSOIL, SEEDING, AND MULCH = $500.00

ESTIMATE OF EXCAVATION AND FILL FROM EXISTING TO FINAL GRADE:
- EXCAVATION = 15 CY, FILL = 10 CY

ON SITE SOILS PER THE USDA SOIL SURVEY OF WASHTENAW COUNTY, MICHIGAN:
- Sb – SEBEWA LOAM – IN DEPRESSION AREAS, BROAD LOW-LYING AREA, AND DRAINAGEWAYS OF OUTWASH PLAINS, VALLEY TRAINS, AND TERRACES. SLOPE IS 0% TO 2%.
- FoB – FOX SANDY LOAM – IN UPLAND AREAS AND ON OUT WASH PLAINS, KAMES, VALLEY TRAINS, TERRACES, AND MORAINES. SLOPES ARE UNIFORM OR SHORT AND COMPLEX.
- MdA – MATHERTON SANDY LOAM – IN DEPRESSION AREAS, BROAD LOW-LYING AREAS, AND ALONG DRAINAGEWAYS, OUTWASH PLAINS, VALLEY TRAINS, AND TERRACES. NEARLY LEVEL TO GENTLY SLOPING.
- MfA – METAMORA SANDY LOAM – IN DEPRESSION AREAS, BROAD, LOW-LYING AREAS, AND ALONG DRAINAGEWAYS OF TILL PLAINS AND MORAINES.
- NaB – NAPPANEE SILTY CLAY LOAM – ON FOOT SLOPES AND ALONG DRAINAGEWAYS OF TILL PLAINS, MORAINES, AND LAKE PLAINS. NEARLY LEVEL TO GENTLY SLOPING.

IMPERVIOUS PROJECT AREA	
PRIOR TO CONSTRUCTION = 0.112 ACRES	POST CONSTRUCTION = 0.113 ACRES

AREA OF PROPOSED DISTURBANCE = 0.3 ACRES

PERMITS REQUIRED TO BE OBTAINED BY THE CONTRACTOR PRIOR TO THE BEGINNING OF CONSTRUCTION.

PERMIT	ISSUING AUTHORITY
GRADING/SOIL EROSION & SEDIMENTATION CONTROL PERMIT*	ANN ARBOR TOWNSHIP
BUILDING PERMIT	ANN ARBOR TOWNSHIP
ELECTRICAL PERMIT	ANN ARBOR TOWNSHIP
MECHANICAL PERMIT	ANN ARBOR TOWNSHIP

* NO COST TO CONTRACTOR

PERMITS REQUIRED TO BE OBTAINED BY THE CITY OF ANN ARBOR PRIOR TO THE BEGINNING OF CONSTRUCTION.

PERMIT	ISSUING AUTHORITY
EGLE PART 41 PERMIT APPLICATION FOR WASTEWATER SYSTEMS	MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

CONTACT INFORMATION

PUBLIC UTILITIES	OWNER	CONTACT
WATER		
SANITARY		
STORM	CITY OF ANN ARBOR PUBLIC WORKS W.R. WHEELER SERVICE CENTER 4251 STONE SCHOOL ROAD ANN ARBOR, MI 48108	(734) 794-6350
FORESTRY		
SIGNS SIGNALS STREET LIGHTS		MARK MORENO (734) 794-6361

PRIVATE UTILITIES	OWNER	CONTACT
GAS	DTE ENERGY 3150 E. MICHIGAN AVE, YPSILANTI TOWNSHIP, MI 48198	ROBERT CZAPIEWSKI (734) 544-7818
ELECTRIC	DTE ENERGY WESTERN WAYNE SERVICE CENTER 8001 HAGGERTY ROAD BELLEVILLE, MI 48111	ANTHONY IGNASIAK (734) 397-4447
CABLE	COMCAST 27800 FRANKLIN ROAD SOUTHFIELD, MI 48034	RON SOUTHERLAND (313) 999-8300
PHONE	AT&T 550 S. MAPLE ROAD ANN ARBOR, MI 48103	STEVEN ALLSHOUSE (734) 996-5381
FIBER OPTIC	MCI 2800 N. GLENFILLE ROAD RICHARDSON, TX 75082	DEAN BOYERS (972) 729-6016
FIBER OPTIC	WINDSTREAM 1295 S LINDEN ROAD, SUITE B FLINT, MI 48532	GREG SERICH (810) 244-3500
STREET LIGHTING	DTE ENERGY 8001 HAGGERTY ROAD BELLEVILLE, MI 48111	LANCE ALLEY (734) 397-4188

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PUBLIC SERVICES
301 EAST HURON STREET
P.O. BOX 8647
ANN ARBOR, MI 48107-8647
734-794-6410
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BLACK & VEATCH Ltd. of Michigan
Moore+Bruggink Consulting Engineers
JDH Engineering

CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

GENERAL
OWNER NOTES, CONTACT INFORMATION, AND PERMITS

SCALE NTS | DRAWING No. G-002

SHEET No.
2 OF 52

ABBREVIATIONS, LEGENDS AND GENERAL NOTES

AB	ANCHOR BOLT	FEC	FIRE EXTINGUISHER CABINET	POT	POINT ON TANGENT
AC	ALTERNATING CURRENT	FEW	FINAL EFFLUENT WATER	PP	POWER POLE
A/C	AIR CONDITIONER, (ING)	FH	FLAT HEAD, FIRE HYDRANT	PROJ	PROJECTION
AD	ACCESS DOOR, AREA DRAIN, AIR DAMPER, ANODE	FHMS	FLAT HEAD MACHINE SCREW	PRV	POWER ROOF VENTILATOR, PRESSURE REDUCING VALVE
ADD	ADDITIONAL	FIG	FIGURE	PRS	PRESSURE REDUCING STATION
ADH	ADHESIVE	FIN	FINISH	PS	PIPE SUPPORT
ADJ	ADJUSTABLE, ADJACENT	FIN GR	FINISH GRADE	PSF	POUNDS PER SQUARE FOOT
ADMIN	ADMINISTRATION	FL	FLOOR, FLOW LINE FLEX FLEXIBLE	PSI	POUNDS PER SQUARE INCH
AF	AIR FLOW	FLG	FLANGE, FLASHING	PT	POINT, POINT OF TANGENCY
AFF	ABOVE FINISH FLOOR	FM	FORCE MAIN	PV	PLUG VALVE
AH	AHEAD	FOM	FACE OF MASONRY	PVC	POLYVINYL CHLORIDE, POINT ON VERTICAL CURVE
AHU	AIR HANDLING UNIT	FOS	FACE OF STUDS	PVCP	POLYVINYL CHLORIDE PIPE
AL	ALUM. LEAF	FOT	FLAT ON TOP	PWMT	PAVEMENT
ALT	ALTERNATE, (IVE)	FRP	FIBERGLASS REINFORCED PLASTIC	PW	POTABLE WATER
ALUM	ALUMINUM	FS	FAR SIDE, FLOOR SLEEVE, FLOAT SWITCH		
AMP	AMPERE	FT	FOOT	R	RADIUS, RISER
ANOD	ANODIZED	FTG	FOOTING FURN FURNISH, FURNISHED	RAS	RETURN ACTIVATED SLUDGE
AP	ACCESS PANEL	FV	FLAP VALVE	RCP	REINFORCED CONCRETE PIPE
APPR	APPROACH	FWD	FORWARD	RCCP	REINFORCED CONCRETE CYLINDER PIPE
APPROX	APPROXIMATE, (LY)			RCHEP	REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE
AR	ALARM RELAY	G	GAS	RDL	ROOF DRAIN LEADER
ARCH	ARCHITECTURAL	GA	GAUGE	RD	ROOF DRAIN, ROAD
AS	AMMETER SWITCH	GAL	GALLON	RDL	ROOF DRAIN LEADER
ASSY	ASSEMBLY	GALV	GALVANIZED	RECEP	RECEPTION
AUTO	AUTOMATIC	GC/MS	GAS CHROMATOGRAPH/MASS SPECTROMETER	RECIRC	RECIRCULATING
AUX	AUXILIARY	GEN	GENERAL, GENERATOR	RECP	RECEPTACLE
AVS	AUTOMATIC VALVE STATION	GV	GLOBE VALVE	RED	REDUCER, REDUCING
AWG	AMERICAN WIRE GAGE	GM	GAS METER	REG	REGULATOR, REGULATING
		GPM	GALLONS PER MINUTE	REF	REFERENCE
B	BEAM	GR	GRADE	REFR	REFRIGERATION, REFRIGERATOR
B TO B	BACK TO BACK	GV	GATE VALVE	REINF	REINFORCING
BA	BEARING AREA	GWB	GYPSUM WALLBOARD	REM	REMOVABLE
BAT	BATTERY	GYP	GYPSUM	REQD	REQUIRED
BD	BOARD			RET	RETURN
BEJ	BRICK EXPANSION JOINT	H	HIGH, HOUR, HYDROGEN	REV	REVISION, REVISED, REVERSED
BF	BLIND FLANGE	HB	HOSE BIBB	RFG	ROOFING
BFV	BUTTERFLY VALVE	HDR	HEADER	RG	RETAINER GLAND
BHP	BRAKE HORSEPOWER	HV	HOLLOW CORE	RHD	ROOF HOOD, RIGHT HAND, ROUND HEAD, RED HEAD
BKR	BREAKER	HE	HEAT EXCHANGER	RHMS	ROUND HEAD MACHINE SCREW
BLDG	BUILDING	HEX	HEXAGONAL	RHWS	ROUND HEAD WOOD SCREW
BLK	BLOCK	HF	HOSE FAUCET	RM	ROOM
BM	BENCHMARK	HGT	HEIGHT	RO	ROUGH OPENING
BC	BOTTOM OF CONCRETE	HH	HANDHOLE	RPM	REVOLUTIONS PER MINUTE
BOF	BOTTOM OF FOOTING	HLS	HIGH LEVEL SWITCH	RR	RAIL ROAD
BOT	BOTTOM	HMC	HARNESSED MECHANICAL COUPLING	RS	RAW SLUDGE, RAW SEWAGE, ROLLED STEEL
BP	BACK PRESSURE	HMJ	HARNESSED MECHANICAL JOINT	RT	RIGHT
BPMK NO.	BASE PLATE MARK NUMBER	HORIZ	HORIZONTAL	RV	REGULATING VALVE
BRG	BEARING	HP	HIGH POINT, HORSEPOWER	R/W	RIGHT OF WAY
BRK	BRICK	HR	HOUR, HANDRAIL		
BSMT	BASEMENT	HS	HIGH STRENGTH	S	SOUTH, SPEAKER
BTU	BRITISH THERMAL UNIT	HV	HOSE VALVE	SAN SWR	SANITARY SEWER
BTUH	BRITISH THERMAL UNIT–HOUR	HVAC	HEATING,VENTILATING AND AIR CONDITIONING	SCHED	SCHEDULE
BU	BUBBLER	HW	HOT WATER	SD	STORM DRAIN, SOAP DISH
BUR	BUILT UP ROOFING	HWY	HIGHWAY	SECC	SECOND
BV	BALL VALVE	HYD	FIRE HYDRANT	SECT	SECTION
		HYDRO	HYDROPNEUMATIC	SK	SERVICE SINK
C	COUNTER			SLG	SLUICE GATE, SUPPLY GRILLE
C TO C	CENTER TO CENTER	I	INDICATOR	SHD	SHOWER DOOR
CB	CATCH BASIN	ID	INSIDE DIAMETER	SHR	SHOWER
CD	CEILING DIFFUSER	IF	INSIDE FACE	SHT	SHEET
C/EJ	CONTRACTION/EXPANSION JOINT	I/I	CURRENT TO CURRENT BOOSTER	SIM	SIMILAR
CFM	CUBIC FEET PER MINUTE	IN	INCHES	SKY	SKYLIGHT
CI	CAST IRON	INC	INCORPORATED	SM	SHEET METAL
CJT	CONTROL JOINT	INCL	INCLUDING	SP	SUMP PUMP
CKT	CIRCUIT	INCR	INCREASE	SPA	SPACING, SPACES
CL	CLASS	INST	INSTRUMENT, (ATION)	SPEC(S)	SPECIFICATION(S)
CL	CENTER LINE	INSUL	INSULATE, (ED), (ING)	SPLY	SUPPLY
CLO	CLOSET	INT	INTERIOR, INTERNAL	SQ	SQUARE
CLR	CLEAR, (ANCE)	INV	INVERT	SR	SUPPLY REGISTER
CMP	CORRUGATED METAL PIPE			SS	STAINLESS STEEL
CMU	CONCRETE MASONRY UNIT	JB	JUNCTION BOX	SST	SELF TAPPING
CO	CLEAN OUT, COMPANY	JF	JOINT FILLER	S SWR	STORM SEWER
COD	CHEMICAL OXYGEN DEMAND	JT	JOINT	STA	STATION
COL	COLUMN			STD	STANDARD
COMB	COMBINATION	K	KIPS	STL	STEEL
COMB SWR	COMBINED SEWER	KO	KNOCK OUT	STOR	STORAGE
COMP	COMPRESSOR, (ED)	KV	KILOVOLT	STR	STRUCTURAL
CONC	CONCRETE	KVA	KILOVOLT AMPERE	SUP	SUPPLY
CONN	CONNECTION	KW	KILOWATT	SUSP	SUSPENDED
CONST	CONSTRUCTION	KWH	KILOWATT HOUR	SV	SHUTOFF VALVE
CONT	CONTINUOUS, CONTINUATION, CONTROL			SW	SWITCH
CONTR	CONTRACTOR	L	LOUVER	SWBD	SWITCHBOARD
COR	CORNER	LAM	LAMINATE(D)	SWGR	SWITCHGEAR
CORR	CORRIDOR, CORRUGATED	LAT	LATERAL	SYM	SYMMETRICAL
CP	CONTROL PANEL	LAT	LEAVING AIR TEMPERATURE	SYS	SYSTEM
CPLG	COUPLING	LB(S)	POUNDS		
CPT	CONTROL POWER TRANSFORMER	LG	LENGTH, LONG	T	THERMOSTAT, THREAD, TOTALIZER
CRS	COURSES, (ING)	LH	LEFT HAND	T	TRANSFORMER, TELEPHONE, TOP
CS	CONTROL SWITCH, CONTROL STATION, CUP SINK	LIN	LINEAL, LINEAR	TAN	TANGENT
CSK	COUNTERSUNK, (INK)	LL	LIVE LOAD	TB	TERMINAL BOX
CTR(S)	CENTER(S)	LO	LOUVER OPENING	TBE	THREAD BOTH ENDS
CU	CUBIC	LP	LOW POINT	TBM	TEMPORARY BENCHMARK
CU YD	CUBIC YARD	LS	LEVEL SWITCH	T&G	TONGUE & GROVE
CV	CHECK VALVE	LT	LEFT, LAB TABLE	TC	TOP OF CURB
CW	COLD WATER			TC	TERMINAL CABINET
CWR	COOLING WATER RETURN	MA	MILLIAMPERE	TEL	TELESCOPING
CWR	COOLING WATER SUPPLY	MACH	MACHINE	TEMP	TEMPERATURE, TEMPORARY
		MAINT	MAINTENANCE	TERM	TERMINAL
D	DOOR	MAN	MANUAL	TH	TEST HOLE
DBL	DOUBLE	MAS	MASONRY	THK	THICK, THICKNESS
DC	DIRECT CURRENT	MAX	MAXIMUM	THR	THRESHOLD
DEG	DEGREE	MB	MACHINE BOLT	TI	TOTALIZING INDICATOR, TEMPRATURE INDICATOR
DET	DETAIL	MC	MECHANICAL COUPLING	TIR	TOTALIZING INDICATING RECORD
DH	DOOR HEIGHT	MCC	MOTOR CONTROL CENTER	TOC	TOP OF CONCRETE
DI	DROP INLET, DUCTILE IRON	MECH	MECHANICAL	TOF	TOP OF FOOTING
DIA	DIAMETER	MED	MEDIUM	TOG	TOP OF GRATING
DIM	DIMENSION	MF	MAGNETIC FLOWMETER	TOM	TOP OF MASONRY
DIP	DUCTILE IRON PIPE	MFR(S)	MANUFACTURER(S)	TOS	TOP OF STEEL
DISCH	DISCHARGE	MG	MILLION GALLONS	TP	TWISTED PAIR COUPLE, TOWEL PIN
DISP	DISPENSER	MGD	MILLION GALLONS PER DAY	TRANS	TRANSFORMER, TRANSMITTER, TRANSFER
DIST	DISTRIBUTION	MH	MANHOLE	TS	TEMPERATURE SWITCH
DIV	DIVISION	MIN	MINIMUM, MINUTE	TV	TELEVISION
DL	DEAD LOAD	MISC	MISCELLANEOUS	TYP	TYPICAL
DM	DAMPER MOTOR	MJ	MECHANICAL JOINT		
DMJ	DOUBLE MECHANICAL JOINT	MJRG	MECHANICAL JOINT RETAINER GLAND	UDM	ULTRASONIC DENSITY METER
DN	DOWN	MJTR	MECHANICAL JOINT WITH TIE ROD	UGND	UNDERGROUND
DO	DISSOLVED OXYGEN, DOOR OPENING	MO	MASONRY OPENING, MOTOR OPERATED	UH	UNIT HEATER
DRN	DRAIN, DRAINAGE	MTD	MOUNTED	USGS	UNITED STATES GEOLOGICAL SURVEY
DS	DOWNSPOUT	MTL	MATERIAL	UV	ULTRAVIOLET
DT	DISTRIBUTION TRANSFORMER	MTR	MOTOR		
DV	DRAIN VALVE			V	VALVE, VOLT, VENT VAC VACUUM
DWG(S)	DRAWING(S)	N	NORTH	VB	VACUUM BREAKER
DWL(S)	DOWEL(S)	N/A	NOT APPLICABLE	VC	VERTICAL CURVE, VICTAULIC COUPLING
		NC	NORMALLY CLOSED	VCD	VERTICAL CONTROL DAMPER
E	EAST, ELECTRICAL	NEUT	NEUTRAL	VCP	VITRIFIED CLAY PIPE
EA	EACH	NF	NEAR FACE	VERT	VERTICAL
EAT	ENTERING AIR TEMPERATURE	NO	NORMALLY OPEN	VF	VACUUM FILTER
ECC	ECCENTRIC	NO(S)	NUMBER(S)	VIB	VIBRATION
ECC RED	ECCENTRIC REDUCER	NOM	NOMINAL	VM	VOLT METER
EEW	EMERGENCY EYEWASH	NORM	NORMAL	VNR	VENEER
EF	EACH FACE	NPT	NATIONAL PIPE THREAD	VV	VENT VALVE
EFF	EFFLUENT	NPW	NONPOTABLE WATER		
EJ	EXPANSION JOINT	NS	NEAR SIDE	W	WEST, WIDE, WINDOW, WATT, WATER
EL	ELEVATION	NTS	NOT TO SCALE	W/	WITH
ELB	ELBOW			WAS	WASTE ACTIVATED SLUDGE
ELEC	ELECTRIC, (AL)	OC	ON CENTER, ODOR CONTROL	WB	WALLBOARD
EMER	EMERGENCY	OD	OUTSIDE DIAMETER	WC	WATER CLOSET
ENC	ENCASEMENT	OF	OUTSIDE FACE, OVERFLOW	WD	WOOD, WIDTH
ENCL	ENCLOSURE	OH	OVERHEAD	WF	WALL FITTING
ENT	ENTRANCE	OL	OVERLOAD	WH	WALL HYDRANT
EOL	END OF LINE	OPER	OPERATING / OPERATOR	WL	WATER LEVEL
EOP	EDGE OF PAVEMENT	OPNG	OPENING	WM	WATER METER, WATTMETER
EPV	ECCENTRIC PLUG VALVE	OPER	OPERATING / OPERATOR	WO	WINDOW OPENING
EQ	EQUAL EQUIP EQUIPMENT	OPP	OPPOSITE	W/O	WITHOUT
EW	EFFLUENT WATER, EACH WAY	OSL	OUTSTANDING LEG	WP	WATERPROOF, WORKING POINT
EWEF	EACH WAY EACH FACE	OZ	OUNCE	WR	WATER RECEPTACLE
EWT&B	EACH WAY TOP AND BOTTOM			WS	WATERSTOP
EXIST	EXISTING	PC	POINT OF CURVE	WT	WEIGHT
EXP	EXPANSION, EXPOSED	PD	PLAN DIMENSION	WW	WETWELL
EXP JT	EXPANSION JOINT	PE	PLAIN END	WWF	WELDED WIRE FABRIC
EXT	EXTENSION, EXTERIOR, EXTERNAL	PG	PRESSURE GAUGE	x	BY TIMES
		PH	PIPE HANGER, PENTHOUSE	YH	YARD HYDRANT
F	FAN	PI	POINT OF INTERSECTION	&	AND
FB	FACE BRICK	PIVC	POINT OF INTERSECTION ON VERTICLE CURVE	@	AT
FC	FLEXIBLE CONNECTION, FLOW CONTROL	PL	PLATE	℄	CENTERLINE
FCA	FLANGED COUPLING ADAPTER	PLYWD	PLYWOOD	∠	DEFLECTION ANGLE
FD	FLOOR DRAIN	PNL(S)	PANEL(S)	#	NUMBER
FDN	FOUNDATION	POLY	POLYMER	%	PERCENT
FDPR	FIRE DAMPER				
FE	FIRE EXTINGUISHER				

NOTE:

1. THIS IS A GENERAL LEGEND AND ABBREVIATION SHEET. SOME ITEMS CONTAINED ON THIS SHEET MAY NOT BE USED ON THIS PROJECT.

ELEVATION & GRID CALLOUTS

ELEVATION CALLOUTS

LEVEL NAME / X.XX — PLAN ELEVATION (SECTIONS & ELEVATIONS)

EL X.XX — FLOOR ELEVATION (PLAN VIEWS)

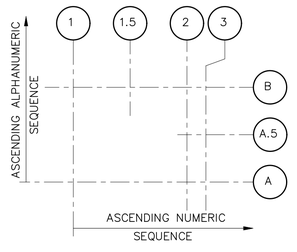
EL X.XX — SPOT ELEVATION (SECTIONS & ELEVATIONS)

N XXX
E XXX
EL XXX — SPOT COORDINATE(PLAN VIEWS)

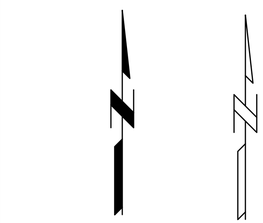
EL X.XX — WATER SURFACE ELEVATION

GRID/COLUMN CALLOUTS

TYPICAL GRID/COLUMN LAYOUT



NORTH ARROW



NORTH ARROW (PLANT GRID NORTH)

NORTH ARROW (TRUE NORTH)

BREAKS

PLAN, ELEVATION, AND SECTION BREAKS

PIPE BREAK

LINE STYLES

EXISTING FACILITY

NEW FACILITY

OTHER DISCIPLINE NEW FACILITY BACKGROUND

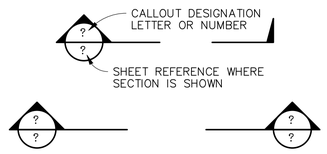
GRID LINE OR CENTERLINE

MATCH LINE

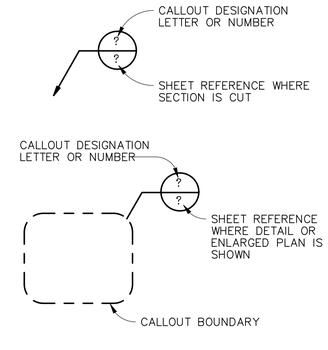
EXAMPLE BOUNDARY LINE (SEE CIVIL LEGEND) — PL

VIEW CALLOUTS

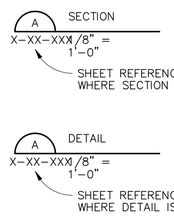
SECTION CALLOUTS



DETAIL/ENLARGED PLAN AREA CALLOUTS



SECTION & DETAIL VIEW TITLES



ANNOTATION

SHEET NOTES

1 — SHEET KEYNOTE

? — REFERENCE KEYNOTE (KEYNOTE LIST)

REVISIONS

? — REVISION TAG

REVISION CLOUD

DRAWING NUMBERING SYSTEM

M–00–1 01

- SHEET SEQUENTIAL NUMBER
- SHEET TYPE DESIGNATOR
- FACILITY/AREA DESIGNATION CODE
- DISCIPLINE DESIGNATOR

DISCIPLINE DESIGNATORS

A	ARCHITECTURAL
C	CIVIL
D	DEMOLITION
E	ELECTRICAL
F	FIRE PROTECTION
G	GENERAL
H	HVAC/BUILDING MECHANICAL
I	INSTRUMENTATION AND CONTROLS
L	LANDSCAPE
M	PROCESS MECHANICAL
P	PLUMBING
S	STRUCTURAL

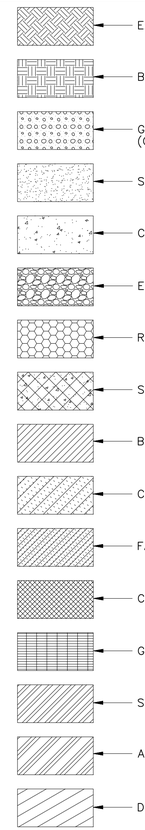
AREA/FACILITY DESIGNATION CODES

REFER TO THE PROJECT SITE PLAN FOR AREA OR FACILITY DESIGNATIONS.

SHEET TYPE DESIGNATORS

0	GENERAL (SYMBOLS, LEGENDS, NOTES, ETC.)
1	PLANS (ARRANGEMENT PLANS, PARTIAL PLANS)
2	ELEVATIONS
3	SECTIONS
4	LARGE SCALE VIEWS (ENLARGED PLANS, STAIR SECTIONS OR SECTIONS THAT ARE NOT DETAILS)
5	DETAILS
6	SCHEDULES & DIAGRAMS
7	SCHEMATICS (ONE–LINES, BLOCK DIAGRAMS)
8	USER DEFINED
9	3D MODEL (PERSPECTIVES, ISOMETRICS, PHOTOGRAPHS)

FILL PATTERNS



REV.	DESCRIPTION	DATE	DRAWN	CHECKED
	100% ISSUE FOR BID/PERMITTING	SEPT 2023	BE	LG

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JDH Engineers

CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

GENERAL
ABBREVIATIONS, LEGENDS, AND GENERAL NOTES

SCALE NTS

DRAWING No. G-003

SHEET No. 3 OF 52

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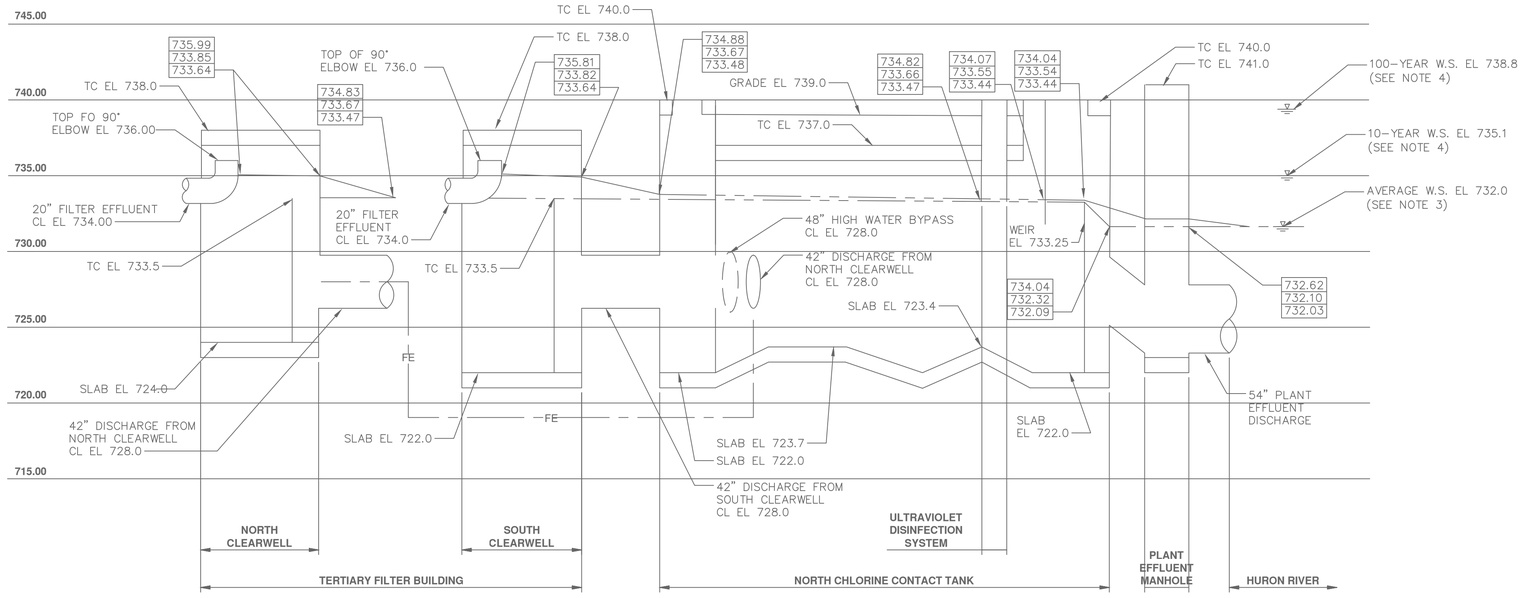


HYDRAULIC PROFILE OF EXISTING CONDITIONS
1" = 5'-0"

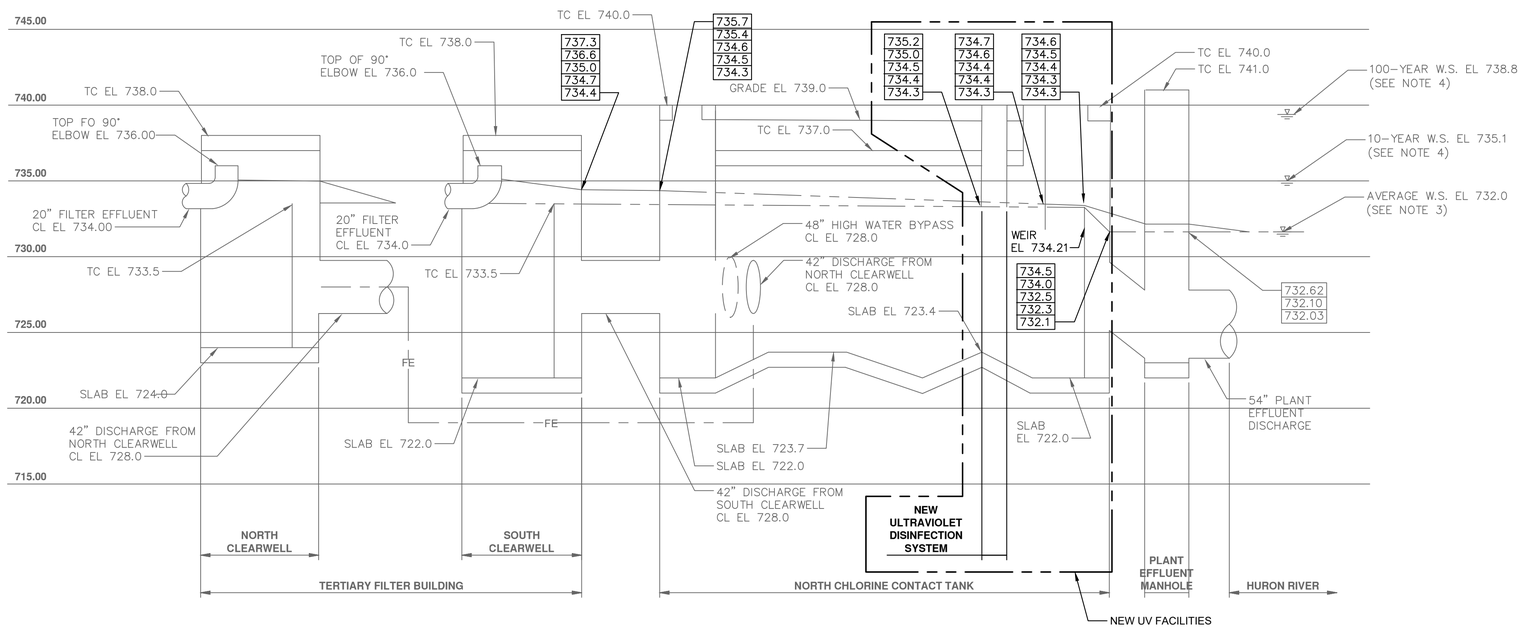
NOTES:

1. ELEVATIONS SHOWN REFER TO NGVD OF 1929 OF THE U.S.G.S. DATUM.
2. ALL WATER SURFACE ELEVATIONS FOR THE HYDRAULIC PROFILE OF EXISTING CONDITIONS TAKEN FROM THE CITY OF ANN ARBOR WASTEWATER TREATMENT PLANT DISINFECTION FACILITIES UPGRADE, DATED OCTOBER 1999. BOLDED ELEVATIONS ON THE PROPOSED CONDITIONS PROFILE HAVE BEEN UPDATED FOR THIS PROJECT.
3. VALUE SHOWN ON THE EXISTING CONDITIONS PROFILE (XXX.XX) IN THE UPPER ROW OF THE BOXED ELEVATIONS DENOTES WATER SURFACE AT PEAK HOUR FLOW OF 48 MGD BASED ON AVERAGE RIVER WATER SURFACE ELEVATION.

   VALUE SHOWN ON THE EXISTING CONDITIONS PROFILE (XXX.XX) IN MIDDLE ROW OF THE BOXED ELEVATIONS DENOTES WATER SURFACE AT AVERAGE FLOW OF 19 MGD BASED ON AVERAGE RIVER WATER SURFACE ELEVATION.

   VALUE SHOWN ON THE EXISTING CONDITIONS PROFILE (XXX.XX) IN BOTTOM ROW OF THE BOXED ELEVATIONS DENOTES WATER SURFACE AT LOW FLOW OF 10 MGD BASED ON AVERAGE RIVER WATER SURFACE ELEVATION.
4. AVERAGE RIVER WATER SURFACE ELEVATION FROM WASHTENAW COUNTY, DEPARTMENT OF PUBLIC WORKS, CITY OF ANN ARBOR, MICHIGAN WASTEWATER TREATMENT PLANT IMPROVEMENTS. CONTRACT 77-S-7, C26 2539 05. VOLUME II DRAWINGS. DATED JULY 1977.
5. THE 100 YEAR FLOOD ELEVATION IS 7738.10 AS ESTABLISHED BY FEMA (APPROVED LOMR LETTER, 11/20/2013)
6. VALUES SHOWN ON THE PROPOSED CONDITIONS PROFILE AS "XXX.XX" IN THE BOXES DENOTES WATER SURFACE AT THE FOLLOWING FLOWS BASED ON AVERAGE RIVER WATER SURFACE ELEVATIONS:

54 MGD
48 MGD
25 MGD
18 MGD
10 MGD



HYDRAULIC PROFILE OF PROPOSED CONDITIONS
1" = 5'-0"

5' 3' 0 5' 10'
VERT. SCALE 1"=5'

REV.	DESCRIPTION	DATE	DRAWN	CHECKED
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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

GENERAL
HYDRAULIC PROFILES

SCALE NTS
DRAWING No. G-004
SHEET No. 4 OF 52

CONSTRUCTION SEQUENCING PLAN (SUGGESTED - SEE NOTES)

STEP 1
MOBILIZE ALL EQUIPMENT AND MATERIALS AS NEEDED TO THE PROJECT SITE.

STEP 2
INSTALL BELOW GRADE CONDUIT AND ELECTRICAL EQUIPMENT AND RUN ALL WIRING TO PREPARE FOR UV SYSTEM CONNECTIONS. ALL EXISTING EQUIPMENT SHALL REMAIN IN SERVICE.

STEP 3
CONDUCT WRRF SHUTDOWN (MAXIMUM OF 16 HOURS OR 24 HOURS WITH WRRF APPROVAL). COORDINATE WITH WRRF STAFF. CLOSE GATE G18 TO STOP FLOW IN 54" SECONDARY EFFLUENT BY-PASS. CLOSE GATES G11 AND G12 AT TERTIARY FILTER BUILDING TO STOP FLOW IN 42" TERTIARY EFFLUENT PIPE FROM NORTH CLEARWELL. VERIFY GATE G17 IS CLOSED.

STEP 4
CLOSE 36"x36" SLUICE GATE IN EAST EFFLUENT CHAMBER AFTER EFFLUENT CONTROL WEIRS. CLOSE BOTH (2) 42"x42" AND BOTH (2) 36"x36" SLUICE GATES IN WEST EFFLUENT CHAMBER AFTER THE EFFLUENT CONTROL WEIRS.

STEP 5
CONSTRUCT ISOLATION BULKHEAD IN INFLUENT UV CHAMBER TO ISOLATE WEST CHANNEL AND EAST CHANNEL.

STEP 6
CONSTRUCT ISOLATION BULKHEAD IN EAST CHANNEL AFTER EXISTING UV SYSTEM TO ISOLATE FLOW FROM ENTERING INTO EAST CHANNEL FROM COMMON EFFLUENT CHANNEL. LEAVE ROOM FOR NEW GATE INSTALLATION. STAGE OUTLET CHANNEL GATE PRIOR TO ISOLATING CHANNEL.

STEP 7
REINSTATE FLOW THROUGH THE WRRF AND FLOW THROUGH THE EXISTING WEST UV CHANNEL AND EXISTING CONCRETE WEIR STRUCTURE.

STEP 8
DISCONNECT ALL ELECTRICAL CONNECTIONS FROM EXISTING UV EQUIPMENT IN EAST CHANNEL. FOLLOW ALL LOTO PROTOCOL, AS REQUIRED.

STEP 9
REMOVAL ALL EXISTING UV EQUIPMENT IN EAST CHANNEL.

STEP 10
INSPECT EAST CHANNEL FOR STRUCTURAL DEFECTS AND MAKE REPAIRS AS NEEDED.

STEP 11
MAKE STRUCTURAL MODIFICATIONS TO EAST CHANNEL BOTTOM AND WALLS TO PREPARE CHANNEL FOR NEW UV EQUIPMENT.

STEP 12
REMOVAL CENTER DIVIDER WALL AS INDICATED ON STRUCTURAL DRAWINGS BETWEEN UV CHANNELS AND SUPPORT EXISTING UV EQUIPMENT IN WEST CHANNEL, AS NEEDED. IF DESIRED, THE EAST HALF OF THE DIVIDER WALL CAN BE REMOVED ONLY. THE WEST HALF THEN CAN BE REMOVED AS PART OF THE WEST CHANNEL MODIFICATIONS.

STEP 13
CUT WALL AND PLATFORM TO PREPARE FOR STEPS AND FOUNDATION.

STEP 14
INSTALL NEW UPSTREAM AND DOWNSTREAM SLIDE GATES IN EAST CHANNEL AND REMOVE OLD GATES, TOP FRAMES, AND ACTUATORS. INSTALL NEW ELECTRICAL DISTRIBUTION EQUIPMENT AND ABOVE GRADE CONDUIT.

STEP 15
INSTALL NEW UV EQUIPMENT IN EAST CHANNEL AS WELL AS INSTRUMENTATION SUCH AS FLOW SENSORS AND MONITORS.

STEP 16
BEGIN ASSEMBLY OF NEW UV EFFLUENT WEIR AT GRADE.

STEP 17
MAKE CONNECTIONS FROM NEW UV EQUIPMENT TO NEW ELECTRICAL EQUIPMENT.

STEP 18
SITE ACCEPTANCE TEST OR PERFORMANCE TEST TO BE CARRIED OUT ON ALL ELECTRICAL EQUIPMENT.

STEP 19
CONNECT ALL I/O FROM INSTRUMENTS AND EQUIPMENT TO NEW PLC.

STEP 20
INTEGRATE NEW PLC INTO EXISTING PLANT CONTROL SYSTEM

STEP 21
TEST UV SYSTEM MCP AND ASSOCIATED INSTRUMENTATION FOR PLC MONITORING AND CONTROL.

STEP 22
TEST AND REFINE CONTROL STRATEGIES.

STEP 23
CONDUCT WRRF SHUTDOWN (MAXIMUM OF 16 HOURS OR 24 HOURS WITH WRRF APPROVAL). COORDINATE WITH WRRF STAFF. CLOSE GATE G18 TO STOP FLOW IN 54" SECONDARY EFFLUENT BY-PASS. CLOSE GATES G11 AND G12 AT TERTIARY FILTER BUILDING TO STOP FLOW IN 42" TERTIARY EFFLUENT PIPE FROM NORTH CLEARWELL. VERIFY GATE G17 IS CLOSED.

STEP 24
REMOVE BULKHEAD IN INFLUENT CHANNEL AS WELL AS BULKHEAD DOWNSTREAM OF UV EQUIPMENT IN EAST CHANNEL. UTILIZE NEW GATES FOR ISOLATION OF EAST CHANNEL AS NEEDED.

STEP 25
CONSTRUCT TEMPORARY BULKHEAD AT INFLUENT TO EXISTING CONCRETE CONTROL WEIRS. OPEN GATE G17.

STEP 26
REINSTATE FLOW THROUGH THE WRRF AND FLOW THE EXISTING WEST UV CHANNEL. OPEN GATE G17 AND ROUTE FLOW THROUGH 48" CHLORINATED EFFLUENT PIPE.

STEP 27
SITE ACCEPTANCE TEST OR PERFORMANCE TEST TO BE CARRIED OUT ON EAST CHANNEL UV EQUIPMENT.

STEP 28
TRAINING SESSIONS SHALL BE CONDUCTED BY FACTORY TRAINED REPRESENTATIVES OF VARIOUS MECHANICAL, ELECTRICAL AND INSTRUMENTATION EQUIPMENT MANUFACTURERS.

STEP 29
CUT DOWN ELEVATION OF EXISTING CONCRETE WEIRS.

STEP 30
INSTALL NEW WEIR SYSTEM AND SUPPORTS.

STEP 31
CONDUCT WRRF SHUTDOWN (MAXIMUM OF 16 HOURS OR 24 HOURS WITH WRRF APPROVAL). COORDINATE WITH WRRF STAFF. CLOSE GATE G18 TO STOP FLOW IN 54" SECONDARY EFFLUENT BY-PASS. CLOSE GATES G11 AND G12 AT TERTIARY FILTER BUILDING TO STOP FLOW IN 42" TERTIARY EFFLUENT PIPE FROM NORTH CLEARWELL. VERIFY GATE G17 IS CLOSED.

STEP 32
INSTALL NEW ISOLATION BULKHEADS UPSTREAM AND DOWN STREAM OF EXISTING UV BANKS IN WEST CHANNEL. LEAVE ROOM FOR NEW GATE INSTALLATION. STAGE OUTLET CHANNEL GATE PRIOR TO ISOLATING CHANNEL.

STEP 33
REINSTATE FLOW THROUGH THE WRRF AND FLOW THROUGH THE NEW EAST CHANNEL AND NEW WEIR STRUCTURE.

STEP 34
DISCONNECT ALL ELECTRICAL CONNECTIONS FROM UV EQUIPMENT IN WEST CHANNEL. FOLLOW ALL LOTO PROTOCOL, AS REQUIRED.

STEP 35
REMOVAL ALL EXISTING UV EQUIPMENT IN WEST CHANNEL.

STEP 36
INSPECT WEST CHANNEL FOR STRUCTURAL DEFECTS AND MAKE REPAIRS AS NEEDED.

STEP 37
MAKE STRUCTURAL MODIFICATIONS TO WEST CHANNEL BOTTOM AND WALLS TO PREPARE CHANNEL FOR NEW UV EQUIPMENT.

STEP 38
INSTALL NEW UPSTREAM AND DOWNSTREAM SLIDE GATES AND REMOVE OLD GATES, TOP FRAMES, AND ACTUATORS.

STEP 39
INSTALL NEW UV EQUIPMENT IN WEST CHANNEL AS WELL INSTRUMENTATION SUCH AS FLOW SENSORS AND MONITORS.

STEP 40
REMOVE EXISTING UV AREA CANOPY AND SUPPORT COLUMNS.

STEP 41
BEGIN CONSTRUCTION ON NEW BUILDING. CONSTRUCTION WILL BE ONGOING THROUGHOUT REMAINING STEPS. THIS INCLUDES STAIRWAY MODIFICATIONS, SIDEWALK, ETC.

STEP 42
MAKE CONNECTIONS FROM NEW UV EQUIPMENT TO NEW ELECTRICAL EQUIPMENT.

STEP 43
CONNECT ALL I/O FROM INSTRUMENTS AND EQUIPMENT TO NEW PLC.

STEP 44
TEST AND REFINE CONTROL STRATEGIES.

STEP 45
SITE ACCEPTANCE TEST OR PERFORMANCE TEST TO BE CARRIED OUT ON WEST CHANNEL UV EQUIPMENT.

STEP 46
IF NOT COMPLETED PREVIOUSLY WITH EAST CHANNEL, TRAINING SESSIONS SHALL BE CONDUCTED BY FACTORY TRAINED REPRESENTATIVES OF VARIOUS MECHANICAL, ELECTRICAL AND INSTRUMENTATION EQUIPMENT MANUFACTURERS.

STEP 47
CONDUCT WRRF SHUTDOWN (MAXIMUM OF 16 HOURS OR 24 HOURS WITH WRRF APPROVAL). COORDINATE WITH WRRF STAFF. CLOSE GATE G18 TO STOP FLOW IN 54" SECONDARY EFFLUENT BY-PASS. CLOSE GATES G11 AND G12 AT TERTIARY FILTER BUILDING TO STOP FLOW IN 42" TERTIARY EFFLUENT PIPE FROM NORTH CLEARWELL. VERIFY GATE G17 IS CLOSED.

STEP 48
REMOVE ISOLATION BULKHEAD AT INFLUENT AND EFFLUENT THAT IS ISOLATING WEST AND EAST UV CHANNEL.

STEP 49
CLEAN ALL EQUIPMENT AND MATERIALS TO AN ACCEPTABLE CONDITIONS DEEMED APPROPRIATE BY THE OWNER.

STEP 50
RESTORE SITE TO EXISTING CONDITIONS AS NEEDED. ITEMS SUCH AS GRASS SEEDING, PAVING, ETC. SHALL BE REPLACED IN KIND.

STEP 51
DEMOBILIZE ALL EQUIPMENT AND MATERIALS FROM THE SITE.

NOTES:

1. CONTRACTOR SHALL COORDINATE ALL SHUTDOWNS WITH WRRF STAFF PRIOR TO CONDUCTING ANY SHUTDOWN. REFER TO APPLICABLE SPECIFICATIONS AS REQUIRED. CONTRACTOR SHALL WORK MULTIPLE SHIFTS AS REQUIRED DURING SHUTDOWNS.
2. MAINTAIN CURRENT FLOW PATH AT ALL TIMES DURING CONSTRUCTION, UNLESS OTHERWISE NOTED.
3. THE CONSTRUCTION SEQUENCE SHOWN IN THIS DRAWING IS FOR REFERENCE ONLY. CONTRACTOR SHALL USE THEIR OWN MEANS AND METHODS AS LONG AS THE INTENT OF THIS SEQUENCE IS MET. CONTRACTOR SHALL SUBMIT THEIR INTENDED SEQUENCES ALONG WITH ANY REQUIRED PRELIMINARY SCHEDULE SUBMITTAL.CONTRACTOR IS ENCOURAGED TO MINIMIZE QUANTITY AND DURATION OF SHUTDOWNS TO EXTENT POSSIBLE. HOWEVER, PENALTIES FOR EXCEEDING ALLOWABLE SHUTDOWN DURATIONS WILL BE ASSESSED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS
4. ONE EXISTING CHANNEL CAN HANDLE A MAXIMUM CAPACITY OF 24 MGD. CONTRACTOR AND WRRF STAFF SHALL BE IN REGULAR COMMUNICATION AND READY POTENTIALLY IMPLEMENT A DISINFECTION ALTERNATIVE. PRIOR TO THE START OF THE PROJECT AND ANY PLANT SHUTDOWN, THE CONTRACTOR SHALL PREPARE A PLAN FOR REVIEW AND ACCEPTANCE BY THE ENGINEER AND OWNER WITH REGARDS TO AN EMERGENCY DISINFECTION ALTERNATIVE, BYPASS PUMPING, OR SAMPLING METHODS TO VERIFY THAT THE PLANT EFFLUENT IS MEETING THEIR NPDES PERMIT REQUIREMENTS.
5. WRRF SHUTDOWNS MUST BE SEPARATED BY A MINIMUM OF 3 DAYS, UNLESS OTHERWISE APPROVED BY WRRF STAFF. TIMING OF SHUTDOWNS WILL ALSO BE DICATED BY WEATHER AND OTHER WRRF OPERATIONS AND ACTIVITIES.

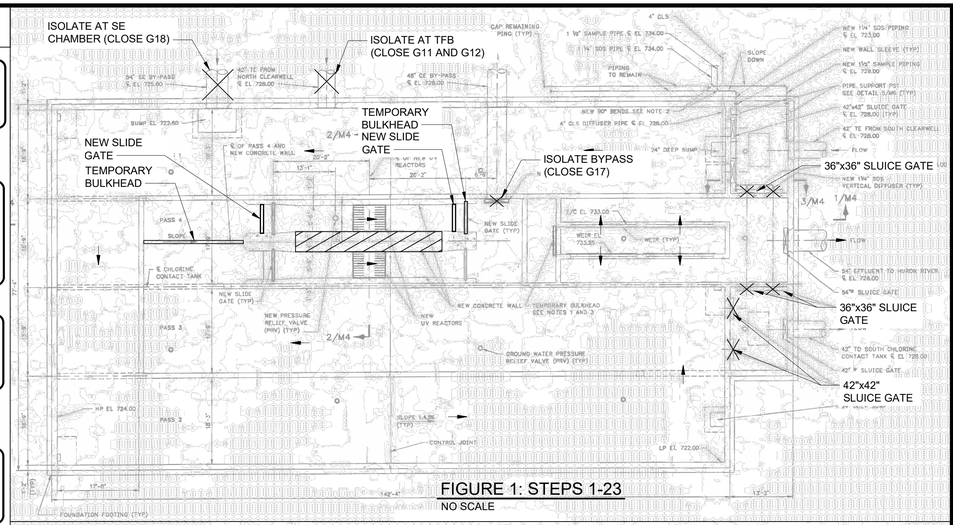

FIGURE 1: STEPS 1-23
NO SCALE

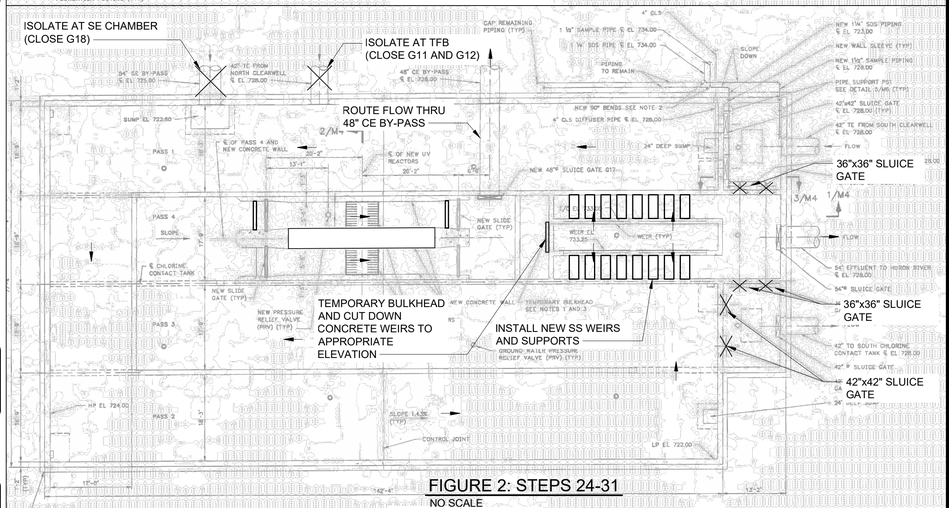

FIGURE 2: STEPS 24-31
NO SCALE

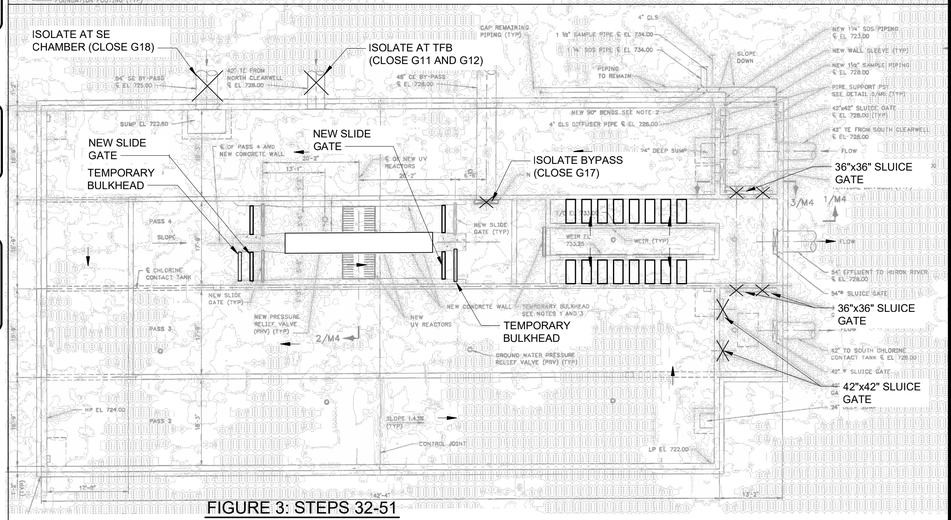

FIGURE 3: STEPS 32-51
NO SCALE

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

GENERAL
CONSTRUCTION SEQUENCING PLAN

SCALE: NTS
DRAWING No.: G-005
SHEET No.: 5 OF 52

EXISTING FACILITY LEGEND

EX = EXISTING

FIRE HYDRANT	(AS LABELED)	WATER MAIN
GATE VALVE IN BOX	(AS LABELED)	WATER MAIN ABANDONED
GATE VALVE IN WELL	(AS LABELED)	STORM SEWER
STOP BOX	(AS LABELED)	STORM SEWER ABANDONED
WATER VAULT	(AS LABELED)	SANITARY SEWER
WELL	(AS LABELED)	SANITARY SEWER ABANDONED
CATCH BASIN (SQ)	(AS LABELED)	GAS MAIN
CATCH BASIN (RD)	(AS LABELED)	GAS MAIN (DEAD)
STORM MANHOLE	(AS LABELED)	ELECTRICAL OVER HEAD
NON-CURB CATCH BASIN (SQ)	(AS LABELED)	ELECTRICAL UNDER GROUND
END SECTION	(AS LABELED)	ELECTRICAL DUCT BANK
SANITARY MANHOLE	(AS LABELED)	TELEPHONE OVER HEAD
CLEAN-OUT	(AS LABELED)	TELEPHONE UNDER GROUND
POST	(AS LABELED)	TELEPHONE DUCT BANK
PEDESTRIAN SIGNAL	(AS LABELED)	CABLE TV OVER HEAD
SIGN	(AS LABELED)	CABLE TV UNDER GROUND
HAND HOLE	(AS LABELED)	FIBER OPTIC
ORNAMENTAL LIGHT	(AS LABELED)	FIBER OPTIC DUCT BANK
FLOOD LIGHT		
UNKNOWN MANHOLE		BOUNDARY
TELEPHONE MANHOLE		BUILDING
TELEPHONE RISER		CENTERLINE OF DITCH
GAS VALVE		CENTERLINE/CROWN OF ROAD
GAS VENT	800	CONTOUR MAJOR
GAS BOX	799	CONTOUR MINOR
ELECTRICAL RISER		EDGE OF WATER
TRANSFORMER		FLOODPLAIN
UTILITY POLE		FENCE
LAMP POLE		GRAVEL
GUY ANCHOR		GUARDRAIL
GUY POLE		STONE WALL
MONITORING WELL		R.O.W.
MAILBOX		TREELINE
SOIL BORING		WETLAND
TRAVERSE POINT		EDGE OF BRUSH
BENCH MARK		HEDGE
IRON PIPE	326	EXISTING GRADE CONTOUR
MON BOX		
MANHOLE		EXISTING PIPING
UTILITY POLE		
PROPERTY LINE		CENTERLINE
EXISTING INLET		
EXISTING MANHOLE		
EXISTING WATER UTILITY MANHOLE		
PHONE UTILITY BOX		
ROADWAY SIGN		TREE (DECIDUOUS)
EXISTING FENCE		
SOIL BORING		TREE (CONIFEROUS)
LIGHT POLE		
OBSERVATION WELL		SHRUB (DECIDUOUS)
		STUMP
	C.R.Z.	TREE TO REMAIN & PROTECT (DECIDUOUS) CRITICAL ROOT ZONE (C.R.Z.) = DIAMETER BREAST HEIGHT (INCHES) X 10
	C.R.Z.	TREE TO REMAIN & PROTECT (CONIFEROUS) CRITICAL ROOT ZONE (C.R.Z.) = DIAMETER BREAST HEIGHT (INCHES) X 10

WRRF PIPE/UTILITY ABBREVIATIONS

BWW	BACKWASH WASTE WATER
CB	CATCH BASIN
CE	CHLORINATED EFFLUENT
CLS	CHLORINE SOLUTION
E	ELECTRICAL
HHWS	HEATING HOT WATER SUPPLY/HOT WATER RETURN
PEW	PLANT EFFLUENT WATER
PW	POTABLE WATER
S	SCUM
SA	SERVICE AIR
SAM	SAMPLER LINE
SE	SECONDARY EFFLUENT
ST	STORM SEWER
SW	SERVICE WATER
TE	TERTIARY EFFLUENT
WWD	WASH WATER DRAIN

NEW FACILITY LEGEND

PROP = PROPOSED

HYDRANT (PLAN)	
WATER GATE WELL	
REDUCER	
WATER GATE VALVE	
WATER STOP BOX	
WATER VAULT	
INLET	
DOUBLE INLET	
INLET JUNCTION CHAMBER	
ROUND CATCH BASIN	
STORM MANHOLE	
DRAIN ARROW	
FLARED END SECTION	
SANITARY MANHOLE	
CLEAN-OUT	
BARREL	
SIGN	
PUSH BUTTON	
HAND HOLE	
	WATER MAIN
	STORM SEWER
	SANITARY SEWER
	FIBER OPTIC
	ELECTRICAL
	CENTERLINE OF DITCH
	CENTERLINE OF ROAD
	FENCE
	GRAVEL
	SILT FENCE
	PROTECTIVE FENCE
	GUARDRAIL
	LOT/UNIT
	CURB
	TEMPORARY GRADING PERMIT
800	CONTOUR MAJOR
799	CONTOUR MINOR
	WATER EASMENT
	STORM EASEMENT
	SANITARY EASEMENT
	R.O.W.
	LIMITS OF CONSTRUCTION
	LIMIT OF GRADING
	STONE WALL
	DETECTABLE WARNING
	ASPHALT
	CONCRETE PAVING
	CONCRETE
	SIDEWALK
	TREE (DECIDUOUS)
	TREE (CONIFEROUS)
	TREE TO BE REMOVED (DECIDUOUS)
	TREE TO BE REMOVED (CONIFEROUS)
	STUMP TO BE REMOVED
2183	DESIGN POINT
1.5%	PERCENT SLOPE
2+50	STATION
3:1	SLOPE RUN : RISE
C-26	CURVE NUMBER
4562.63	SPOT ELEVATION
	SURFACED STREET, ROAD OR DRIVE
	SURFACED STREET, ROAD OR DRIVE WITH CURBS
CB	CATCH BASIN
S SD	SEWER OR STORMDRAIN MANHOLE
	DRAINAGE COURSE OR FLOW LINE
326	FINISHED GRADE CONTOUR
TOP TOE	BANK OR SLOPE LINES
B3 TH5	BORE HOLE OR TEST HOLE AND NUMBER
	SURVEY LINE WITH PI, PT, OR POT
	CONCRETE ENCASEMENT – PLAN VIEW
	CULVERT
	NEW PIPING
	NEW PIPING IN PROFILE
	CONTRACTOR STAGING AREA
	BUILDINGS, STRUCTURES
	STRUCTURES UNDERGROUND
	FUTURE BUILDINGS, STRUCTURES
X X	FENCE
	CENTERLINE
	FIRE HYDRANT
Y	YARD HYDRANT
	STREET LIGHT POLE
	TO BE DEMOLISHED
	WHEELCHAIR ACCESSIBILITY MARKER

EQUIPMENT & VALVE TAG LEGEND

XXX — MECHANICAL EQUIPMENT/VALVE TAG, SEE P&ID LEGEND AND ABBREVIATIONS

LEGENDS NOTES:

1. REFER TO PROCESS MECHANICAL LEGENDS FOR VALVE, PIPE JOINT, AND PIPE FITTING SYMBOLS.

GENERAL NOTES

1. FOR ABBREVIATIONS, LEGENDS AND GENERAL NOTES SEE DWG G-002 AND G-003.
2. THE 100 YEAR FLOOD ELEVATION IS 738.10 AS ESTABLISHED BY FEMA (APPROVED LOMR LETTER, 11/20/2013).
3. EXISTING UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS KNOWN, OR MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATIONS, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES MAY BE INDICATED. OVERHEAD UTILITIES ARE NOT INDICATED IN ARCHITECTURAL ELEVATIONS, PROFILE OR SECTION DRAWINGS. THE ENGINEERING INVESTIGATIONS, LOCATION, AND DESIGNATION OF SUBSURFACE UTILITIES INDICATED IN THESE CONTRACT DOCUMENTS HAS BEEN PERFORMED TO QUALITY LEVEL C IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES AS OUTLINED IN ASCE STANDARD AND GUIDELINE BULLETIN CI/ASCE 38-02 UNLESS OTHERWISE DESIGNATED. WHERE SUCH ACTIVITIES HAVE BEEN TO A HIGHER LEVEL OF QUALITY, THE HIGHER QUALITY LEVEL FOR THE AFFECTED AREAS IS INDICATED IN THE CONTRACT DOCUMENTS.
4. 'SCREENED' (LIGHT) DELINEATION INDICATED ON THE DRAWINGS DENOTES EXISTING FACILITIES. 'SCREENED' INFORMATION WAS TAKEN FROM EXISTING CONSTRUCTION DRAWINGS AND DATA AND SURVEYS, IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE ORDERING OF MATERIALS AND BEGINNING OF CONSTRUCTION. 'BOLD' DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.
5. CONTRACTOR'S STAGING, PARKING AND MATERIAL STORAGE SHALL BE LIMITED TO THE SPACE(S) DESIGNATED ON THE DRAWINGS. PROVIDING ADDITIONAL STORAGE OR PARKING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
6. CALL BEFORE YOU DIG. CONTRACTOR SHALL DETERMINE ACCURATE LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STRUCTURES, WHETHER INDICATED ON THE DRAWINGS OR NOT, IN THE FIELD IN ADVANCE OF EXCAVATING, BY CONTACTING ALL UTILITIES AND OTHER AGENCIES, AND BY PROSPECTING. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL, DEMOLITION, RECONSTRUCTION, AND RECONNECTION OF EXISTING FACILITIES AS REQUIRED TO COMPLETE THE WORK. IF REQUIRED AFTER FIELD LOCATION AND VERIFICATION, CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE ANY NECESSARY MODIFICATIONS TO THE DESIGN OF NEW WORK.
7. BEFORE CONSTRUCTION IS STARTED, CONTRACTOR SHALL COORDINATE WITH THE OWNER OF EACH UTILITY AND DEFINE THE REQUIREMENTS AND METHODS TO ACCOMMODATE THE PROTECTION, TEMPORARY SUPPORT, ADJUSTMENT, OR RELOCATION OF ANY UTILITIES AFFECTED BY THE NEW WORK.
8. CONTRACTOR SHALL COMPLY WITH THE GOVERNING AGENCY NPDES CONSTRUCTION REQUIREMENTS, AND SHALL PROVIDE APPROPRIATE MITIGATION MEASURES OR PROTECTION AND RESTORATION AT ALL LOCATIONS AS REQUIRED BY THEIR OPERATIONS, AND AS DIRECTED BY ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL PROPERTY CORNER AND SURVEYING CONTROL MARKERS AND MONUMENTS. MONUMENTS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REESTABLISHED BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF MICHIGAN.
10. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING TREES, SHRUBS, AND PLANTS, UNLESS OTHERWISE NOTED.
11. FOR ALL SITE GRADING, SMOOTH PARABOLIC TRANSITIONS SHALL BE MADE BETWEEN CHANGES IN SLOPE, UNLESS NOTED OTHERWISE IN THE DRAWINGS. PARABOLIC ROUNDING SHALL APPLY TO ALL CUT AND FILL SECTIONS.
12. THE CONTRACTOR'S CONSTRUCTION OPERATIONS SHALL CONFORM TO FEDERAL, STATE, AND LOCAL AGENCY SAFETY AND HEALTH RULES AND REGULATIONS FOR CONFINED SPACE ENTRY, WORK IN HAZARDOUS LOCATIONS, WORK AT HEIGHTS, AIR QUALITY CONTROL, NOISE CONTROL, AND ANY OTHER POTENTIALLY HAZARDOUS CONDITIONS.
13. THE TERM "NEW" AS INDICATED ON THE DRAWINGS MEANS THE ITEM IS INCLUDED IN THE SCOPE OF THIS PROJECT. THE TERM 'PROPOSED' AS INDICATED ON THE DRAWINGS MEANS THE ITEM IS DESIGNED OR PLANNED TO BE PROVIDED BY OWNER OR OTHERS SEPARATE FROM THIS CONTRACT. THE TERM 'FUTURE' AS INDICATED ON THE DRAWINGS REFERS TO THE ENGINEER'S INTERPRETATION OF THE ITEM FOR THE FUTURE, BASED ON AVAILABLE INFORMATION.
14. THE EXISTING PROCESS FACILITIES SHALL REMAIN IN OPERATION CONTINUOUSLY THROUGHOUT THE DURATION OF CONSTRUCTION ACTIVITIES. INDIVIDUAL PROCESS FACILITIES CAN BE TAKEN OUT OF SERVICE FOR LIMITED PERIODS OF TIME TO FACILITATE CONSTRUCTION AS SPECIFIED IN THE CONTRACT DOCUMENTS.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

CIVIL
LEGNED AND NOTES

SCALE NTS

DRAWING No. C-001

SHEET No. 6 OF 52

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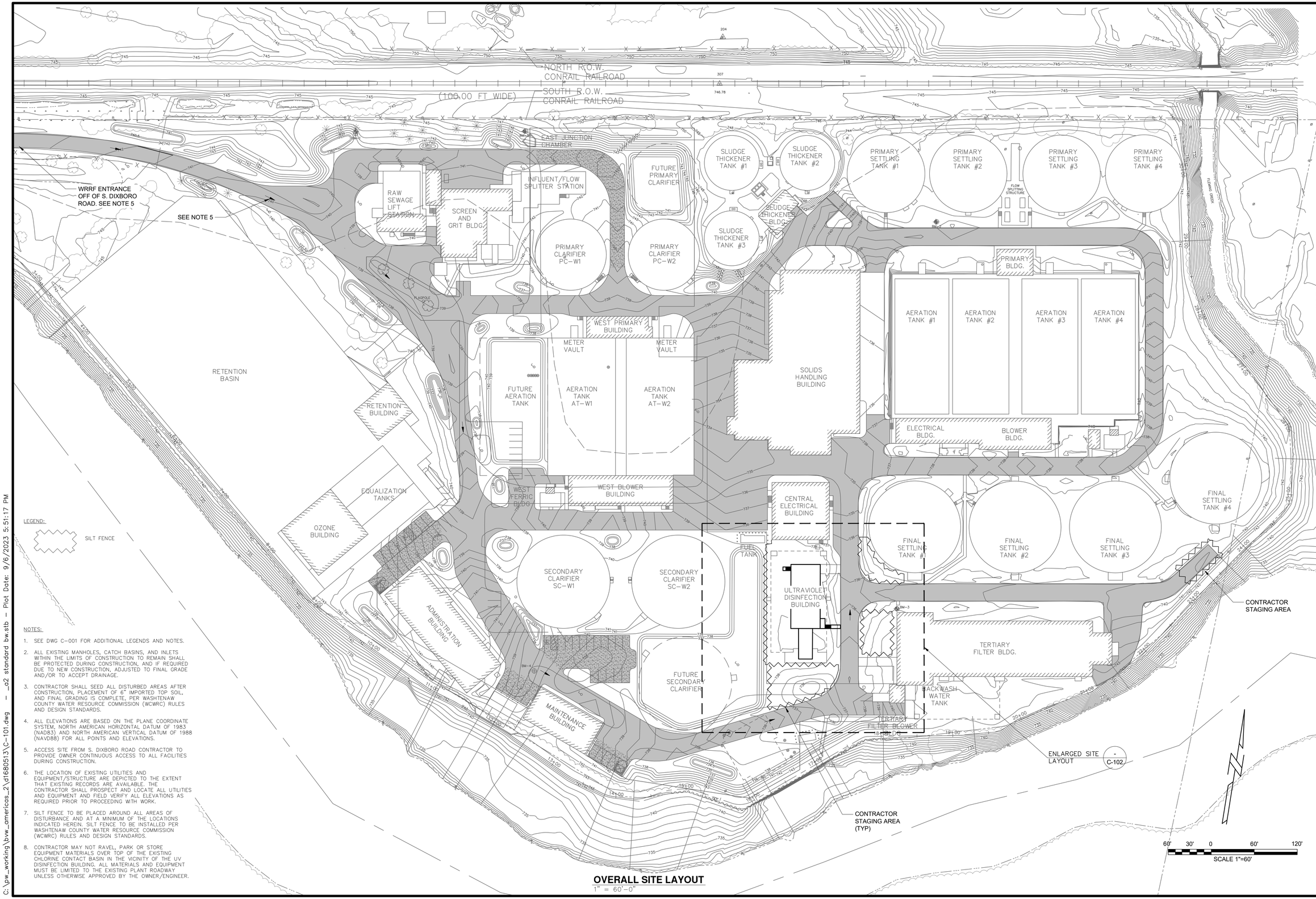

LEGEND:

SILT FENCE

NOTES:

1. SEE DWG C-001 FOR ADDITIONAL LEGENDS AND NOTES.
2. ALL EXISTING MANHOLES, CATCH BASINS, AND INLETS WITHIN THE LIMITS OF CONSTRUCTION TO REMAIN SHALL BE PROTECTED DURING CONSTRUCTION, AND IF REQUIRED DUE TO NEW CONSTRUCTION, ADJUSTED TO FINAL GRADE AND/OR TO ACCEPT DRAINAGE.
3. CONTRACTOR SHALL SEED ALL DISTURBED AREAS AFTER CONSTRUCTION, PLACEMENT OF 6" IMPORTED TOP SOIL, AND FINAL GRADING IS COMPLETE, PER WASHTENAW COUNTY WATER RESOURCE COMMISSION (WCWRC) RULES AND DESIGN STANDARDS.
4. ALL ELEVATIONS ARE BASED ON THE PLANE COORDINATE SYSTEM, NORTH AMERICAN HORIZONTAL DATUM OF 1983 (NAD83) AND NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) FOR ALL POINTS AND ELEVATIONS.
5. ACCESS SITE FROM S. DIXBORO ROAD CONTRACTOR TO PROVIDE OWNER CONTINUOUS ACCESS TO ALL FACILITIES DURING CONSTRUCTION.
6. THE LOCATION OF EXISTING UTILITIES AND EQUIPMENT/STRUCTURE ARE DEPICTED TO THE EXTENT THAT EXISTING RECORDS ARE AVAILABLE. THE CONTRACTOR SHALL PROSPECT AND LOCATE ALL UTILITIES AND EQUIPMENT AND FIELD VERIFY ALL ELEVATIONS AS REQUIRED PRIOR TO PROCEEDING WITH WORK.
7. SILT FENCE TO BE PLACED AROUND ALL AREAS OF DISTURBANCE AND AT A MINIMUM OF THE LOCATIONS INDICATED HEREIN. SILT FENCE TO BE INSTALLED PER WASHTENAW COUNTY WATER RESOURCE COMMISSION (WCWRC) RULES AND DESIGN STANDARDS.
8. CONTRACTOR MAY NOT RAVEL, PARK OR STORE EQUIPMENT MATERIALS OVER TOP OF THE EXISTING CHLORINE CONTACT BASIN IN THE VICINITY OF THE UV DISINFECTION BUILDING. ALL MATERIALS AND EQUIPMENT MUST BE LIMITED TO THE EXISTING PLANT ROADWAY UNLESS OTHERWISE APPROVED BY THE OWNER/ENGINEER.

OVERALL SITE LAYOUT
1" = 60'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

CIVIL
OVERALL SITE LAYOUT

SCALE 1" = 60'
DRAWING No. C-101
SHEET No. 7 OF 52

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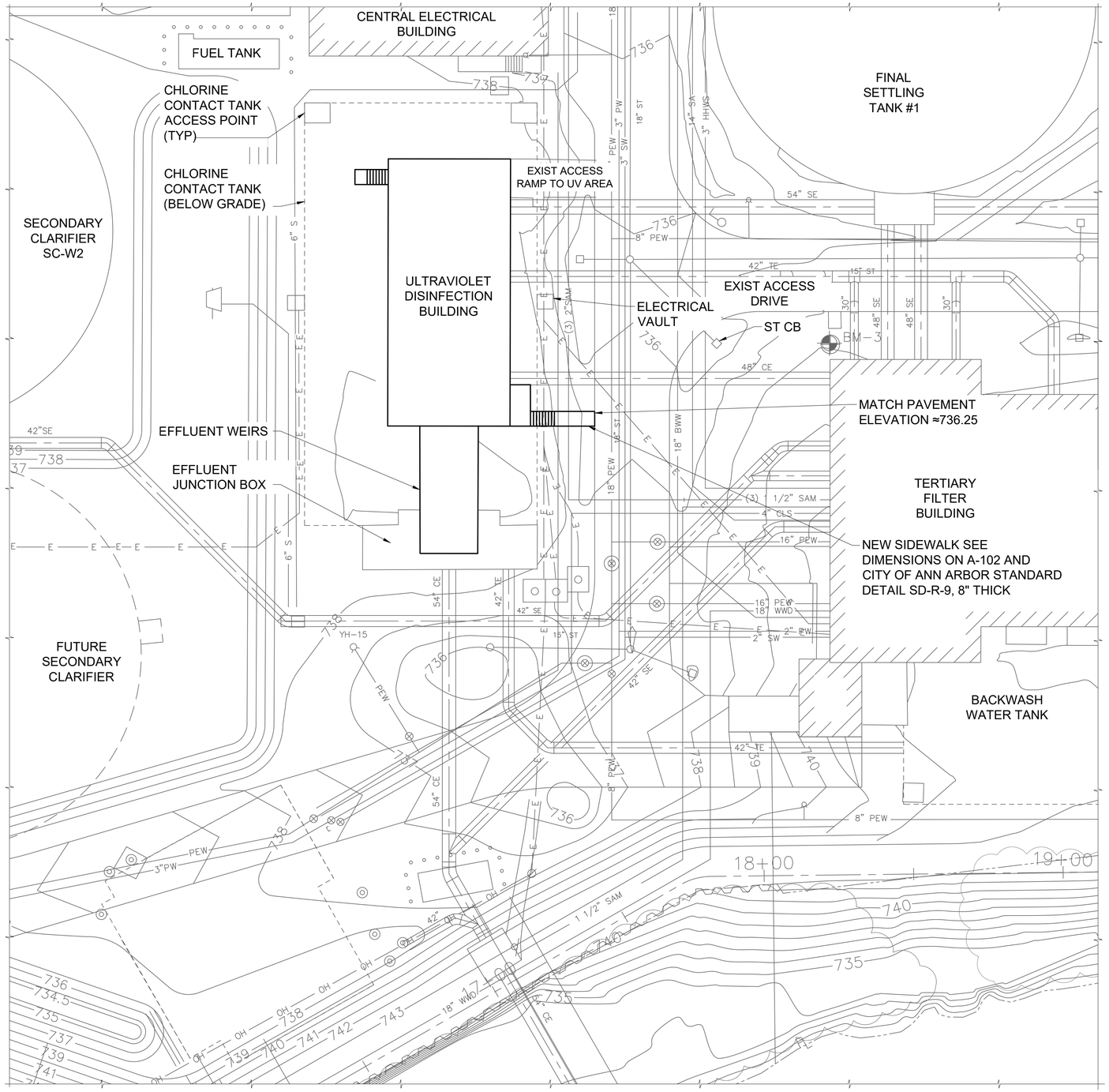

ENLARGED SITE LAYOUT
1" = 20'-0"

NOTES:

1. SEE DWG C-001 FOR LEGENDS AND NOTES AND G-003 FOR ABBREVIATIONS, LEGENDS AND GENERAL NOTES.
2. SEE DWG C-101 FOR CONTRACTOR STAGING AREA.
3. FOR ADDITIONAL CIVIL SITE PLAN NOTES, SEE DWG C-001.

20' 10' 0 20' 40'
SCALE 1"=20'

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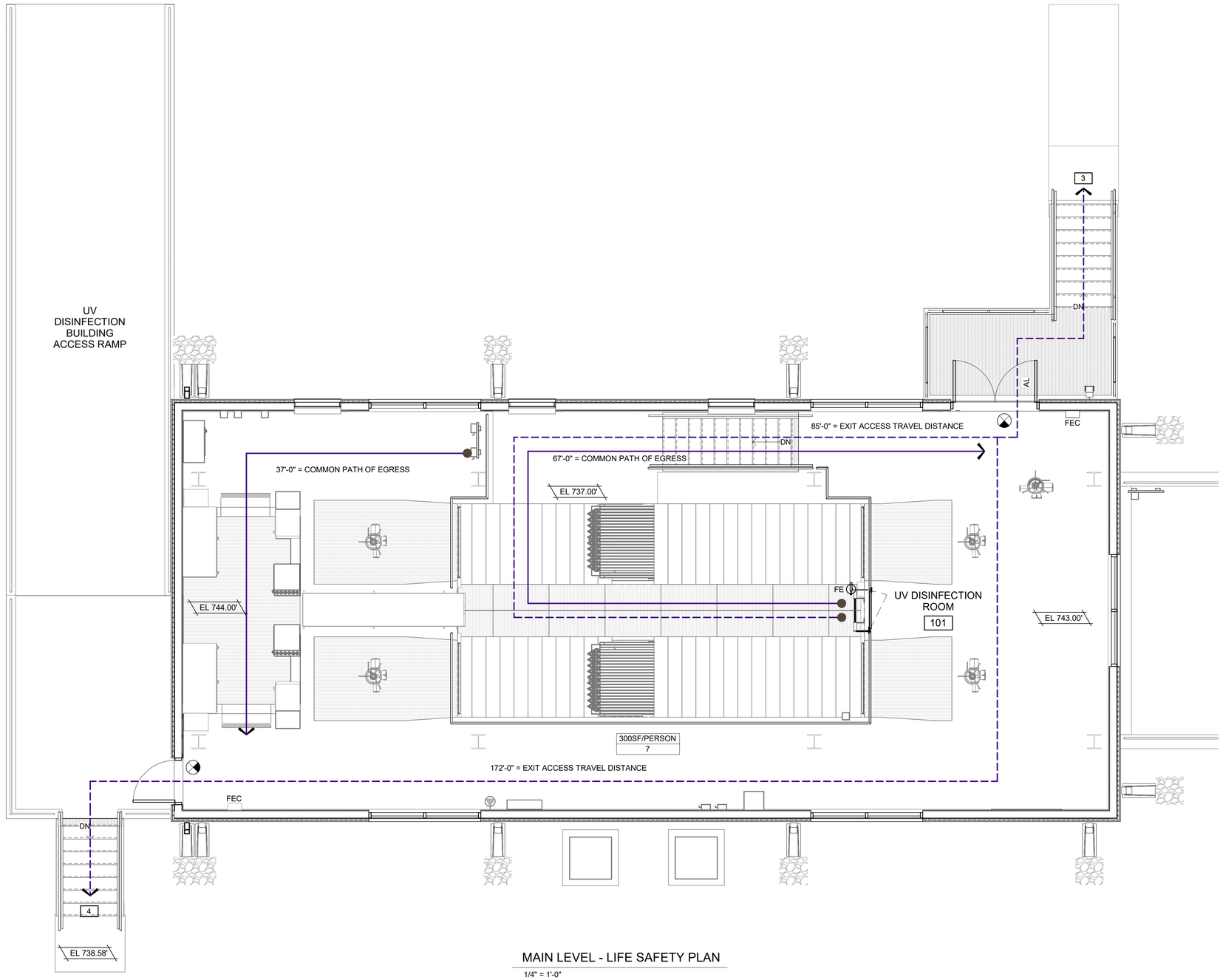
CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

CIVIL
ENLARGED SITE LAYOUT

SCALE 1" = 20'
DRAWING No. C-102
SHEET No. 8 OF 52

UV DISINFECTION BUILDING ACCESS RAMP



MAIN LEVEL - LIFE SAFETY PLAN

1/4" = 1'-0"

BUILDING CODE ANALYSIS

BUILDING NAME: UV DISINFECTION BUILDING	
APPLICABLE CODES:	2015 MICHIGAN BUILDING CODE (MBC) (BASED ON 2015 IBC) 2015 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
TYPE OF CONSTRUCTION:	II-B (TABLE 601)
OCCUPANCY CLASSIFICATION:	GROUP F-1 (SECTION 306.2)
ALLOWABLE BUILDING STORIES:	2 STORIES (TABLE 504.4)
ACTUAL BUILDING STORIES:	1 STORY
ALLOWABLE BUILDING HEIGHT:	55.00 FT (TABLE 504.3)
ACTUAL BUILDING HEIGHT:	21.33 FT (APPROX)
ALLOWABLE BUILDING AREA:	15,500 SF (TABLE 506.2)
ACTUAL BUILDING AREA:	2,046.00 SF
DESIGNED OCCUPANT LOAD:	7 PERSONS - 300 SF/PERSON (TABLE 1004.1.2)
FIRE SAFETY FEATURES:	FIRE EXTINGUISHERS; FIRE & SMOKE DETECTION SYSTEM; FIRE SUPPRESION SYSTEM NOT REQ'D (SECTION 903.2.4)
MINIMUM EGRESS WIDTH:	36 IN (TABLE 1020.2)
MAXIMUM COMMON PATH OF TRAVEL:	75 FT (TABLE 1006.2.1)
MAXIMUM EXIT ACCESS TRAVEL DISTANCE:	200 FT (TABLE 1017.2)
MINIMUM NO. OF EXIT REQ'D:	2 EXITS (SECTION 1006.2.2.2)
NUMBER OF EXITS PROVIDED:	2 EXITS
ADA ACCESSIBILITY:	NOT REQUIRED (SECTION 1103.2.9)

LIFE SAFETY LEGEND

FEC	FIRE EXTINGUISHER CABINET(FEC)
X'-X"	MAXIMUM COMMON PATH OF TRAVEL
X'-X"	TRAVEL DISTANCE
100SF/PERSON / 1	OCCUPANTS PER SF OCCUPANT LOAD
1	CUMULATIVE OCCUPANT LOAD
	EXIT

4' 2' 0' 4' 8'

1/4" = 1'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

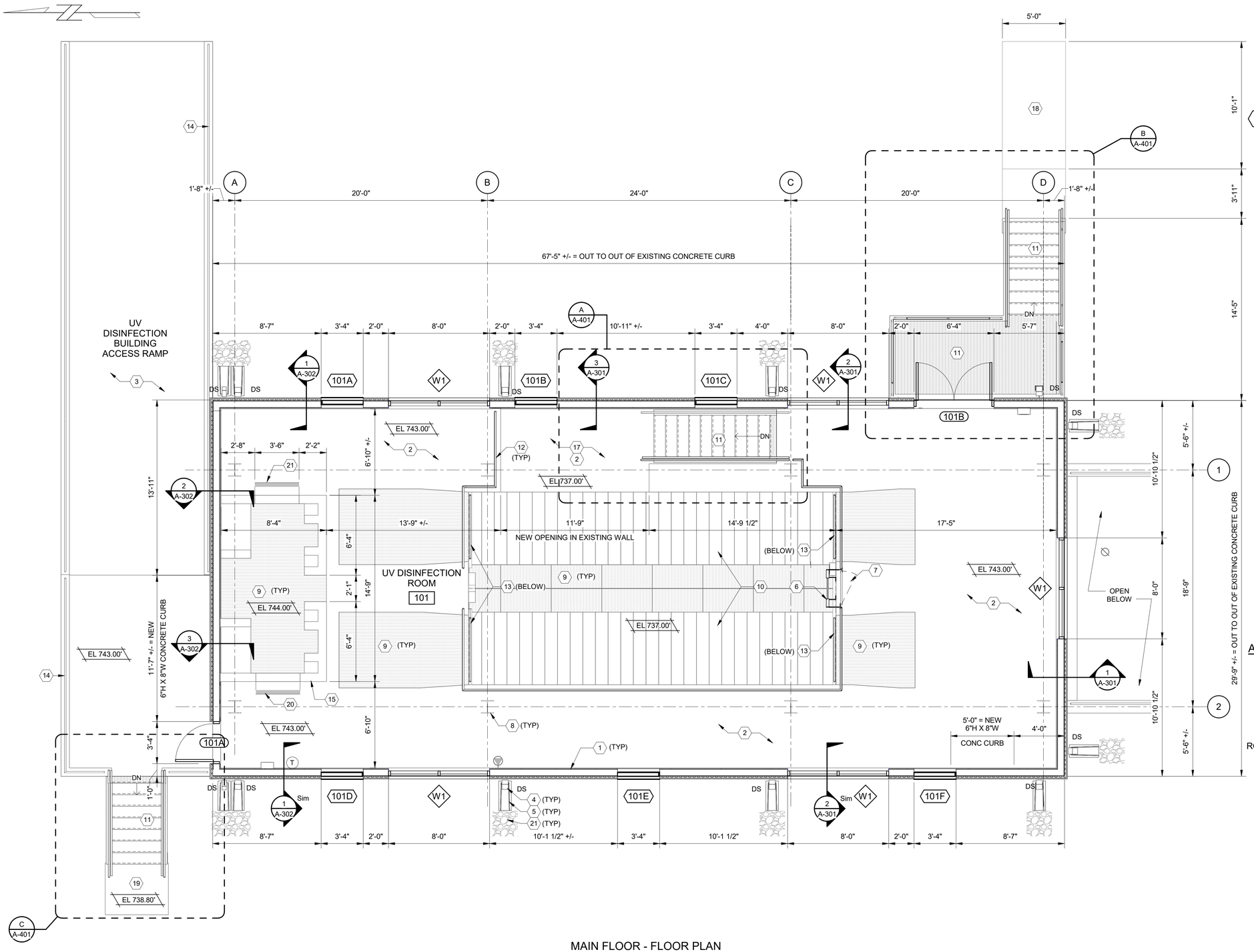
ARCHITECTURAL

LIFE SAFETY PLAN & CODE ANALYSIS

SCALE: As indicated

DRAWING No.: A-101

SHEET No.: 9 OF 52



MAIN FLOOR - FLOOR PLAN

1/4" = 1'-0"

4' 2' 0' 4' 8'

1/4" = 1'-0"

GENERAL SHEET NOTES

1. REFER SHEET A-601 FOR ARCHITECTURAL ABBREVIATION LEGEND.
2. DIMENSIONS INDICATED ARE MEASURED FROM THE OUTSIDE FACE OF EXISTING CONCRETE CURB. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES.
3. ALL EXISTING SPACES ARE TO BE FIELD VERIFIED PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL NOTIFY ENGINEER/ARCHITECT OF ANY DISCREPANCIES.

SHEET KEYNOTES

1. EXTERIOR WALL ASSEMBLY:
   - PREFINISHED METAL WALL PANEL.
   - 1-1/2 INCH CONT RIGID INSULATION B/W HORIZONTAL Z-FURRING @ 24 INCH O.C. (R-7.5 MIN)
   - 5/8 INCH EXTERIOR GYP BD SHEATHING WITH FLUID APPLIED VAPOR BARRIER.
   - 6 INCH METAL STUD @ 16 O.C. W/ BATT INSULATION (R-19)
   - 5/8" TYPE X GYPSUM WALL BOARD WITH ABUSE, MOISTURE, AND MOLD RESISTANCE.REFER TO FINISH SCHEDULE FOR PAINT FINISH.
2. EXISTING CONCRETE SLAB.
3. EXISTING CONCRETE RAMP.
4. PREFINISHED METAL DOWNSPOUTS.
5. PRECAST CONCRETE SPLASHBLOCK.
6. WALL MOUNTED LADDER W/ RAIL RETURN, SEE DETAIL A/A-504.
7. ALUMINUM SELF-CLOSING GATE, SEE DETAIL C/A-503.
8. STEEL COLUMN, SEE STRUCTURAL DRAWINGS.
9. GRATING, SEE STRUCTURAL DRAWINGS.
10. REMOVABLE CHECKER PLANKS, SEE STRUCTURAL DRAWINGS.
11. ALUMINUM GRATED STAIRS AND LANDING, REFER TO SHEET A-401 FOR MORE INFORMATION.
12. TOP MOUNTED ALUMINUM GUARDRAIL WITH TOE KICK, SEE DETAIL A/A-503.
13. TOP MOUNTED ALUMINUM GUARDRAIL W/O IN CHANNEL OPENINGS ON OPERATING LEVEL EL 737.00, SEE DETAIL A/A-503.
14. TOP MOUNTED ALUMINUM GUARDRAIL W/O TOE KICK, SEE DETAIL A/A-503.
15. ELEVATED EQUIPMENT PLATFORM, SEE STRUCTURAL & MECHANICAL DRAWINGS. COORDINATE PEDISTAL SIZES WITH EQUIPMENT VENDER TO DETERMINE FINAL SIZE AND LOCATION.
16. CONCRETE CURB, SEE STRUCTURAL DRAWINGS.
17. SELF LEVELING CONCRETE SKIM COAT OVER EXISTING CONCRETE SLAB, SEE STRUCTURAL DRAWINGS.
18. CONCRETE SIDEWALK, SEE STRUCTURAL DRAWINGS.
19. CONCRETE STOOP, SEE STRUCTURAL DRAWINGS.
20. REFLECTIVE COATING ON CONCRETE STEP.
21. SPLASHBLOCK RIPRAP, SEE DETAIL G/A-501.

ARCHITECTURAL SYMBOL LEGEND

101A	DOOR
101A	LOUVER
W	WINDOW
ROOM NAME 101	ROOM NAME & NUMBER

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
FLOOR PLAN

SCALE: As indicated
DRAWING No.: A-102

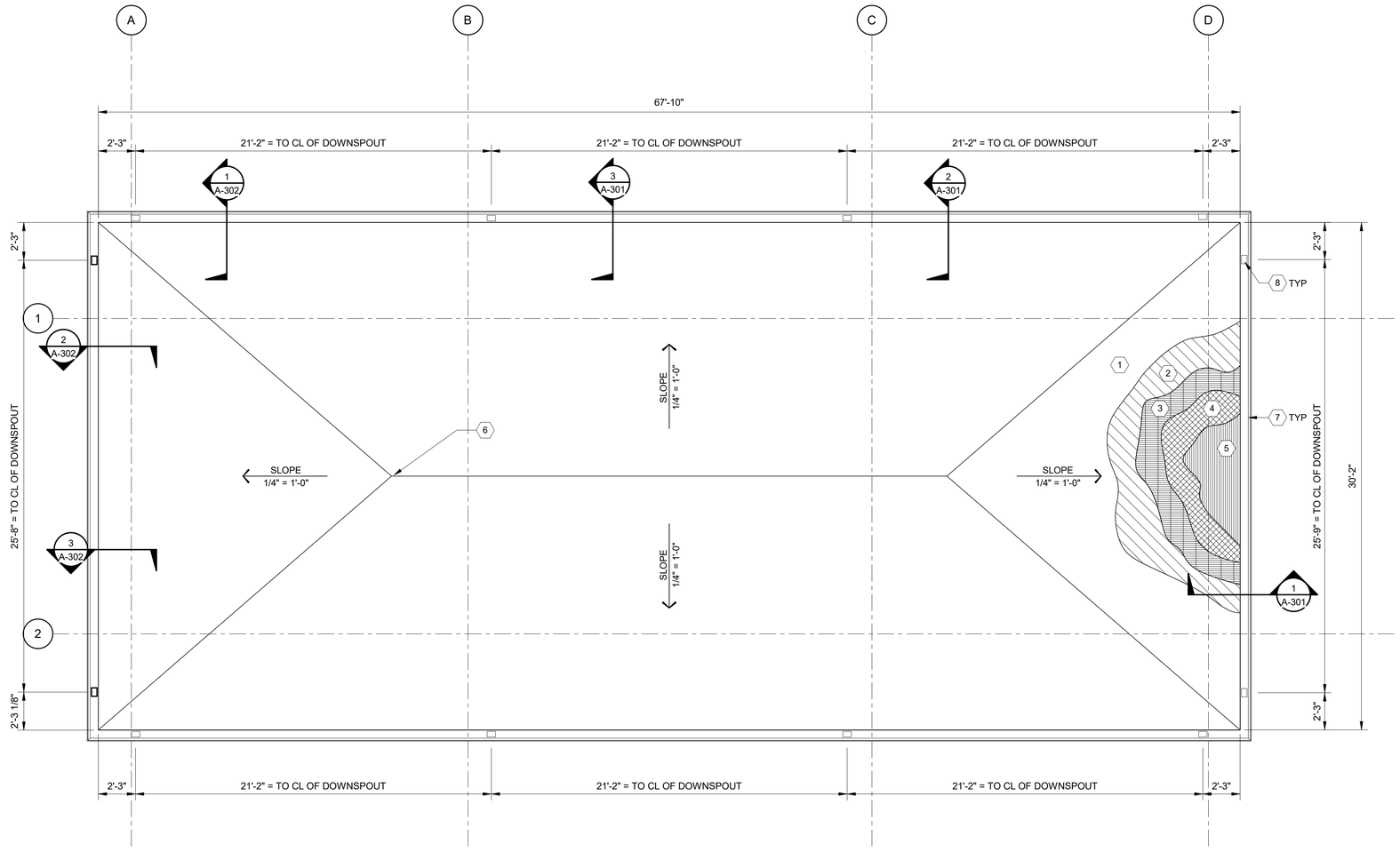
SHEET No.
10 OF 52

GENERAL SHEET NOTES

1. REFER TO SHEET A-102 FOR ARCHITECTURAL SYMBOL LEGEND & SHEET A-501 FOR ARCHITECTURAL ABBREVIATIONS.
2. ROOF TOP DIMENSIONS ARE TO OUTSIDE FACE OF EXTERIOR CLADDING & CENTERLINE OF ROOF TOP DRAINS, EQUIPMENT, ETC, UNLESS NOTED OTHERWISE.
3. MINIMUM 2" ROOF INSULATION THICKNESS REQUIRED AT ALL PRIMARY ROOF DRAINS & SCUPPERS.
4. ROOF INSULATION R-VALUE IS BASED ON ANOVERALL AVERAGE R-VALUE OVER THE ENTIRETYOF THE ROOF.

SHEET KEYNOTES

1. SINGLE-PLY ROOF MEMBRANE.
2. 1/2" COVERBOARD.
3. TAPERED RIGID INSULATION.
4. VAPOR RETARDER.
5. METAL DECK, SEE STRUCTURAL DRAWINGS.
6. ROOF RIDGE.
7. PRE-FINISHED METAL GUTTER.
8. PRE-FINISHED METAL DOWNSPOUT.



ROOF PLAN
1/4" = 1'-0"

4' 2' 0' 4' 8'
1/4" = 1'-0"

Plot Date: 9/7/2023 2:55:59 PM

BIM 360://413104 – Ann Arbor WWTP UV Replacement/413104-AA_UV-BV.rvt

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

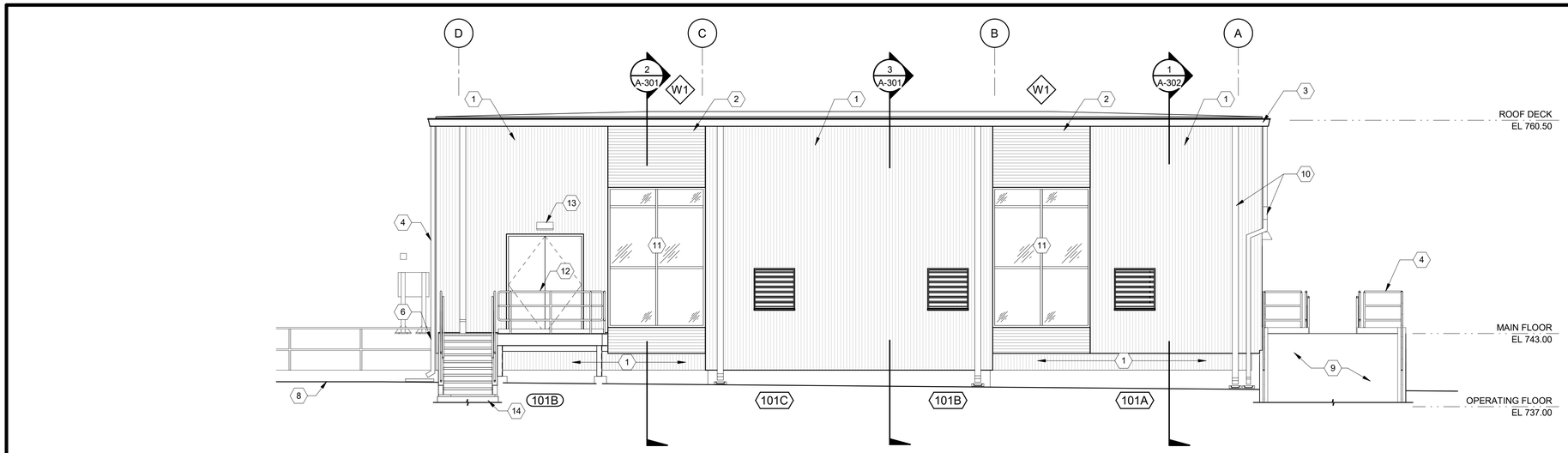
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
ROOF PLAN

SCALE 1/4" = 1'-0"

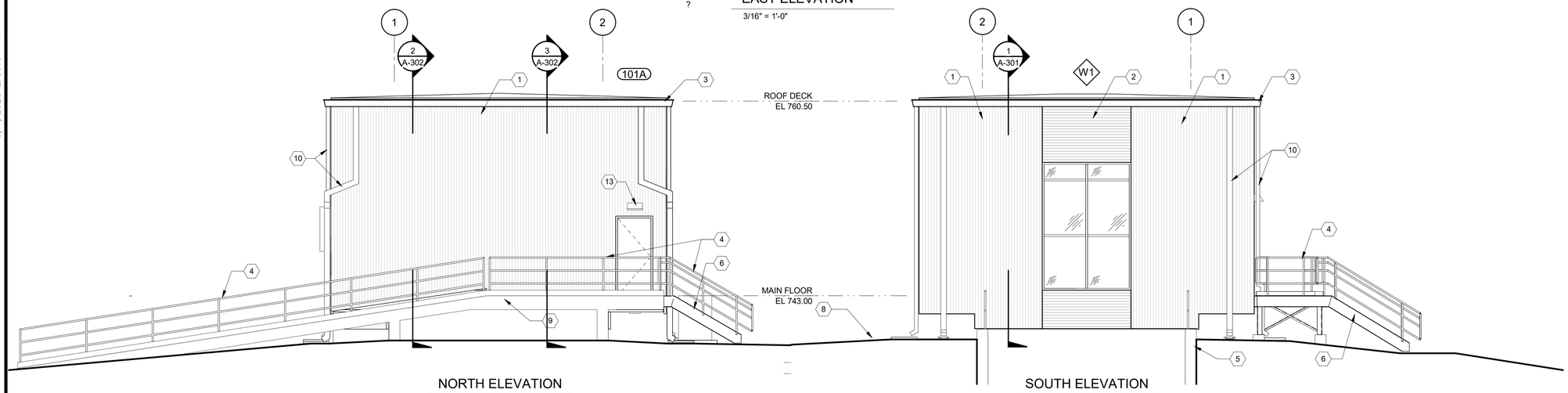
DRAWING No. A-103

SHEET No.
11 OF 52



EAST ELEVATION

3/16" = 1'-0"

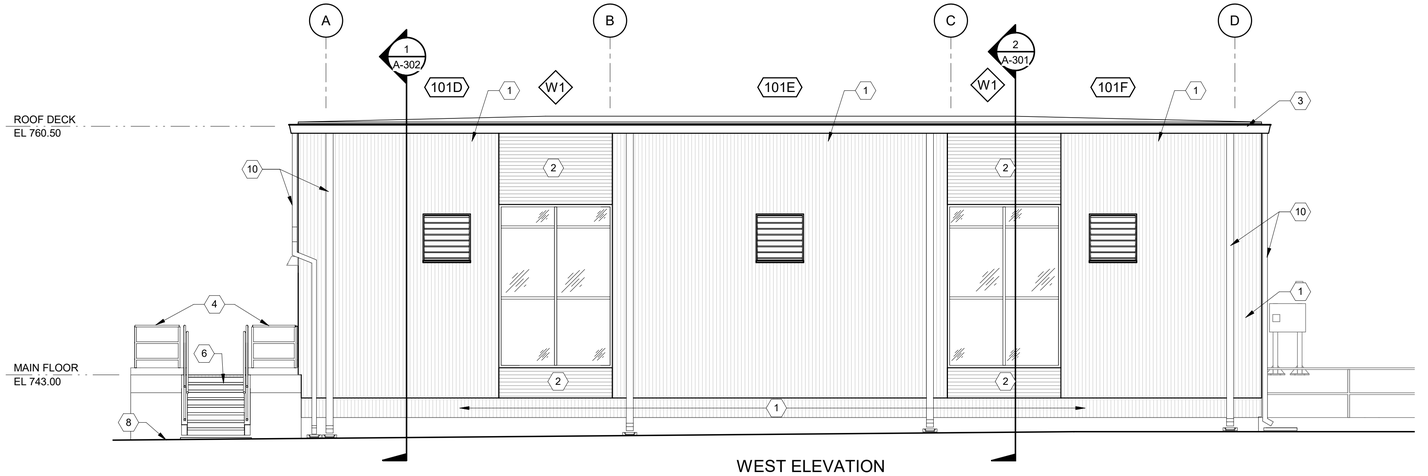


NORTH ELEVATION

3/16" = 1'-0"

SOUTH ELEVATION

3/16" = 1'-0"



WEST ELEVATION

3/16" = 1'-0"

SHEET KEYNOTES

1. PREFINISHED METAL WALL PANEL SYSTEM - VERTICAL RIB PATTERN, COLOR 1.
2. PREFINISHED METAL WALL PANEL SYSTEM - HORIZONTAL RIB PATTERN, COLOR 2.
3. PREFINISHED METAL GUTTER.
4. ALUMINUM RAILING.
5. EXISTING CONCRETE FOUNDATION & SLAB.
6. ALUMINUM GRATED STAIRS & LANDING.
7. NOT USED.
8. GRADE, SEE CIVIL DRAWINGS.
9. EXISTING CONCRETE RAMP.
10. PREFINISHED METAL DOWNSPOUT.
11. REMOVABLE WINDOW FRAME SYSTEM.
12. REMOVABLE ALUMINUM GUARDRAIL.
13. LIGHT FIXTURE, SEE ELECTRICAL DRAWINGS.
14. CONCRETE SIDEWALK, SEE STRUCTURAL DRAWINGS.

6' 4' 2' 0' 5' 10'

3/16" = 1'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

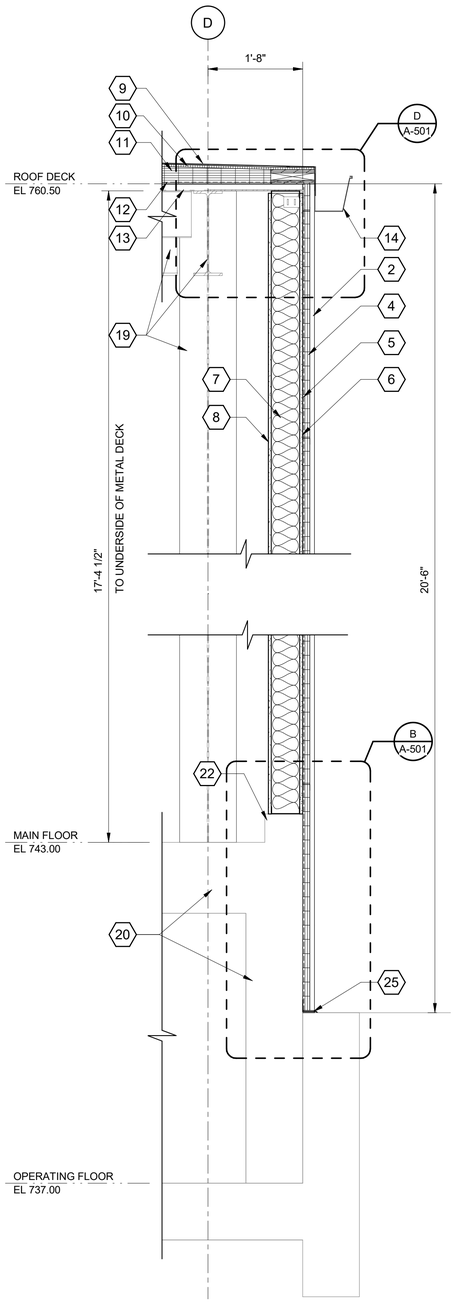
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
BUILDING ELEVATIONS

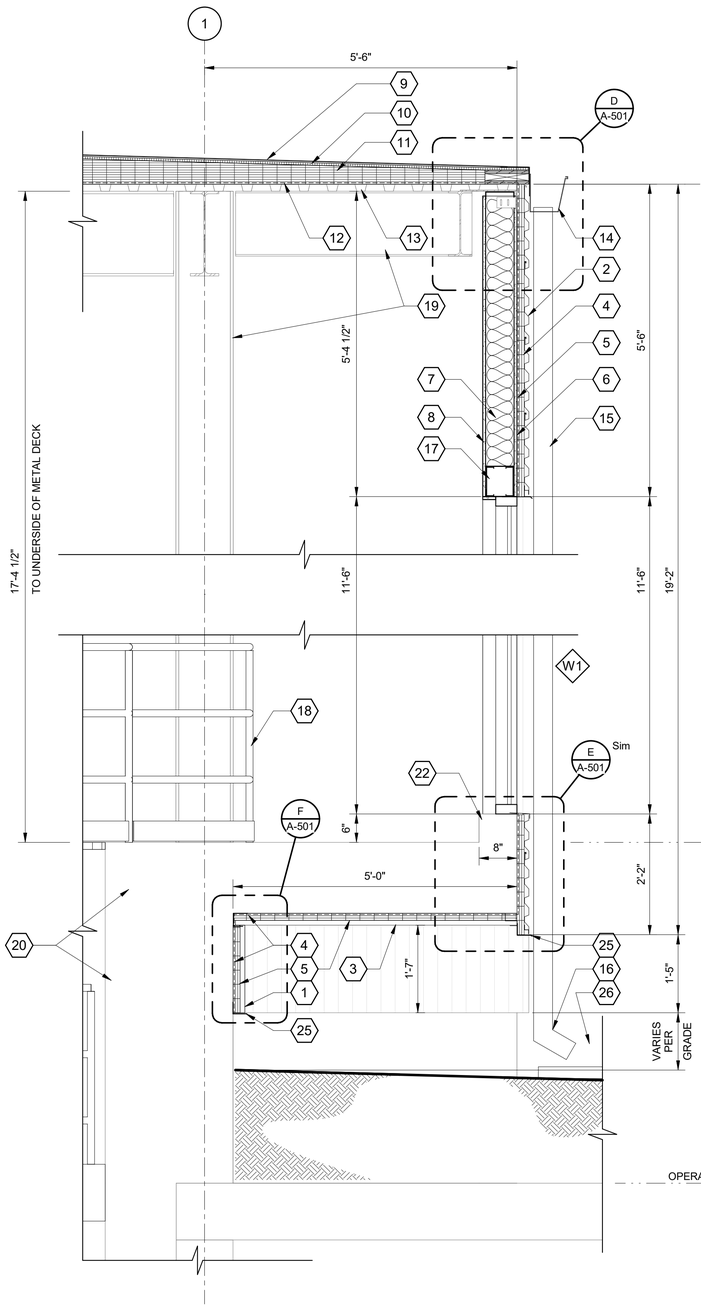
SC ALE 3/16" = 1'-0"

DRAWING No. A-201

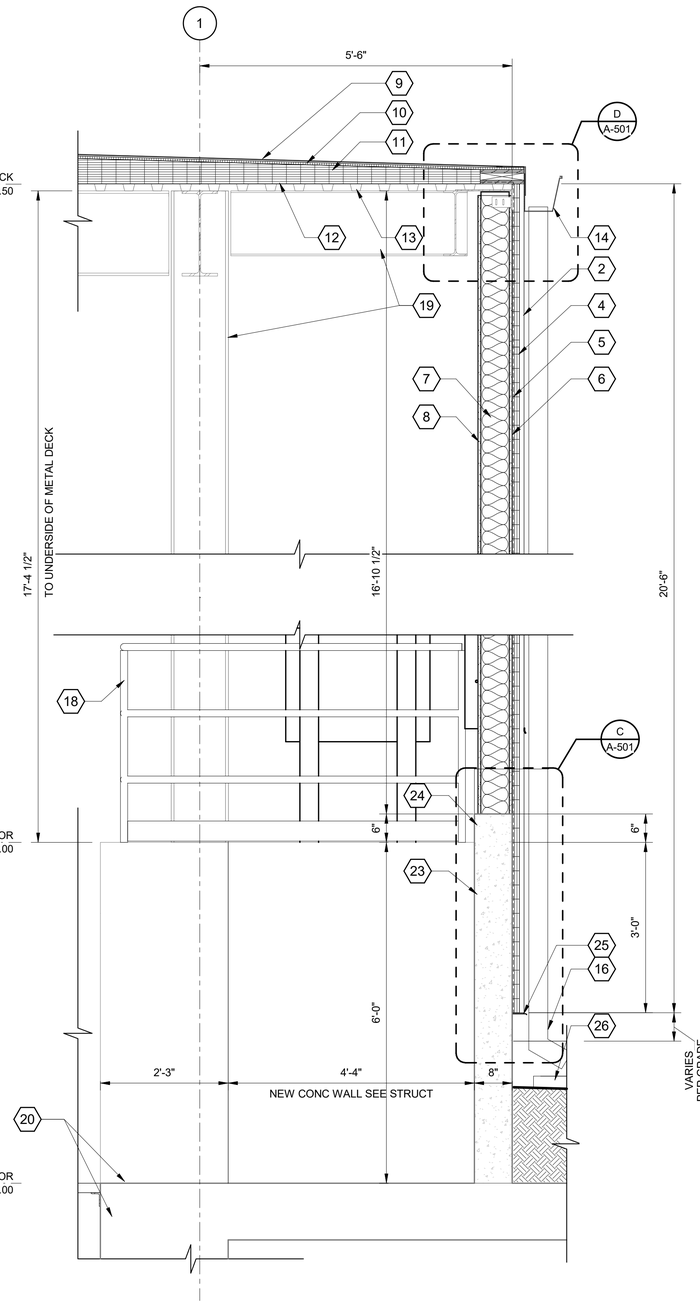
SHEET No. 12 OF 52



1 WALL SECTION
A-102 3/4" = 1'-0"



2 WALL SECTION
A-102 3/4" = 1'-0"



3 WALL SECTION
A-102 3/4" = 1'-0"

SHEET KEYNOTES

1. PREFINISHED METAL WALL PANEL - VERTICAL RIBBED PATTERN, COLOR 1.
2. PREFINISHED METAL WALL PANEL - HORIZONTAL RIBBED PATTERN, COLOR 2.
3. PREFINISHED METAL SOFFIT PANEL - VERTICAL RIBBED, COLOR 1.
4. 1-1/2" CONTINUOUS RIGID INSULATION (R-7.5) BETWEEN 1-1/2" Z-CHANNELS.
5. FLUID APPLIED VAPOR BARRIER.
6. 5/8" EXTERIOR GYPSUM SHEATHING, ALIGN WITH EXTERIOR FACE OF CONCRETE CURB.
7. 6" METAL STUD, SPACED 16" O.C. WITH (R-19) BATT INSULATION.
8. 5/8" TYPE X GYPSUM WALL BOARD WITH ABUSE, MOISTURE, AND MOLD RESISTANCE.
9. SINGLE-PLY ROOFING MEMBRANE.
10. 1/2" COVERBOARD.
11. TAPERED RIGID INSULATION (R-30 AVG.) MIN 3" AT EDGE OF ROOF.
12. VAPOR RETARDER.
13. METAL DECKING, SEE STRUCTURAL DRAWINGS.
14. PREFINISHED METAL GUTTER.
15. PREFINISHED METAL DOWNSPOUT.
16. PRECAST CONCRETE SPLASH BLOCK.
17. BOX BEAM HEADER.
18. ALUMINUM GUARDRAIL (SURFACE MOUNTED) W/ 4" TOE KICK.
19. METAL BUILDING FRAME, SEE STRUCTURAL DRAWINGS.
20. EXISTING CONCRETE SLAB & FOUNDATION.
21. EXISTING CONCRETE ACCESS RAMP.
22. EXISTING 6"H X 8"W CONCRETE CURB.
23. NEW 8" CONCRETE WALL, SEE STRUCTURAL DRAWINGS.
24. NEW 6"H X 8"W CONCRETE CURB, SEE STRUCTURAL DRAWINGS.
25. BASE FLASHING W/ DRIP EDGE.
26. FINISH GRADE.

12" 6" 0' 1' 2' 3'
3/4" = 1'-0"

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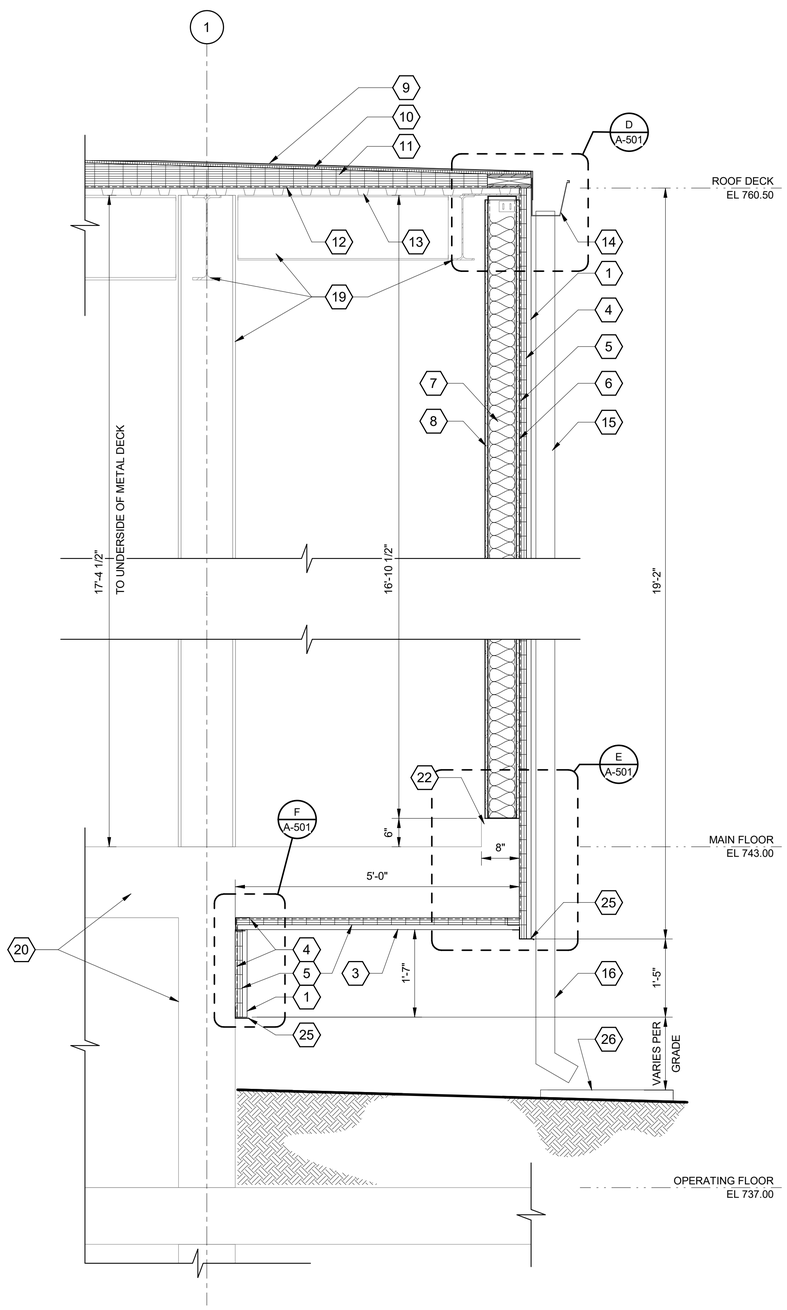
CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

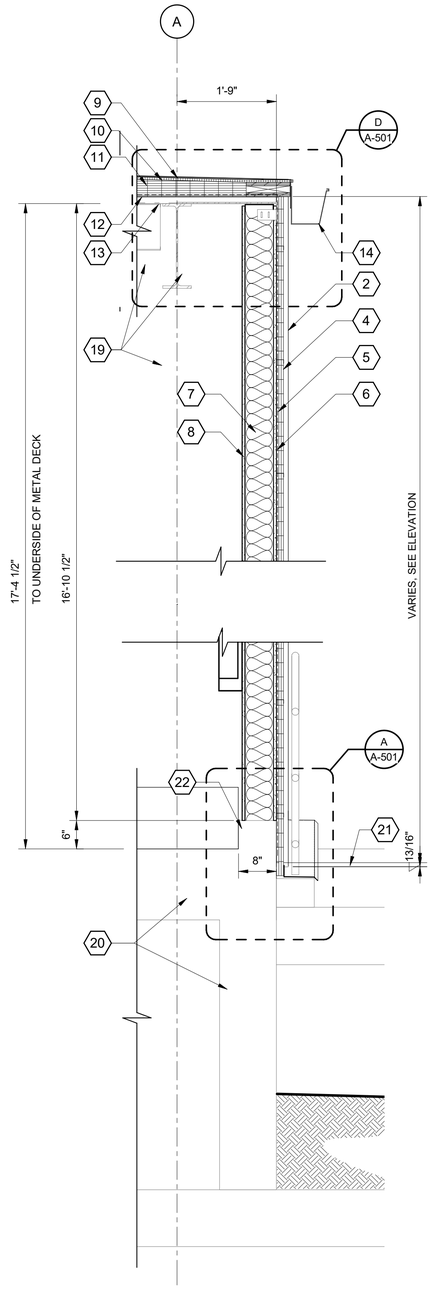
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
WALL SECTIONS SHEET 1 OF 2

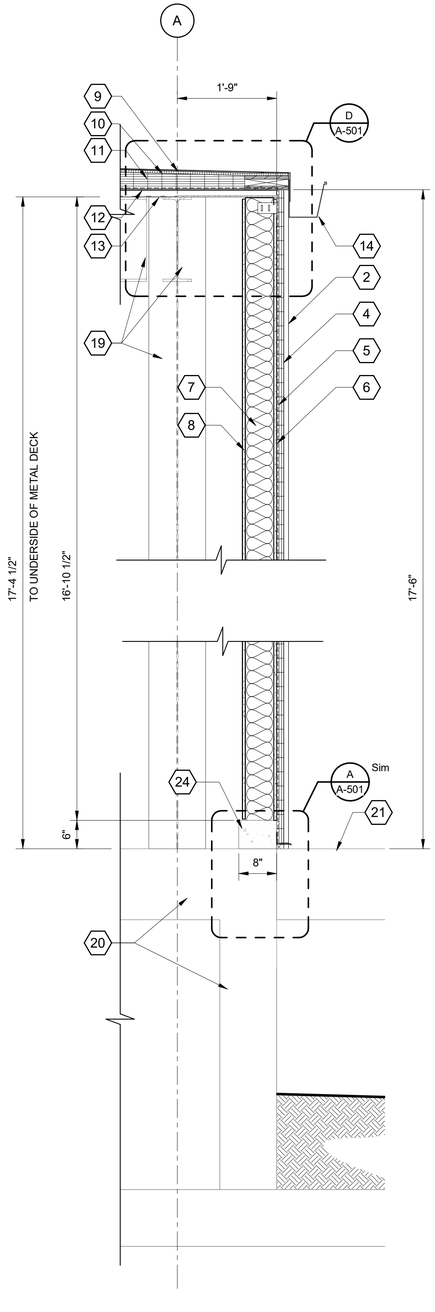
SCALE 3/4" = 1'-0"
DRAWING No. A-301
SHEET No. 13 OF 52



1 WALL SECTION
A-102 3/4" = 1'-0"



2 WALL SECTION
A-102 3/4" = 1'-0"



3 WALL SECTION
A-102 3/4" = 1'-0"

SHEET KEYNOTES

1. PREFINISHED METAL WALL PANEL - VERTICAL RIBBED PATTERN, COLOR 1.
2. PREFINISHED METAL WALL PANEL - HORIZONTAL RIBBED PATTERN, COLOR 2.
3. PREFINISHED METAL SOFFIT PANEL - VERTICAL RIBBED, COLOR 1.
4. 1-1/2" CONTINUOUS RIGID INSULATION (R-7.5) BETWEEN 1-1/2" Z-CHANNELS.
5. FLUID APPLIED VAPOR BARRIER.
6. 5/8" EXTERIOR GYPSUM SHEATHING, ALIGN WITH EXTERIOR FACE OF CONCRETE CURB.
7. 6" METAL STUD, SPACED 16" O.C. WITH (R-19) BATT INSULATION.
8. 5/8" TYPE X GYPSUM WALL BOARD WITH ABUSE, MOISTURE, AND MOLD RESISTANCE.
9. SINGLE-PLY ROOFING MEMBRANE.
10. 1/2" COVERBOARD.
11. TAPERED RIGID INSULATION (R-30 AVG.) MIN 3" AT EDGE OF ROOF.
12. VAP0R RETARDER.
13. METAL DECKING, SEE STRUCTURAL DRAWINGS.
14. PREFINISHED METAL GUTTER.
15. PREFINISHED METAL DOWNSPOUT.
16. PRECAST CONCRETE SPLASH BLOCK.
17. NOT USED.
18. NOT USED.
19. METAL BUILDING FRAME, SEE STRUCTURAL DRAWINGS.
20. EXISTING CONCRETE SLAB & FOUNDATION.
21. EXISTING CONCRETE ACCESS RAMP.
22. EXISTING 6"H X 8"W CONCRETE CURB.
23. NOT USED.
24. NEW 6"H X 8"W CONCRETE CURB, SEE STRUCTURAL DRAWINGS.
25. BASE FLASHING W/ DRIP EDGE.
26. FINISH GRADE.

12" 6" 0' 1' 2' 3'
3/4" = 1'-0"

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL

WALL SECTIONS SHEET 2 OF 2

SCALE 3/4" = 1'-0"

DRAWING No. A-302

SHEET No. 14 OF 52

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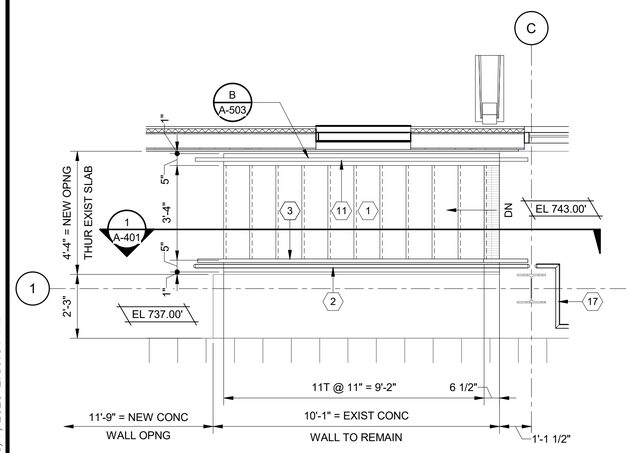
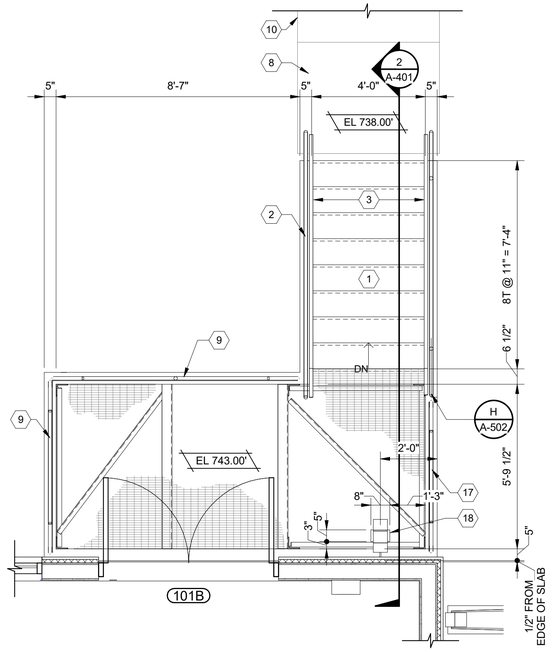
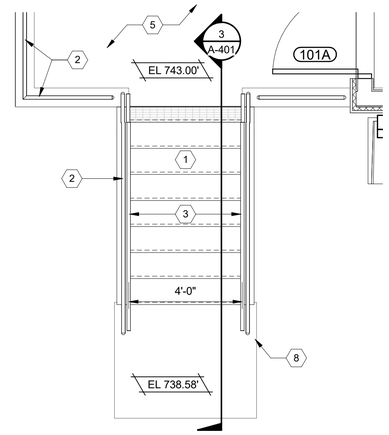


A ENLARGED STAIR PLAN
A-102 3/8" = 1'-0"



B ENLARGED STAIR PLAN
A-102 3/8" = 1'-0"



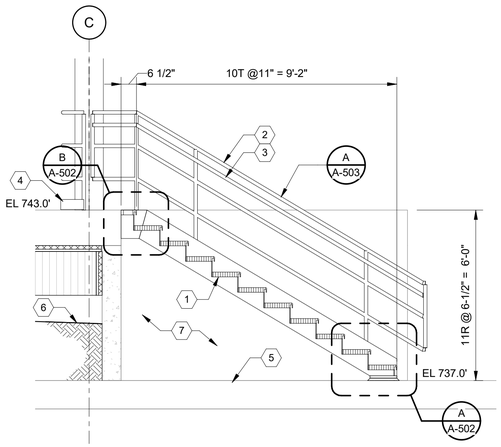
C ENLARGED STAIR PLAN
A-102 3/8" = 1'-0"

GENERAL SHEET NOTES

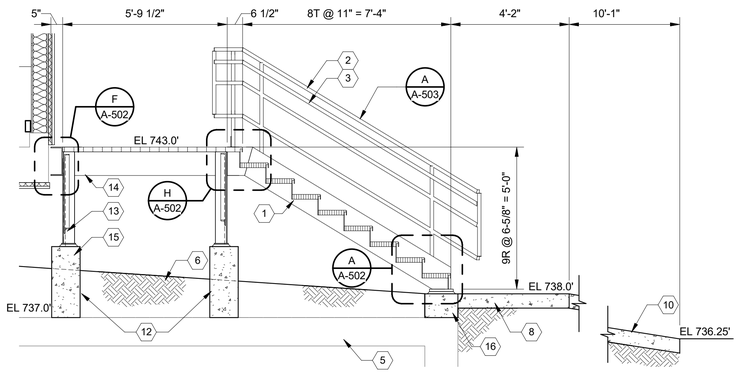
1. REFER TO SHEET A-102 FOR ARCHITECTURAL ABBREVIATION & SYMBOL LEGEND.
2. DIMENSIONS ARE INDICATED FROM THE OUTSIDE FACE OF EXISTING CONCRETE CURB. PLEASE NOTIFY ENGINEER OF ANY DISCREPANCIES.
3. FOR STAIR DETAILS, SEE SHEET A-502

SHEET KEYNOTES

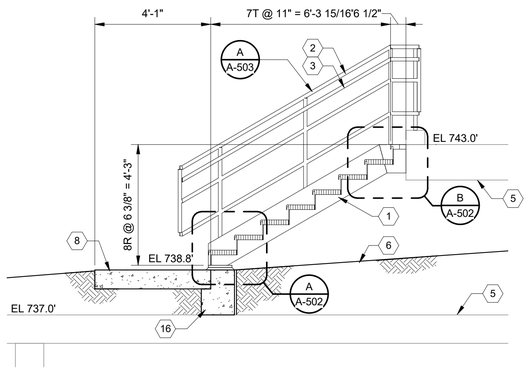
1. ALUMINUM GRATING STAIRS.
2. TOP MOUNTED ALUMINUM GUARDRAIL W/O TOE KICK.
3. ALUMINUM HANDRAIL.
4. 4" TOE KICK.
5. EXISTING CONCRETE SLAB.
6. EXISTING GRADE.
7. EXISTING CONCRETE WALL (BEYOND).
8. NEW CONCRETE STOOP, SEE STRUCTURAL DRAWINGS.
9. TOP MOUNTED REMOVABLE ALUMINUM GUARDRAIL W/ TOE KICK.
10. NEW CONCRETE SIDEWALK, SEE STRUCTURAL DRAWINGS.
11. WALL MOUNTED ALUMINUM HANDRAIL.
12. CONCRETE PEDESTAL, SEE STRUCTURAL DRAWINGS.
13. L2X2 BRACING, TYP ALL 4 SIDES OF PLATFORM.
14. ALUMINUM C10 CHANNEL.
15. L5X5 POST, TYP.
16. CONCRETE STEM WALL, SEE STRUCTURAL DRAWINGS.
17. TOP MOUNTED ALUMINUM GUARDRAIL W/ TOE KICK.
18. 8" X 5" OPENING IN STAIR LANDING TO ALLOW DOWNSPOUT TO PASS THROUGH.



1 SECTION
A-401 3/8" = 1'-0"



2 SECTION
A-401 3/8" = 1'-0"



3 SECTION
A-401 3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
STAIR PLANS & SECTIONS

SCALE 3/8" = 1'-0"
DRAWING No. A-401
SHEET No. 15 OF 52

Plot Date: 9/7/2023 2:56:04 PM
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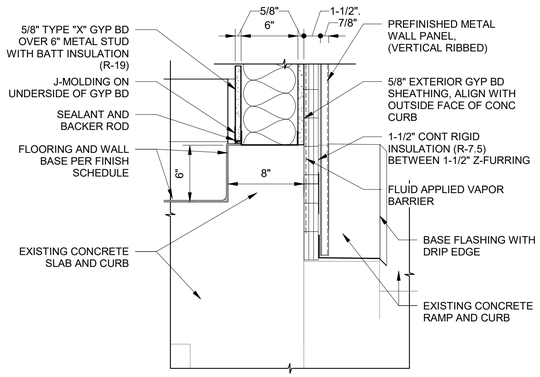
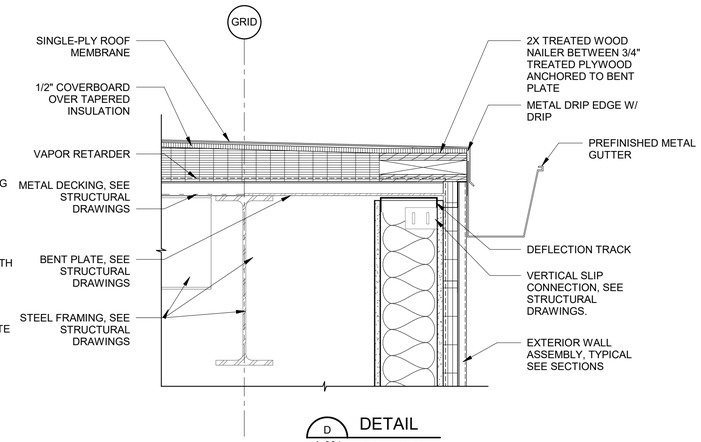
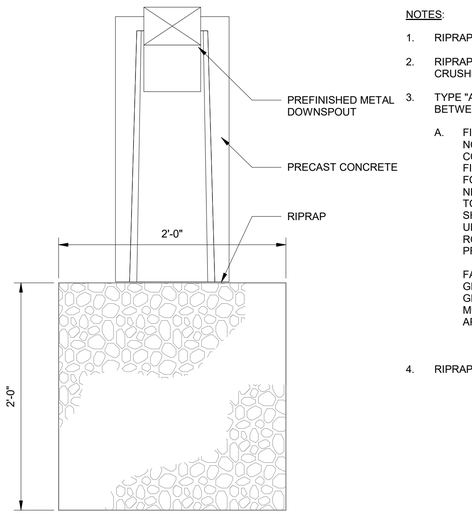


A DETAIL
A-302 1 1/2" = 1'-0"



D DETAIL
A-301 1 1/2" = 1'-0"

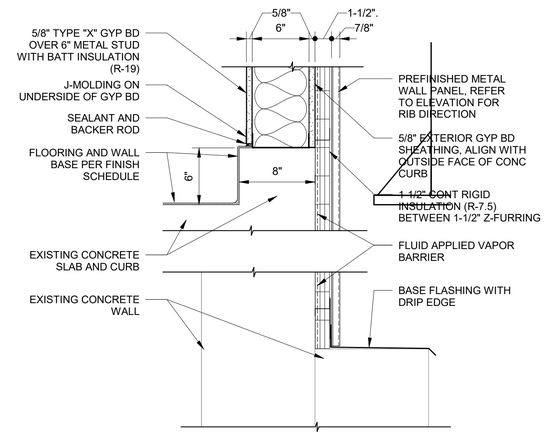


NOTES:

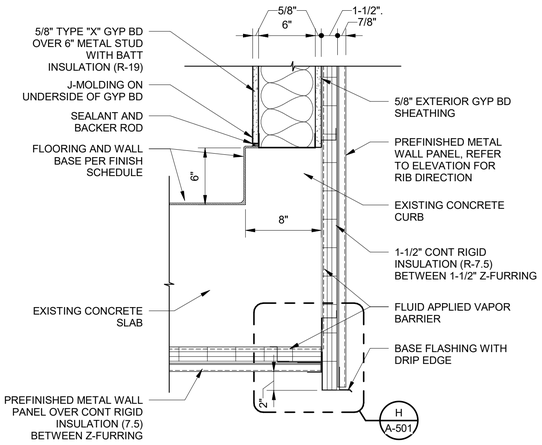
1. RIPRAP SHALL BE A MINIMUM FO 6 INCHES DEEP.
2. RIPRAP SHALL BE 2" - 3" DIAMETER, CRUSHED/COARSE ROCK WITH NO FINES.
3. TYPE "A" FILTER FABRIC SHALL BE PLACED BETWEEN THE RIPRAP AND NATIVE SOIL.
   A. FILTER FABRIC TYPE "A" SHALL BE NONWOVEN FABRIC CONSISTING OF ONLY CONTINUOUS CHAINS OF POLYMERIC FILAMENTS OR YARNS OF POLYESTER FORMED INTO A STABLE NETWORK BY NEEDLE PUNCHING. FABRIC SHALL BE INERT TO COMMONLY ENCOUNTERED CHEMICALS; SHALL BE RESISTANT TO MILDEW, ROT, ULTRAVIOLET LIGHT, INSECTS, AND RODENTS; AND SHALL MEET THE MINIMUM PROPERTIES AS INDICATED BELOW.

   FABRIC WEIGHT: ASTM D3776 - 5.7 oz/yd2
   GRAB STRENGTH: ASTM D4632 - 155 lbs
   GRAB ELONGATION: ASTM D4632 - 50%
   MULLEN BURST STRENGTH: ASTM D3786 - 190 psi
   APPARENT OPENING SIZE: CW-02215 - 70 US STANDARD SIEVE SIZE*
   * MININUM AVERAGE ROLL VALUE IN WEAKEST PRINCIPLE DIRECTION.
4. RIPRAP SHALL BE PLACED AT ALL SPLASHBLOCKS.

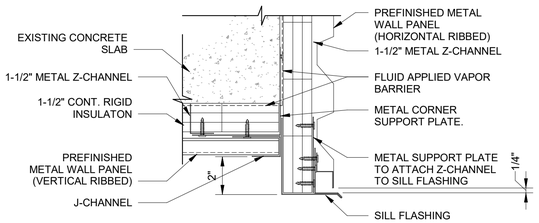
G DETAIL
1 1/2" = 1'-0"



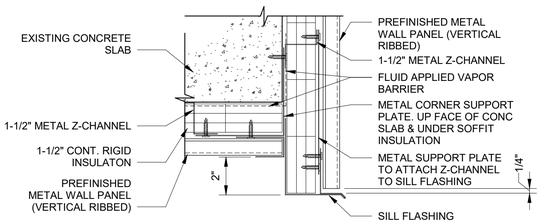
B DETAIL
A-301 1 1/2" = 1'-0"



E DETAIL
A-301 1 1/2" = 1'-0"

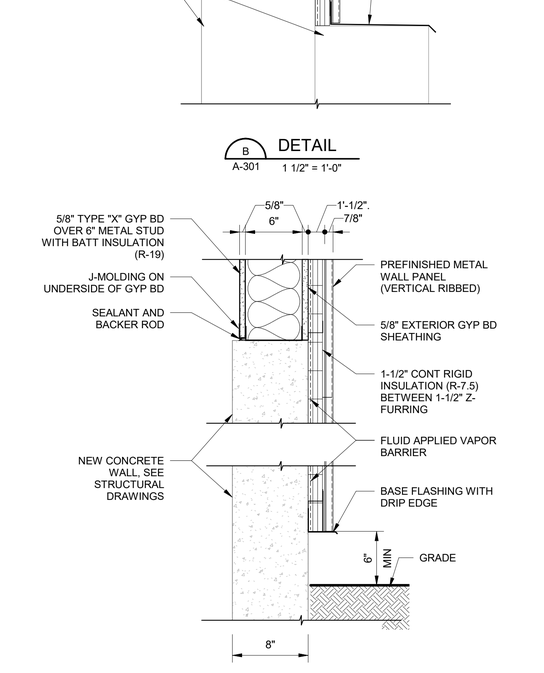


CANTILEVERED SLAB OUTSIDE CORNER HORIZONTAL RIBBED SILL DETAIL

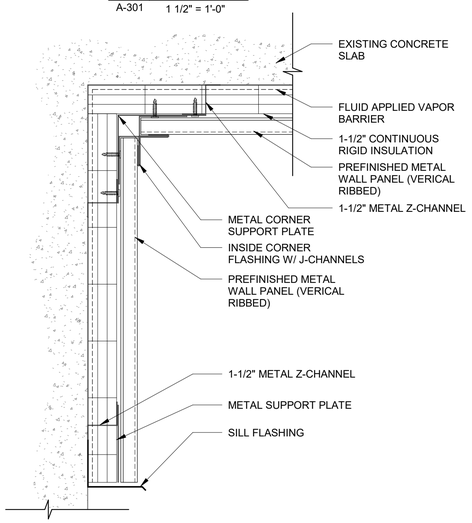


CANTILEVERED SLAB OUTSIDE CORNER VERTICAL RIBBED SILL DETAIL

H DETAIL
A-501 3" = 1'-0"



C DETAIL
A-301 1 1/2" = 1'-0"



F DETAIL
A-301 3" = 1'-0"

12" 9" 6" 3" 0" 1'
1 1/2" = 1'-0"

12" 9" 6" 3" 0"
3" = 1'-0"

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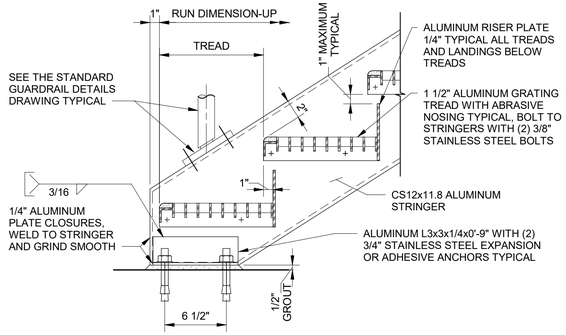
CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

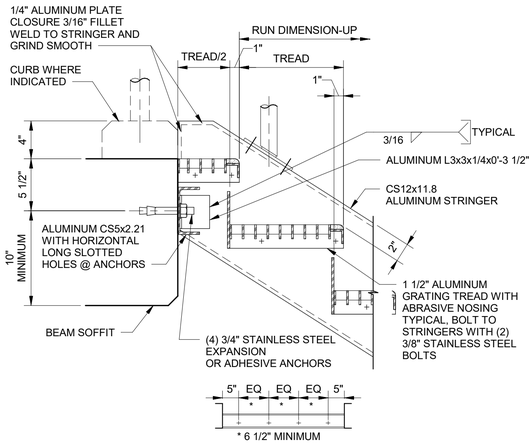
ARCHITECTURAL
MISCELLANEOUS DETAILS

SCALE: As indicated
DRAWING No.: A-501

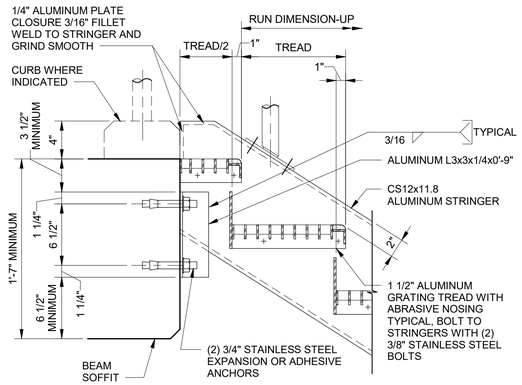
SHEET No.
16 OF 52



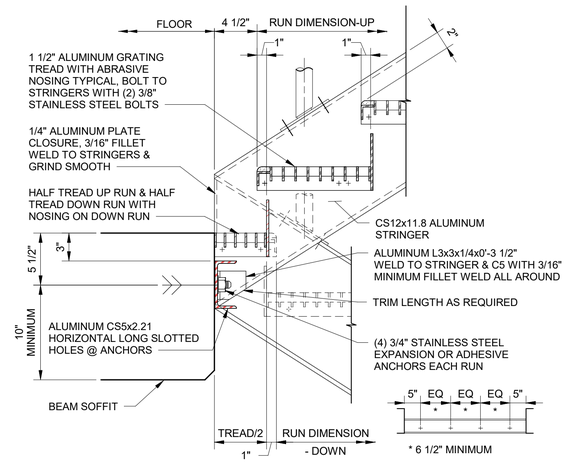
A DETAIL
A-401 1 1/2" = 1'-0"



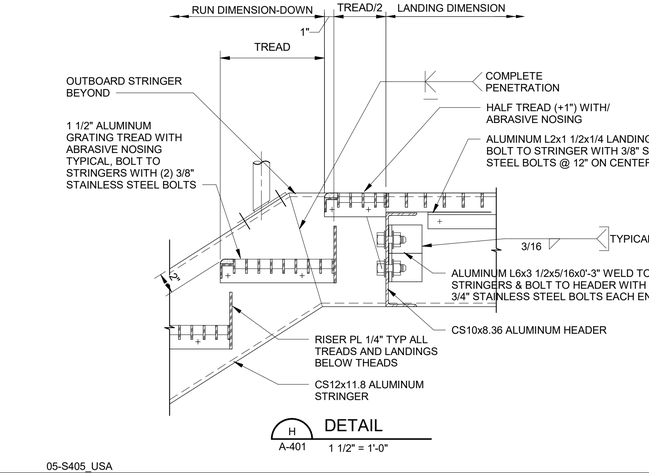
B DETAIL
A-401 1 1/2" = 1'-0"



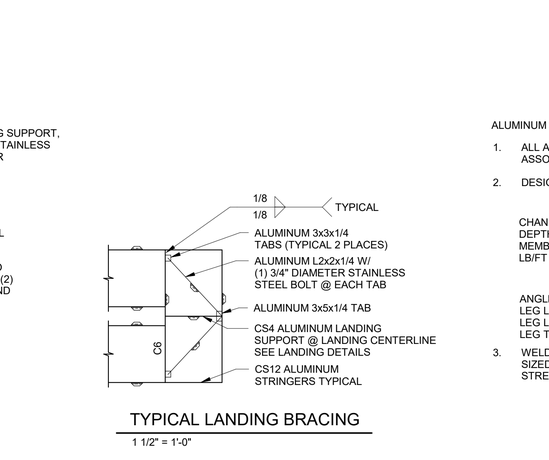
BB ALTERNATE DETAIL
1 1/2" = 1'-0"



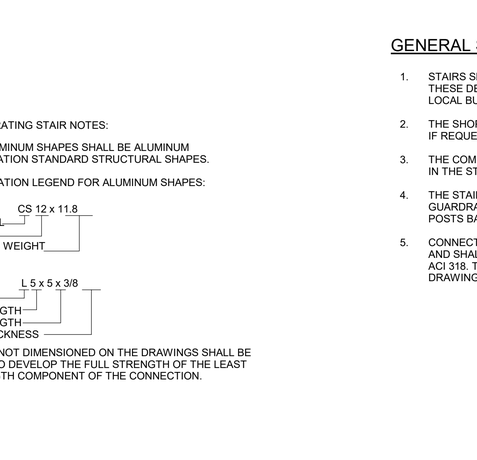
C DETAIL
1 1/2" = 1'-0"



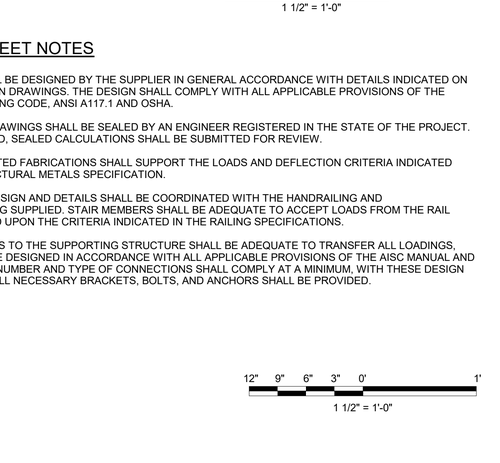
D DETAIL
1 1/2" = 1'-0"



E DETAIL
1 1/2" = 1'-0"



F DETAIL
A-401 1 1/2" = 1'-0"



G DETAIL
1 1/2" = 1'-0"

H DETAIL
A-401 1 1/2" = 1'-0"

TYPICAL LANDING BRACING
1 1/2" = 1'-0"

ALUMINUM GRATING STAIR NOTES:

1. ALL ALUMINUM SHAPES SHALL BE ALUMINUM ASSOCIATION STANDARD STRUCTURAL SHAPES.
2. DESIGNATION LEGEND FOR ALUMINUM SHAPES:

CS 12 x 11.8
CHANNEL
DEPTH
MEMBER WEIGHT LB/FT

L 5 x 5 x 3/8
ANGLE
LEG LENGTH
LEG LENGTH
LEG THICKNESS

3. WELDS NOT DIMENSIONED ON THE DRAWINGS SHALL BE SIZED TO DEVELOP THE FULL STRENGTH OF THE LEAST STRENGTH COMPONENT OF THE CONNECTION.

GENERAL SHEET NOTES

1. STAIRS SHALL BE DESIGNED BY THE SUPPLIER IN GENERAL ACCORDANCE WITH DETAILS INDICATED ON THESE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE, ANSI A117.1 AND OSHA.
2. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, SEALED CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. THE COMPLETED FABRICATIONS SHALL SUPPORT THE LOADS AND DEFLECTION CRITERIA INDICATED IN THE STRUCTURAL METALS SPECIFICATION.
4. THE STAIR DESIGN AND DETAILS SHALL BE COORDINATED WITH THE HANDRAILING AND GUARDRAILING SUPPLIED. STAIR MEMBERS SHALL BE ADEQUATE TO ACCEPT LOADS FROM THE RAIL POSTS BASED UPON THE CRITERIA INDICATED IN THE RAILING SPECIFICATIONS.
5. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE AISC MANUAL AND ACI 318. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY BRACKETS, BOLTS, AND ANCHORS SHALL BE PROVIDED.

12" 9" 6" 3" 0" 1'
1 1/2" = 1'-0"

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

REV.	DESCRIPTION	DATE	DRAWN	CHECKED
	100% ISSUE FOR BID/PERMITTING	SEPT 2023	RNP	JAB

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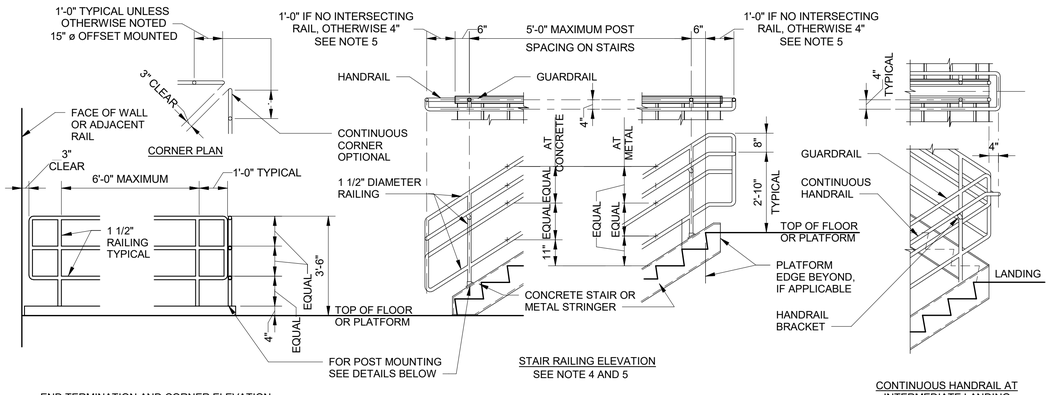
CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

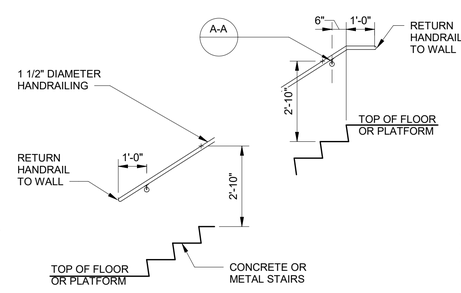
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
STAIR DETAILS

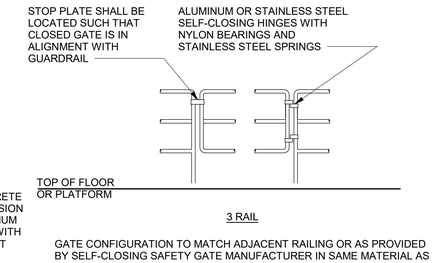
SCALE 1 1/2" = 1'-0"
DRAWING No. A-502
SHEET No. 17 OF 52



A THREE RAIL GUARDRAIL
3/8" = 1'-0"



B WALL MOUNTED HANDRAIL
3/8" = 1'-0"

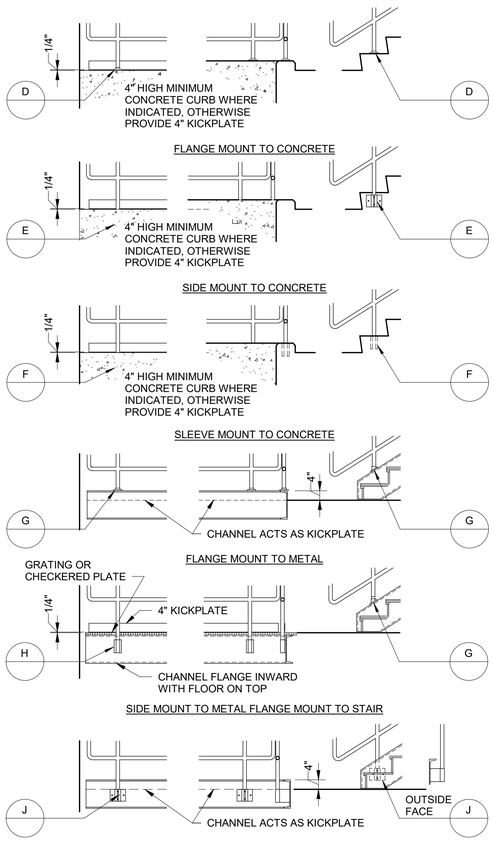


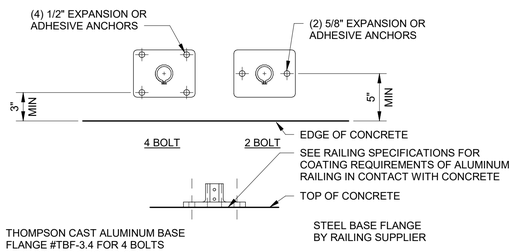
GATE CONFIGURATION TO MATCH ADJACENT RAILING OR AS PROVIDED BY SELF-CLOSING SAFETY GATE MANUFACTURER IN SAME MATERIAL AS GUARDRAIL. SWING GATE INWARD WITH HINGES LOCATED TO PROVIDE LEAST OBSTRUCTION TO ACCESS.

C SELF-CLOSING SWING GATE
3/8" = 1'-0"

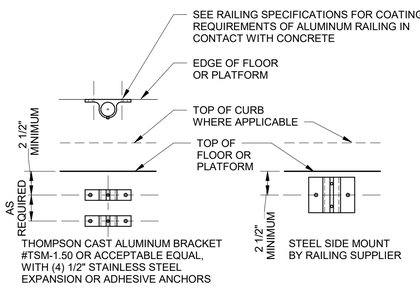
GENERAL SHEET NOTES

1. RAILING MATERIAL AND FABRICATION SHALL BE AS INDICATED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS FOR HANDRAILING AND GUARDRAILING.
2. ALL RAILING AND MOUNTINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH THE MOST STRINGENT REQUIREMENTS OF THE RAILING SPECIFICATIONS, THE APPLICABLE LOCAL BUILDING CODE AND ALL PERTINENT OSHA AND LOCAL SAFETY REGULATIONS. RAILING SHOP DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF MICHIGAN IF REQUESTED SEALED CALCULATION SHALL BE SUBMITTED.
3. GUARDRAIL AND HANDRAIL SHALL BE DESIGNED AND FABRICATED IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
4. GUARDRAIL MAY BE REPLACED WITH WALL MOUNTED HANDRAIL AT STAIR EDGES AND STRINGERS LOCATED ADJACENT TO WALLS. IF THE OUTSIDE EDGE OF THE STAIR STRINGER IS MORE THAN 3" FROM THE WALL FACE, GUARDRAIL SHALL BE USED.
5. THE INBOARD HANDRAILING AT SWITCHBACK STAIR LANDINGS MUST BE CONTINUOUS FROM ONE STAIR RUN TO THE NEXT. ADJUST INDICATED DIMENSION AS REQUIRED TO ALIGN AND CONNECT RAILINGS OVER THE LANDING EDGE.
6. THE GUARDRAIL AND HANDRAIL CONFIGURATIONS ON THIS SHEET WILL NOT SATISFY ADA REQUIREMENTS FOR HANDICAPPED ACCESSIBILITY. AT LOCATIONS ON THE DESIGN DRAWINGS WHERE CONFORMANCE WITH ADA REQUIREMENTS IS SPECIFICALLY NOTED, THE RAILING SUPPLIER SHALL MODIFY THE CONFIGURATIONS TO COMPLY WITH THE MOST STRINGENT REQUIREMENTS OF ANSI 117.1 UNIFORM FEDERAL ACCESSIBILITY STANDARDS AND THE ACCESSIBILITY STANDARDS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
7. AT LOCATIONS SPECIFICALLY INDICATED AS REMOVABLE RAILING, GUARDRAILING AND MOUNTING DETAILS SHALL BE MODIFIED AS FOLLOWS:
   * RAILING SHALL BE DETAILED IN SHORT LENGTHS THAT WEIGH NO MORE THAN 50 LBS. EACH PIECE SHALL INCLUDE AT LEAST 2, BUT NOT MORE THAN 3 POSTS. RAIL ENDS SHALL BE TERMINATED SIMILAR TO THE END TERMINATION DETAILS THIS SHEET.
   * MOUNTING DETAILS SHALL BE MODIFIED TO PERMIT RAILING PIECES TO BE REMOVED AND REINSTALLED WITHOUT USE OF TOOLS.

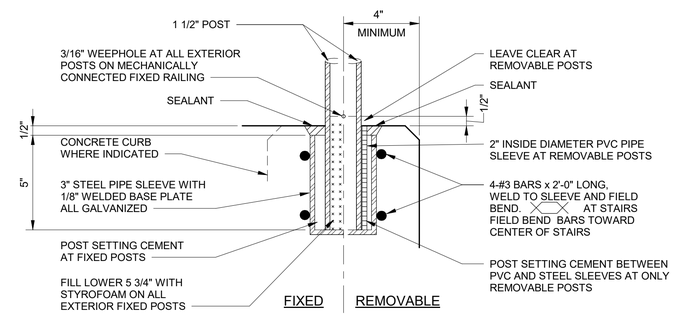




D BASE FLANGE MOUNT
1 1/2" = 1'-0"



E SIDE MOUNT
1 1/2" = 1'-0"



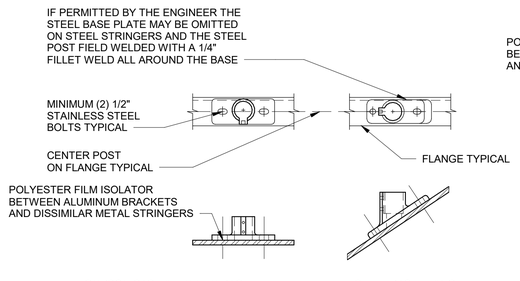
NOTES:

1. FIXED AND REMOVABLE DETAILS SIMILAR EXCEPT AS NOTED.
2. THE REMOVABLE SLEEVE MOUNT DETAIL SHALL NOT BE USED IN WET LOCATIONS SUBJECT TO FREEZING. SUBSTITUTE A REMOVABLE BASE FLANGE OR SIDE MOUNT DETAIL.

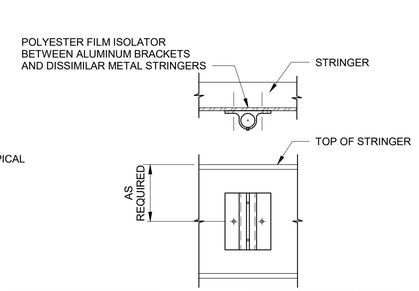
F SLEEVE MOUNT
3" = 1'-0"

POST MOUNTED TO CONCRETE

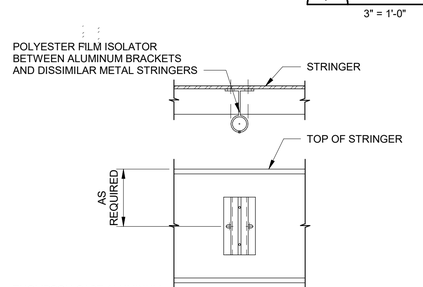
POST MOUNTED TO METAL



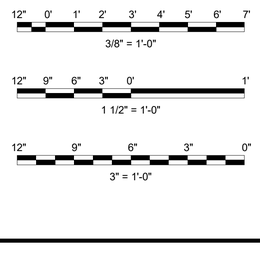
G BASE FLANGE MOUNT
1 1/2" = 1'-0"



H SIDE MOUNT
1 1/2" = 1'-0"



J OFFSET SIDE MOUNT
1 1/2" = 1'-0"



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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

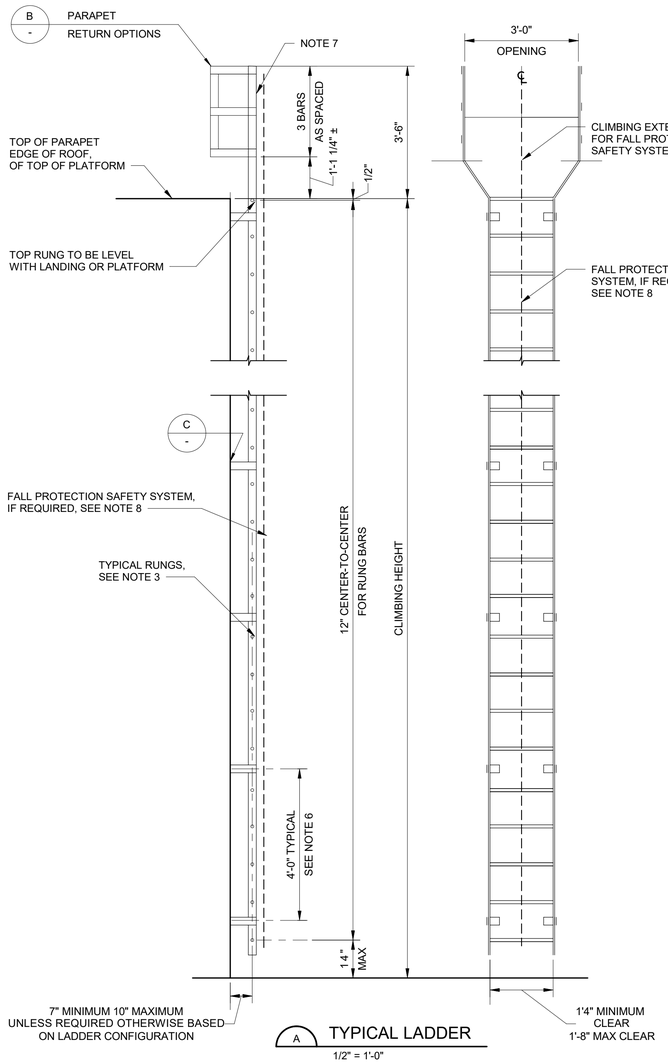
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL RAILING DETAILS

SC ALE: As indicated

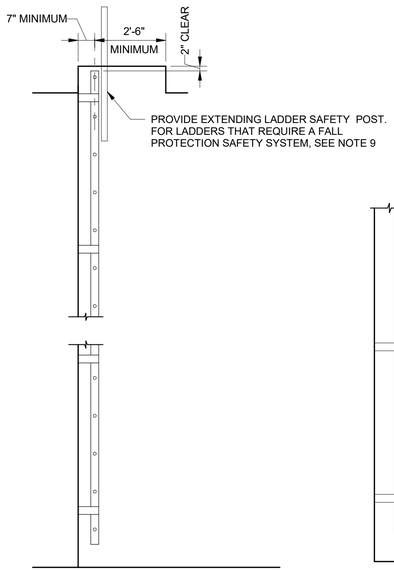
DRAWING No.: A-503

SHEET No.: 18 OF 52



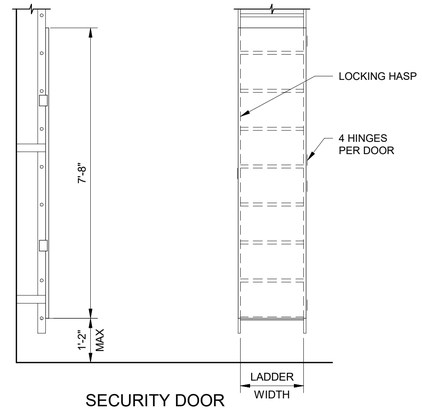
A TYPICAL LADDER

1/2" = 1'-0"



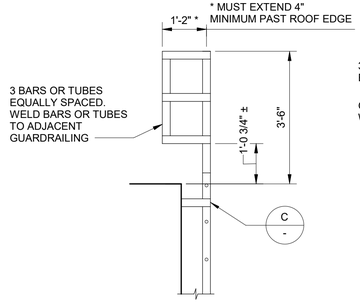
UNDER HATCH

3/8" = 1'-0"



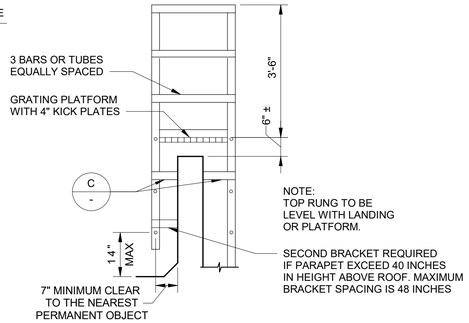
SECURITY DOOR

1/2" = 1'-0"



DEFAULT OPTION 1

MINIMUM RETURN
TO ROOF



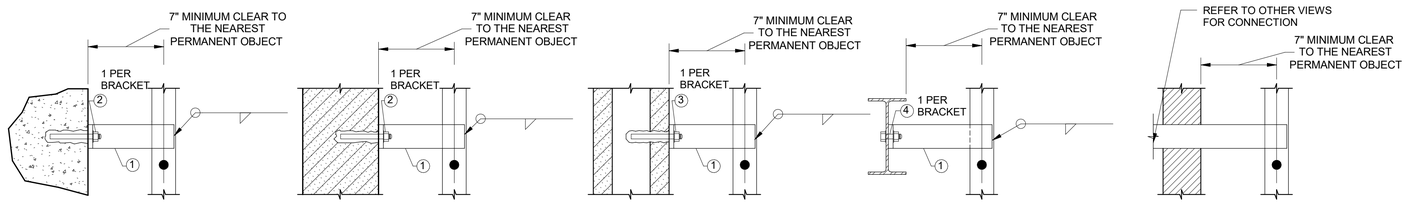
OPTION 2

RETURN TO REAR OF
PARAPET WITH
CROSSOVER PLATFORM

B PARAPET RETURN OPTIONS

1/2" = 1'-0"

USE OPTION 1 IF NONE INDICATED



1. LADDER BRACKET BY LADDER SUPPLIER; WITH HOLES FOR CONNECTION TO STRUCTURE. ADJUSTABLE BRACKETS SHALL BE PROVIDED WHERE REQUIRED TO COMPENSATE FOR IRREGULAR OR OFFSET WALL SURFACES.
2. 1/2" MIN STAINLESS STEEL ADHESIVE OR EXPANSION ANCHORS. MINIMUM EMBEDMENT PER THE ANCHOR MANUFACTURER'S ICC-ES REPORT.
3. 1/2" MIN DIAMETER STAINLESS STEEL ADHESIVE ANCHORS WITH SCREEN TUBES. MINIMUM EMBEDMENT PER THE ANCHOR MANUFACTURER'S ICC-ES REPORT.
4. IF LADDER IS PAINTED OR GALVANIZED STEEL, USE 3/4" GALVANIZED STEEL. USE 3/4" MIN GALVANIZED HIGH STRENGTH STEEL BOLTS WITH COMPATIBLE NUT AND WASHERS. IF LADDER IS STAINLESS STEEL OR ALUMINUM, USE 3/4" MIN STAINLESS STEEL BOLTS WITH COMPATIBLE NUTS AND WASHERS.

C TYPICAL LADDER BRACKET CONNECTIONS

1/2" = 1'-0"

GENERAL SHEET NOTES

1. ALL LADDERS AND FALL PROTECTION SAFETY SYSTEM SHALL BE DESIGNED AND FABRICATED BY THE LADDER SUPPLIER IN CONFORMANCE WITH THE LATEST ISSUE OF OSHA/ANSI A14.3, SECTION 1910.27 APPLICABLE BUILDING CODE STANDARDS FOR FIXED WALL LADDERS, AND THE REQUIREMENTS OF THE CONTRACT DRAWINGS AND SPECIFICATIONS. GENERAL CONFIGURATION AND DETAILS SHALL CONFORM WITH THIS DRAWING.
2. LADDER AND ALL APPURTENANCES TO BE MATERIAL AS NOTED ON DRAWINGS. COORDINATE MATERIALS AND FABRICATION WITH THE SPECIFICATIONS FOR METAL FABRICATIONS AND FIBERGLASS, AS APPLICABLE.
   ALUMINUM - ASTM A6061-T6 ALLOY WITH MILL FINISH UNLESS NOTED OTHERWISE.
3. LADDER RUNGS TO BE MIN 1" DIAMETER BARS OR PREFABRICATED FLAT TOP LADDER TREADS WITH MINIMUM 1" WIDE SLIP RESISTANT SURFACES. SPACE RUNGS AT 12". LADDER SIDE RAILS SHALL BE FLAT STOCK.
4. FURNISH LADDERS IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
5. LADDER SHOP DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, CALCULATIONS OR TEST REPORTS VERIFYING THE LADDERS COMPLIANCE WITH APPLICABLE STANDARDS SHALL BE SUBMITTED, AND SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT.
6. IF A LADDER CONFIGURATION INDICATED ON THE DRAWINGS REQUIRES THAT THE LADDER SPAN A GREATER DISTANCE BETWEEN SUPPORTS THAN INDICATED ON THE TYPICAL DETAILS, THE LADDER SUPPLIER SHALL DESIGN THE LADDER, THE LADDER BRACKET, AND THE LADDER BRACKET CONNECTIONS FOR THE INDICATED SPAN IN ACCORDANCE WITH NOTE 1 ABOVE. THE BRACKET CONNECTIONS SHALL BE AT LEAST EQUAL TO THE TYPICAL CONNECTIONS INDICATED.
7. IF INTERRUPTION OF GUARDRAIL IS REQUIRED, SEE SELF-CLOSING SWING GATE DETAIL ON STANDARD GUARDRAIL DRAWING. SELF-CLOSING GATES SHALL BE UTILIZED AT ALL LADDER ENTRANCES EXCEPT LANDING (REST) PLATFORMS FOR CONTINUOUS LADDER CLIMBS.
8. A FALL PROTECTION SAFETY SYSTEM SHALL BE PROVIDED ON LADDERS AS INDICIATED IN THE DRAWINGS AND WHERE THE LENGTH OF CLIMBING IS MORE THAN 24 FEET OR WHERE THE LENGTH OF CLIMB IS LESS THAN 24 FEET, BUT THE TOP OF THE LADDER IS MORE THAN 24 FEET ABOVE GROUND LEVEL, FLOOR OR ROOF. THE LADDER FALL PROTECTION SAFETY SYSTEM SHALL BE OSHA APPROVED. LADDER AND ANCHORAGES SHALL BE DESIGNED TO SUPPORT OSHA REQUIRED FALL PROTECTION LOADS AND ANY LOADS INDICATED IN THE FALL PROTECTION SAFETY SYSTEM'S PRODUCT LITERATURE.
9. WHERE A FALL PROTECTION SAFETY SYSTEM IS REQUIRED AND THE LADDER TERMINATES BELOW AN ACCESS HATCH, THE FALL PROTECTION SAFETY SYSTEM SHALL INCORPORATE A TELESCOPING ANCHOR EXTENSION WHICH IS INTEGRAL WITH THE SAFETY SYSTEM. THE TELESCOPING ANCHOR EXTENSION SHALL REPLACE THE REQUIREMENT FOR THE EXTENDING LADDER SAFETY POST.

12' 6' 0' 1' 2' 3' 4' 5'

1/2" = 1'-0"

05-S400_USA

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
LADDER DETAILS

SCALE: As indicated

DRAWING No. A-504

SHEET No. 19 OF 52

ROOM FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR		WALLS												CEILING			REMARKS
				NORTH			EAST			SOUTH			WEST						
		MATRL	FINISH	MATRL	FINISH	BASE	MATRL	FINISH	BASE	MATRL	FINISH	BASE	MATRL	FINISH	BASE	MATRL	FINISH	HEIGHT	
101	UV DISINFECTION ROOM	CO	EPF	GWB	EP	IEB	GWB	EP	IEB	GWB	EP	IEB	GWB	EP	IEB	EXP	EP	17'-2 1/2"	EP ALL EXPOSED STEEL COLUMNS & BEAMS

GLAZING SCHEDULE

GLAZING TYPE (G)	DESCRIPTION
G1	1 INCH INSULATED SAFETY GLAZING

ARCHITECTURAL ABBREVIATIONS

ALUM	- ALUMINUM
CO	- CONCRETE
EP	- EPOXY PAINT
EPF	- EPOXY POURED FLOORING
EX	- EXISTING
EXP	- EXPOSED CONSTRUCTION
FF	- FACTORY FINISH
FS	- FLOOR SEALER
GWB	- GYPSUM WALLBOARD
IEB	- INTEGRAL EPOXY BASE
HM	- HOLLOW METAL
PR	- PAIR
PT	- PAINTED

DOOR SCHEDULE (D)

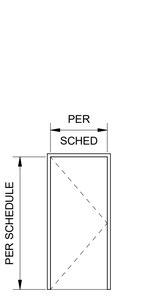
LEVEL	DOOR NO. (D)		DOOR SIZE		DOOR								FRAME					REMARKS
							DETAILS			GLAZING					DIMENSIONS			
			WIDTH	HEIGHT	TYPE (D)	MATERIAL	HEAD	JAMB	SILL	TYPE (G)	HDWR	RATING	TYPE (F)	MATERIAL	HEAD	WIDTH	DEPTH	
MAIN FLOOR	101A		3'-0"	7'-0"	D1	HM	1	2	3	--	01	--	F1	HM	2"	2"	5 3/4"	CARD READER
MAIN FLOOR	101B	PR	3'-0"	8'-0"	D1	HM	1	2	4	--	02	--	F1	HM	2"	2"	5 3/4"	CARD READER

WINDOW SCHEDULE (W)

LEVEL	QTY	TYPE (W)	OPENING		WINDOW								COMMENTS
							DETAILS				GLAZING	TOP ELEV	
			WIDTH	HEIGHT	FRAME DEPTH	MATERIAL	HEAD	JAMB	MULL	SILL	TYPE (G)	AFF	
MAIN FLOOR	5	W1	8'-0"	11'-6"	4 1/2"	ALUM	5	6	7	8	G1	12'-0"	REMOVABLE WINDOW FRAMES

LOUVER SCHEDULE (L)

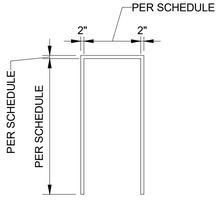
LEVEL	LOUVER NO. (L)	OPENING		LOUVER					REMARKS
		WIDTH	HEIGHT	TYPE	HEAD	JAMB	SILL	TOP ELEV AFF	
MAIN FLOOR	101A	3'-4"	3'-4"	ALUM	9	10	11	5'-4"	
MAIN FLOOR	101B	3'-4"	3'-4"	ALUM	9	10	11	5'-4"	
MAIN FLOOR	101C	3'-4"	3'-4"	ALUM	9	10	11	5'-4"	
MAIN FLOOR	101D	3'-4"	3'-4"	ALUM	9	10	11	11'-4"	
MAIN FLOOR	101E	3'-4"	3'-4"	ALUM	9	10	11	11'-4"	
MAIN FLOOR	101F	3'-4"	3'-4"	ALUM	9	10	11	11'-4"	



D1

DOOR TYPES

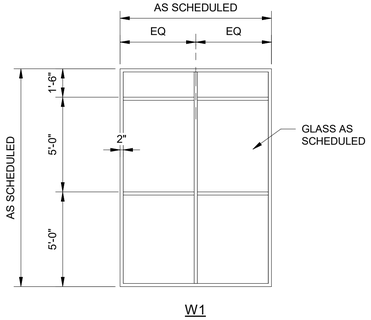
1/4" = 1'-0"



F1

FRAME TYPES

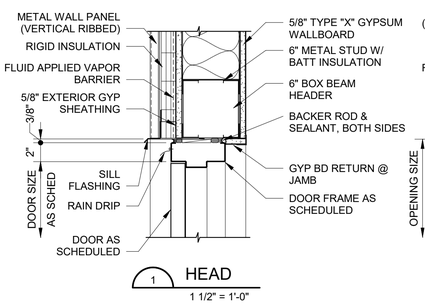
1/4" = 1'-0"



W1

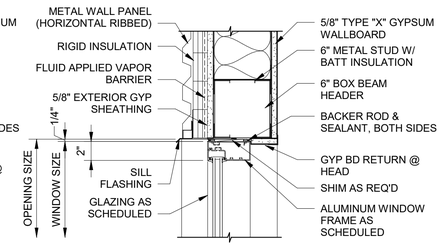
WINDOW TYPES

1/4" = 1'-0"



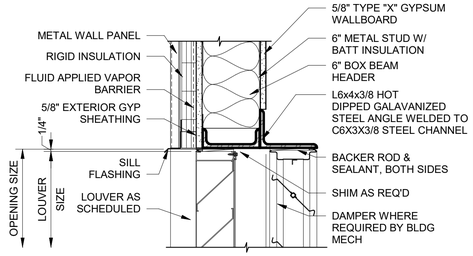
1 HEAD

1 1/2" = 1'-0"



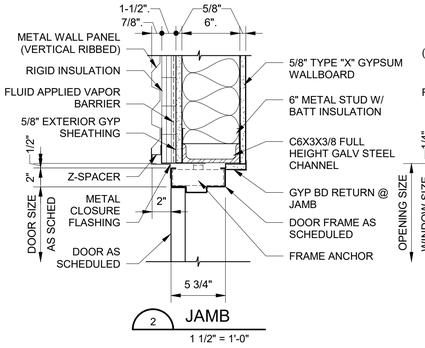
5 HEAD

1 1/2" = 1'-0"



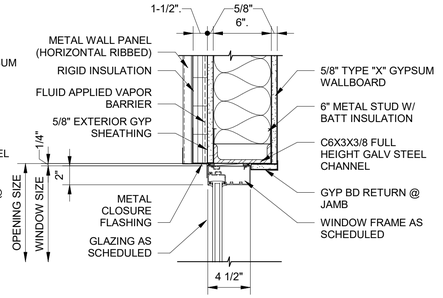
9 HEAD

1 1/2" = 1'-0"



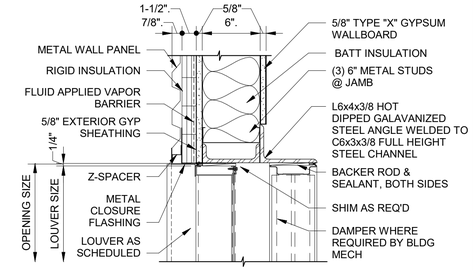
2 JAMB

1 1/2" = 1'-0"



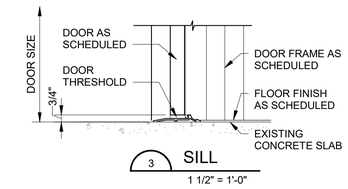
6 JAMB

1 1/2" = 1'-0"



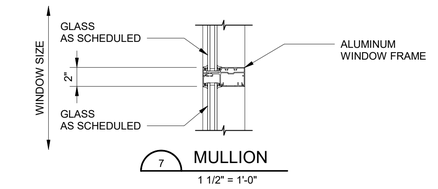
10 JAMB

1 1/2" = 1'-0"



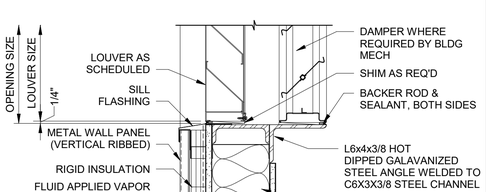
3 SILL

1 1/2" = 1'-0"



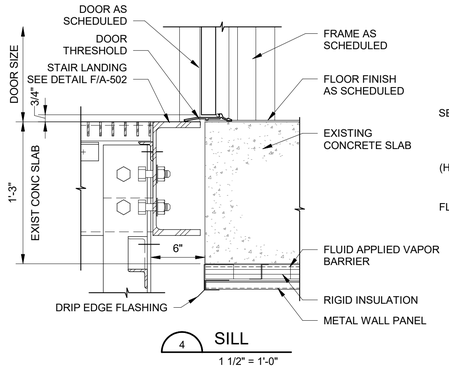
7 MULLION

1 1/2" = 1'-0"



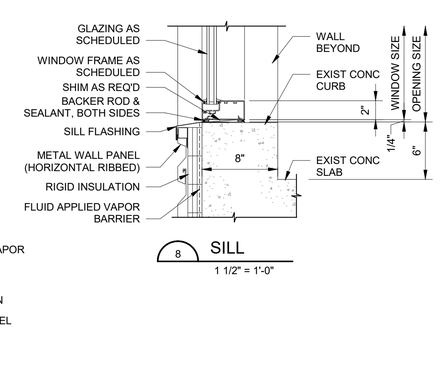
11 SILL

1 1/2" = 1'-0"



4 SILL

1 1/2" = 1'-0"



8 SILL

1 1/2" = 1'-0"

4' 2' 0' 4' 8'

1/4" = 1'-0"

12" 9" 6" 3" 0" 1'

1 1/2" = 1'-0"

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

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL

SCHEDULES & DETAILS

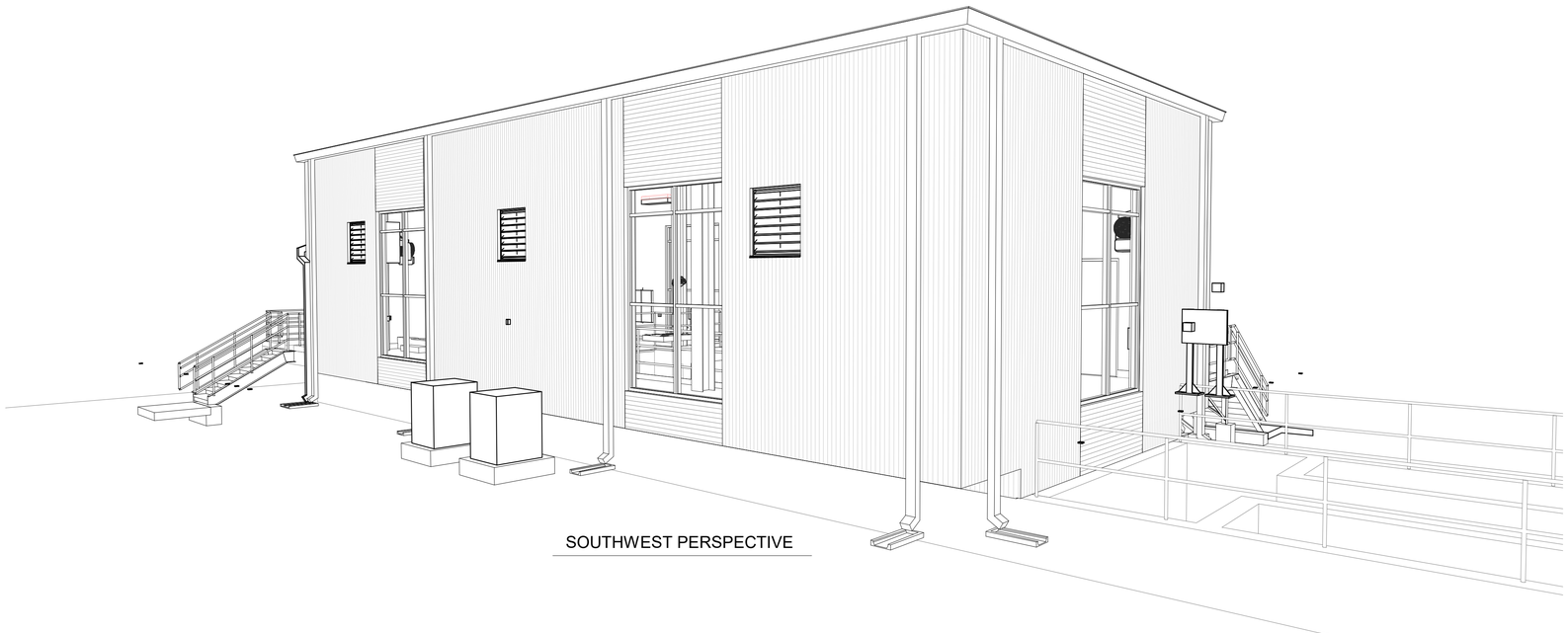
SCALE: As indicated

DRAWING No.: A-601

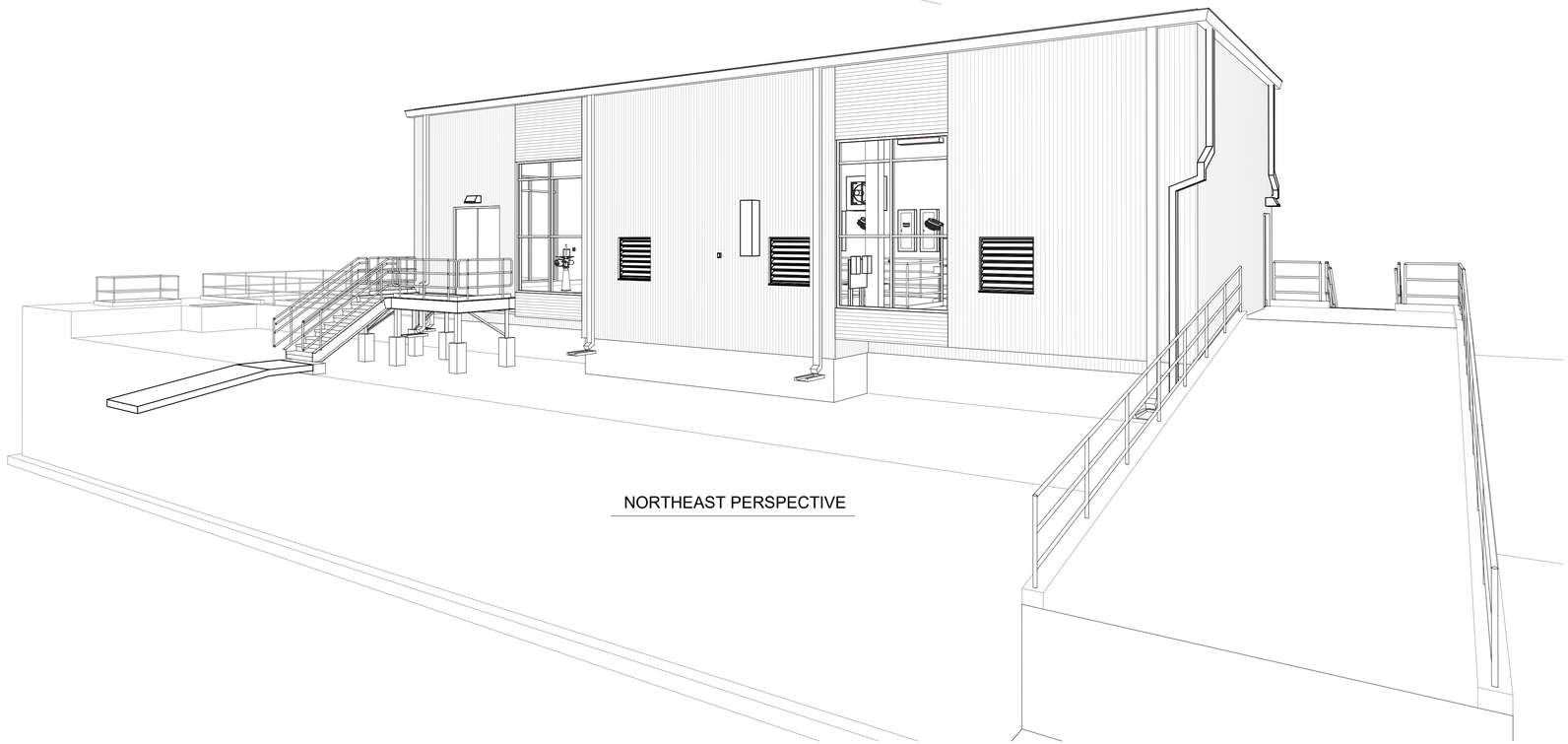
SHEET No.: 20 OF 52

GENERAL SHEET NOTES

1. PERSPECTIVE VIEWS ARE FOR GENERAL REFERENCE ONLY AND MAY NOT INCLUDE ALL NECESSARY BUILDING COMPONENTS OR EQUIPEMENT REQUIRED. REFER TO OTHER DISCIPLINE SHEET FOR MORE INFORMATION.



SOUTHWEST PERSPECTIVE



NORTHEAST PERSPECTIVE

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ARCHITECTURAL
BUILDING PERSPECTIVES

SCALE

DRAWING No. A-901

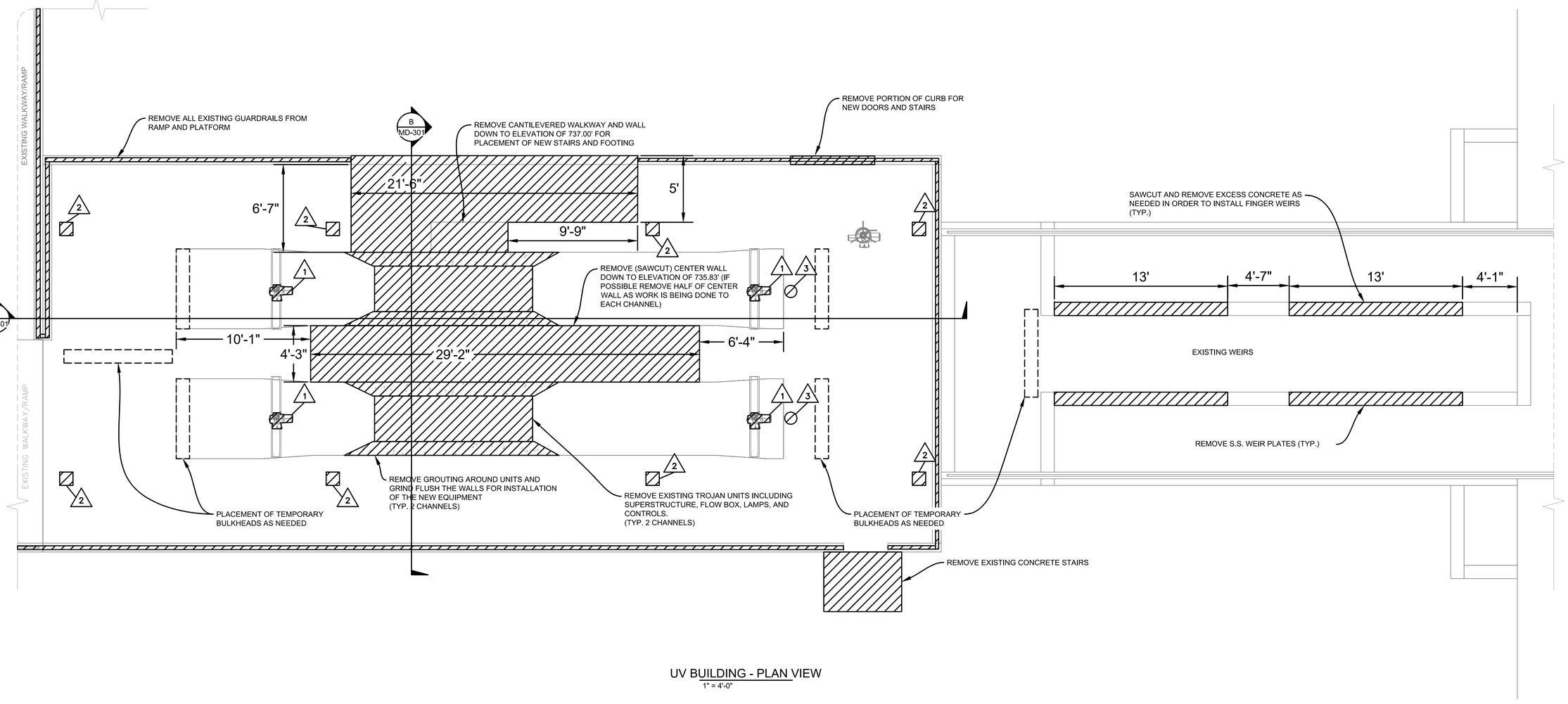
SHEET No. 21 OF 52

GENERAL NOTES:

1. EXISTING INFRASTRUCTURE IS AT APPROXIMATE LOCATIONS/ELEVATIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING ITEMS.
2. REFER TO SECTION 02 41 00
3. PROTECT LAMPS FROM THE IN-SERVICE CHANNEL FROM DEBRIS DURING DEMOLITION.
4. EXISTING UV INFLUENT CHANNELS SURROUNDING UV AREA. BE AWARE OF EXTENTS OF CHANNELS AND NO HEAVY MACHINERY SHOULD BE OPERATED OVER THESE EXISTING CHANNELS

REMOVAL NOTES: (REMOVAL NOTES SHOWN AS) XX

1. REMOVE EXISTING GATE PLATES, SEALS, STEMS, ACTUATORS, AND TRIM THE FRAME BELOW THE GRATING LEVEL (4 LOCATIONS)
2. REMOVE EXSITING CANOPY/SUPERSTRUCTURE AND SUPPORTING COLUMNS (8 LOCATIONS)
3. REMOVE CONCRETE OR CORE HOLE FOR NEW GATE STEM AND STAND ACTUATOR



UV BUILDING - PLAN VIEW
1" = 4'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

DEMOLITION PLAN VIEW

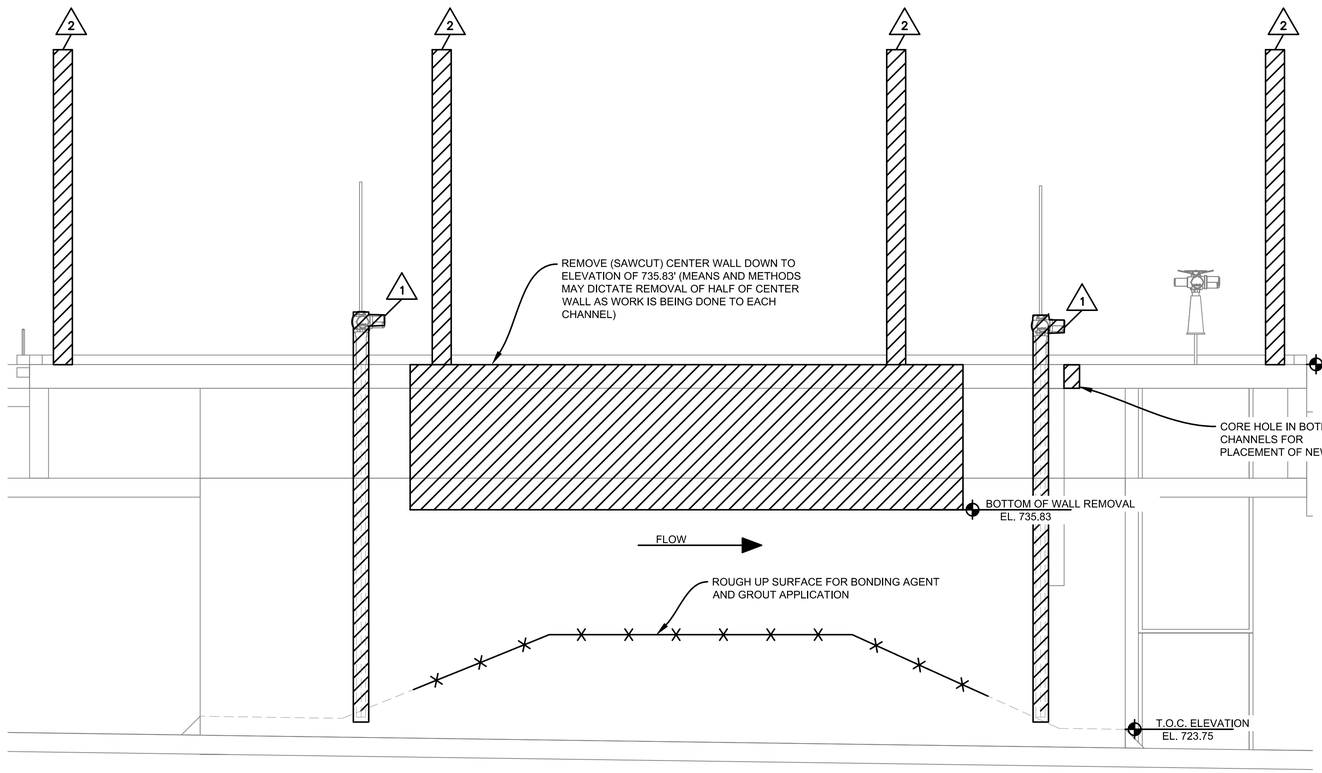
SCALE: AS NOTED
DRAWING No.: MD-101
SHEET No.: 22 OF 52

GENERAL NOTES:

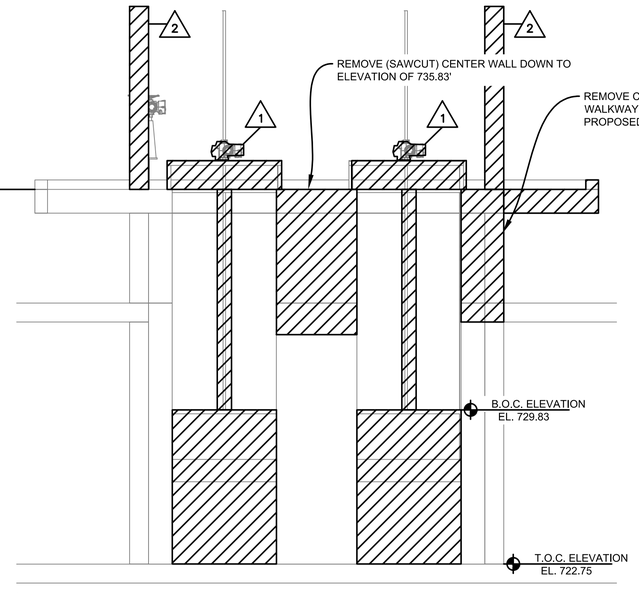
1. EXISTING INFRASTRUCTURE IS AT APPROXIMATE LOCATIONS/ELEVATIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING ITEMS.
2. REFER TO SECTION 02 42 00
3. (NOT SHOWN FOR CLARITY): REMOVE EXISTING UV SYSTEM INCLUDING SUPERSTRUCTURE, FLOW BOX, LAMPS, AND CONTROLS. GRIND WALLS FLUSH AFTER REMOVAL

REMOVAL NOTES: (REMOVAL NOTES SHOWN AS) XX

1. REMOVE EXISTING GATES AND ACTUATORS (4 LOCATIONS)
2. REMOVE EXSITING CANOPY/SUPERSTRUCTURE AND SUPPORTING COLUMNS (8 LOCATIONS)



A SECTION
MD-101 1" =4'-0"



B SECTION
MD-101 1" =4'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

DEMOLITION SECTION VIEWS

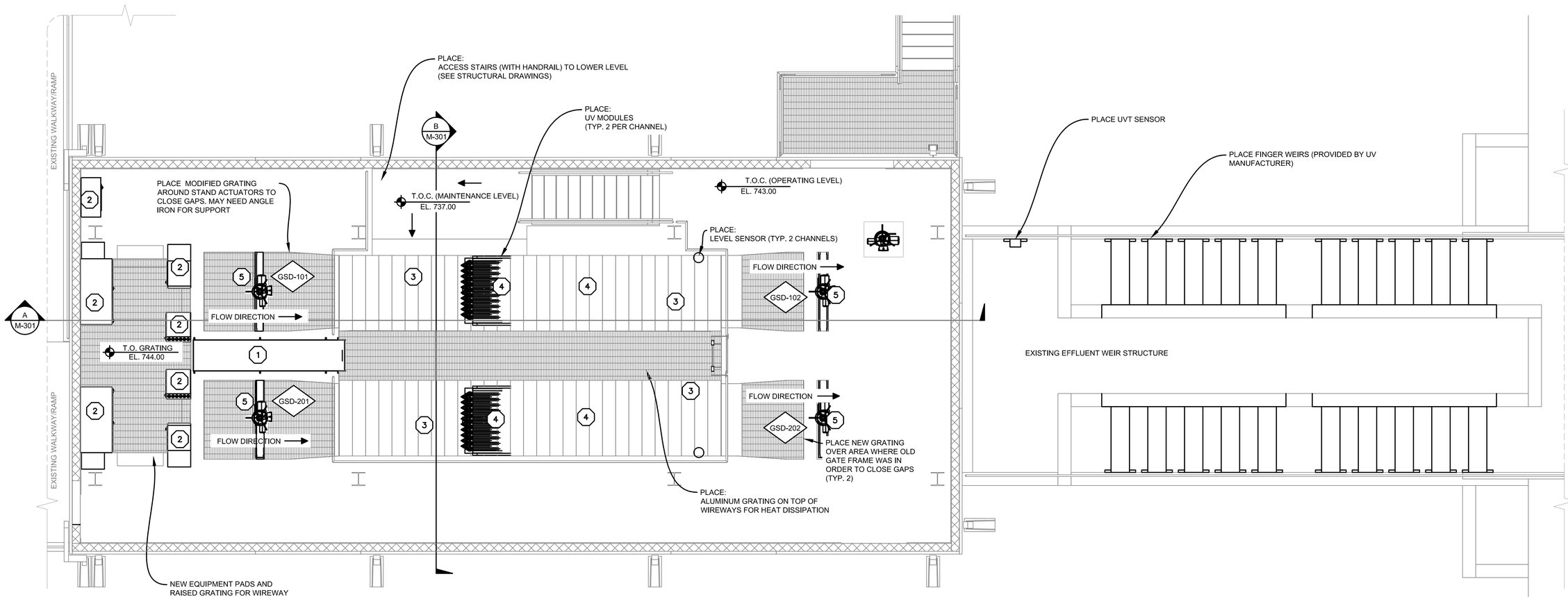
SCALE: AS NOTED
DRAWING No.: MD-301
SHEET No.: 23 OF 52

GENERAL NOTES:

1. EXISTING INFRASTRUCTURE IS AT APPROXIMATE LOCATIONS/ELEVATIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING ITEMS.

PLAN NOTES: (PLAN NOTES SHOWN AS) XX

1. CABLE TRAYS TO BE INSTALLED PER MANUFACTURER REQUIREMENTS. CABLE TRAY IS TO BE INSTALLED ON TOP OF CONCRETE, ALONG WITH 12" FALSE FLOOR TO COVER CABLES AND TO AVOID TRIP HAZARDS. GRATING TO BE PLACED OVERTOP
2. UV SYSTEM CONTROLS AND ELECTRICAL EQUIPMENT. SEE ELECTRICAL SHEETS AND MANUFACTURER FOR DETAILS.
3. REMOVABLE ALUMINUM PLATING SHALL BE PLACED ON LOWER ACCESS LEVEL (EL. 737.00) OF UV CHANNELS.
4. INSTALLATION OF UV MODULES IS TYPICAL FOR EACH CHANNEL. SEE MANUFACTURER FOR INSTALLATION DETAILS.
5. NEW GATES WITH ELECTRIC ACTUATORS. SEE MANUFACTURER FOR INSTALLATION DETAILS.



UV BUILDING - PLAN VIEW
1" = 4'-0"

REV.	DESCRIPTION	DATE	DRAWN	CHECKED
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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

PROPOSED MECHANICAL PROCESS PLAN VIEW

SCALE: AS NOTED

DRAWING No.: M-101

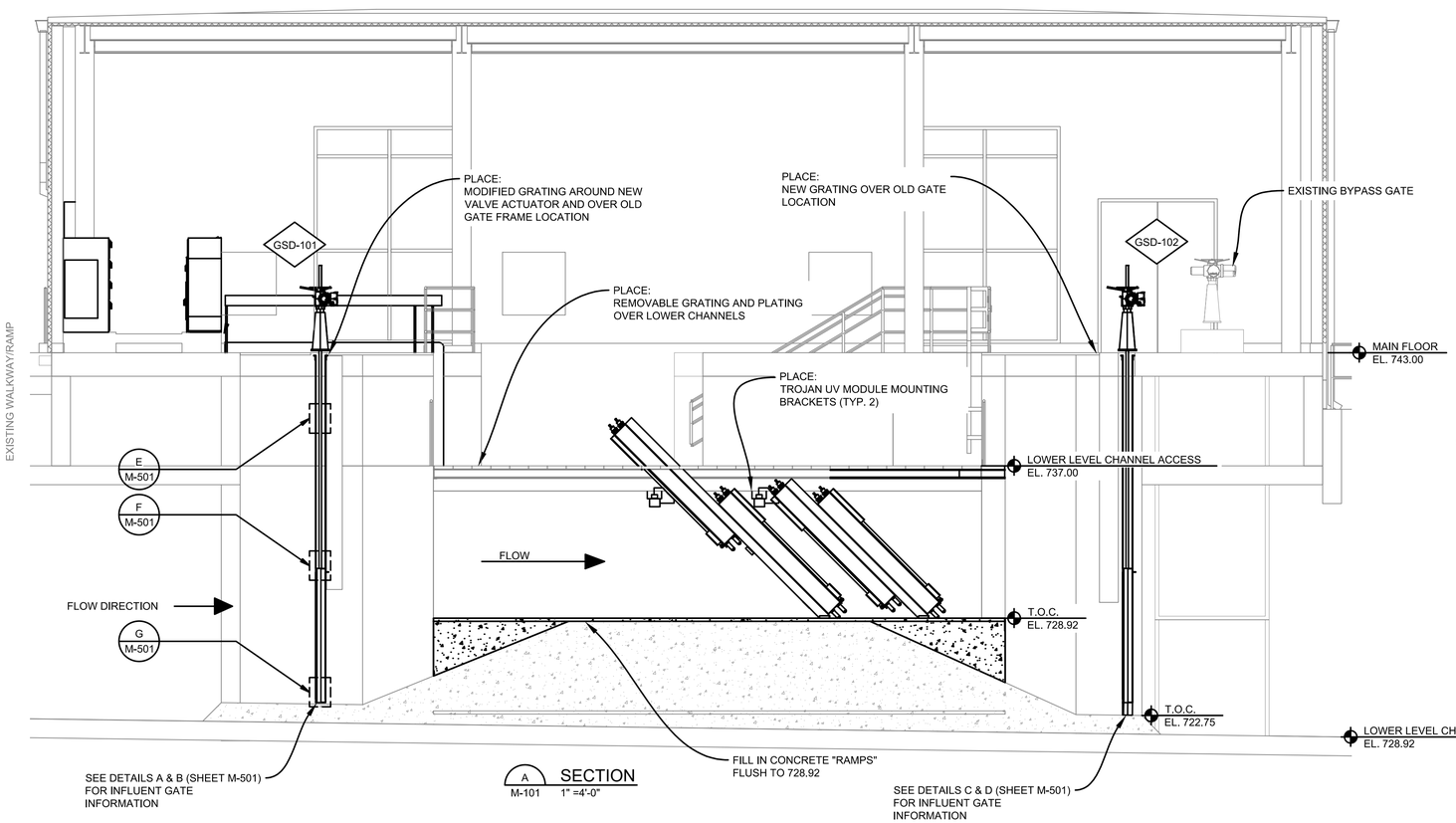
SHEET No.: 24 OF 52

GENERAL NOTES:

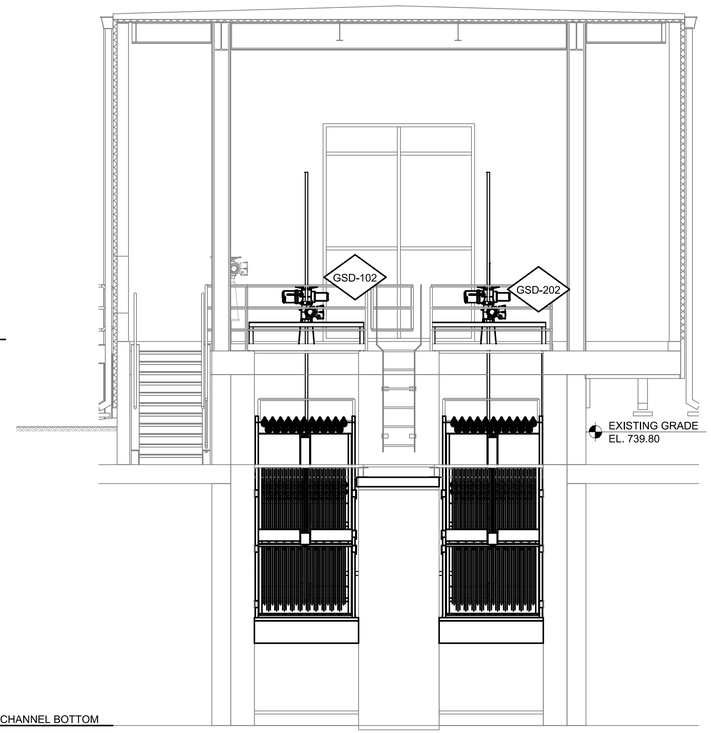
1. EXISTING INFRASTRUCTURE IS AT APPROXIMATE LOCATIONS/ELEVATIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING ITEMS.

PLAN NOTES: (PLAN NOTES SHOWN AS) (XX)

1. PLAN NOTES



A M-101 SECTION 1" =4'-0"



B M-101 SECTION 1" =4'-0"

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

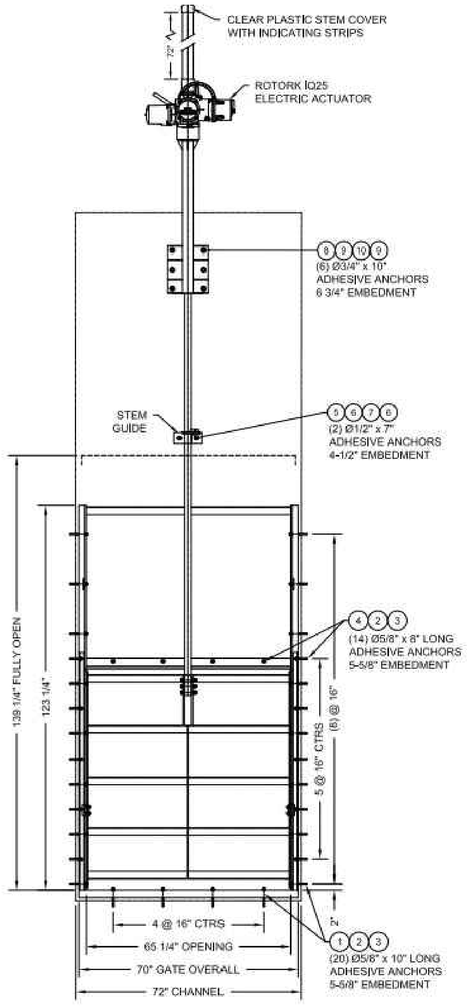
PROPOSED MECHANICAL PROCESS SECTION VIEWS

SCALE AS NOTED

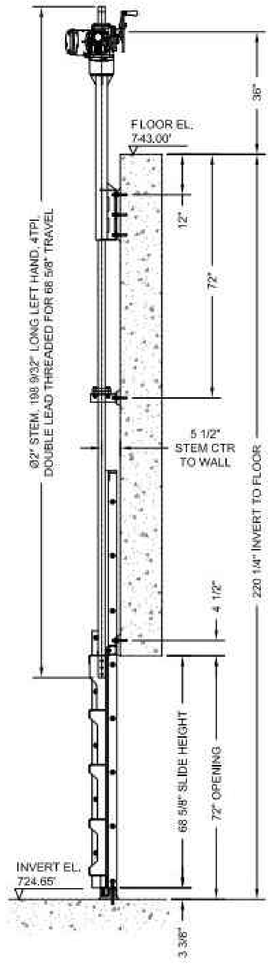
DRAWING No. M-301

SHEET No. 25 OF 52

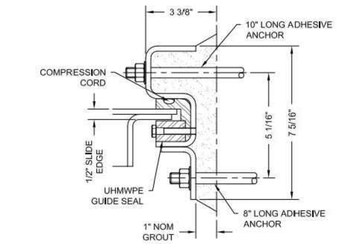
SITE FASTENERS PER GATE			
ITEM	DESCRIPTION	MATERIAL	QTY
1	5/8"-11 x 10" THREADED ROD	SS. 316	20
2	5/8"-11 NUT	SS. 316	34
3	5/8" WASHER	SS. 316	34
4	5/8"-11 x 8" THREADED ROD	SS. 316	14
5	1/2"-13 x 7" THREADED ROD	SS. 316	2
6	1/2"-13 NUT	SS. 316	4
7	1/2" WASHER	SS. 316	2
8	3/4"-10 x 10" THREADED ROD	SS. 316	6
9	3/4"-10 NUT	SS. 316	12
10	3/4" WASHER	SS. 316	6



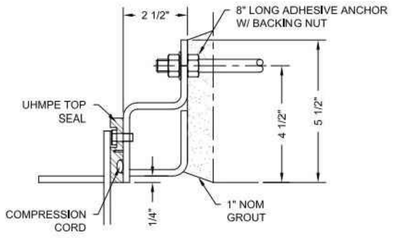
A M-301 DETAIL: INFLUENT GATE



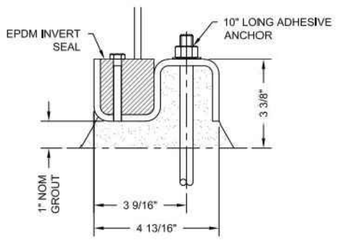
B M-301 DETAIL: INFLUENT GATE



E M-301 DETAIL: GUIDE SECTION CHANNEL MOUNT

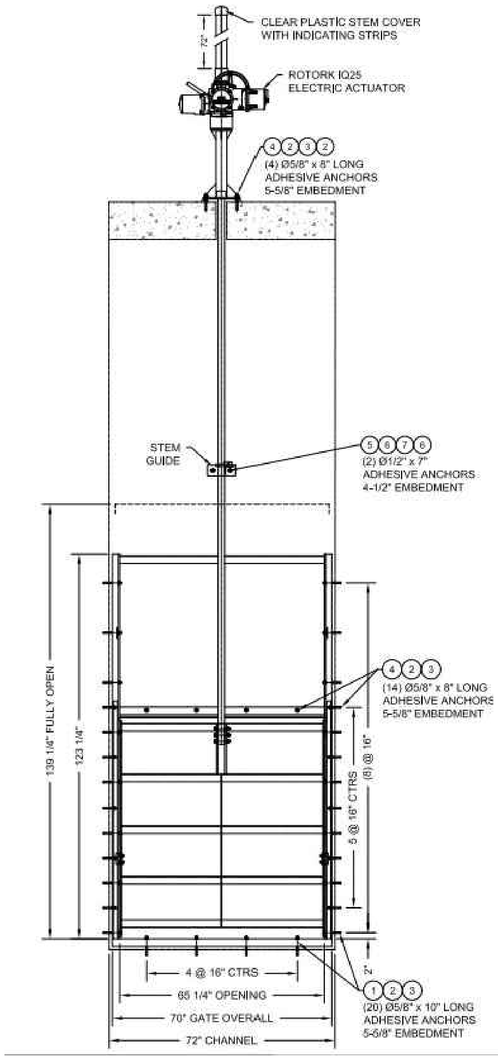


F M-301 DETAIL: TOP SEAL SECTION WALL MOUNT

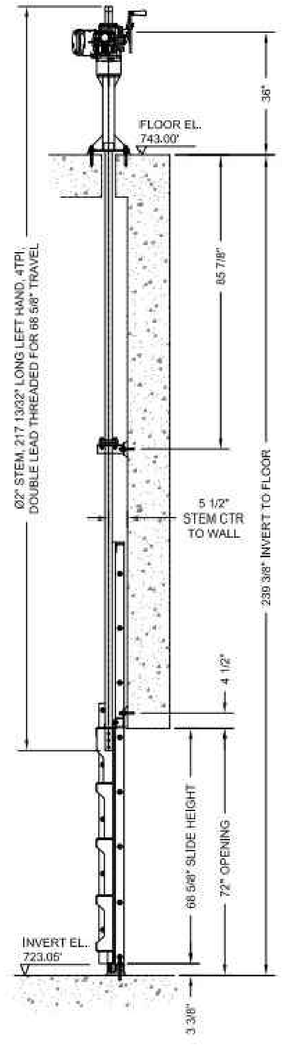


G M-301 DETAIL: INVERT SECTION CHANNEL MOUNT

SITE FASTENERS PER GATE			
ITEM	DESCRIPTION	MATERIAL	QTY
1	5/8"-11 x 10" THREADED ROD	SS. 316	20
2	5/8"-11 NUT	SS. 316	34
3	5/8" WASHER	SS. 316	34
4	5/8"-11 x 8" THREADED ROD	SS. 316	14
5	1/2"-13 x 7" THREADED ROD	SS. 316	2
6	1/2"-13 NUT	SS. 316	4
7	1/2" WASHER	SS. 316	2



C M-301 DETAIL: EFFLUENT GATE



D M-301 DETAIL: EFFLUENT GATE

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

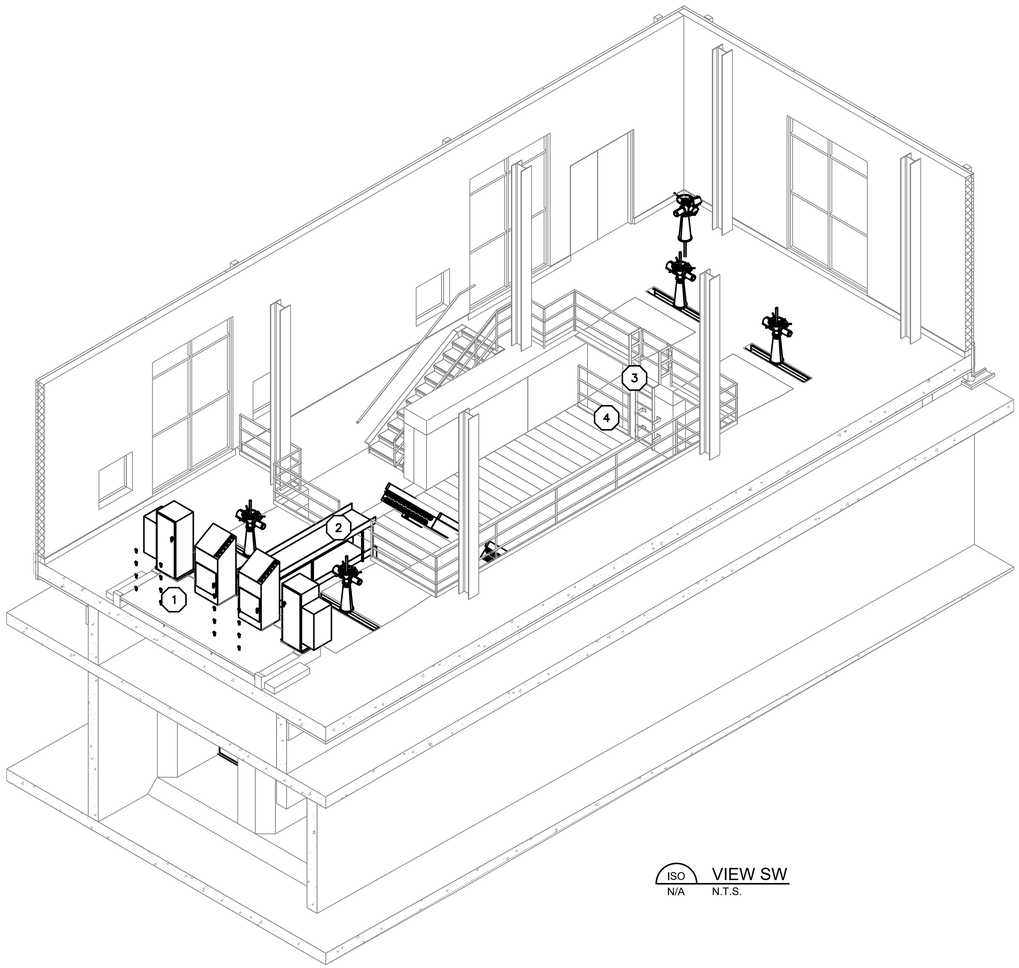
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

UV AREA DETAILS

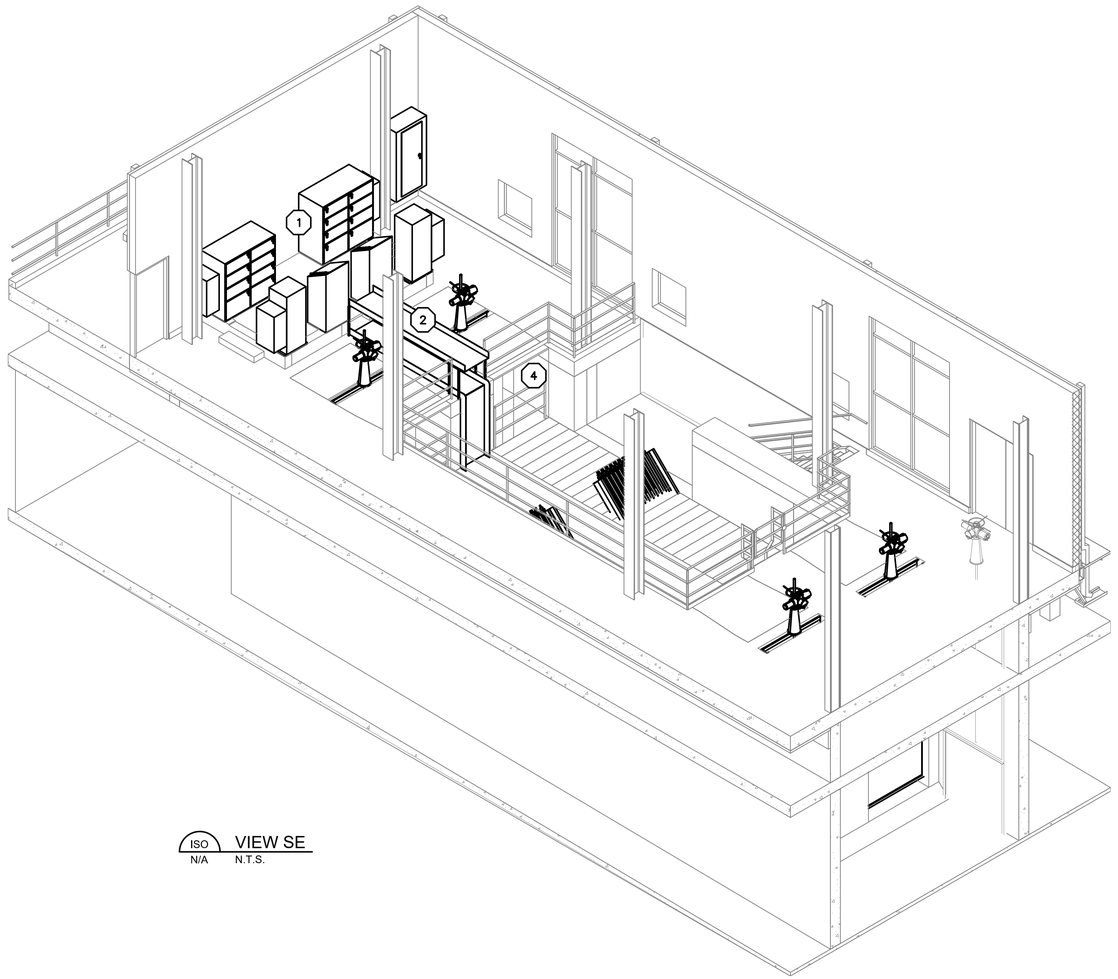
SCALE AS NOTED

DRAWING No. M-501

SHEET No. 26 OF 52



ISO VIEW SW
N/A N.T.S.



ISO VIEW SE
N/A N.T.S.

GENERAL NOTES:

1. EXISTING INFRASTRUCTURE IS AT APPROXIMATE LOCATIONS/ELEVATIONS. CONTRACTOR SHALL FIELD VERIFY EXISTING ITEMS.
2. UPPER LEVEL OF REMOVABLE PLATES AND ROOF ARE NOT SHOWN FOR CLARITY.

PLAN NOTES: (PLAN NOTES SHOWN AS) (XX)

1. UV ELECTRICAL EQUIPMENT/CONTROLS. SEE ELECTRICAL DRAWINGS FOR MORE DETAILS.
2. ELEVATED CABLE TRAYS. INSTALL PER MANUFACTURER.
3. LOWER LEVEL ACCESS LADDER AND SWING GATE. INSTALL PER ARCHITECTURAL DRAWINGS
4. INSTALL ALUMINUM HANDRAIL ON LOWER LEVEL (EL. 737.00) ON BOTH ENDS OF CHANNELS, PER ARCHITECTURAL DRAWINGS.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

PROPOSED MECHANICAL PROCESS ISO VIEWS

SCALE AS NOTED

DRAWING No. M-901

SHEET No. 27 OF 52

STRUCTURAL ABBREVIATION INDEX	
ABBREV.	ITEM
A/E	Architect/Engineer
AB	Anchor Bolt/Column Anchor Rod
ACIP	Augered Cast In Place
AESS	Architecturally Exposed Structural Steel
AFF	Above Finished Floor
ALT	Alternate
AP	Anchor Plate
ARCH	Architectural
BB	Bond Beam
BC	Bottom Chord
BCX	Bottom Chord Extension
BFF	Below Finished Floor
BL	Brick Ledge
BM	Beam
BO	Bottom of
BOS	Bottom of Steel
BP	Bearing Plate
BRG	Bearing
BT	Bent
C/C	Center-to-Center
CANT	Cantilever
CBP	Column Base Plate
CJ	Construction Joint
CJ	Contraction Joint
CJ	Control Joint
CJP	Complete Joint Penetration Weld
CL	Centerline
CLR	Clear
CMU	Concrete Masonry Unit
COL	Column
CONC	Concrete
CONN	Connection, Connect
CONT	Continuous
COORD	Coordinate
DA	Deck Angle
DB	Deck Bar
DBE	Deck Bearing Elevation
DIA, Ø	Diameter
DP	Deck Plate
DWG	Drawing(s)
EA	Each
EF	Each Face
EL	Elevation
EQ	Equal
ES	Each Side
EW	Each Way
EX	Existing
EXP	Expansion
EXT	Exterior
FD	Floor Drain
FDN	Foundation
FF	Finished Floor
FFE	Finished Floor Elevation
FP	Foundation Pier
FS	Far Side
FTG, F	Footing
FV	Field Verify
GA	Gauge
GALV	Galvanized
GB	Grade Beam
GS	Grout Solid
GT	Girder Truss
HD	Hold Down Anchor
HORZ	Horizontal
HP	High Point
HS	Headed Stud
HT	Height
ID	Inside Diameter
IF	Inside Face

STRUCTURAL ABBREVIATION INDEX	
ABBREV.	ITEM
INT	Interior
JB	Joist Bearing Elevation
L	Lintel
L	Angle
LAT	Lateral
LD	Load
LF	Linear Foot
LG	Long
LLH	Long Leg Horizontal
LLV	Long Leg Vertical
LOC'N	Location
LP	Low Point
LT	Light
LW	Long Way
LWB	Laminated Wood Beam
MAX	Maximum
MCJ	Masonry Control Joint
MECH	Mechanical
MIN	Minimum
NS	Near Side
NTS	Not To Scale
O/O	Out-to-Out
OC	On-Center
OD	Outside Diameter
OF	Outside Face
OFD	Overflow Drain
OH	Opposite Hand
P	Pier
PAF	Power Actuated Fastener
PC	Precast
PEMB	Pre-Engineered Metal Building
PERP	Perpendicular
PL	Plate
PT	Pressure Treated
R, RAD	Radius
RD	Roof Drain
RE:	Reference, Refer to
REINF	Reinforce
REM	Remainder
REQ'D	Required
RMW	Reinforced Masonry Wall
RTU	Roof Top Unit
RXN	Reaction
SC	Slip Critical
SF	Step Footing
SIM	Similar
SIP	Structural Insulated Panel
SOG	Slab On Grade
SPCS	Spaces
SS	Stainless Steel
STL	Steel
SW	Short Way
T&B	Top and Bottom
TC	Top Chord
TCX	Top Chord Extension
TO	Top of
TOB	Top of Beam
TOF	Top of Footing
TOL	Top of Ledge
TOM	Top of Masonry
TOS	Top of Steel
TOW	Top of Wall
TYP	Typical
UNO	Unless Noted Otherwise
VERT	Vertical
w/	With
w/o	Without
WF	Wall Footing
WP	Working Point
WWF	Welded Wire Fabric

GENERAL STRUCTURAL NOTES

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. IN CASE OF A CONFLICT WITHIN THE CONTRACT DOCUMENTS, THE MORE STRINGENT CONDITION SHALL GOVERN, UNLESS DIRECTED OTHERWISE BY THE ENGINEER OF RECORD. PRIOR TO IMPLEMENTATION, ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER FOR CLARIFICATION.
2. IN THE EVENT THAT CERTAIN DETAILS OF CONSTRUCTION ARE NOT INDICATED OR NOTED IN THE DRAWINGS, DETAILS FOR SIMILAR CONDITIONS THAT ARE INDICATED OR NOTED SHALL BE UTILIZED, SUBJECT TO THE STRUCTURAL ENGINEER'S APPROVAL.
3. OPENINGS AND PENETRATIONS THROUGH STRUCTURAL ELEMENTS, AND ITEMS EMBEDDED IN STRUCTURAL ELEMENTS THAT ARE NOT INDICATED IN THE STRUCTURAL DRAWINGS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO FABRICATION, ERECTION AND/OR CONSTRUCTION.
4. MATERIALS OR EQUIPMENT SHALL NOT BE PLACED ON UNFINISHED FLOORS OR ROOFS IN EXCESS OF 20 PSF NOR ON FINISHED FLOORS IN EXCESS OF THE DESIGN LIVE LOADS WHICH ARE INDICATED IN THE STRUCTURAL DRAWINGS. IMPACT LOADING SHALL BE AVOIDED.
5. THE STRUCTURE HAS BEEN DESIGNED FOR THE IN-SERVICE LOADS ONLY. THE METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE STRUCTURAL ENGINEER OF ANY CONDITION WHICH, IN HIS OPINION, MIGHT ENDANGER THE STABILITY OF THE STRUCTURE OR CAUSE DISTRESS IN THE STRUCTURE.
6. ALL EXISTING CONDITIONS AND ALL RELATED DIMENSIONS INDICATED IN THE CONTRACT DOCUMENTS SHALL BE FIELD VERIFIED PRIOR TO FABRICATION, ERECTION AND/OR CONSTRUCTION. ANY CONDITION THAT DIFFERS FROM THAT INDICATED IN THE CONTRACT DOCUMENTS SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW PRIOR TO FABRICATION, ERECTION AND/OR CONSTRUCTION.
7. THE STRUCTURE HAS BEEN DESIGNED TO MEET OR EXCEED SERVICEABILITY REQUIREMENTS OF SECTION 1604.3 OF THE INTERNATIONAL BUILDING CODE. ALL NON-STRUCTURAL COMPONENTS & THEIR CONNECTIONS THAT ARE ANCHORED TO THE STRUCTURE SHALL BE DESIGNED TO ALLOW FOR THE MOVEMENT OF THE STRUCTURE CAUSED BY WIND, SNOW, LIVE, THERMAL, SHRINKAGE/CREEP AND EARTHQUAKE LOADS. NON-STRUCTURAL COMPONENTS INCLUDE ITEMS SUCH AS NON-LOAD BEARING WALLS, MEP COMPONENTS, BULKHEADS, ETC.
8. PROVIDE SPECIAL INSPECTION IN ACCORDANCE WITH CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE AND WITH PROJECT SPECIFICATIONS.
9. UNLESS NOTED OTHERWISE, ALL LOADS SPECIFIED IN THESE DOCUMENTS ARE NOMINAL LOADS AND ARE TO BE ENTERED INTO THE APPROPRIATE STRENGTH OR ALLOWABLE STRESS DESIGN LOAD COMBINATIONS WITH APPROPRIATE FACTORS, AS DEFINED BY ASCE 7, BY THE BUILDING COMPONENT ENGINEER IN THE DESIGN OF THEIR PRODUCT. GRAVITY LOAD SHEAR BEAM REACTIONS ON PLAN FOR STEEL FRAMING REPRESENT THE COMBINED SERVICE LOAD EFFECT FROM ALLOWABLE STRESS DESIGN LOAD COMBINATIONS.
10. POST INSTALLED ANCHORS SHALL BE THE SPECIFIC PRODUCT INDICATED. WHERE PRODUCT SUBSTITUTIONS ARE DESIRED, THEY SHALL BE SUBMITTED TO ENGINEER FOR REVIEW & APPROVAL A MINIMUM OF 2 WEEKS PRIOR TO PLANNED INSTALLATION. ADHESIVE ANCHORS SHALL BE INSTALLED USING PRODUCTS THAT ARE APPROVED BY THE SUPPLIER FOR ALL TEMPERATURE CONSIDERATIONS. INSTALLATION SHALL BE IN ACCORDANCE WITH SUPPLIERS PUBLISHED INSTALLATION INSTRUCTIONS.

GENERAL FOUNDATION AND CONCRETE NOTES

1. PROVIDE DIAGONAL REINFORCING (ACROSS EACH CORNER) OF OPENINGS IN FOUNDATION WALLS AND SLABS AS FOLLOWS: (1)-#4 X 44" FOR EACH 4" OF CONCRETE THICKNESS.
2. COORDINATE FINISH OF ALL FOUNDATION WORK, INCLUDING SLABS ON GRADE, WITH ARCHITECTURAL REQUIREMENTS.
3. LAP ALL REINFORCING AS INDICATED IN "REINFORCEMENT DEVELOPMENT AND LAP SPLICE LENGTHS" DETAIL. PROVIDE CORNER BARS FOR ALL HORIZONTAL REINFORCING. PROVIDE DOWELS FROM FOOTING EQUAL IN SIZE AND NUMBER TO VERTICAL WALL OR PIER REINFORCING (UNO).
4. COVER FOR REINFORCING SHALL BE IN ACCORDANCE WITH ACI-318.
5. ALL EXPOSED EDGES OF CONCRETE PIERS, BEAMS, AND WALLS SHALL BE CHAMFERED 3/4" X 45 DEGREES. UNO
6. REFER TO "GENERAL STRUCTURAL NOTES" FOR INFORMATION REGARDING SPECIAL INSPECTIONS AND INSTALLATION OF POST INSTALLED ANCHORS.

CONCRETE MIX GUIDELINES

FOOTINGS AND FOUNDATIONS

SLUMP	4 INCH +/- 1 INCH
LARGE AGGREGATE	1 INCH

TOPPING SLABS

SLUMP	3 INCH +/- 1 INCH
LARGE AGGREGATE	3/8 OR 5/8 INCH
FIBROUS REINFORCING	SEE NOTES BELOW

EXTERIOR STRUCTURAL CONCRETE

CEMENTITIOUS MATERIAL (MIN)	564 LBS/YD
SLUMP	3 INCH +/- 1 INCH
LARGE AGGREGATE	1 INCH (CRUSHED LIMESTONE)
AIR	6% +OR- 1%

1. IN FOOTINGS AND FOUNDATION CONCRETE 25% FLYASH OR 30% GROUND BLAST FURNACE SLAG IS ACCEPTABLE. A MINIMUM OF 30% GROUND BLAST FURNACE SLAG IS RECOMMENDED FOR INTERIOR SLABS.
2. AGGREGATES SHALL BE CLEAN UNIFORMLY GRADED FROM COARSE TO FINE.
3. WATER-REDUCING ADMIXTURES MAY BE USED TO MAINTAIN WATER/CEMENT RATIO AND WORKABILITY- NOTE THAT THIS MAY AFFECT FINISHING PROCEDURES.
4. COORDINATE ADMIXTURES AND CURING MEASURES TO BE COMPATIBLE WITH FLOORING MATERIALS AND ADHESIVES.
5. EXTERIOR STRUCTURAL CONCRETE ONLY COVERS CONCRETE STRUCTURES OUTSIDE THE BUILDING FOOTPRINT SHOWN ON STRUCTURAL DRAWINGS, IT DOES NOT INCLUDE THAT SHOWN ON CIVIL DRAWINGS.
6. REINFORCE WITH MONOFILAMENT POLYPROPYLENE OR NYLON FIBERS. FIBERS SHALL BE PLACE IN THE CONCRETE AT THE BATCH PLANT IN THE AMOUNT AND IN THE METHOD RECOMMENDED BY THE SUPPLIER.

STEEL NOTES

1. STRUCTURAL STEEL SHALL BE GALVANIZED AND PREPARED FOR PAINT, UNLESS NOTED OTHERWISE.
2. COORDINATE METAL DECK ATTACHMENT METHOD WITH BASE MATERIAL SHAPE AND THICKNESS (JOIST, BEAM, OR TRUSS). ALTERNATELY, THE CONSTRUCTION MANAGER AND STEEL SUBCONTRACTOR SHALL WORK TOGETHER TO ENSURE PROPER BASE MATERIALS ARE PROVIDED, SUCH AS STEEL JOIST TOP CHORD SHAPES, THAT ARE ADEQUATE FOR THE PREFERRED ATTACHMENT METHOD.
3. ERECTOR IS TO PROVIDE TEMPORARY BRACING SUFFICIENT TO HOLD FRAME IN POSITION UNTIL ALL CONSTRUCTION NECESSARY FOR BUILDING STABILITY IS COMPLETE.
4. CAMBER BEAMS UPWARD THE DESIGNATED AMOUNT INDICATED ON THE STRUCTURAL DRAWINGS. BEAMS WITHOUT A SPECIFIED CAMBER SHALL BE ORIENTED SUCH THAT ANY INCIDENTAL CAMBER IS UPWARD.
5. ALL BOLTED MOMENT, BRACE FRAME, AND TRUSS CONNECTIONS SHALL BE DONE WITH SLIP CRITICAL BOLTS INCLUDING THE GRAVITY SHEAR CONNECTION. SLIP CRITICAL JOINTS SHALL BE PREPARED WITH A CLASS A FAYING SURFACE, AND OVERSIZED HOLES IN SLIP CRITICAL JOINTS MAY BE USED AT THE FABRICATOR'S OPTION.
6. BOLTED CONNECTIONS NOT SPECIFIED TO BE SLIP CRITICAL SHALL BE TIGHTENED SNUG TIGHT (ALL METAL SURFACES IN CONTACT).
7. WHERE ALUMINUM OR STEEL WILL CONTACT DISSIMILAR METALS, PROTECT AGAINST GALVANIC ACTION BY PAINTING CONTACT SURFACES WITH PRIMER AND APPLYING SEALANT OR TAPE, OR BY INSTALLING NONCONDUCTIVE SPACERS AS RECOMMENDED FOR THIS PURPOSE.
8. ALL GUSSET PLATES TO BE MINIMUM 3/8" THICK. UNLESS NOTED OTHERWISE, ALL COLUMN AND BEAM WEB STIFFENERS AND GUSSET PLATES SHALL BE 3/8" THICK.
9. MISCELLANEOUS STEEL SUPPLIER SHALL SUBMIT SHOP DRAWINGS FOR ALL MISCELLANEOUS STEEL STAIRS, LADDERS AND RAILING, DESIGNED AND SEALED BY AN ENGINEER REGISTERED IN THE STATE OF MICHIGAN, FOR REVIEW. COORDINATE CONSTRUCTION DETAILS AND DIMENSIONS WITH ARCHITECTURAL INFORMATION. COORDINATE AND DETAIL CONNECTIONS TO THE PRIMARY STRUCTURE.

GENERAL POST INSTALLED ANCHOR NOTES

1. POST INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ARCHITECT PRIOR TO INSTALLING POST INSTALLED ANCHORS IN PLACE OF MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.
2. UNLESS OTHERWISE NOTED IN THE DRAWINGS ALL POST INSTALLED ANCHORS ARE BASED ON HILTI CORPORATION PRODUCT INFORMATION.
3. IF THE CONTRACTOR WANTS TO SUBMIT AN ALTERNATE ANCHOR THEY MUST PROVIDE SEALED CALCULATIONS AT LEAST 2 WEEKS PRIOR TO PRODUCT USE. THESE CALCULATIONS MUST SHOW THAT THE STRENGTH OF THE SUBSTITUTED ANCHOR MEETS OR EXCEEDS THE STRENGTH OF THE SPECIFIED ANCHOR AT EACH APPLICATION IN THE PROJECT WHERE A SUBSTITUTED ANCHOR IS PROPOSED, WITH CONSIDERATION FOR COMBINED STRESS AND ANY APPLICABLE REDUCTION FACTORS
4. WITHIN CONTRACT DOCUMENTS ADHESIVE ANCHORS MAY BE GENERICALLY REFERRED TO AS EPOXY ANCHORS, WHERE THIS OCCURS SUBSTITUTE THE WORD EPOXY WITH ADHESIVE.
5. ADHESIVE ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 21 DAYS AT TIME OF ANCHOR INSTALLATION.
6. MECHANICAL ANCHORS SHALL BE INSTALLED IN CONCRETE HAVING A MINIMUM AGE OF 7 DAYS, AND CONCRETE HAVING MET MINIMUM CONCRETE COMPRESSIVE STRENGTH (F'C).
7. ANCHORAGE TO CONCRETE SHALL BE DONE BY EITHER EXPANSION ANCHORS OR ADHESIVE ANCHORS.
8. ANCHORAGE TO SOLID MASONRY SHALL BE DONE BY EITHER ADHESIVE ANCHORS OR SCREW ANCHORS SEE DETAILS FOR SPECIFIC USE.
9. ANCHORAGE TO HOLLOW OR MULTI-WYTHE MASONRY SHALL BE DONE WITH SCREEN ANCHORS.
10. PROVIDE ICC APPROVED ADHESIVE ANCHORS BASED ON THE FOLLOWING:
    - A. CONCRETE ANCHORS -
      - a. AUTOMATIC HOLE CLEANING HILTI HIT-RE 500-V3 WITH HAS THREADED ROD OR HILTI HIT HY 200 SAFE SET WITH HY200 HAS THREADED ROD
      - b. NO HOLE CLEANING - HILTI HIT HY 200 SAFE SET WITH HIT-Z OR HIT-Z-R THREADED RODS.
    - B. MASONRY ANCHOR - HILTI HIT HY 270 WITH HAS-E ROD
      - a. PROVIDE ICC APPROVED MECHANICAL ANCHORS BASED ON THE FOLLOWING;
        - TORQUE CONTROL (TC) ANCHOR - HILTI KWIK BOLT TZ2
        - SLEEVE ANCHOR - HILTI HLC SLEEVE ANCHOR
        - SCREW ANCHOR - HILTI KWIK HUS-EZ
11. SEE SPECIFICATIONS FOR SPECIFIC PRODUCT INFORMATION AND INSTALLATION INSTRUCTIONS, AND DRAWINGS FOR APPLICATION USE.
12. ALL INSTALLATIONS SHALL BE DONE BY AN INDIVIDUAL CERTIFIED BY THE MANUFACTURER. CERTIFICATIONS SHALL BE SUBMITTED TO THE SPECIAL INSPECTOR PRIOR TO COMMENCEMENT OF WORK.
13. ALL ANCHORS SHALL BE INSPECTED AS DESCRIBED IN SPECIFICATIONS.
14. ANCHOR CAPACITY IS DEPENDANT ON ANCHOR SPACING AND EDGE DISTANCES. INSTALL BOLTS AS DETAILED.
15. IF ANCHORS CANNOT BE INSTALLED AS DETAILED NOTIFY ARCHITECT FOR ALTERNATE CONNECTION DETAIL.
16. EXISTING REINFORCING BARS IN THE CONCRETE MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. UNLESS NOTED OTHERWISE THOSE BARS ARE NOT TO BE CUT. THE CONTRACTOR SHALL REVIEW THE DRAWINGS AND UNDERTAKE A METHOD TO LOCATE SUCH BARS.

ENGINEERING DATA

DESIGN STRESSES

CONCRETE

FOOTINGS AND FOUNDATIONS	f'c = 4000 psi
TOPPING SLABS	f'c = 4000 psi
EXTERIOR STRUCTURAL CONCRETE (6% AIR)	f'c = 4000 psi
REINFORCING STEEL	Fy = 60000 psi

STEEL

W SHAPES	Fy = 50000 psi
RECTANGULAR HSS SHAPES (A500 GR. C)	Fy = 46000 psi
ROUND HSS & PIPE SHAPES (A500)	Fy = 42000 psi
ALL OTHER SHAPES	Fy = 36000 psi
STAINLESS STEEL	Fy = 30000 psi
STRUCTURAL BOLTS	ASTM A325
ANCHOR BOLTS/COLUMN ANCHOR RODS	ASTM F 1554 - Grade 36
WELDING ELECTRODE	E70XX E80XX (ASTM A706) E304XX/E316XX (SS)

LIGHT GAUGE FRAMING

UP TO AND INCLUDING 43 MILS	AS REQUIRED BY DESIGN
54 MILS AND THICKER	Fy = 33000 psi Fy = 50000 psi

METAL DECK

ROOF DECK	
1.5B	Fy = 33000 psi

STRUCTURAL DESIGN REQUIREMENTS

FLOOR LIVE LOAD (LL REDUCTIONS USED WHERE PERMITTED BY CODE)

WALKWAYS, STAIRS AND LANDINGS	100 psf
ELEVATED EQUIPMENT PLATFORMS	100 psf
ROOF LIVE LOAD	20 psf
RISK CATEGORY	IV

ROOF SNOW LOAD

GROUND SNOW LOAD (Pg)	20 psf
FLAT ROOF SNOW LOAD (Pf)	20 psf + Drift
SNOW EXPOSURE (Ce)	1.0
SNOW LOAD IMPORTANCE FACTOR (I)	1.2
THERMAL FACTOR (Ct)	1.2

WIND LOAD

ULTIMATE DESIGN WIND SPEED (3 sec)	120 mph
WIND EXPOSURE CATEGORY	B
INTERNAL PRESSURE COEFF (GCpi)	0.18
COMPONENTS & CLADDING	
WALL STUD DESIGN PRESSURE	VARIES BY TRIBUTARY AREA - PER ASCE7

EARTHQUAKE

SEISMIC IMPORTANCE FACTOR, Ie	1.50
SPECTRAL RESPONSE	Ss = 0.095 S1 = 0.048 SDs = 0.101 SD1 = 0.076
SITE CLASS	D
SEISMIC DESIGN CATEGORY	C
BASIC SEISMIC FORCE RESISTING SYSTEM:	
ORDINARY STEEL MOMENT FRAMES	
DESIGN BASE SHEAR	Cs*W
SEISMIC RESPONSE COEFFICIENT Cs	0.043
RESPONSE MODIFICATION FACTOR R	3.5
ANALYSIS PROCEDURE	"Equivalent lateral force"

SPECIFIC DESIGN LOADS

ROOF DEAD LOADS

ROOFING (ADHERED)	2
INSULATION	4
METAL DECK	3
STRUCTURE	5
CEILING	3
M/E/P	3
FIRE PROTECTION	3
MISC	2
	25 psf Total

DESIGN CODES

GENERAL BUILDING CODE	IBC 2018
CONCRETE	ACI 318
STEEL	AISC 360 - ASD

LIGHT GAUGE METAL FRAMED WALL FRAMING NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND DETAIL ALL LIGHT GAUGE METAL FRAMING AND CONNECTIONS IN ACCORDANCE WITH THE CURRENT LOCAL BUILDING CODE AND AISI'S STANDARDS AND SPECIFICATIONS. PROVIDE SHOP DRAWINGS THAT INDICATE ALL MEMBER SIZES AND CONNECTION REQUIREMENTS INCLUDING FASTENERS AND CLIPS. SHOP DRAWINGS SHALL BE SEALED BY A REGISTERED ENGINEER IN THE STATE OF MICHIGAN FOR ARCHITECT'S REVIEW.
2. LIGHT GAUGE METAL STUD SIZES SHOWN ON PLANS & DETAILS ARE BASED ON METAL STUD INDUSTRY STANDARDS.
3. WHERE STUD DEPTH, WIDTH, OR THICKNESS IS INDICATED ON DRAWINGS IT SHALL BE CONSIDERED A MINIMUM REQUIREMENT.
4. WHERE METAL STUDS PROVIDE BACKUP FOR METAL PANEL OR OTHER SPECIALTY FINISH MATERIAL, THE CONSTRUCTION MANAGER AND STUD SUPPLIER SHALL VERIFY/COORDINATE MINIMUM STUD GAUGE THICKNESS REQUIREMENTS WITH THE SUPPLIER OF THE WALL FINISH MATERIAL. THE METAL PANEL/FINISH SUPPLIER MAY HAVE MINIMUM THICKNESS REQUIREMENTS THAT MUST BE MET WITH STUD BACKUP.
5. AT OPENINGS IN FRAMED WALLS, ALL HEADERS, SILLS, JAMB STUDS, AND RELATED CONNECTIONS SHALL BE DESIGNED TO TRANSFER WIND AND GRAVITY LOADS TO THE SUPPORTING PRIMARY STRUCTURE.
6. STUDS SHALL BE SECURELY ATTACHED TO TRACK COMPONENTS AT THE TOP AND BOTTOM OF THE WALL ASSEMBLY. STUD ENDS SHALL BE SEATED TIGHTLY IN ALL LOAD-BEARING WALLS.
7. METAL FRAMING SHALL BE FASTENED TOGETHER WITH MINIMUM #8 WAFER HEAD SELF DRILLING SCREWS.
8. UNLESS NOTED OTHERWISE, INSTALL 1/2" DIAMETER ANCHOR BOLTS IN BOTTOM TRACK AT 2'-8" ON CENTER WITH MINIMUM OF TWO BOLTS PER LENGTH OF WALL. ALTERNATELY, PAF ANCHORAGE SPECIFIED BY THE STUD ENGINEER IS ACCEPTABLE.

REV.	DESCRIPTION	DATE	DRAWN	CHECKED
	100% ISSUE FOR BID/PERMITTING	SEPT 2023	JV	CT

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

STRUCTURAL
NOTES AND LEGENDS SHEET 1 OF 2

SCALE
12" = 1'-0"

DRAWING No.
S-001

SHEET No.
28 OF 52

STRUCTURAL SPECIAL INSPECTION SCHEDULE (2018 IBC - Chapter 17)

ITEM	CONT[2]	PERIODIC[2]	REFERENCE STANDARD	NOTES
PRE-FABRICATED CONSTRUCTION (1704.2.5)				3&4
STRUCTURAL STEEL CONSTRUCTION (1705.2)				13
Verify Bolt, Nut & Washer Materials		X	ASTM specs/AISC 360 - A3.3	
Inspect Bearing-type Connections		X	AISC 360 - M2.5	
Inspect Slip-critical Connections	X		AISC 360 - M2.5	5
Verify Structural Steel Materials		X	ASTM A 6/ASTM A 568	
Verify Weld Filler Materials		X	AISC 360 - A3.5	
Partial / Complete Penetration Welds, Multipass Fillet Welds, Single-pass Fillet Welds > 5/16"	X		AWS D1.1	6&7
Single-pass Fillet Welds ≤ 5/16", Anchor / Stud Welds, Stair / Railing Welds		X	AWS D1.1	6
Inspect Steel Frame Joint Details		X		
COLD FORMED STEEL DECK (1705.2.2)			SDI QA/QC, AWS: B5.1, D1.1, D1.3	
Verify compliance of deck and all deck accessories materials and installation with construction documents, including profiles . Verify deck materials are represented by the mill certifications that comply with the construction drawings		X	Applicable ASTM material standards	
Welding procedure specifications (WPS), manufacturer certifications for welding consumables and/or manufacturer installation instructions for mechanical fasteners available		X		
Material identification (type/grade)		X		
Check welding equipment and/or proper tools available for fastener installation and proper storage for mechanical fasteners		X		
Use of qualified welders, WPS followed, environmental conditions and control and handling of consumables		X		
Fasteners are positioned as required and installed in accordance with manufacturer's instructions		X		
Verify size and location of welds, including support, sidelap and perimeter welds. Welds meet visual acceptance criteria		X		
Check spacing, type and installation of support, sidelap and perimeter fasteners		X		
Verify repair activities		X		
CONCRETE CONSTRUCTION (1705.3)			ACI 318: Ch. 26	9
Reinforcing Steel Placement		X	ACI 318: Ch. 20, Ch 25, 26.6	
Welding of Reinforcing Steel			AWS D1.4/ACI 318: 26.6.4	8
Verification of weldability of reinforcing steel other than ASTM A 706		X	AWS D1.4/ACI 318 - 26.6	
Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X		AWS D1.4/ACI 318 - 26.6	
Shear reinforcement	X		AWS D1.4/ACI 318 - 26.6	
Other reinforcing steel		X	AWS D1.4/ACI 318 - 26.6	
Embedded Bolts & Plates		X	ACI 318: 17.8.2, 26.7, 26.8	
Verify Required Mix Design		X	ACI 318: Ch 19, 26.4.3, 26.4.4 IBC: 1904.1, 1904.2, 1908.2, 1908.3	
Concrete Sampling	X		ASTM C 172/ASTM C 31/ACI 318: 26.12	
Concrete / Shotcrete Placement	X		ACI 318: 26.4, 26.5 IBC: 1908	
Curing Temperature & Techniques		X	ACI 318: 26.5.3, 26.5.4 IBC:1908.9	
Application of Prestressing Forces	X		ACI 318: 26.10	
Grouting Bonded Prestressing Tendons	X		ACI 318: 26.10	
Erection of Precast Members		X	ACI 318: 26.9	
Verify In-Situ Strength		X	ACI 318: 26.12	10
Formwork Shape, Location & Dimensions		X	ACI 318: 26.11	
Post-Installed Anchor Placement			ACI 318: 17.8.2.4, 17.8.2, 26.7	11
Retaining Walls Bent Dowels Placement and Projection	X			

STRUCTURAL SPECIAL INSPECTION SCHEDULE NOTES:

1. ITEMS MARKED WITH AN 'X' SHALL BE INSPECTED IN ACCORDANCE WITH CHAPTER 17 OF THE BUILDING CODE BY A CERTIFIED SPECIAL INSPECTOR FROM AN ESTABLISHED TESTING AGENCY. FOR MATERIAL SAMPLING AND TESTING REQUIREMENTS, REFER TO THE PROJECT SPECIFICATIONS AND THE SPECIFIC GENERAL NOTES SECTIONS. THE TESTING AGENCY SHALL SEND COPIES OF ALL STRUCTURAL TESTING AND INSPECTION REPORTS DIRECTLY TO THE ARCHITECT, ENGINEER, CONTRACTOR, AND BUILDING OFFICIAL. ANY ITEMS WHICH FAIL TO COMPLY WITH THE APPROVED CONSTRUCTION DOCUMENTS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF DISCREPANCIES ARE NOT CORRECTED, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL, ARCHITECT, AND ENGINEER PRIOR TO COMPLETION OF THAT PHASE OF THE WORK. SPECIAL INSPECTION TESTING REQUIREMENTS APPLY EQUALLY TO ALL BIDDER DESIGNED COMPONENTS.
2. CONTINUOUS SPECIAL INSPECTION MEANS THE FULL-TIME OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY AN APPROVED SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED. PERIODIC SPECIAL INSPECTION MEANS THE PART-TIME OR INTERMITTENT OBSERVATION OF WORK REQUIRING SPECIAL INSPECTION BY AN APPROVED SPECIAL INSPECTOR WHO IS PRESENT IN THE AREA WHERE THE WORK HAS BEEN OR IS BEING PERFORMED AND AT THE COMPLETION OF THE WORK. (SECT 1702)
3. SPECIAL INSPECTION IS NOT REQUIRED FOR WORK PERFORMED BY AN APPROVED FABRICATOR PER SECTION 1704.2.5.1.
4. INSPECTION FOR PRE-FABRICATED CONSTRUCTION SHALL BE THE SAME AS IF THE MATERIAL USED IN THE CONSTRUCTION TOOK PLACE ON SITE. CONTINUOUS INSPECTION WILL NOT BE REQUIRED DURING PRE-FABRICATION IF THE APPROVED AGENCY CERTIFIES THE CONSTRUCTION AND FURNISHES EVIDENCE OF COMPLIANCE.
5. SLIP-CRITICAL CONNECTIONS MAY HAVE PERIODIC SPECIAL INSPECTION PROVIDED THAT DIRECT TENSION INDICATORS, TWIST-OFF BOLTS, OR TURN-OF-THE-NUT METHOD WITH MATCH MARKING TECHNIQUES ARE USED.
6. ALL WELDS SHALL BE VISIBLY INSPECTED.
7. ALL COMPLETE PENETRATION WELDS SHALL BE TESTED ULTRASONICALLY OR BY USING ANOTHER APPROVED METHOD.
8. PERIODIC SPECIAL INSPECTION IS ALLOWED FOR VERIFICATION OF THE WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706 AND SINGLE PASS FILLET WELDS (MAXIMUM 5/16") IN ACCORDANCE WITH BUILDING CODE SECTION 1705.3.1. CONTINUOUS SPECIAL INSPECTION IS REQUIRED FOR INSPECTION OF ALL OTHER WELDS NOT INCLUDED IN THE PERIODIC SPECIAL INSPECTION REQUIREMENTS NOTED ABOVE.
9. SPECIAL INSPECTION IS NOT REQUIRED FOR ISOLATED SPREAD FOOTINGS (≤ 3 STORIES), NON-STRUCTURAL SLABS, FOUNDATION WALLS, PATIOS, DRIVEWAYS AND SIDEWALKS PROVIDED THE REQUIREMENTS OF SECTION 1705.3 ARE MET.
10. PERIODIC SPECIAL INSPECTION IS REQUIRED FOR VERIFICATION OF IN-SITU CONCRETE STRENGTH FOR POST-TENSIONED CONCRETE PRIOR TO TENSIONING TENDONS AND FOR BEAMS AND STRUCTURAL SLABS BEFORE REMOVING SHORING OR FORMS.
11. CONTINUOUS SPECIAL INSPECTION IS REQUIRED FOR ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS IN ACCORDANCE WITH BUILDING CODE SECTION 1705.3. PERIODIC SPECIAL INSPECTIONS IS ALLOWED FOR MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN THE CONTINUOUS SPECIAL INSPECTIONS REQUIREMENTS NOTED ABOVE. POST-INSTALLED ANCHORS INTO MASONRY OR CONCRETE MAY BE USED ONLY WHEN APPROVED BY ARCHITECT AND/OR ENGINEER USING AN APPROVED PRODUCT WITH CURRENT PUBLISHED ICC-ES RESEARCH REPORT ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.8.2 IN ACI318 OR OTHER QUALIFICATION PROCEDURES.
12. SPECIAL INSPECTION OF SOILS SHALL REFERENCE THE APPROVED SOILS REPORT TO DETERMINE COMPLIANCE.
13. SPECIAL INSPECTION FOR STRUCTURAL STEEL SHALL BE PER AISC 303, SECTION 8 OR THE PROJECT CONTRACT DOCUMENTS, WHICHEVER IS MORE STRINGENT.
14. ANY CONSTRUCTION OR MATERIAL THAT HAS FAILED INSPECTION SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT.
15. THIS TABLE AND NOTES REPRESENT CODE REQUIREMENTS FOR STRUCTURAL PORTIONS OF THE PROJECT AND IS NOT A COMPLETE REPRESENTATION OF WHAT MAY BE REQUIRED BY CHAPTER 17 OF THE BUILDING CODE. SEE CHAPTER 17 AND PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

REINFORCEMENT DEVELOPMENT AND LAP SPLICE LENGTH - HORIZONTAL TOP BARS- UNCOATED

BAR SIZE	DEVELOPMENT LENGTH (ℓD)		LAP SPLICE LENGTH	
	CASE 1	CASE 2	CASE 1	CASE 2
#3	19"	28"	25"	37"
#4	25"	37"	33"	49"
#5	31"	47"	41"	61"
#6	37"	56"	49"	73"
#7	54"	81"	71"	106"
#8	62"	93"	81"	121"
#9	70"	105"	91"	136"
#10	79"	118"	102"	153"
#11	87"	131"	114"	170"

REINFORCEMENT DEVELOPMENT AND LAP SPLICE LENGTH -...

BAR SIZE	DEVELOPMENT LENGTH (ℓD)		LAP SPLICE LENGTH	
	CASE 1	CASE 2	CASE 1	CASE 2
#3	15"	22"	19"	28"
#4	19"	29"	25"	37"
#5	24"	36"	31"	47"
#6	29"	43"	37"	56"
#7	42"	63"	54"	81"
#8	48"	72"	62"	93"
#9	54"	81"	70"	105"
#10	61"	91"	79"	118"
#11	67"	101"	87"	131"

REINFORCEMENT DEVELOPMENT AND LAP SPLICE LENGTH NOTES:

1. HORIZONTAL BOTTOM BARS ARE HORIZONTAL BARS SO PLACED THAT 12" OR LESS OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE.
2. HORIZONTAL TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE.
3. CASE 1: CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN Db, CLEAR COVER NOT LESS THAN Db, AND STIRRUPS OR TIES THROUGHOUT ℓd NOT LESS THAN THE CODE MINIMUM OR CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAT 2db AND CLEAR COVER NOT LESS THAN db.
4. CASE 2: OTHER CASES
5. CASE 3: EPOXY COATED REINFORCEMENT WITH COVER LESS THAN 3db, OR CLEAR SPACING LESS THAN 6db.
6. MULTIPLY VALUES SHOWN BY 1.3 FOR LIGHTWEIGHT CONCRETE.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

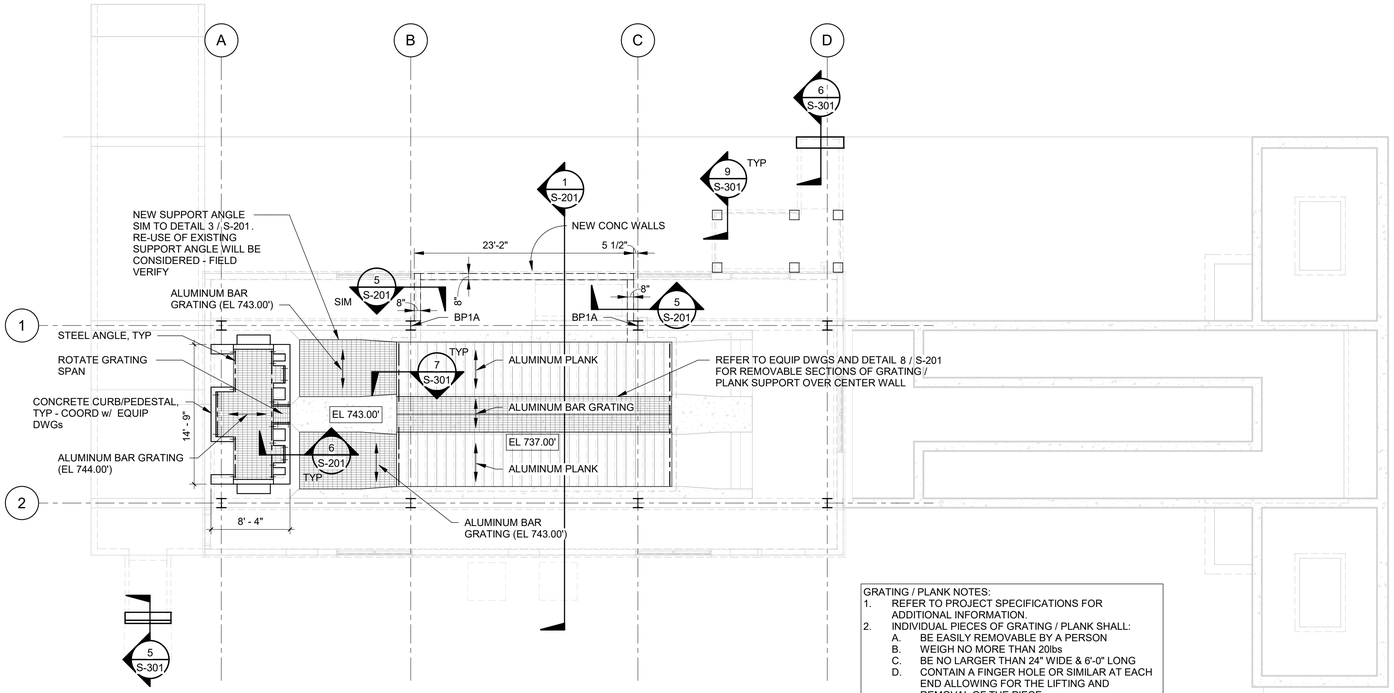
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

STRUCTURAL
NOTES AND LEGENDS SHEET 2 OF 2

SCALE: 12" = 1'-0"

DRAWING No. S-002

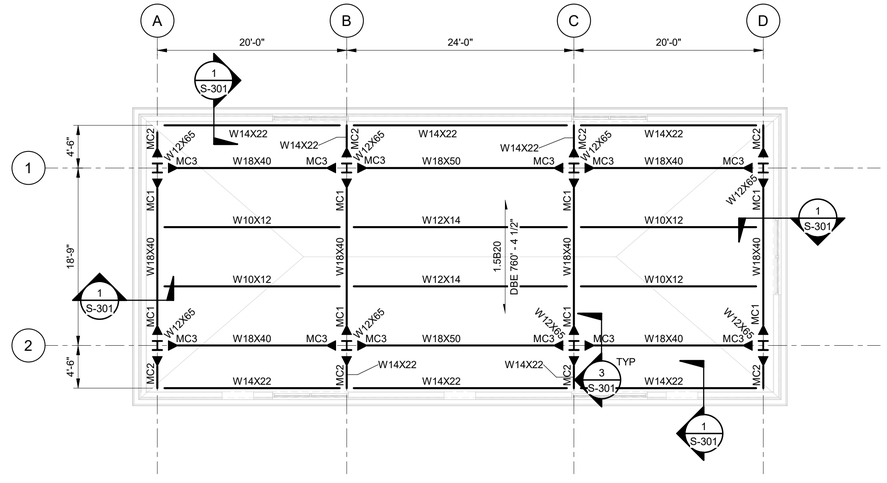
SHEET No. 29 OF 52



GRATING / PLANK NOTES:
1. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. INDIVIDUAL PIECES OF GRATING / PLANK SHALL:
   - A. BE EASILY REMOVABLE BY A PERSON
   - B. WEIGH NO MORE THAN 20lbs
   - C. BE NO LARGER THAN 24" WIDE & 6'-0" LONG
   - D. CONTAIN A FINGER HOLE OR SIMILAR AT EACH END ALLOWING FOR THE LIFTING AND REMOVAL OF THE PIECE.
   - E. BE CUT TO FIT AS TIGHTLY AS POSSIBLE BETWEEN SUPPORTS, "TABS", ETC. GAPS AT ENDS AND SIDES SHALL BE NO LARGER THAN 1/8" (1/16" IS PREFERRED)

Level 01 - Floor Framing Plan

1/8" = 1'-0"



Level 02 - Roof Framing Plan

1/8" = 1'-0"

ROOF FRAMING PLAN NOTES

ROOF BEAM NOMENCLATURE IS AS FOLLOWS:

AISC STEEL DESIGNATION — CAMBER (IF ANY)

15k W14x22 c=3/4" 15k

BEAM END REACTION: COMBINED SERVICE LOAD EFFECT FROM ALLOWABLE STRESS DESIGN LOAD COMBINATIONS, UNO.

1. ROOF DECK BEARING ELEVATION (DBE) = 760.38 UNLESS NOTED THUS (XXX'-X") ON PLAN. STRUCTURE SHALL SLOPE UNIFORMLY BETWEEN POINTS OF UNEQUAL ELEVATION.
2. BEAMS ARE EQUALLY SPACED BETWEEN GRIDS OR COLUMNS UNLESS DIMENSIONED OTHERWISE.
3. ROOF DECK:
   - A. UNO, ROOF DECK SHALL BE GALVANIZED METAL DECK, MINIMUM 3 SPAN CONTINUOUS (OR EQUIVALENT). TYPE AND GAUGE OF DECK IS AS INDICATED BELOW.
   - B. UNO, WELD TO SUPPORTS SHALL BE 5/8" PUDDLE WELDS IN A 36/4 PATTERN FOR 36" WIDE SHEETS. ALTERNATE: FASTEN WITH POWDER ACTIVATED FASTENERS AT THE SAME SPACING IF PERMITTED BY JOIST SUPPLIER. SUBMIT PAF SIZE AND TYPE TO A/E FOR REVIEW.
   - C. UNO, SIDELAP FASTENERS SHALL BE #10 BUILDEX TRAXX SCREWS (OR EQUIVALENT) BETWEEN SUPPORTS, SPACED AT 36" ON CENTER FOR SPANS OVER 5'-0" IN LENGTH. NO FASTENERS REQUIRED FOR SPANS LESS THAN 5'-0".
   - D. UNO, AT BEARING ENDS OF DECK, WELD DECK EDGES TO SUPPORTS AT EACH DECK RIB WITH 5/8" PUDDLE WELD.
   - E. UNO, AT DECK EDGES WHERE DECK RUNS PARALLEL, PROVIDE (2) 5/8" PUDDLE WELDS AT EACH JOIST OR BEAM. WHERE A CONTINUOUS STEEL SUPPORT HAS BEEN PROVIDED, WELD TO SUPPORTING MEMBER WITH 5/8" PUDDLE WELDS AT 12" OC.
4. LAP ENDS OF ROOF DECK SHEETS 4" (MIN) OVER BEAMS OR JOISTS.
5. ▶ INDICATES BEAM TO COLUMN OR THRU BEAM MOMENT CONNECTION. MCXX REFERS TO MOMENT CONNECTION # - SEE DETAILS.
6. DESIGN BEAMS W/O REACTION IDENTIFIED ON PLAN FOR VERTICAL ALLOWABLE LOAD OF 10K.
7. 1.5Bxx INDICATES 1-1/2" WIDE RIB METAL ROOF DECK. XX INDICATES THE GAUGE OF THE DECK.

8' 4' 0' 8' 16'

1/8" = 1'-0"

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

STRUCTURAL

UV AREA & ENCLOSURE - MAIN LEVEL/ROOF PLAN

SCALE: As Indicated

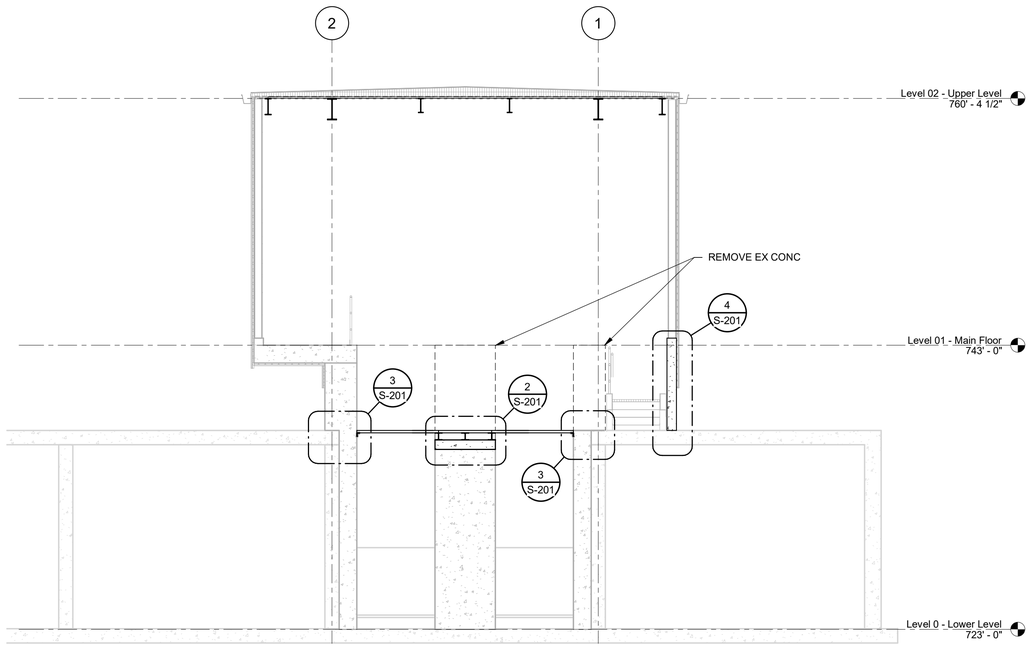
DRAWING No.: S-101

SHEET No.

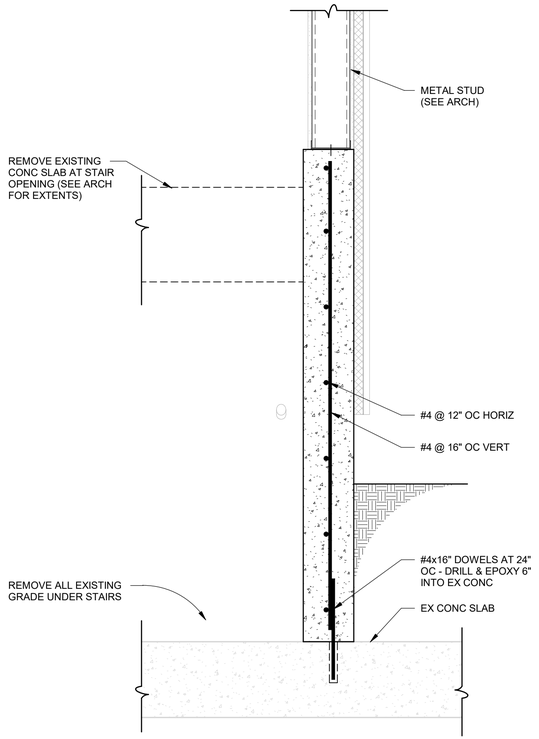
30 OF 52

Plot Date: 9/6/2023 1:57:14 PM

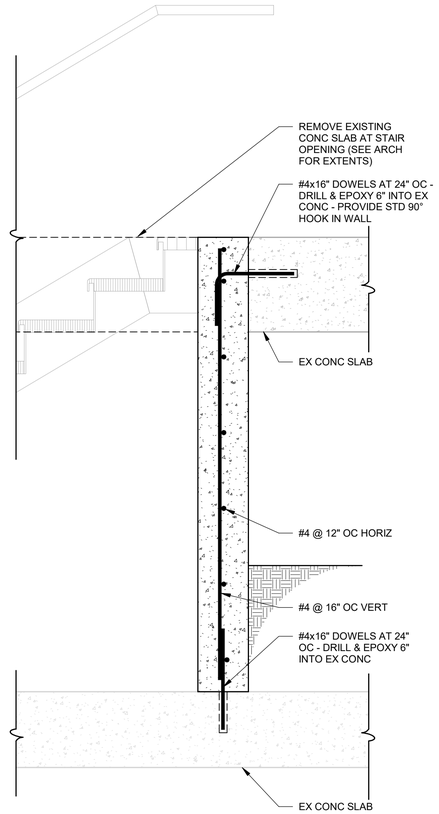
BIM 360://413104 – Ann Arbor WWTP UV Replacement/RS21_2205_021_AA UV_Stru_Central.rvt



1 S-101 BUILDING SECTION NS
3/16" = 1'-0"

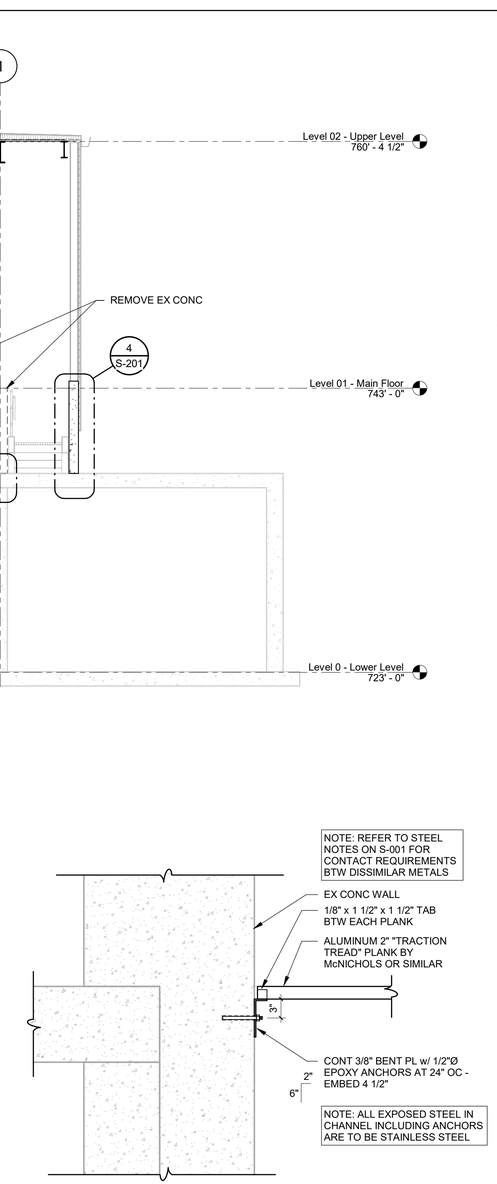


4 S-201 FOUNDATION WALL DETAIL AT EXTERIOR STAIR PERIMETER
1" = 1'-0"

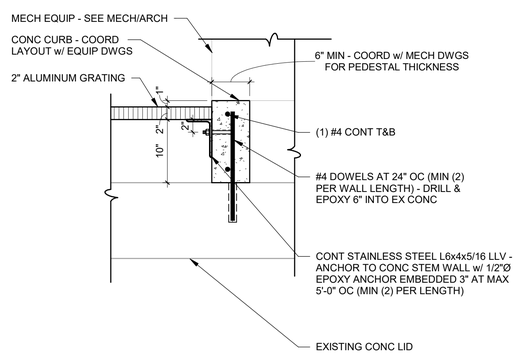


5 S-101 FOUNDATION WALL DETAIL AT INTERIOR STAIR PERIMETERS
1" = 1'-0"

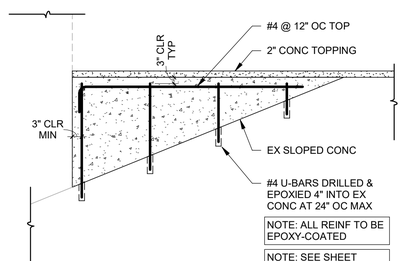
2 S-201 PIT DETAIL
3/4" = 1'-0"



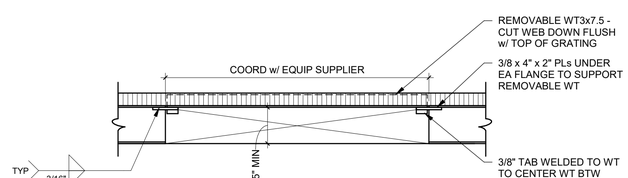
3 S-201 GRATING SUPPORT AT EX CONC WALL
1" = 1'-0"



6 S-101 DETAIL AT CURB BELOW ELECTRICAL EQUIPMENT
1" = 1'-0"



7 CONCRETE INFILL DETAIL
1/2" = 1'-0"



8 REMOVABLE PORTION OF BEAM DETAIL
1" = 1'-0"

12" 6" 0' 1' 2' 3' 4' 5'
1/2" = 1'-0"

12" 6" 0' 1' 2' 3'
3/4" = 1'-0"

12" 9" 6" 3" 0' 1' 2'
1" = 1'-0"

6' 4' 2' 0' 5' 10'
3/16" = 1'-0"

Plot Date: 9/6/2023 1:57:14 PM

B:\M 360://413104 – Ann Arbor WWTP UV Replacement/RS21_2205-021_AA UV_Stru_Central.rvt

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

STRUCTURAL

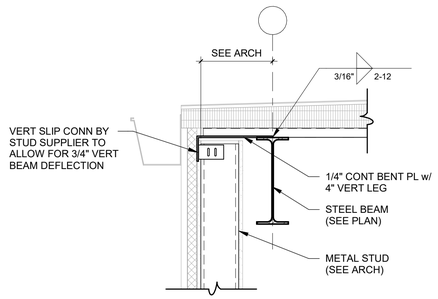
UV AREA - SECTIONS AND DETAILS

SCALE: As indicated

DRAWING No.: S-201

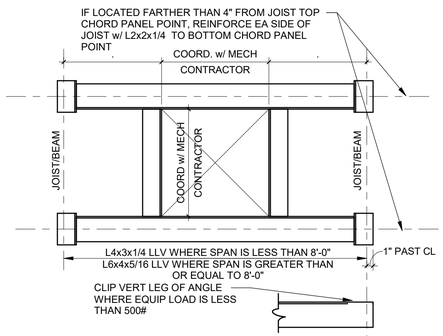
SHEET No.

31 OF 52



1 S-101 TYPICAL ROOF EDGE DETAIL

1" = 1'-0"

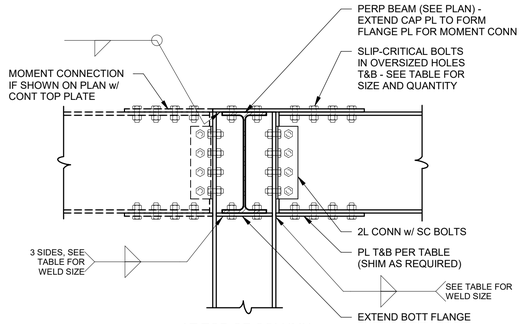


NOTES:

1. THIS DETAIL APPLIES TO ALL ROOF OPENINGS LARGER THAN 18". ALL OPENINGS ARE NOT NECESSARILY SHOWN ON STRUCTURAL DRAWINGS. COORDINATE OPENINGS WITH FINAL ARCH AND MECHANICAL DRAWINGS.
2. AT FLOOR OPENINGS, PROVIDE POUR STOP AT TOP OF FRAME PER TYP DETAIL.
3. AT EXISTING BUILDING, FIELD WELD FRAME TOGETHER AS REQUIRED TO ALLOW FOR INSTALLATION AND TOLERANCE.

2 TYPICAL ROOF OPENING FRAME

1" = 1'-0"



AT TOP OF COLUMN

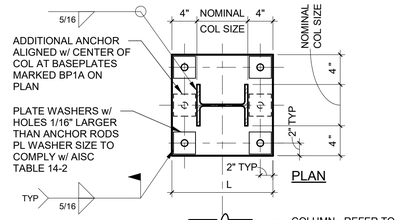
MOMENT CONNECTION SCHEDULE				
MARK	FLANGE PLs	BOLT SIZE	BOLT ROWS	WELD TO COL FLANGE
MC-1	1/2"x6"	3/4" DIA	3	1/4" FILLET
MC-2	1/2"x6"	3/4" DIA	2	1/4" FILLET
MC-3	1/2"x6"	3/4" DIA	1	1/4" FILLET

MOMENT CONNECTION NOTES

1. BEAM AND COLUMN SIZES AND ELEVATIONS MAY VARY. SEE PLAN FOR ALL SIZE AND ELEVATION INFORMATION.

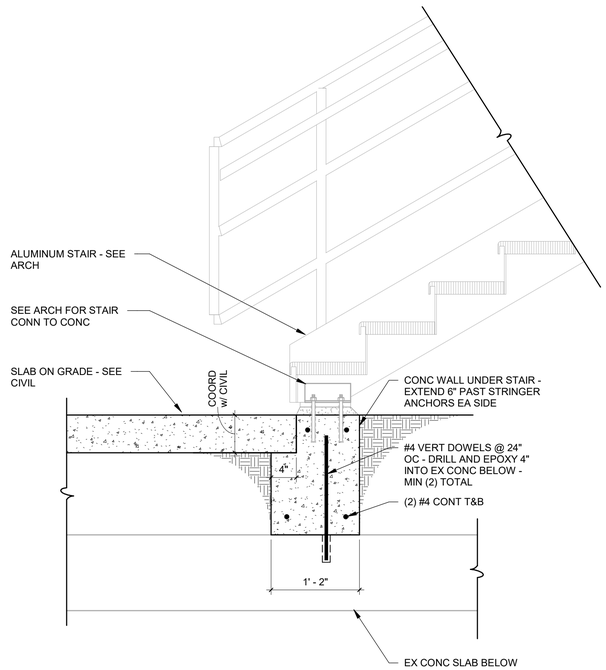
3 S-101 MOMENT CONNECTION SCHEDULE & DETAILS

1" = 1'-0"



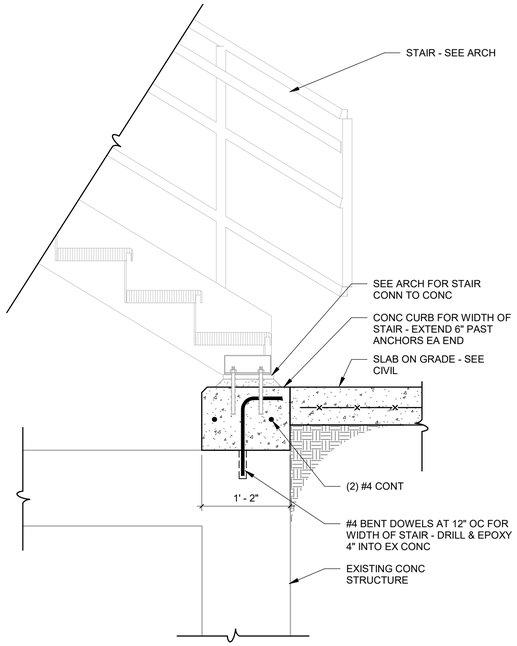
4 TYPICAL COLUMN SETTING/BASE PLATE DETAIL

1" = 1'-0"



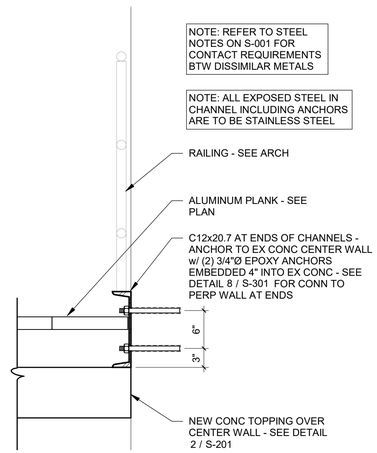
5 S-101 DETAIL AT BOTT OF STAIR

1" = 1'-0"



6 S-101 SOUTHEAST STAIR SUPPORT AT BASE

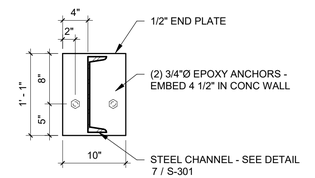
1" = 1'-0"



7 S-101 DETAIL AT ENDS OF CHANNELS

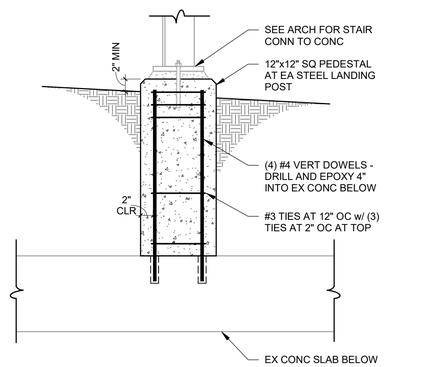
1" = 1'-0"

NOTE: ALL EXPOSED STEEL IN CHANNEL INCLUDING ANCHORS ARE TO BE STAINLESS STEEL



8 STEEL CHANNEL CONN TO PERPENDICULAR WALL

1" = 1'-0"



9 S-101 PEDESTAL FOR LANDING POSTS

1" = 1'-0"

12" 9" 6" 3" 0" 1' 2'

1" = 1'-0"

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

STRUCTURAL

UV ENCLOSURE - SECTIONS AND FRAMING DETAILS

SCALE 1" = 1'-0"

DRAWING No. S-301

SHEET No. 32 OF 52

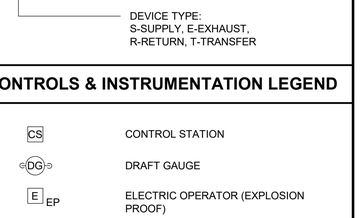
SYSTEM ABBREVIATIONS

CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
C	CONDENSATE DRAIN
CDWR	CONDENSER WATER RETURN
CDWS	CONDENSER WATER SUPPLY
EA	EXHAUST AIR
FA	FOUL AIR
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM (<15 PSIG)
OA	OUTSIDE AIR
R	REFRIGERANT
RA	RETURN AIR
SA	SUPPLY AIR

HVAC LEGEND

- DIFFUSER FOR FLEXIBLE DUCT
- 30"x20"(L) — DUCTWORK DIMENSIONS, THE FIRST DIMENSION IS THE SIDE SEEN OR SIDE THE LEADER LINE TOUCHES. SEE GENERAL MECHANICAL NOTES.
- FLEXIBLE CONNECTION
- FLEXIBLE DUCTWORK
- UP / DN — INCLINED RISE (UP) OR DROP (DN) IN RESPECT TO DIRECTION OF AIRFLOW
- NEGATIVE PRESSURE DUCT
- POSITIVE PRESSURE DUCT
- REGISTER, GRILLE OR DIFFUSER
- ROUND OR FLEXIBLE DUCT TAKEOFF
- ROUND TO SQUARE TRANSITION
- TURNING VANES

AIR INLET & OUTLET IDENTIFICATIONS



CONTROLS & INSTRUMENTATION LEGEND

- CS — CONTROL STATION
- DG — DRAFT GAUGE
- E EP — ELECTRIC OPERATOR (EXPLOSION PROOF)
- E M — ELECTRIC OPERATOR (MODULATING)
- E — ELECTRIC OPERATOR (2 POSITION)
- EVS 1 — EMERGENCY VENTILATION SWITCH W/ NUMBER
- FS — FLOW SWITCH
- GAUGE ACTIVATOR/ISOLATOR
- H 1 — HUMIDISTAT W/ NUMBER
- LS — LEVEL SWITCH
- PDS 1 — PRESSURE DIFFERENTIAL SWITCH W/ NUMBER
- P — PRESSURE GAUGE W/ SHUTOFF VALVE
- PS — PRESSURE SWITCH
- SMD 1 — SMOKE DETECTOR W/ NUMBER
- S — SOLENOID OPERATOR
- THERMOMETER - DIAL TYPE
- THERMOMETER - STEM TYPE
- TS 1 — TEMPERATURE SENSOR WITH NUMBER
- T 1 — THERMOSTAT WITH NUMBER
- V — VACUUM GAUGE W/ SHUTOFF VALVE

MECHANICAL ABBREVIATIONS

A

A	ALARM
AC	AIR COMPRESSOR
AD	ACCESS DOOR
AF	AIR FLOW, AIRFOIL
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISH FLOOR
AFM	AIR FLOW MONITOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
AP	ACCESS PANEL
APPROX	APPROXIMATE
AS	AIR SEPARATOR
ATU	AIR TERMINAL UNIT
AUTO	AUTOMATIC
AVG	AVERAGE

B

B	BELT DRIVE, BLOW THROUGH
BDD	BACKDRAFT DAMPER
BF	BLIND FLANGE
BFF	BELOW FINISH FLOOR
BFP	BACKFLOW PREVENTER
BH	BASEBOARD HEATER
BI	BACKWARD INCLINED, BUILT-IN THERMOSTAT
BL	BOTTOM LEVEL
BLDG	BUILDING
BLR	BLOWER
BOD	BOTTOM OF DUCT ELEVATION
BOT	BOTTOM
BTUH	BRITISH THERMAL UNITS PER HOUR
BU	BELL-UP
BV	BALL VALVE

C

C	CHANNEL, CONVECTOR, COOLING, COOLING (MAKE ON RISE)
CB	CENTRIFUGAL BLOWER
CBD	COUNTERBALANCE BACKDRAFT DAMPER
CC	COOLING COIL
CD	CONTROL DAMPER
CDWP	CONDENSER WATER PUMP
CENTR	CENTRIFUGAL
CF	CABINET FAN
CFM	CUBIC FEET PER MINUTE
CH	CONVECTION HEATER
CL	CENTERLINE
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUATION
CS	CONTROL STATION
CT	COOLING TOWER
CU	CONDENSING UNIT
CV	CHECK VALVE, CONTROL VALVE
CWP	CHILLED WATER PUMP

D

D	DIRECT DRIVE, DRAW-THRU
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEH	DEHUMIDIFIER
DF	DUCT FAN
DIA	DIAMETER
DM	DUCT MOUNTED
DN	DOWN
DX	DIRECT EXPANSION

E

E	ELECTRIC, ELECTRIC OPERATOR, EXHAUST
EA	EACH, EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ECONOMIZER, EVAPORATIVE COOLER
ECH	ELECTRIC CABINET HEATER
ECP	EQUIPMENT CONTROL PANEL
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
EGS	EMERGENCY GAS SCRUBBER
EIH	ELECTRIC INFRARED HEATER
EL	ELEVATION
EP	EXPLOSION PROOF
EQUIP	EQUIPMENT
ES	EMERGENCY SWITCH
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EV	EXHAUST VALVE
EVS	EMERGENCY VENTILATION SWITCH
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING

F

F	DEGREES FAHRENHEIT
FBD	FACE AND BYPASS DAMPER
FC	FORWARD CURVE, FAN COIL
FD	FIRE DAMPER
FDB	DEGREES FAHRENHEIT DRY BULB
FEF	FUME EXHAUST FAN
FLEX	FLEXIBLE
FM	FLOW METER
FPM	FEET PER MINUTE
FR	FUNNEL RECEPTOR
FRP	FIBERGLASS REINFORCED PLASTIC PIPE
FS	FLOW SWITCH
FSD	COMBINATION FIRE/SMOKE DAMPER
FT	FEET, FIN TUBE HEATER
FUR	FURNACE
FWB	DEGREES FAHRENHEIT WET BULB

G

GA	GAUGE
GALV	GALVANIZED
GIH	GAS INFRARED HEATER
GPM	GALLONS PER MINUTE
GUH	GAS UNIT HEATER
GV	GATE VALVE

H

H	HAND OPERATOR, HEATING, HEATING (MAKE ON FALL), HEIGHT, HORIZONTAL, HUMIDISTAT
HC	HEATING COIL
HCH	HEATING WATER CABINET HEATER
HE	HEAT EXCHANGER
HO	HAND-OFF
HOA	HAND-OFF-AUTO
HP	HEAT PUMP, HORSEPOWER
HR	HEAT RECOVERY UNIT
HUH	HEATING WATER UNIT HEATER
HUM	HUMIDIFIER
HWB	HEATING WATER BOILER
HWP	HEATING WATER PUMP
HZ	HERTZ

I

I	INTAKE
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT

K

KW	KILOWATT

L

L	LINED DUCT, LOUVER
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	COMBINATION LOUVER/DAMPER
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
LWT	LEAVING WATER TEMPERATURE

M

MAU	MAKEUP AIR UNIT
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPS
ME	MIST ELIMINATOR
MFR	MANUFACTURER
MOCP	MAXIMUM OVERCURRENT PROTECTION
MIN	MINIMUM
MOD	MODULATING

N

NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED

O

OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER

P

P	PNEUMATIC
PD	PRESSURE DROP (INCHES OF WATER FOR AIR, FEET OF WATER FOR FLUIDS)
PAC	PACKAGED AIR CONDITIONING UNIT
PAH	PACKAGED AIR HANDLING UNIT
PDS	PRESSURE DIFFERENTIAL SWITCH
PF	PROPELLER FAN
PHP	PACKAGED HEAT PUMP
PL	PLATE
POS	POSITION
PPM	PARTS PER MILLION
PROP	PROPELLER
PRS	PRESSURE REDUCING STATION
PRV	POWER ROOF VENTILATOR, PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PTAC	PACKAGED TERMINAL AIR CONDITIONER

R

RA	REACTIVATION AIR, RETURN AIR
RAC	ROOM AIR CONDITIONER
RCS	REMOTE CONTROL STATION
REQD	REQUIRED
RH	RELATIVE HUMIDITY, ROOF HOOD
RSF	ROOF SUPPLY FAN

S

SA	SUPPLY AIR
SCD	SMOKE CONTROL DAMPER
SCFM	STANDARD CUBIC FEET PER MINUTE
SF	SQUARE FEET, SUPPLY FAN
SH	SHEET
SIM	SIMILAR
SMD	SMOKE DETECTOR
SP	STATIC PRESSURE (INCHES OF WATER)
SPS	STATIC PRESSURE SENSOR
SS	STAINLESS STEEL
STD	STANDARD
SV	SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE

T

T	THERMOSTAT
TCP	TEMPERATURE CONTROL PANEL
TCV	TEMPERATURE CONTROL VALVE
TE	TEMPERATURE ELEMENT
TL	TOP LEVEL
TS	TIP SPEED
TYP	TYPICAL

V

V	VERTICAL
VAC	VACUUM OUTLET
VANE	VANEAXIAL
VAV	VARIABLE AIR VOLUME
VCD	VOLUME CONTROL DAMPER
VF	VANEAXIAL FAN

W

W	WIDE FLANGE, WIDTH
WB	WET BULB
WC	WATER CHILLER WATER COLUMN
WF	WALL FAN
WG	WATER GAUGE
WH	WALL HEATER
WM	WALL MOUNTED
WST	WATER STORAGE TANK
WT	WEIGHT
WV	WATER CONTROL VALVE

Z

ZD	ZONE DAMPER

GENERAL HVAC NOTES

1. THIS IS THE GENERAL LEGEND AND ABBREVIATION SHEET FOR HVAC DRAWINGS. SOME ITEMS CONTAINED ON THIS SHEET MAY NOT BE USED ON THIS SPECIFIC PROJECT.
2. ALL MECHANICAL HVAC WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING APPLICABLE CODES:
   2015 MICHIGAN BUILDING CODE, BASED ON INTERNATIONAL BUILDING CODE (IBC), 2015 WITH LOCAL AMENDMENTS.
   2015 MICHIGAN MECHANICAL CODE, BASED ON INTERNATIONAL MECHANICAL CODE (IMC), 2015 WITH LOCAL AMENDMENTS.
   INTERNATIONAL FIRE CODE (IFC), 2015 WITH LOCAL AMENDMENTS.
   2015 MICHIGAN ENERGY CODE, BASED ON INTERNATIONAL ENERGY CONSERVATION CODE (IECC), 2015 WITH LOCAL AMENDMENTS.
3. "SCREENED" DELINEATION DENOTES EXISTING AND NEW FACILITIES AND IS FOR REFERENCE ONLY. "LIGHT" LINE DELINEATION DENOTES EXISTING MECHANICAL EQUIPMENT AND SYSTEMS. EXISTING FACILITY AND MECHANICAL SYSTEMS INFORMATION WAS TAKEN FROM PREVIOUS DRAWINGS, CONSTRUCTION RECORDS, DATA, AND FIELD SURVEY INFORMATION. ACTUAL LOCATION, ARRANGEMENT, AND DIMENSIONS SHALL BE FIELD VERIFIED AND WORK INSTALLED TO MEET ACTUAL CONDITIONS AND LOCATIONS ENCOUNTERED. "BOLD" (DARK) DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.
4. METAL ROOF DECKING OR BOTTOM CHORD OF BAR JOISTS SHALL NOT BE USED FOR THE SUPPORT OF EQUIPMENT, PIPING, OR DUCTWORK.
5. ALL HANGERS, BRACKETS, OR BRACES FOR PIPING, DUCTWORK AND EQUIPMENT ARE NOT INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS NOT SHOWN ON THE PLANS.
6. OUTSIDE AIR INLETS SHALL BE LOCATED A MINIMUM OF 10'-0" AWAY FROM ANY EXHAUST AIR OR PLUMBING VENT OUTLET.
7. ALL EQUIPMENT, PIPING AND DUCTWORK FINAL LOCATIONS SHALL BE COORDINATED TO AVOID INTERFERENCES WITH STRUCTURE, OTHER PIPING, EQUIPMENT, DUCTWORK, AND CONDUIT.
8. DUCT CONNECTIONS TO EQUIPMENT, PIPING SIZES TO EQUIPMENT, AND EQUIPMENT SUPPORTS SHALL BE VERIFIED AND ADJUSTED TO MATCH ACTUAL EQUIPMENT FURNISHED.
9. CONTROL DAMPER SIZES SHALL MATCH DIMENSIONS OF ASSOCIATED LOUVER UNLESS OTHERWISE INDICATED.
10. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE WITH A MINIMUM HEIGHT OF 8'-0" ABOVE THE WALKING SURFACE UNLESS OTHERWISE INDICATED BY A CENTERLINE OR BOTTOM OF DUCT ELEVATION.
11. DUCTWORK SHALL BE FABRICATED, REINFORCED, SUPPORTED AND SEALED FOR OPERATING PRESSURES INDICATED IN THE SCHEDULES FOR THE EQUIPMENT IT SERVES. ALL DUCTWORK SHALL HAVE A MINIMUM SMACNA PRESSURE CLASSIFICATION OF ONE INCH.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

HVAC

LEGENDS, ABBREVIATIONS AND GENERAL NOTES

SCALE 12" = 1'-0"

DRAWING No. H-001

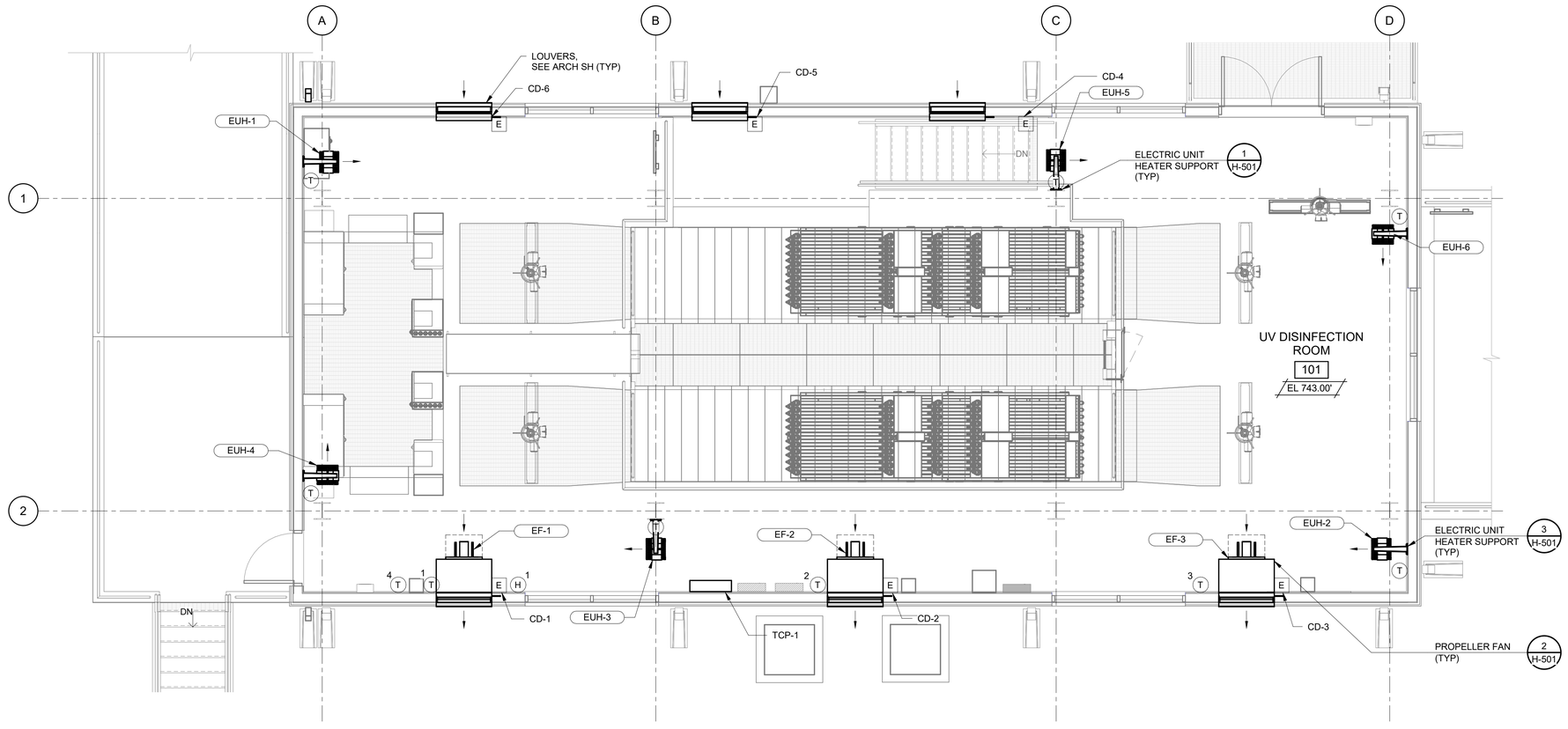
SHEET No. 33 OF 52

Plot Date: 9/7/2023 2:56:14 PM

BIM 360://413104 — Ann Arbor WWTP UV Replacement/413104-AA_UV-BV.rvt

GENERAL SHEET NOTES

1. SEE DRAWING H-001 FOR HVAC LEGENDS AND GENERAL NOTES.
2. ALL THERMOSTATS SHALL BE CORROSION RESISTANT TYPE. ALL OTHER INSTRUMENTS SHOWN ON PLAN SHALL BE HOUSED IN NEMA 4X ENCLOSURES



MAIN FLOOR - FLOOR PLAN

1/4" = 1'-0"

4' 2' 0' 4' 8'

1/4" = 1'-0"

Plot Date: 9/7/2023 2:56:15 PM

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

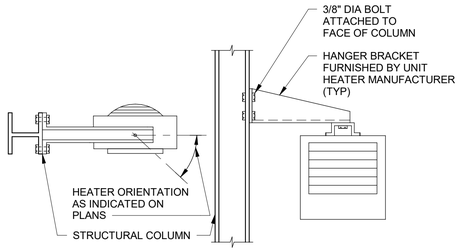
HVAC

UV FLOOR PLAN

SCALE 1/4" = 1'-0"

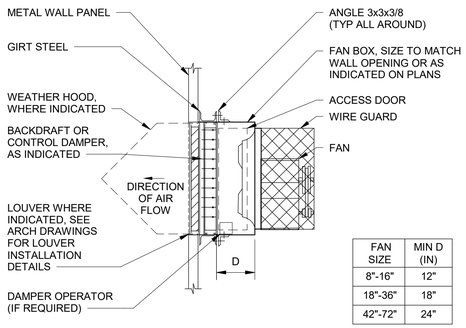
DRAWING No. H-101

SHEET No. 34 OF 52



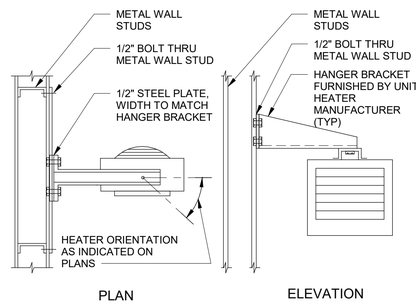
NOTES:
UNIT HEATER BOTTOM ELEVATION SHALL BE 8 FT ABOVE FINISHED FLOOR UNLESS OTHERWISE INDICATED.

1 ELECTRIC UNIT HEATER SUPPORT
NO SCALE



FAN SIZE	MIN D (IN)
8"-16"	12"
18"-36"	18"
42"-72"	24"

2 PROPELLER FAN
NO SCALE



3 ELECTRIC UNIT HEATER SUPPORT
NO SCALE

GENERAL SHEET NOTES

SEE DRAWING H-001 FOR HVAC LEGENDS AND GENERAL NOTES.

SCHEDULE LEGEND NOTES:

FAN SCHEDULE:

FAN TYPE ABBREVIATIONS:
PF - PROPELLER FAN.

WHEEL TYPE ABBREVIATIONS:
P - PROPELLER.

NOTES:
1. UNIT IS SUBJECT TO CORROSION FROM A HYDROGEN SULFIDE LADEN HUMID ATMOSPHERE. ALL AIRSTREAM COMPONENTS SHALL BE GIVEN A PROTECTIVE SPECIAL COATING OF HERESITE OR APPROVED EQUAL. CONTROLS PANELS, WIRING CONNECTIONS AND OTHER SENSITIVE ELECTRONICS SHALL HAVE A CONFORMAL COATING APPLIED
2. CONSTRUCTION A) ALUMINUM FAN BLADES B) STEEL FAN BLADES
3. ADJUSTABLE FREQUENCY DRIVE (AFD) FOR VARIABLE FAN SPEED CONTROL. ELECTRICALLY COMMUTATED MOTORS AND CONTROLS ARE ACCEPTABLE IN PLACE OF SPECIFIED AFD.
4. TEFC MOTOR

HEATER SCHEDULE:

TYPE ABBREVIATIONS:
EUHCR - CORROSION RESISTANT ELECTRIC UNIT HEATER

NOTES:
1. WALL MOUNTING BRACKET.

FAN SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	FAN TYPE	AIRFLOW (CFM)	ESP (IN WC)	BRAKE HP	MOTOR HP	POWER SUPPLY VOLTS	POWER SUPPLY PHASE	MINIMUM WHEEL DIAMETER (IN)	WHEEL TYPE	DRIVE	VIBRATION ISOLATION	APPROX WEIGHT (LBS)	NOTES
EF-1	UV ROOM - 101	GREENHECK	AER-20-03-0625	PF	1100 MIN / 3100 MAX	0.5	0.57	1	480	3	20	P	DIRECT	INTERNAL	150	1, 2A, 3, 4
EF-2	UV ROOM - 101	GREENHECK	AER-20-03-0625	PF	3000	0.5	0.57	1	480	3	20	P	DIRECT	INTERNAL	150	1, 2A, 3, 4
EF-3	UV ROOM - 101	GREENHECK	AER-20-03-0625	PF	3000	0.5	0.57	1	480	3	20	P	DIRECT	INTERNAL	150	1, 2A, 3, 4

HEATER SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	TYPE	UNIT ORIENTATION	EAT (F)	AIR FLOW (CFM)	OUTPUT CAPACITY (KW)	MOTOR HP	POWER SUPPLY VOLTS	POWER SUPPLY PHASE	APPROX WEIGHT (LBS)	NOTES
EUH-1	UV ROOM - 101	CHROMALOX	HD3D-1500	EUHCR	HORIZONTAL	55	1180	10	1/15	480	3	100	1
EUH-2	UV ROOM - 101	CHROMALOX	HD3D-1500	EUHCR	HORIZONTAL	55	1180	10	1/15	480	3	100	1
EUH-3	UV ROOM - 101	CHROMALOX	HD3D-1500	EUHCR	HORIZONTAL	55	1180	10	1/15	480	3	100	1
EUH-4	UV ROOM - 101	CHROMALOX	HD3D-1500	EUHCR	HORIZONTAL	55	1180	10	1/15	480	3	100	1
EUH-5	UV ROOM - 101	CHROMALOX	HD3D-1500	EUHCR	HORIZONTAL	55	1180	10	1/15	480	3	100	1
EUH-6	UV ROOM - 101	CHROMALOX	HD3D-1500	EUHCR	HORIZONTAL	55	1180	10	1/15	480	3	100	1

HVAC SEQUENCE OF OPERATION

1. GENERAL SYSTEM OPERATIONS.

1.1. TEMPERATURE CONTROL PANEL(S). TEMPERATURE CONTROL PANEL(S) (TCP) IDENTIFIED IN THE SEQUENCE OF OPERATION SHALL BE PROVIDED WITH THE INDICATING LIGHTS, RUNNING LIGHTS, ALARM LIGHTS, AUDIBLE ALARMS, TIMERS, AND SELECTOR SWITCHES FOR CONTROL AND STATUS INDICATION OF THE EQUIPMENT SERVED. WHERE NO CONTROL PANELS ARE PROVIDED FOR EQUIPENT, THE LIGHTS AND SWITCHES SHALL BE AT THE STARTER OR MCC. RUNNING LIGHTS SHALL BE PROVIDED TO INDICATE BOTH ENERGIZED AND DE-ENERGIZED CONDITIONS FOR THE EQUIPMENT AND SHALL POSITIVELY INDICATE EQUIPMENT CONDITIONS FROM THE MOTOR STARTER OR CURRENT SENSOR. SWITCH POSITION SHALL NOT BE USED FOR LIGHT ILLUMINATION. INDICATING AND RUNNING LIGHTS SHALL BE LOCATED DIRECTLY ABOVE EACH RESPECTIVE SELECTOR SWITCH WITH LIGHT COLORS AS FOLLOWS:

RED - DE-ENERGIZED
GREEN - ENERGIZED
AMBER - ALARM
WHITE - STATUS

INDICATING LIGHTS AND SELECTOR SWITCHES SHALL BE LOCATED ON THE FACE OF THE TEMPERATURE CONTROL PANEL SERVING THE RESPECTIVE EQUIPMENT. IN ADDITION TO THE LIGHTS, TIMERS, AND SELECTOR SWITCHES DESCRIBED IN THE SEQUENCE OF OPERATION FOR THE INDIVIDUAL EQUIPMENT, EACH CONTROL PANEL SHALL BE PROVIDED WITH THE FOLLOWING:

"CONTROL POWER ON" STATUS LIGHT
"INDICATING LIGHT TEST" PUSHBUTTON
ALARM SILENCE PUSHBUTTON
"ALARM RESET" PUSHBUTTON (WHERE APPLICABLE)

CONTROL PANELS SPECIFIED TO BE PROVIDED WITH ALARM CONDITION INDICATING LIGHTS SHALL BE PROVIDED WITH AN ELECTRICALLY ISOLATED CONTACT TO PROVIDE A COMMON ALARM TO THE PLANT CONTROL SYSTEM (PCS). EACH CONTROL PANEL SHALL BE PROVIDED WITH A MINIMUM OF ONE COMMON ALARM OUTPUT POINT TO THE PCS.

TEMPERATURE CONTROL PANELS SHALL COME WITH PHENOLIC NAMEPLATES FOR EACH CONTROL SWITCH INDICATING SWITCH TYPE, EQUIPMENT CONTROLLED, ROOM OR AREA SERVED, AND SWITCH AUTOMATIC POSITION EQUIPMENT INTERLOCK.

1.2. SYSTEM INTERLOCKS AND ALARMS

UNLESS OTHERWISE INDICATED, ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDED WITHIN THE RESPECTIVE TEMPERATURE CONTROL PANEL (TCP).

1.2.2 LOW TEMPERATURE PROTECTION. LOW AIR TEMPERATURE THERMOSTATS/SENSORS SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE THERMOSTAT SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT, CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL RETURN TO THE NORMAL POSITION, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE TEMPERATURE CONTROL PANEL SHALL BE ILLUMINATED AND AN ALARM INDICATION SENT TO THE PLANT CONTROL SYSTEM (PCS) UNDER THE COMMON ALARM REFERENCED IN PARAGRAPH 1.1. AN ADJUSTABLE 0 TO 15 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO AVOID NUISANCE ALARMS AND EQUIPMENT SHUTDOWNS UNDER COLD AMBIENT CONDITIONS. UPON LOW TEMPERATURE SHUTDOWN, THE EQUIPMENT SHALL REQUIRE A MANUAL RESTART.

EQUIPMENT	THERMOSTAT	TEMPERATURE/EQUIPMENT CONTROL PANEL
EF-1	T-4	TCP-1

2. HEATING SYSTEMS.

2.1. UNIT HEATERS. UNIT HEATERS SHALL BE CONTROLLED BY THEIR RESPECTIVE WALL MOUNTED THERMOSTATS.

3. VENTILATING/EXHAUST SYSTEMS.

3.1. "ON-OFF-AUTO" EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR "ON-OFF-AUTO" CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHERE THE FAN IS INTERLOCKED WITH ANOTHER FAN OR EQUIPMENT WITH A FAN, THE FANS SHALL BE ENERGIZED SIMULTANEOUSLY AFTER ALL ASSOCIATED CONTROL DAMPERS ARE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED.

EQUIPMENT	SWITCH LOCATION	FAN INTERLOCK	CONTROL DAMPER(S)
EF-1	TCP-1	T-1	CD-1, CD-4
EF-2	TCP-1	T-2	CD-2, CD-6
EF-3	TCP-1	T-3	CD-3, CD-5

3.2. WINTER VENTILATION MODE. IN WINTER TO PROVIDE MINIMAL VENTILATION IN THE SPACE FOR HUMIDITY CONTROL, CD-1 AND CD-4 SHALL OPEN WHEN SPACE HUMIDITY EXCEEDS THE SETPOINT OF H-1. AN ADJUSTABLE TIME DELAY OF 0 TO 60 MINUTES SHALL BE PROVIDED TO ALLOW STARTING OF EF-1 AT MINIMUM FLOW IF HUMIDITY IS NOT MAINTAINED BELOW H-1 SETPOINT. EF-1 SHALL BE EQUIPPED WITH AN ADJUSTABLE FREQUENCEY DRIVE TO PROVIDE THE MINIMUM FLOWRATE. BEFORE EF-1 CAN RUN, ALL ASSOCIATED CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN HUMIDITY LEVELS ARE SATISFIED EF-1 SHALL BE DE-ENERGIZED AND CONTRL DAMPERS SHALL RETURN TO THE NORMALLY CLOSED POSITION. THE UV ROOM SHALL BE EQUIPPED WITH A HUMIDISTAT H-1.

EQUIPMENT	CONTROL STATION	FAN INTERLOCK	CONTROL DAMPER(S)
EF-1	TCP-1	H-1	CD-1, CD-4

4. THERMOSTAT SETPOINTS

4.1 THERMOSTAT SETPOINTS SHALL BE AS INDICATED BELOW, UNLESS THE SETPOINT HAS BEEN DESCRIBED PREVIOUSLY IN THIS SEQUENCE OF OPERATIONS.

HEATERS	- 55 F
VENTILATING EQUIPMENT	- 86 F (T-1)
	- 88 F (T-2)
	- 90 F (T-3)
HUMIDITY (HUMIDISTAT H-1)	- 50%
LOW TEMPERATURE THERMOSTATS	- 40 F

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

HVAC
DETAILS, SCHEDULES AND SEQUENCE OF OPERATIONS

SCALE 12" = 1'-0"
DRAWING No. H-501
SHEET No. 35 OF 52

Plot Date: 9/7/2023 2:56:15 PM
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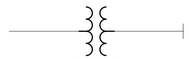
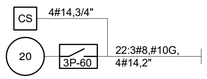
ELECTRICAL LEGENDS

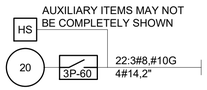
ONE-LINE DIAGRAM LEGEND



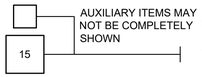
TRANSFORMER WITH PRIMARY AND SECONDARY VOLTAGE, AND KVA RATING AS NOTED



CIRCUIT NO.22 WITH 3#8 INSTALLED CONDUCTORS AND 1#10 GROUND WIRE FOR A 20HP MOTOR WITH 3 POLE, 60A, MOTOR DISCONNECT SWITCH AND 4#14 INSULATED CONDUCTORS FOR AUXILIARY ITEM, AS FOR EXAMPLE A CONTROL STATION, ALL IN 2" CONDUIT.



CONDUCTORS FOR AUXILIARY ITEM SHALL NOT PASS THROUGH MOTOR DISCONNECT SWITCH.

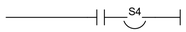


ONE-LINE SHOWING POWER AND CONTROL TO A PACKAGE UNIT, AS FOR EXAMPLE A STEAM GENERATOR OR AN AIR HANDLING UNIT, SHALL IMPLY THAT ANY AND ALL ASSOCIATED EQUIPMENT SHALL ALSO BE INSTALLED AND WIRED AS REQUIRED BY THE EQUIPMENT FURNISHED.


INDICATES THAT ALL OR PART OF CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND. CONDUIT SIZE SHOWN ON ONE-LINE IS ABOVE GROUND AND/OR INSIDE OF STRUCTURE. SEE DUCT BANK SCHEDULE AND SECTIONS FOR CONDUIT SIZE OF UNDERGROUND PORTION OF CIRCUIT.

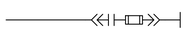

HIGH VOLTAGE DRAWOUT AIR OR VACUUM CIRCUIT BREAKER

LOW VOLTAGE AIR CIRCUIT BREAKER, 3 POLE, 20 AMPERE

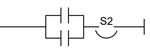


SIZE 4 COMBINATION MAGNETIC MOTOR STARTER

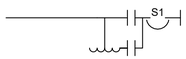

LOW VOLTAGE DRAWOUT AIR CIRCUIT BREAKER


HIGH VOLTAGE DRAWOUT CONTACTOR


FUSE AND DISCONNECT SWITCH



SIZE 2 COMBINATION MAGNETIC MOTOR STARTER, REVERSING OR 2 SPEED



SIZE 1 COMBINATION REDUCED VOLTAGE AUTOTRANSFORMER


POTENTIAL TRANSFORMER

CURRENT TRANSFORMER

CURRENT OR POTENTIAL TEST SWITCH

GENERATOR

KIRK KEY INTERLOCK

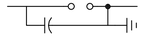
ELECTRICAL INTERLOCK

RESISTOR

PROTECTION RELAY WITH IEEE DEVICE FUNCTION AS SHOWN

SINGLE-FUNCTION METER

SURGE OR LIGHTNING ARRESTER


SURGE ARRESTER WITH SURGE CAPACITOR

GROUND CONNECTION

SCHEMATIC SYMBOLS

WIRE CONNECTION POINT

EXTERNAL CONNECTION POINT

NORMALLY OPEN CONTACT

NORMALLY CLOSED CONTACT

STARTER, CONTACTOR OR RELAY COIL

NORMALLY OPEN PUSH BUTTON

NORMALLY CLOSED PUSH BUTTON

MAINTAINED PUSH BUTTON

NORMALLY CLOSED GEARED LIMIT SWITCH

NORMALLY OPEN GEARED LIMIT SWITCH

INDICATING LIGHT

FUSE

POTENTIOMETER

CAPACITOR

DIODE

RESISTOR

CONTROL POWER TRANSFORMER

SWITCH

MANUAL STARTER

OVERLOAD

OVERLOAD

ELECTRODE

FLOAT SWITCH
(CLOSING ON RISING LEVEL)

FLOAT SWITCH
(OPENING ON RISING LEVEL)

PRESSURE SWITCH
(CLOSING ON RISING PRESSURE)

PRESSURE SWITCH
(OPENING ON RISING PRESSURE)

VACUUM SWITCH
(CLOSING ON INCREASING VACUUM)

VACUUM SWITCH
(OPENING ON INCREASING VACUUM)

TEMPERATURE SWITCH
(CLOSING ON RISING TEMPERATURE)

TEMPERATURE SWITCH
(OPENING ON RISING TEMPERATURE)

FLOW ACTUATED SWITCH
(CLOSING ON INCREASE IN FLOW)

FLOW ACTUATED SWITCH
(OPENING ON INCREASE IN FLOW)

ON TIME DELAY CONTACT
(NORMALLY OPEN, WHEN THE COIL IS ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)

ON TIME DELAY CONTACT
(NORMALLY CLOSED, WHEN THE COIL IS ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)

OFF TIME DELAY CONTACT
(NORMALLY OPEN, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)

OFF TIME DELAY CONTACT
(NORMALLY CLOSED, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)

TORQUE SWITCH
(NORMALLY OPEN)

TORQUE SWITCH
(NORMALLY CLOSED)

LIMIT SWITCH
(NORMALLY OPEN)

LIMIT SWITCH
(NORMALLY OPEN, HELD CLOSED)

LIMIT SWITCH
(NORMALLY CLOSED)

LIMIT SWITCH
(NORMALLY CLOSED, HELD OPEN)

DIFFERENTIAL PRESSURE SWITCH
(NORMALLY OPEN, CLOSING ON INCREASING DIFF.)

DIFFERENTIAL PRESSURE SWITCH
(NORMALLY CLOSED, OPENING ON INCREASING DIFF.)

SWITCH & OUTLET SYMBOLS

S — SINGLE POLE SWITCH

S_2 — TWO POLE SWITCH

S_{3A} — THREE-WAY SWITCH
CONTROLLING LIGHTS WITH "A" DESIGNATION

S_4 — FOUR-WAY SWITCH

S_M^{C1} — MOMENTARY SWITCH
CONTROLLING CONTACTOR C1

S_A^{DM} — DIMMING WALL SWITCH
CONTROLLING LIGHTS WITH "A" DESIGNATION

S_A^{OS} — WALL SWITCH OCCUPANCY SENSOR
CONTROLLING LIGHTS WITH "A" DESIGNATION

DUPLEX RECEPTACLE 120 VOLT

SIMPLEX RECEPTACLE

RANGE RECEPTACLE

TWISTLOCK RECEPTACLE

240V, 1Ø RECEPTACLE, TYPICAL AMPERE RATING NOTED

480V, 3Ø WELDING RECEPTACLE, TYPICAL AMPERE RATING NOTED

120 VOLT DUPLEX
RECEPTACLE (UPS)

DUPLEX FLOOR OUTLET

TELEPHONE OUTLET

TELEPHONE FLOOR OUTLET

COAXIAL CABLE OUTLET

DATA NETWORK OUTLET

MISCELLANEOUS SYMBOLS

STROBE

HORN & STROBE

HORN

THERMOSTAT

JUNCTION BOX

GROUND ROD

GROUND ROD WITH TEST WELL

GROUND CONNECTION

DISCONNECT SWITCH

COMBINATION STARTER

POWER PANEL

LIGHTING PANEL

MISCELLANEOUS PANEL

LIGHTING CONTACTOR

CAMERA

PHOTOELECTRIC SENSOR, PHOTOCELL

CEILING MOUNTED OCCUPANCY SENSOR

WALL MOUNTED OCCUPANCY SENSOR

BREAKER DETAILS

DETAIL A

A 5KV CLASS MEDIUM-VOLTAGE, DRAWOUT, VACUUM OR AIR INSOLATED CIRCUIT BREAKER WITH A 1,200 AMPERE FRAME. BREAKER HAS A 49,000 AMPERE MAXIMUM FAULT CURRENT INTERRUPTING RATING.

DETAIL B

A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 50 AMPERE TRIP RATING.
TRIP UNIT IS NON-ADJUSTABLE THERMAL-MAGNETIC TYPE.

A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 1200 AMPERE FRAME AND A 1000 AMPERE TRIP RATING.
TRIP UNIT IS ADJUSTABLE SOLID-STATE TYPE WITH LONG-TIME, SHORT-TIME, INSTANTANEOUS, GROUND FAULT AND ARC-FLASH REDUCTION PROTECTION FEATURES.

DETAIL C

A LOW VOLTAGE, DRAWOUT, POWER OR INSULATED CASE CIRCUIT BREAKER WITH A 1600A FRAME AND SOLID-STATE TRIP UNIT.
TRIP UNIT HAS A SENSOR MODULE RATED FOR 1000 AMPERES AND WITH A TRIP RATING OF 800 AMPERES AND ARC-FLASH REDUCTION PROTECTION FEATURES.

CONDUIT & WIRING INSTALLATION LEGEND

CONDUIT EXPOSED

CONDUIT CONCEALED

CONDUIT TURNING UP. CONDUIT TURNING DOWN.

CONDUIT PLUGGED FLUSH. CONDUIT CAPPED.

TYPICAL FOR HOME RUN TO BE ROUTED TO LIGHTING PANEL L2 & CONNECTED TO CIRCUIT #5 (MINIMUM NO. 12 AWG CONDUCTORS AND 3/4" CONDUIT)

POLE OR STANCHION MOUNTED LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA FROM SWITCH A.

WALL MOUNTED LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA FROM SWITCH A.

CEILING, PENDANT, OR RECESSED LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA FROM SWITCH A.

RECEPTACLE POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1.

LINEAR LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA SWITCH A.

EXIT LIGHTING FIXTURE. REFER TO FIXTURE NUMBER OR LETTERS IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL 1, CIRCUIT 1.

EMERGENCY LIGHTING FIXTURE. REFER TO FIXTURE NUMBER OR LETTERS IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL 1, CIRCUIT 1.

UNDERGROUND CONCRETE ENCASED ELECTRICAL DUCT BANK

UNDERGROUND CONCRETE ENCASED ELECTRICAL BANK ROUTED BENEATH SLAB-ON-GRADE

DIRECT BURIED CONDUIT

GROUND CONDUCTOR

UNDERGROUND ELECTRIC

OVERHEAD CIRCUIT

COMMUNICATION SYMBOLS

HORN SPEAKER

DUAL HORN SPEAKER

WALL MOUNTED
CONE SPEAKER

CEILING MOUNTED
CONE SPEAKER

PROTECTION/RELAY DEVICE NUMBERS

25 - SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
27 - UNDERVOLTAGE RELAY
32 - DIRECTIONAL POWER RELAY
37 - UNDERCURRENT OR UNDERPOWER RELAY
46 - REV. PHASE OR PHASE-BAL. CURRENT RELAY
47 - PHASE SEQ. OR PHASE BAL. VOLTAGE RELAY
49 - MACHINE OR TRANSFORMER THERMAL RELAY
50 - INSTANTANEOUS OVERCURRENT
51 - AC TIME OVERCURRENT RELAY
52 - AC CIRCUIT BREAKER
59 - OVERVOLTAGE RELAY
63 - PRESSURE SWITCH
64 - GROUND DETECTOR RELAY
67 - AC DIRECTIONAL OVERCURRENT RELAY
71 - LIQUID OR GAS LEVEL RELAY
81 - FREQUENCY RELAY
83 - AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
86 - LOCKOUT RELAY
87 - DIFFERENTIAL PROTECTIVE RELAY

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REV.	DESCRIPTION	DATE	DRAWN	CHECKED
	100% ISSUE FOR BID/PERMITTING	SEPT 2023		

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL LEGENDS

SCALE NTS

DRAWING No. E-001

SHEET No. 36 OF 52

ELECTRICAL ABBREVIATIONS & NOTES

ELECTRICAL GENERAL NOTES

1. SOLID LINES (————————) INDICATE NEW WORK OR EQUIPMENT.
2. SCREENED LINES (————————) INDICATE EXISTING WORK OR EQUIPMENT.
3. DASHED LINES (– – – – – – – –) INDICATE FUTURE WORK OR EQUIPMENT.
4. REFER TO INDIVIDUAL DISCIPLINE CONTRACT DRAWINGS FOR ADDITIONAL ABBREVIATIONS, DETAILS, AND GENERAL DESIGN NOTES.
5. LEGEND SHEETS ARE GENERAL. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
6. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.
   - A. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WITHIN STRUCTURES. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUITS ROUTED UNDERGROUND.
   - B. FOR CIRCUITS WITHOUT UNDERGROUND PORTIONS, BUILDING FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR DETERMINING CIRCUIT LENGTH WITHIN THE STRUCTURE. FOR CIRCUITS WITH UNDERGROUND PORTIONS, ANTICIPATED PENETRATION OF UNDERGROUND CONDUITS ARE SHOWN ON STRUCTURE PLANS FOR DETERMINING THE LENGTH OF THE IN-STRUCTURE PORTIONS OF CIRCUITS. BUILDING FLOOR PLANS MAY ALSO SHOW HOME RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.
   - C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. CIRCUITS ROUTED IN UNDERGROUND CONDUITS OR DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.
   - D. DUCT BANK SECTIONS AND SCHEDULES IDENTIFY CONDUIT SIZE, CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED IN EACH UNDERGROUND CONDUIT.

AREA DESIGNATIONS

THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED ON THE PLAN DRAWINGS TO DEFINE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OR BELOW ROOM NUMBER. ALL INDOOR AREAS NOT INDICATED OTHERWISE ARE AREA TYPE 1 AND MINIMUM NEMA TYPE 1 ENCLOSURES.

AREA TYPE 1A	CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED SCHEDULE 80 PVC RIGID NON-METALLIC CONDUIT WITH PVC FITTINGS, BOXES AND ACCESSORIES.
AREA TYPE 4	INDOOR WET LOCATIONS SUCH AS VAULTS, HOSEDOWN AREAS, BASEMENTS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.
AREA TYPE 7A	CLASS I, DIVISION 1 AREA AS DEFINED BY NEC. ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 7B	CLASS I, DIVISION 2, GROUP C AND D (METHANE, GASOLINE) AS DEFINED BY NEC. EQUIPMENT AND CONDUITS SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 12	INDOOR, DRY, DIRTY AREA. REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.

GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATION.
2. SPARE WIRES SHALL BE TAPED AND COILED AND LABELED TO INDICATE WHERE OTHER END OF SPARE WIRE IS LOCATED.
3. 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.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR EQUIPMENT FURNISHED.
5. LIGHTING AND RECEPTACLE CIRCUITS DESIGNATED ON THE FLOOR PLANS ARE NOT SHOWN ON THE ONE-LINES. CONDUCTORS FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM NO. 12AWG. CONDUIT FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM 3/4".
6. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC. NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.

ELECTRICAL ABBREVIATIONS

A

A	AMBER, AMPERE, ALARM
AC	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
ACR	ACCESS CARD READER
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AFRD	ARC-FLASH REDUCTION DEVICE
AM	AMMETER
ANN	ANNUNCIATOR
AR	ALARM RELAY
AS	AMMETER SWITCH, AMPERE SENSOR
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE

B

B	BUS
BC	BATTERY CHARGER
BKR	BREAKER
BR	BRAKE
BT	BEARING TEMPERATURE

C

C	CLOSE, COUNTER, CONTACTOR, CONTROL, CCTV CAMERA
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CB"A"	CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN)
CB"B"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN)
CD	CONTROL DAMPER
CI	CELL INTERLOCK
CKT	CIRCUIT
CL2	CHLORINE
COS	CABLE OPERATED SWITCH
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CURRENT OF CONTROL RELAY, CARD READER
CS	CONTROL STATION
CT	CYCLE TIMER OR CURRENT TRANSFORMER
CTC	CYCLE TIMER CLUTCH
CTM	CYCLE TIMER MONITOR
2/C	2 CONDUCTOR
4"C	4" CONDUIT

D

DC	DIRECT CURRENT, DOOR CONTACT
DI	DOOR INTERLOCK
DM	DAMPER MOTOR, DEMAND METER, DIMMER SWITCH
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPR	DIFFERENTIAL PRESSURE REGULATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DS	DISCONNECT SWITCH, DOOR SWITCH, DESKTOP STATION
DVLS	DISCHARGE VALVE LIMIT SWITCH

E

E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE
EC	EMPTY CONDUIT
EDS	ELECTRICAL DOOR STRIKE
EL	ELEVATION, EMERGENCY LIGHT
EMH	ELECTRICAL MANHOLE
ER	ELECTRODE RELAY
ES	END SWITCH, REQUEST TO EXIT SENSOR
E-STOP	EMERGENCY STOP
ETM	ELAPSED TIME METER
EX	EXISTING
EXP	EXPLOSION PROOF

F

F	FORWARD, FIELD
FO	FIBER OPTIC
FPR	FEEDER PROTECTION RELAY
FS	FLOW SWITCH

G

G	GREEN, GROUND, GENERATOR, GROUND FAULT
GD	GROUND DETECTOR
GEN	GENERATOR
GFCI,GFI	GROUND FAULT CURRENT INTERRUPTOR, GROUND FAULT INTERRUPTOR
GLS	GEARED LIMIT SWITCH
GPR	GENERATOR PROTECTION RELAY
GND	GROUND
#8G	#8 GROUND WIRE

H

H	HIGH, HUMIDISTAT
HH	HANDHOLE
HMT	HIGH MOTOR TEMPERATURE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HS	HAND STATION
HWCO	HIGH WATER CUTOFF
HZ	HERTZ (CYCLE)

I

I/O	INPUT/OUTPUT
I	INSTANTANEOUS
IJB	INTERCOM JUNCTION BOX

J

J,JB	JUNCTION BOX

K

K	KEY INTERLOCK
KAIC	THOUSAND AMPERES INTERRUPTING CURRENT
KCMIL	THOUSAND CIRCULAR MIL
KO	KEY OPERATED
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR
KW	KILOWATT
KWH	KILOWATT HOUR

L

L	LOW, LEVEL, LONG-TIME
LA	LIGHTNING ARRESTER
LAN	LOCAL AREA NETWORK
LC	LIGHTING CONTRACTOR
LCE	LIGHTING CONTACTOR ENCLOSURE LIGHTING CONTROL ENCLOSURE
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LOS	LOCK OUT STOP
LP	LIGHTING PANEL
LS	LIMIT OR LEVEL SWITCH
LTG	LIGHTING
LWCO	LOW WATER CUTOFF

M

M	MAGNETIC MOTOR STARTER
MA	MILLIAMPERE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCLU	MOTOR CONTROL LINEUP
MD	MOISTURE DETECTOR, MOTION DETECTOR
MDL	MAGNETIC DOOR LOCK
MFR	MANUFACTURER
MH	MANHOLE, MOUNTING HEIGHT
MOV	MOTOR OPERATED VALVE
MPR	MOTOR PROTECTION RELAY
MS	MANUAL MOTOR STARTER
MSH	MOTOR SPACE HEATER
MTS	MANUAL TRANSFER SWITCH
MV	MILLIVOLT, MEDIUM VOLTAGE
MVA	MEGAVOLT AMPERE

N

N	NEUTRAL
NGR	NEUTRAL GROUNDING RESISTOR
NGT	NEUTRAL GROUNDING TRANSFORMER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER

O

O	OPEN
OL	OVERLOAD
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
OS	OCCUPANCY SENSOR
O/U	OVER/UNDER

P

P	PRIMARY, POWER, POLE
PCS	PLANT CONTROL SYSTEM
PB	PUSH BUTTON, PULL BOX
PE	PHOTOELECTRIC SENSOR, PHOTOCELL
PF	POWER FACTOR
PFCC	POWER FACTOR CORRECTION CAPACITOR
PH	PHASE
PL	PILOT LIGHT
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PR	PAIR
PRS	PROXIMITY SWITCH
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER, PROGRAM TIMER

Q

NOT USED

R

R	RED, RAISE, RELAY, REVERSE
RECP	RECEPTACLE
RES	RESISTOR
RH	REMOTE HANDSET
RT	REPEATING TIMER
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLID STATE STARTER

S

S	SHORT-TIME, SHIELDED, STARTER
SA	SURGE ARRESTER, SPEAKER AMPLIFIER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SF6	SULFUR HEXAFLOURIDE
SH	SPACE HEATER
SN	SOLID NEUTRAL
SO	SOLENOID OILER
SP	SINGLE POLE
SPD	SURGE PROTECTION DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SS	SELECTOR SWITCH, START/STOP, STAINLESS STEEL
SSM	SOLID-STATE METERING
SSS	SOLID STATE STARTER
SST	SOLID-STATE TRIP
SUPV	SUPERVISORY CONTROL
SV	SOLENOID VALVE
SWB,SWBD	SWITCHBOARD
SWG,SWGR	SWITCHGEAR

T

T	THERMOSTAT, TIMER, TOTALIZER, TRANSFORMER
TACH	TACHOMETER
TB	TERMINAL BLOCK
TC	TIMER CLUTCH
TD	TIME DELAY RELAY
TEMP	TEMPERATURE
TM	TIMER MOTOR
TQ	TORQUE
TR	TIMER RELAY, TRIAD
TS	TEMPERATURE SWITCH
TTB	TELEPHONE TERMINAL BOARD

U

UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY

V

V	VOLTS, VOLTAGE RESTRAINED
VA	VOLT AMPERE
VAR	VARMETER
VFD	VARIABLE FREQUENCY DRIVE
VI	VACUUM INTERRUPTER
VLS	VALVE LIMIT SWITCH
VM	VOLTMETER
VPI	VALVE POSITION INDICATOR
VS	VOLTMETER SWITCH

W

W	WHITE, WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
WPI	WEATHERPROOF IN-USE
WS	WALL STATION

X

X	AUXILIARY RELAY
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

Y

Y	YELLOW

Z

Z	AUXILIARY RELAY, IMPEDANCE
ZS	POSITION SWITCH
ZSS	ZERO SPEED SWITCH

1-1PR#16S	ONE, SINGLE PAIR, TWISTED SHIELDED #16 CABLE
3-7/C#14	THREE, SINGLE, SEVEN CONDUCTOR #14 MULTICONDUCTOR CONTROL CABLES

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

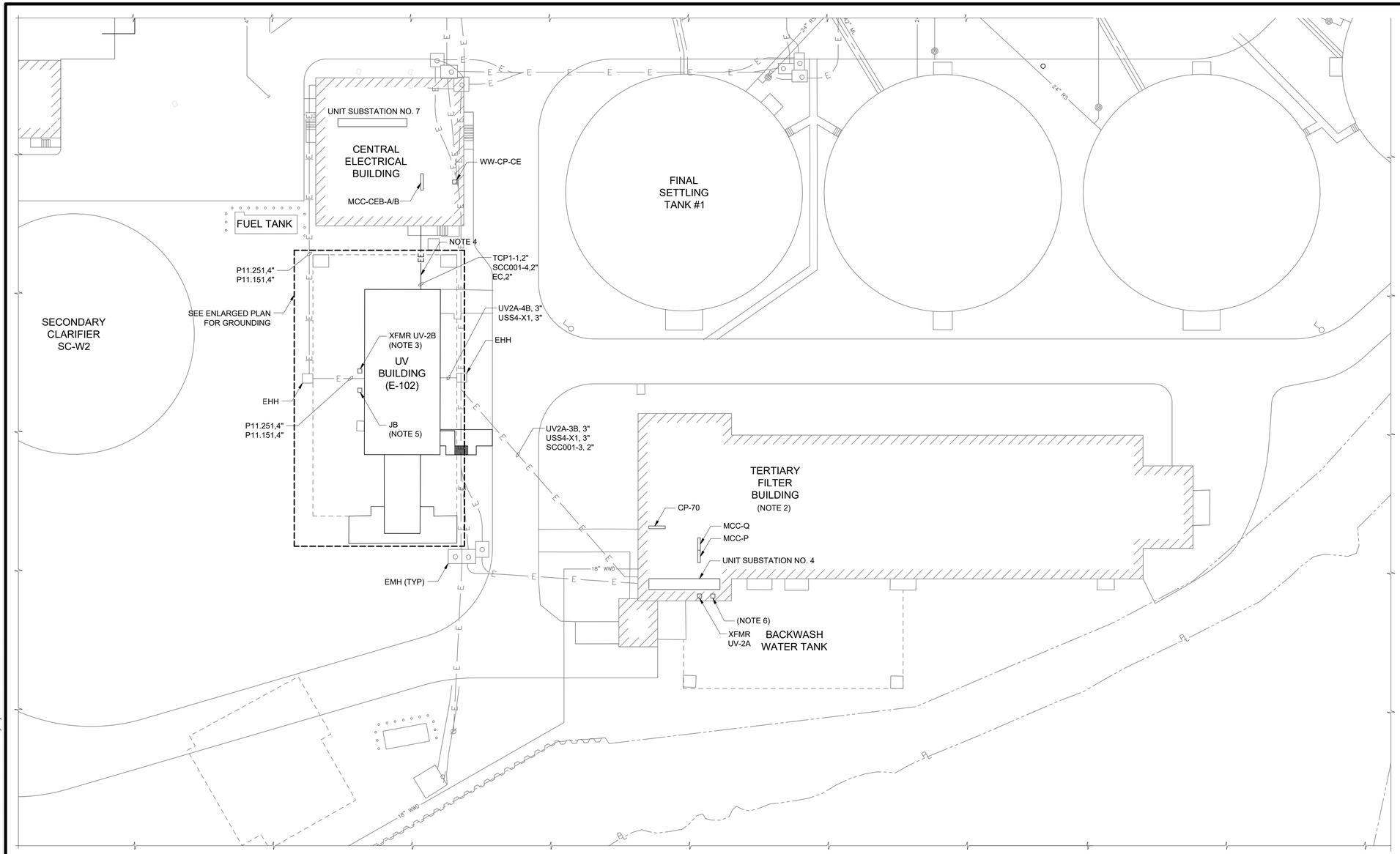
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL
ABBREVIATIONS AND NOTES

SCALE NTS

DRAWING No. E-002

SHEET No. 37 OF 52



SITE LAYOUT
1" = 30'-0"

30' 20' 10' 0 30'
SCALE 1"=30'

NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.
2. EXISTING UNIT SUBSTATION NO. 4 AND CP-70 ARE LOCATED ON THE SECOND FLOOR ABOVE GRADE AT THE TERTIARY FILTER BUILDING. XFMR UV-2A & UV-2B ARE ON THE FIRST FLOOR ABOVE GRADE. INCOMING DUCTBANK ENTERS THROUGH THE BASEMENT.
3. EXISTING XFMR UV-2B SHALL BE RELOCATED HERE. EXISTING TRANSFORMERS UV-1A AND UV-1B AT THIS LOCATION SHALL BE DISCONNECTED AND PROVIDED TO THE OWNER AS SPARE.
4. CONTRACTOR SHALL DEMOLISH EXISTING TEMPORARY CONDUIT AT THIS LOCATION. CONTRACTOR SHALL FURNISH AND INSTALL JUNCTION BOXES EXTERIOR TO THE CENTRAL ELECTRICAL BUILDING (CEB) AND WITHIN THE UV BUILDING AS REQUIRED TO TRANSITION FROM EXPOSED CONDUIT TO DIRECT BURIED CONDUIT BETWEEN THE NEW SCC-001 WITHIN THE UV BUILDING.
5. CONTRACTOR SHALL FURNISH AND INSTALL NEMA 4X TYPE 316 SS JUNCTION BOX AT THE LOCATION OF REMOVED XFMR UV-1B TO FACILITATE SPLICE TO EXISTING CONDUCTORS AS INDICATED ON THE DRAWINGS.
6. EXISTING LOCATION OF XFMR UV-2B, TO BE RELOCATED AS NOTED HEREIN.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

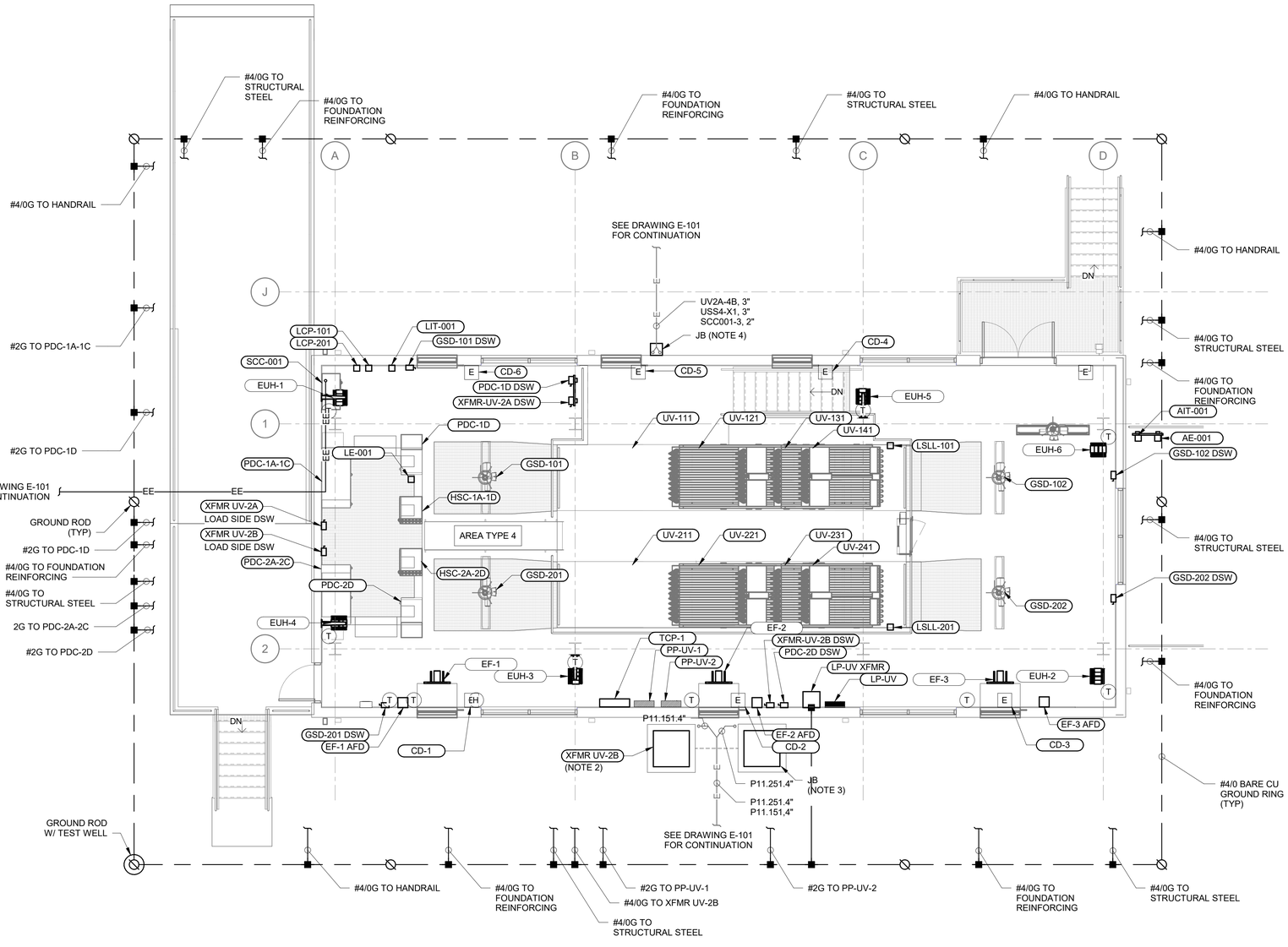
ELECTRICAL
SITE PLAN

SCALE 1" = 30'
DRAWING No. E-101
SHEET No. 38 OF 52

C:\pw_working\pvw_americas_2\d1680511\E-101.dwg — _o2 standard bw.stb — Plot Date: 9/6/2023 8:59:38 AM

GENERAL SHEET NOTES

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.
2. EXISTING XFMR UV-2B SHALL BE RELOCATED HERE. EXISTING TRANSFORMER UV-1A AT THIS LOCATION SHALL BE DISCONNECTED AND PROVIDED TO THE OWNER.
3. EXISTING TRANSFORMER UV-2A AT THIS LOCATION SHALL BE DISCONNECTED AND PROVIDED TO THE OWNER. CONTRACTOR SHALL FURNISH AND INSTALL A NEMA 4X TYPE 316 SS JUNCTION BOX AT THIS LOCATION TO FACILITATE SPLICE OF EXISTING CONDUCTORS AS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL TRANSITION TO EXPOSED CONDUIT THEREFROM, PENETRATING THROUGH NEARBY UV BUILDING WALL AND ROUTING EXPOSED TO LOAD AS REQUIRED.
4. CONTRACTOR SHALL INTERCEPT EXISTING EXPOSED CONDUIT STUB-UPS AT THIS LOCATION AND SHALL INSTALL A NEMA 4X TYPE 316 SS JUNCTION BOX TO FACILITATE TRANSITION TO EXPOSED CONDUIT, PENTETRATION THROUGH NEARBY UV BUILDING WALL AND ROUTED EXPOSED TO LOADS AS REQUIRED.



UV BUILDING POWER AND GROUNDING PLAN

3/16" = 1'-0"

6' 4' 2' 0' 5' 10'

3/16" = 1'-0"

Know what's below. Call before you dig.

REV.	DESCRIPTION	DATE	DRAWN	CHECKED
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Moore+Bruggink Engineers
JDH Structural Engineering

CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL

UV BUILDING POWER AND GROUNDING PLAN

SCALE: 3/16" = 1'-0"

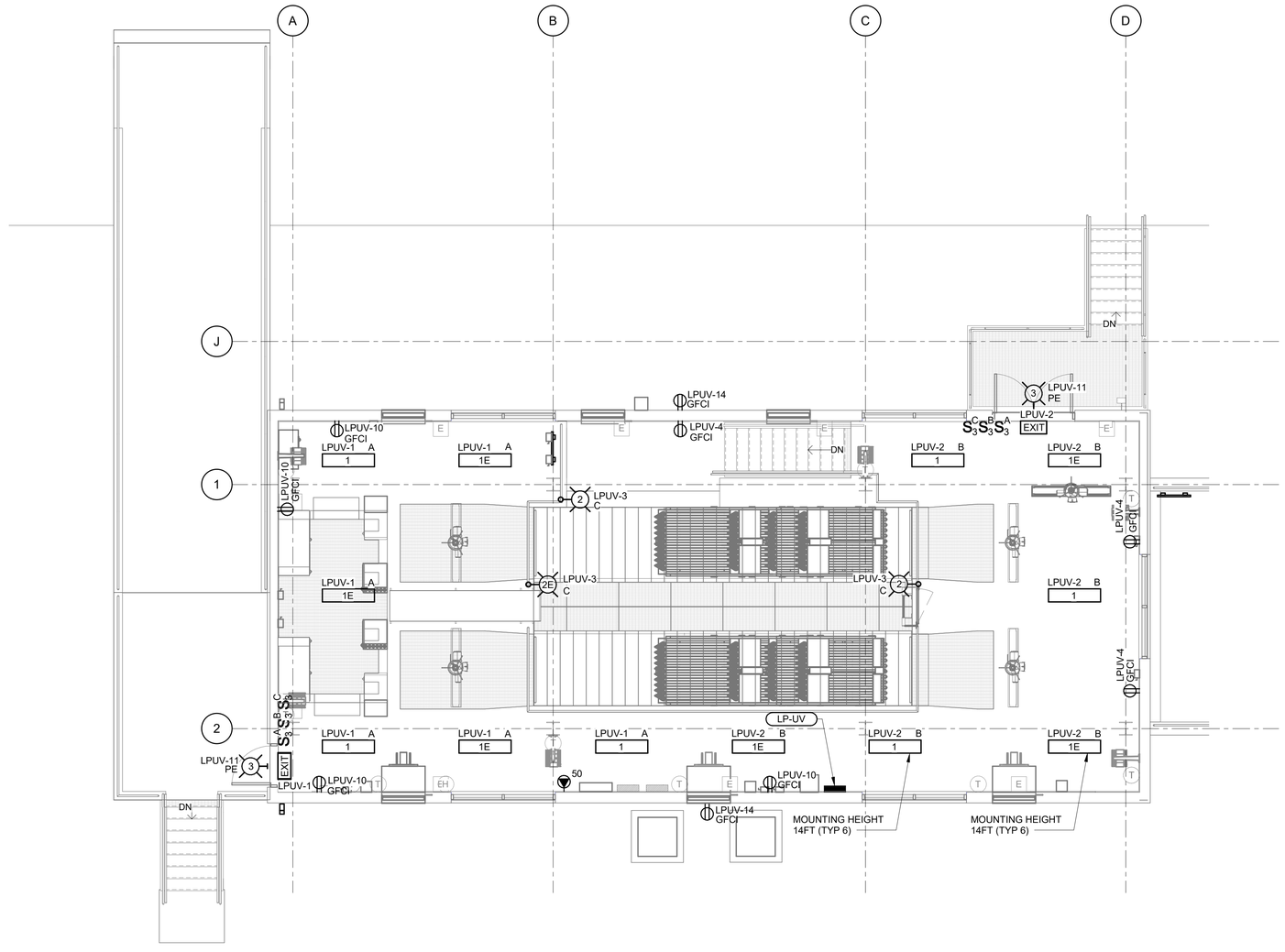
DRAWING No.: E-102

SHEET No.

39 OF 52

GENERAL SHEET NOTES

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.



MAIN FLOOR - LIGHTING & RECEPTACLE PLAN

3/16" = 1'-0"

6' 4' 2' 0' 5' 10'

3/16" = 1'-0"

Plot Date: 9/7/2023 2:56:14 PM

BIM 360://413104 - Ann Arbor WWTP UV Replacement/413104-AA_UV-B_V.rvt

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL

UV BUILDING LIGHTING PLAN

SCALE: 3/16" = 1'-0"

DRAWING No. E-103

SHEET No. 40 OF 52

BLACK & VEATCH Ltd of Michigan
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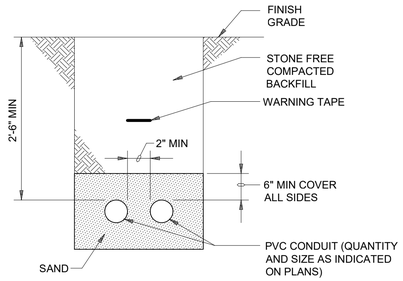
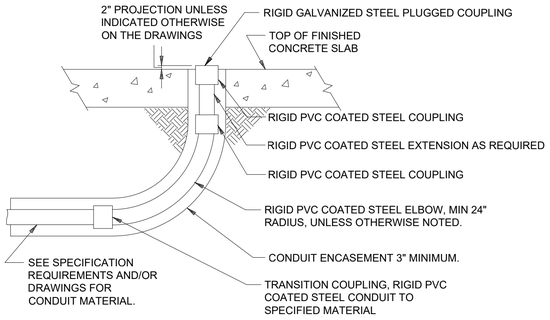


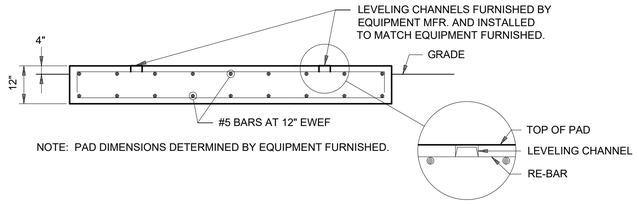
TYPICAL DIRECT BURIED CONDUIT SECTION

NO SCALE



TYPICAL CONDUIT RISER TERMINATING IN CONCRETE SLAB

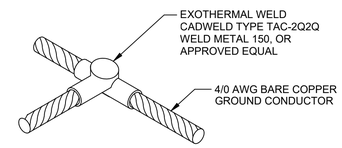
NO SCALE



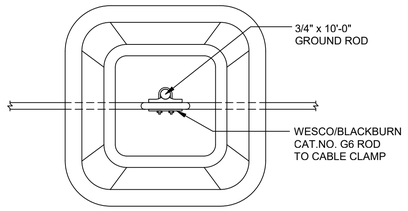
NOTE: PAD DIMENSIONS DETERMINED BY EQUIPMENT FURNISHED.

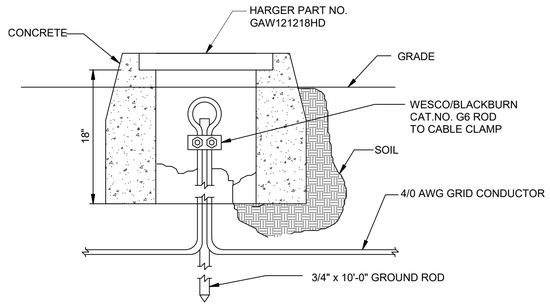
TYPICAL EQUIPMENT PAD DETAIL

NO SCALE

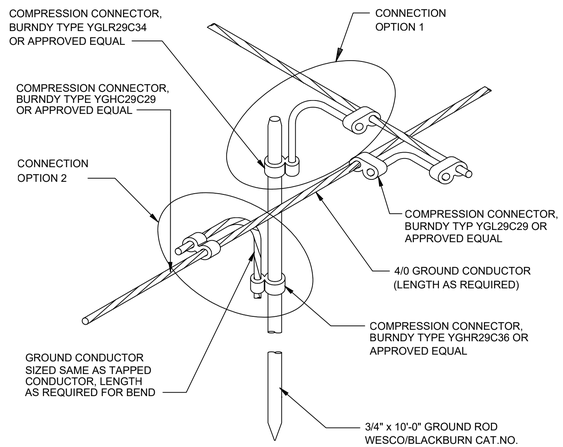


TYPICAL EXOTHERMAL WELD TEE CONNECTION





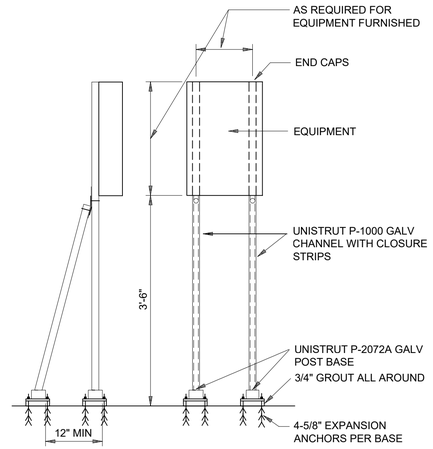
ELEVATION
TYPICAL GROUND TEST STATION



NOTE:
CONTRACTOR SHALL APPLY AN OXIDE-INHIBITING JOINT COMPOUND TO THE INSIDE CONTACT SURFACE OF THE COMPRESSION CONNECTORS PRIOR TO INSTALLING THE COMPRESSION CONNECTORS.

TYPICAL COMPRESSION FITTING
GROUND ROD TO CONNECTION AT CROSS OR TEE

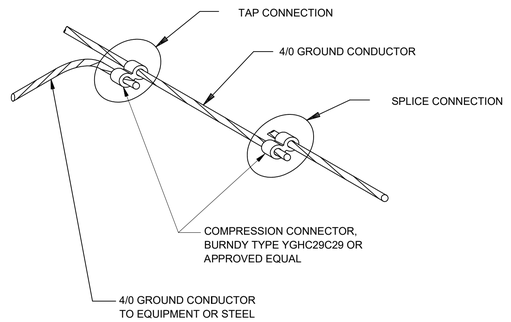
(TWO CONNECTION OPTIONS SHOWN)



TYPICAL EQUIPMENT MOUNTING DETAIL

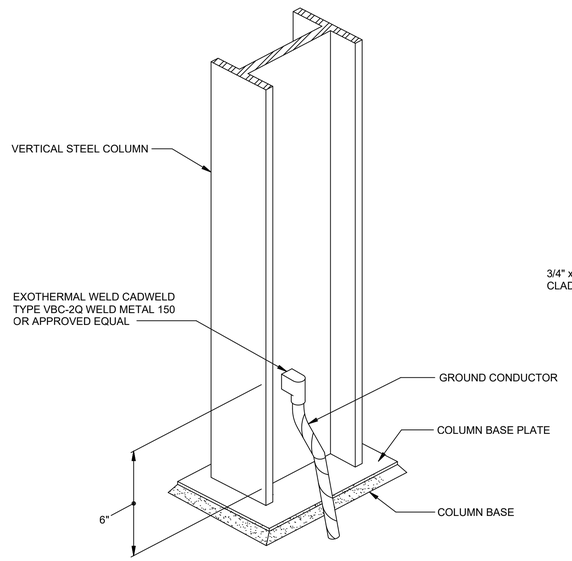
NO SCALE

NOTE: IN OUTDOOR LOCATIONS, USE STAINLESS STEEL BOLTS, NUTS, WASHERS, AND ANCHOR BOLTS.

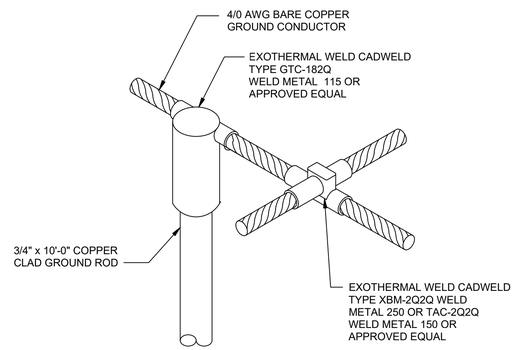


NOTE:
CONTRACTOR SHALL APPLY AN OXIDE-INHIBITING JOINT COMPOUND TO THE INSIDE CONTACT SURFACE OF THE COMPRESSION CONNECTOR PRIOR TO INSTALLING THE COMPRESSION CONNECTOR.

TYPICAL COMPRESSION FITTING TEE CONNECTION



TYPICAL EXOTHERMAL WELD
STRUCTURE COLUMN GROUNDING



TYPICAL EXOTHERMAL WELD
GROUND ROD AT CROSS OR TEE CONNECTION

NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

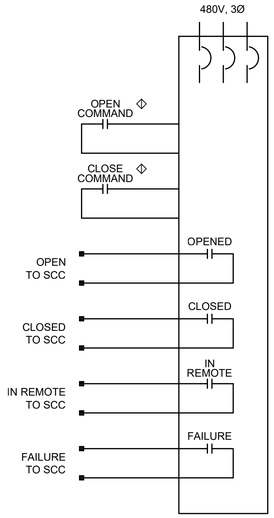
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL
TYPICAL DETAILS

SCALE NTS

DRAWING No. E-501

SHEET No. 41 OF 52



GSD-101, -102, -201, & -202

NO SCALE

DEVICE LOCATION LEGEND:

◇ AT PLC

NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS & NOTES.

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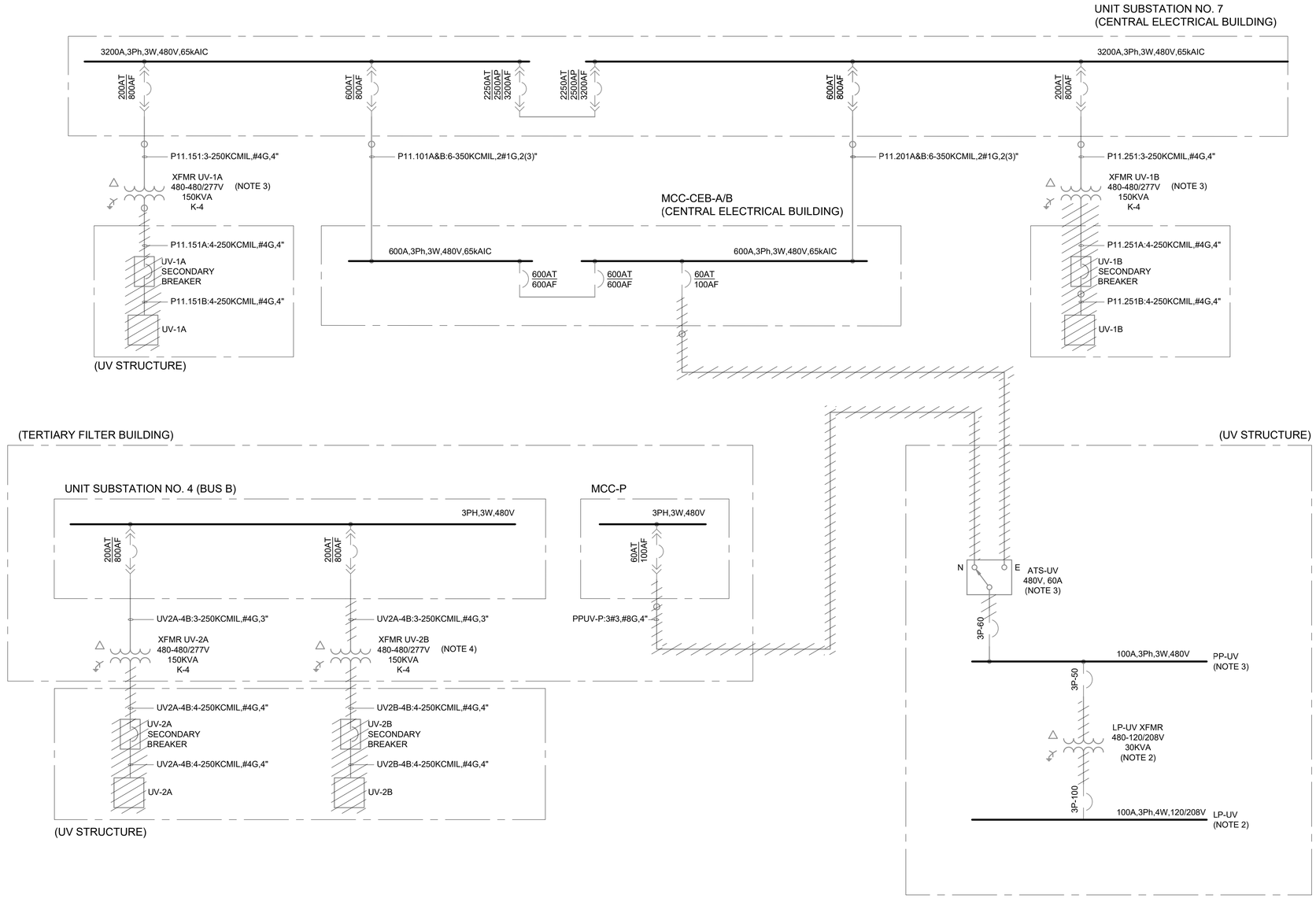
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL SCHEMATICS

SCALE NTS

DRAWING No. E-601

SHEET No. 42 OF 52



NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.
2. EXISTING EQUIPMENT TO BE RELOCATED WITHIN NEW UV BUILDING. EXISTING INTERCONNECTING WIRING TO BE DEMOLISHED AS INDICATED.
3. TO BE REMOVED AND PROVIDED TO THE OWNER AS SPARE.
4. EXISTING TRANSFORMER TO BE DISCONNECTED AND RELOCATED WEST OF THE NEW UV BUILDING AS INDICATED ON THE DRAWINGS.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

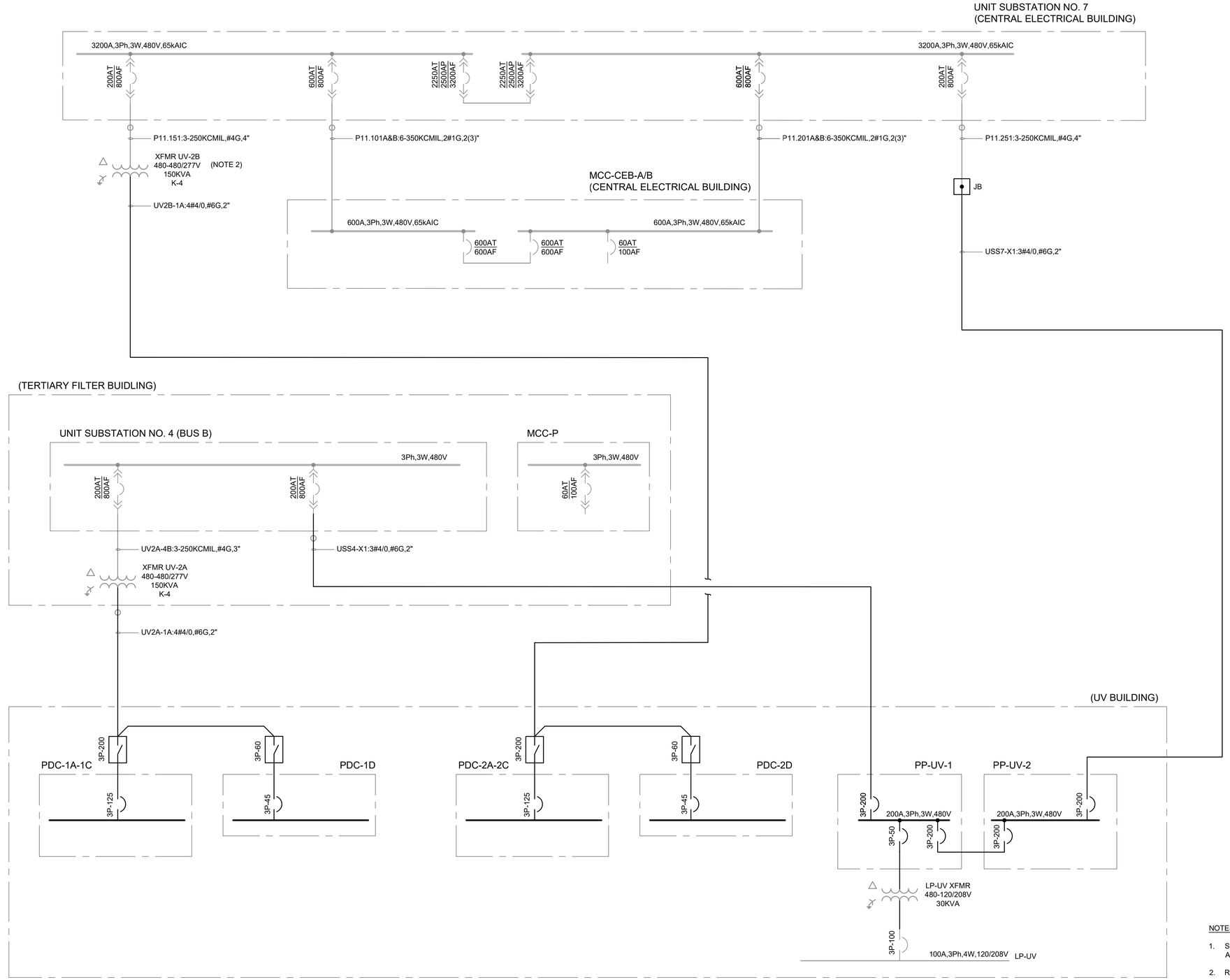
ELECTRICAL
POWER DISTRIBUTION FUNCTIONAL DIAGRAM - DEMO

SCALE NTS

DRAWING No. E-701

SHEET No. 43 OF 52

C:\pw_working\bvw_americas_2\d1680511\E-701.dwg — _a2 standard bw.stb — Plot Date: 9/6/2023 8:06:33 AM



NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.
2. RELOCATED FROM EXISTING UV TREATMENT FACILITY.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

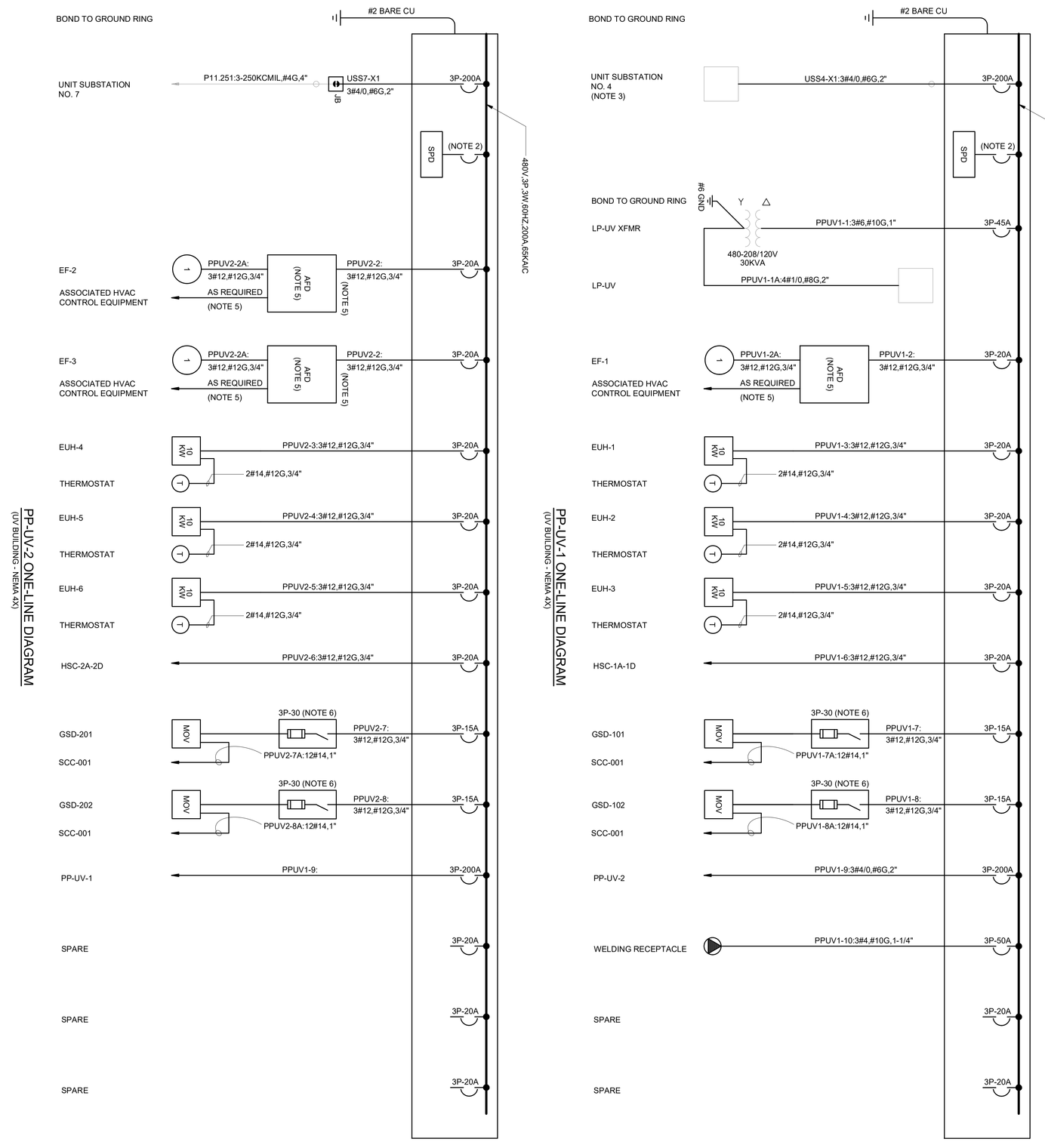
ELECTRICAL

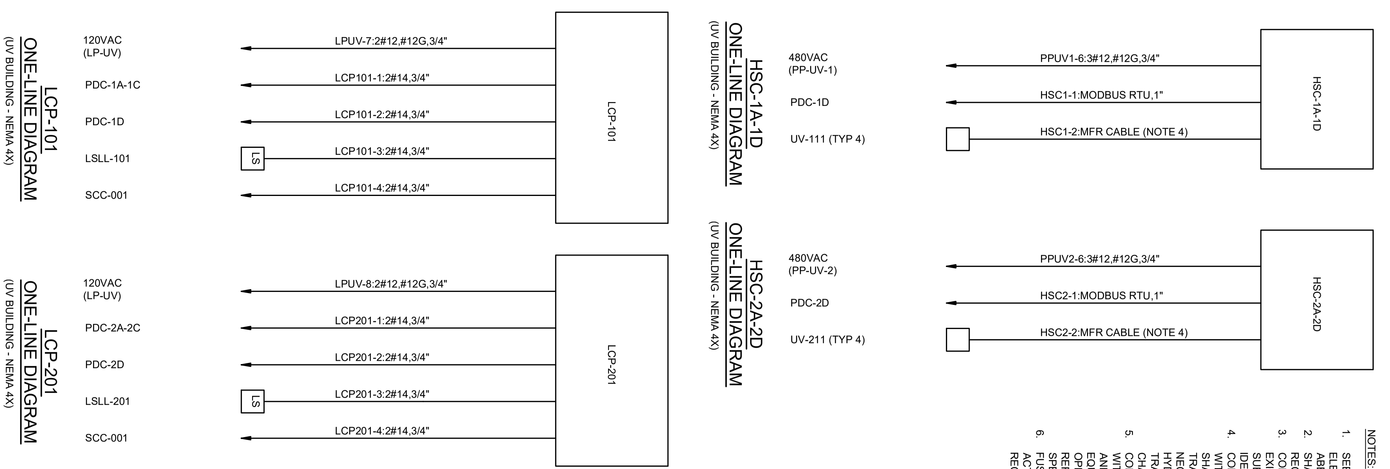
POWER DISTRIBUTION FUNCTIONAL DIAGRAM - NEW WORK

SCALE NTS

DRAWING No. E-702

SHEET No. 44 OF 52





NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS, NOTES.
2. SHALL BE SIZED PER SPD MFR RECOMMENDATIONS
3. CONTRACTOR SHALL CONNECT TO EXISTING 200A BREAKER WITHIN UNIT SUBSTATION NO. 4 PREVIOUSLY DEDICATED TO UV. CONTRACTOR SHALL COORDINATE WITH UV SYSTEM SUPPLIER AND SHALL FURNISH AND INSTALL CABLE TRAY SYSTEMS IN COMPLIANCE WITH NEC REQUIREMENTS TO FACILITATE HYDRAULIC AND BALLAST LINE TRANSITIONS INTO TREATMENT CHANNELS.
4. CONTRACTOR SHALL COORDINATE WITH HVAC EQUIPMENT SUPPLIER AND PROCURE AND INSTALL ALL EQUIPMENT REQUIRED FOR PROPER OPERATION. CONTRACTOR SHALL REFER TO HVAC DRAWINGS AND SPECIFICATIONS.
5. FUSE SHALL BE SIZED PER ACTUATOR MFR RECOMMENDATIONS.
6.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

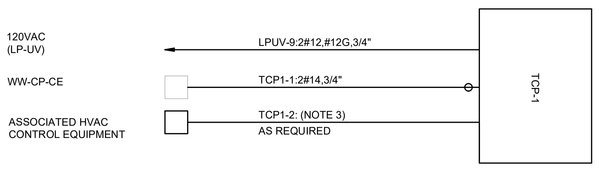
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL
POWER AND CONTROL ONE-LINES SHEET 1 OF 2

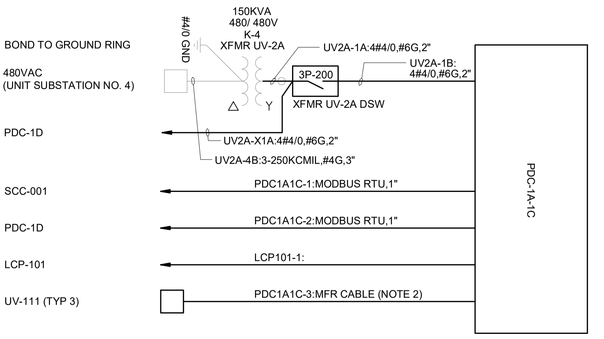
SCALE: NTS
DRAWING No.: E-703
SHEET No.: 45 OF 52

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

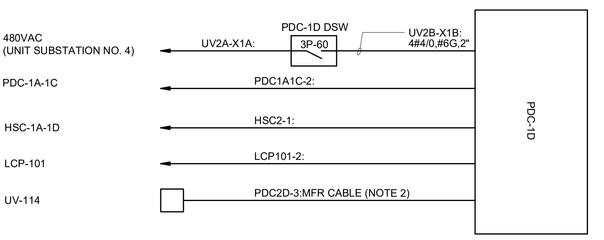
TCP-1 ONE-LINE DIAGRAM
(UV BUILDING - NEMA 4X)



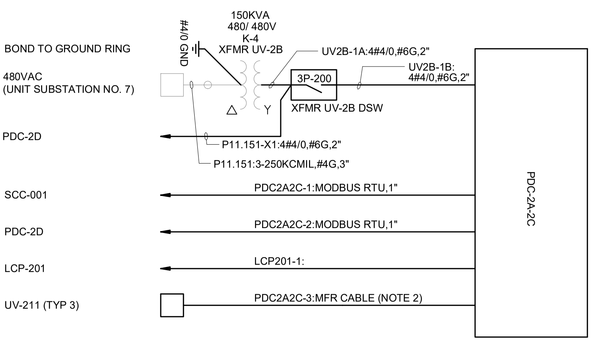
PDC-1A-1C ONE-LINE DIAGRAM
(UV BUILDING - NEMA 4X)



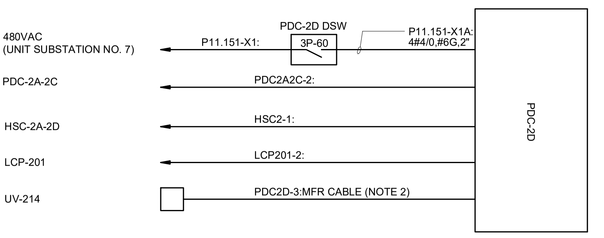
PDC-1D ONE-LINE DIAGRAM
(UV BUILDING - NEMA 4X)



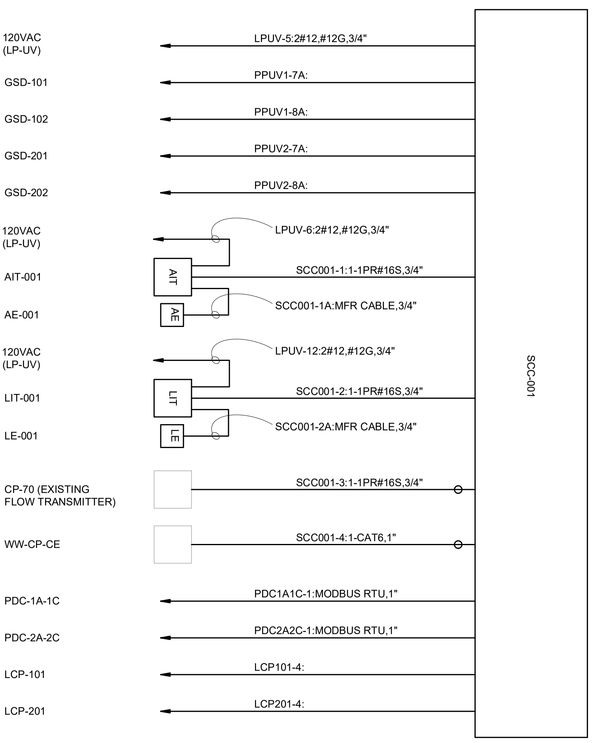
PDC-2A-2C ONE-LINE DIAGRAM
(UV BUILDING - NEMA 4X)



PDC-2D ONE-LINE DIAGRAM
(UV BUILDING - NEMA 4X)



SCC-001 ONE-LINE DIAGRAM
(UV BUILDING - NEMA 4X)



NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS.
2. ABBREVIATIONS AND SYMBOLS SHALL BE AS SHOWN.
   CONTRACTOR SHALL COORDINATE WITH UV SYSTEM SUPPLIER AND SHALL FURNISH AND INSTALL CABLE TRAY SYSTEMS IN COMPLIANCE WITH NEC REQUIREMENTS TO FACILITATE HYDRAULIC AND BALLAST LINE TRANSITION INTO TREATMENT CHANNELS.
3. CONTRACTOR SHALL COORDINATE WITH HVAC EQUIPMENT SUPPLIER TO PROVIDE ALL EQUIPMENT REQUIRED FOR PROPER OPERATION. CONTRACTOR SHALL REFER TO HVAC DRAWINGS AND SPECIFICATIONS.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

ELECTRICAL
POWER AND CONTROL ONE-LINES SHEET 2 OF 2

SCALE: NTS
DRAWING No.: E-704
SHEET No.: 46 OF 52

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

			PANELBOARD: (EXISTING) LP-UV		BUS: COPPER				MAINS: 3P-100A MAIN BREAKER				
PHASE			SERVICE: 120/208V, 3PH, 4W, S/N		RATING: 100A				LOCATION: UV BUILDING		PHASE		
"A"	"B"	"C"	MOUNTING: SURFACE								"A"	"B"	"C"
V.A.	V.A.	V.A.	LOAD	P	BKR	CKT #		BKR	P	LOAD	V.A.	V.A.	V.A.
767			LIGHTING	1	20	1	2	20	1	LIGHTING	767		
	222		LIGHTING	1	20	3	4	15	1	RECEPTACLES		540	
		1000	SCC-001	1	15	5	6	15	1	AIT-001			100
200			LCP-101	1	15	7	8	20	1	LCP-201	200		
	500		TCP-1	1	20	9	10	20	1	RECEPTACLES		720	
		111	OUTDOOR LIGHTING	1	20	11	12	20	1	LIT-001			100
0			SPARE	1	20	13	14	20	1	EXTERIOR RECEPTACLE	360		
	0		SPARE	1	15	15	16	20	1	SPARE		0	
		0	SPARE	1	15	17	18	20	1	SPARE			0
0			SPARE	1	15	19	20	20	1	SPARE	0		
	0		SPARE	1	15	21	22	20	1	SPARE		0	
		0	SPARE	1	15	23	24	20	1	SPARE			0
0			SPARE	1	15	25	26	20	1	SPARE	0		
	0		SPARE	1	15	27	28	20	1	SPARE		0	
		0	SPARE	1	15	29	30	20	1	SPARE			0
0			SPARE	1	15	31	32	20	1	SPARE	0		
	0		SPARE	1	15	33	34	20	1	SPARE		0	
		0	SPARE	1	15	35	36	20	1	SPARE			0
0			SPARE	1	15	37	38	20	1	SPARE	0		
	0		SPARE	1	15	39	40	20	1	SPARE		0	
		0	SPARE	1	15	41	42	20	1	SPARE			0
967			TOTAL "A"			2294				TOTAL "A"	1327		
	722		TOTAL "B"			1982				TOTAL "B"		1260	
		1111	TOTAL "C"			1311				TOTAL "C"			200
			TOTAL =			5587							

LIGHTING FIXTURE SCHEDULE

FIXTURE	LAMP	MTG HGT	DESCRIPTION	MANUFACTURER
1	LED 67 WATT 8604 LUMENS	AS NOTED ON PLANS	LITHONIA LINEAR LED CHAIN MOUNTED, CLEAR POLYCARBONATE LENS, WIDE DISTRIBUTION, 120V, 4000K COLOR TEMPERATURE, 80 CRI	LITHONIA VAP 8000LM PCL WD 120 GZ10 40K 80CRI VAPCMB
1E	LED 67 WATT 8604 LUMENS	AS NOTED ON PLANS	LITHONIA LINEAR LED CHAIN MOUNTED, CLEAR POLYCARBONATE LENS, WIDE DISTRIBUTION, 120V, 4000K COLOR TEMPERATURE, 80 CRI, EMERGENCY BATTERY BACKUP	LITHONIA VAP 8000LM PCL WD 120 GZ10 40K 80CRI VAPCMB E15WCP
2	LED 73 WATT 9375 LUMENS	AS NOTED ON PLANS	HOLOPHANE LED STANCHION MOUNTED, 10000 LUMENS, FORWARD THROW DISTRIBUTION, 120V, 4000K, 80CRI, UNIVERSAL ARM FOR STANCHION MOUNT, GRAY COLOR SUPER DURABLE	HOLOPHANE PXLW 10000LM FWD 120 40K 80CRI UNM P3US DGXD
2E	LED 73 WATT 9375 LUMENS	AS NOTED ON PLANS	HOLOPHANE LED STANCHION MOUNTED, 10000 LUMENS, FORWARD THROW DISTRIBUTION, 120V, 4000K, 80CRI, UNIVERSAL ARM FOR STANCHION MOUNT, EMERGENCY BATTERY BACKUP, GRAY COLOR SUPER DURABLE	HOLOPHANE PXLW 10000LM FWD 120 40K 80CRI UNM P3US DGXD E10WMCP
3	LED 28 WATT 3209 LUMENS	AS NOTED ON PLANS	HOLOPHANE WALLPACK FULL CUTOFF LED, HEAVY GRADE A360 CAST ALUMINUM, 4000 K COLOR TEMPERATURE, 120V, FORWARD THROW MEDIUM, BLACK, 80 CRI, INTEGRAL EMERGENCY BATTERY, INTEGRAL BUTTON STYLE PHOTO CONTROL	HOLOPHANE HLWPC2 P10 40K 120 TFTM BKSDP 80CRI EM PE
EXIT	LED 1.3 WATT	AS NOTED ON PLANS	HOLOPHANE MAGELLAN MEX LED EXIT LIGHT, PRECISION MOLDED, DIE-CAST ALUMINUM CONSTRUCTION, LETTERS 6" HIGH WITH 3/4" STROKE, WITH 100FT VIEWING DISTANCE RATING	HOLOPHANE MEX S W 1 R EL N

NOTES:

1. SEE DRAWINGS E-001 AND E-002 FOR ELECTRICAL LEGENDS, ABBREVIATIONS AND NOTES.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

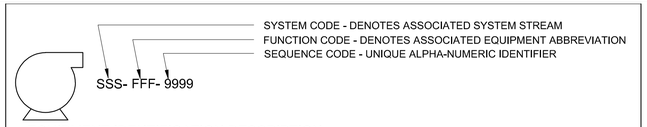
ELECTRICAL SCHEDULES

SCALE NTS

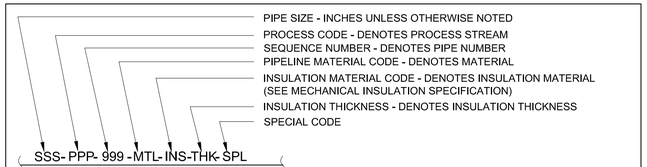
DRAWING No. E-705

SHEET No. 47 OF 52

EQUIPMENT IDENTIFICATION DESCRIPTION

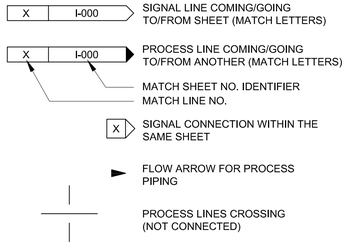


PIPELINE IDENTIFICATION DESCRIPTION

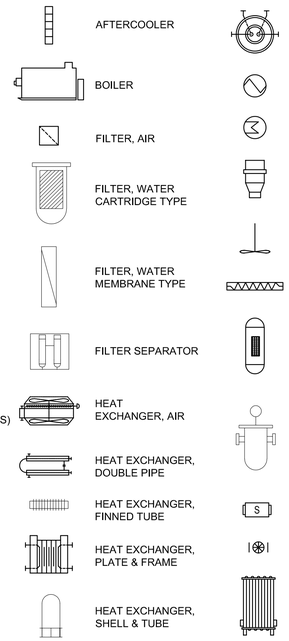


LINE SYMBOLS

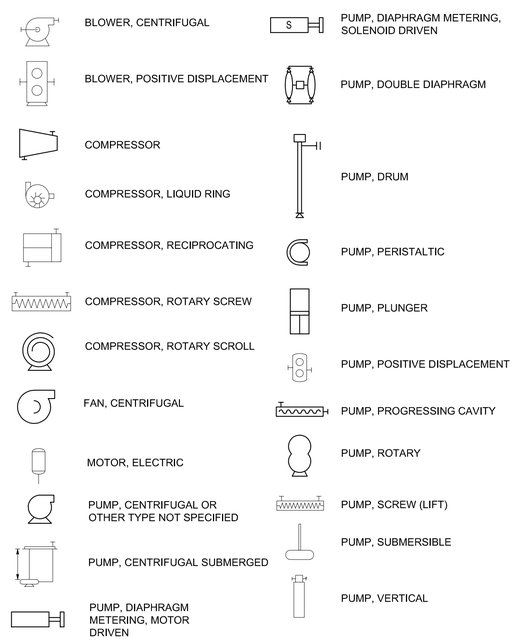
- MAJOR PROCESS PIPING OR FLOW CHANNEL
- SECONDARY PROCESS PIPING
- MISCELLANEOUS PIPING
- SCREENED LINE DENOTES EXISTING PIPE OR EQUIPMENT
- DASHED LINE DENOTES FUTURE PIPE AND EQUIPMENT
- ELECTRIC SIGNAL
- HYDRAULIC SIGNAL
- PNEUMATIC SIGNAL
- SIGNAL CONNECTION POINT
- CONTROL SYSTEM BACKBONE NETWORK SIGNAL (ETHERNET)
- FIELD DEVICE NETWORK SIGNAL (ETHERNET)
- NON-STANDARD OR INDEPENDENT CONTROL SYSTEM NETWORK SIGNAL (AS NOTED ON DRAWINGS)



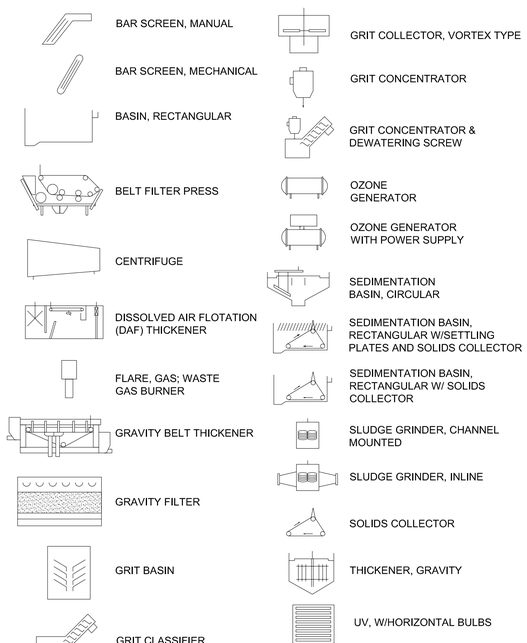
MISCELLANEOUS MECHANICAL EQUIPMENT SYMBOLS



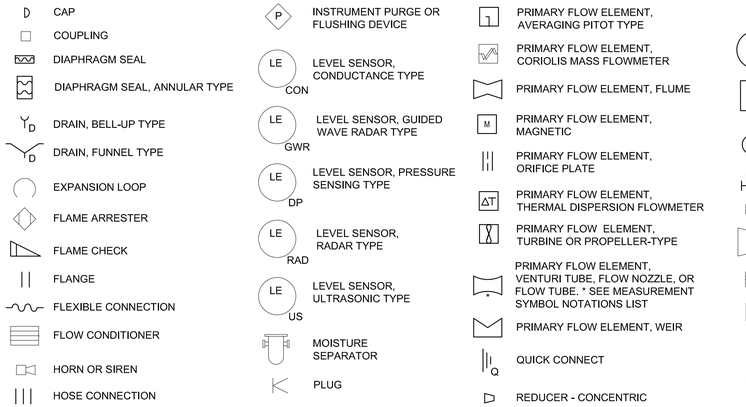
PUMP & BLOWER SYMBOLS



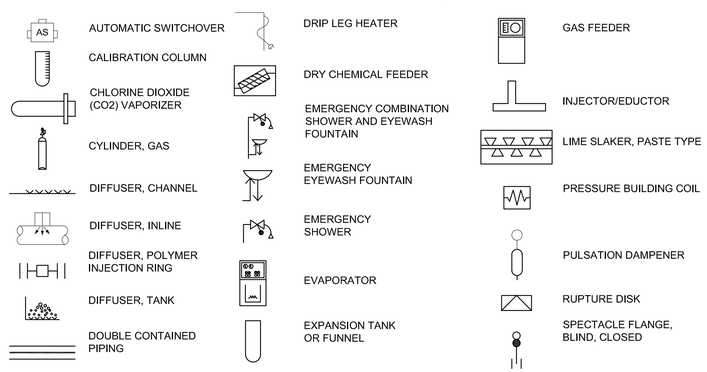
WATER & WASTEWATER MECHANICAL EQUIPMENT SYMBOLS



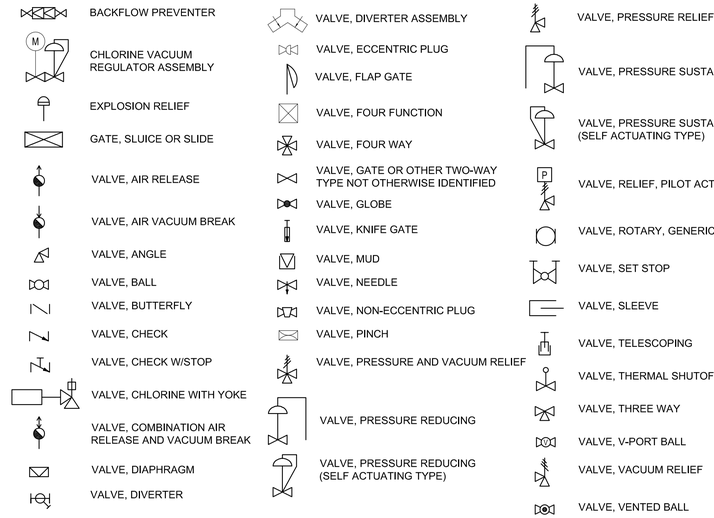
PRIMARY ELEMENT & FITTING SYMBOLS



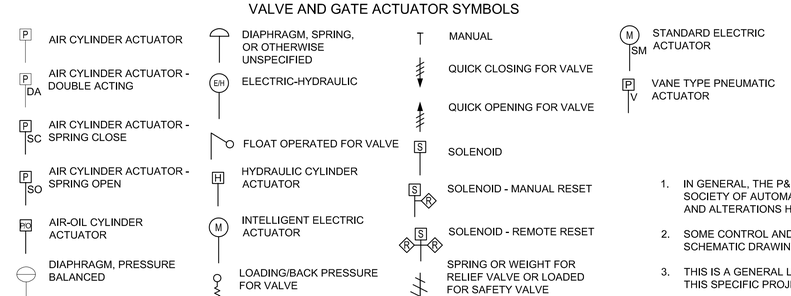
CHEMICAL FEED EQUIPMENT SYMBOLS



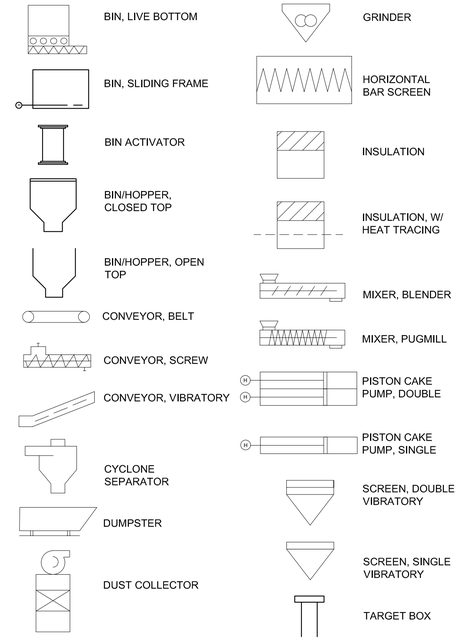
VALVE & GATE SYMBOLS



VALVE AND GATE ACTUATOR SYMBOLS



MATERIAL HANDLING EQUIPMENT SYMBOLS



GENERAL NOTES

1. IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2022). SOME MODIFICATIONS, ADDITIONS, AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM THE P&ID DRAWINGS.
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.

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ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

INSTRUMENTATION P&ID LEGEND AND ABBREVIATIONS SHEET 1 OF 3

SCALE

DRAWING No. I-001

SHEET No. 48 OF 52

C:\Users\bro75220\AppData\Local\Autodesk\AutoCAD Plant 3D\CollaborationCache\413104\PID DWG\I-001.dwg - _a2 standard bw.stb - Plot Date: 9/5/2023 1:42:38 PM

INSTRUMENT AND I/O ABBREVIATIONS
MEANINGS OF IDENTIFICATION LETTERS

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	VARIABLE MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT OR ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENTIAL			DEVIATION
E	VOLTAGE (EMF)		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER		SCAN		
K	TIME OR TIME-SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE OR TOTALIZE	INTEGRATE OR TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED OR FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION OR MECHANICAL ANALYSIS			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL, PROBE		
X	UNCLASSIFIED	X-AXIS	ACCESSORY DEVICES OR UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, OR PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS		DRIVE, ACTUATOR OR FINAL CTRL ELEMENT	

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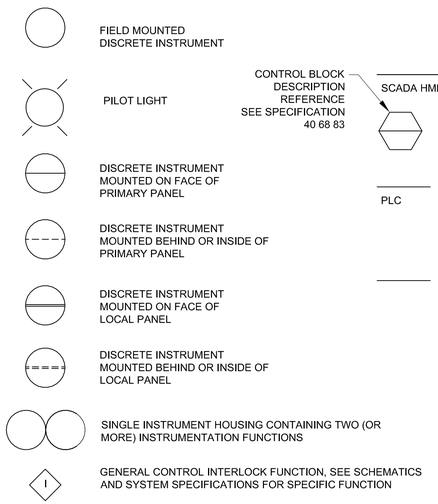
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS.

INSTRUMENT AND I/O ABBREVIATION DEFINITIONS

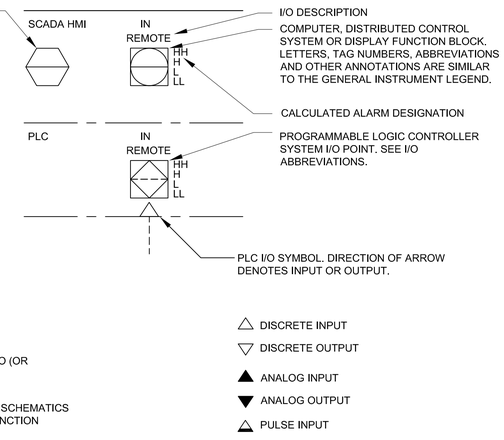
AAH	ANALYZER ALARM HIGH
AAHH	ANALYZER ALARM HIGH-HIGH
AAL	ANALYZER ALARM LOW OR STROBE ALARM LIGHT
AALL	ANALYZER ALARM LOW-LOW
AAX	ALARM HORN
AE	ANALYZER SENSOR
AI	ANALYZER INDICATION
AIT	ANALYZER INDICATING TRANSMITTER
ASH	ANALYZER SWITCH HIGH
ASHH	ANALYZER SWITCH HIGH-HIGH
CB	CONTROL BLOCK REFERENCE (SCADA LEVEL)
FAH	FLOW ALARM HIGH
FAL	FLOW ALARM LOW
FC	FLOW CONTROLLER
FE	PRIMARY FLOW ELEMENT/SENSOR
FG	FLOW SIGHT GAUGE
FI	FLOW DIGITAL INDICATOR (LED OR SCREEN)
FIC	FLOW INDICATING CONTROLLER
FIT	FLOW INDICATING TRANSMITTER
FQG	FLOW TOTALIZING GAUGE
FQIT	FLOW TOTALIZING INDICATING TRANSMITTER
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
FY	FLOW SIGNAL CONVERTER, REPEATER, OR ISOLATOR
HIC	HAND INDICATING CONTROLLER
HMS	MOMENTARY PUSHBUTTON OR SELECTOR SWITCH
HS	HAND SWITCH
IAH	CURRENT ALARM HIGH (MOTOR OVERLOAD)
IE	CURRENT ELEMENT/SENSOR
ISH	CURRENT SWITCH HIGH USED TO DETECT HIGH TORQUE
JA	POWER FAILURE ALARM
JI	POWER INDICATOR
JIT	POWER INDICATING TRANSMITTER
JL	POWER INDICATING LIGHT
KQI	TIME TOTALIZING INDICATOR
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH-HIGH
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW-LOW
LE	PRIMARY LEVEL ELEMENT/SENSOR
LG	LEVEL SIGHT GAUGE
LI	LEVEL INDICATOR (LED OR SCREEN)
LIT	LEVEL INDICATING TRANSMITTER
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH-HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LY	LEVEL SIGNAL CONVERTER, ISOLATOR, OR REPEATER
OAH	TORQUE ALARM HIGH
OAHH	TORQUE ALARM HIGH HIGH
OSH	TORQUE SWITCH HIGH
OSHH	TORQUE SWITCH HIGH-HIGH
PAH	PRESSURE ALARM HIGH
PAHH	PRESSURE ALARM HIGH-HIGH
PAL	PRESSURE ALARM LOW
PALL	PRESSURE ALARM LOW-LOW
PDAH	DIFFERENTIAL PRESSURE ALARM HIGH
PDAHH	DIFFERENTIAL PRESSURE ALARM HIGH-HIGH
PDG	DIFFERENTIAL PRESSURE GAUGE
PDI	DIFFERENTIAL PRESSURE INDICATOR (LED OR SCREEN)
PDIT	DIFFERENTIAL PRESSURE INDICATING TRANSMITTER
PDSH	DIFFERENTIAL PRESSURE SWITCH HIGH
PDSHH	DIFFERENTIAL PRESSURE SWITCH HIGH-HIGH
PDSL	DIFFERENTIAL PRESSURE SWITCH LOW
PDSLL	DIFFERENTIAL PRESSURE SWITCH LOW-LOW
PE	PRESSURE SENSOR
PG	PRESSURE GAUGE
PI	PRESSURE INDICATOR (LED OR SCREEN)
PIT	PRESSURE INDICATING TRANSMITTER
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW
SC	SPEED CONTROL
SI	SPEED INDICATION (LED OR SCREEN)
SIT	SPEED INDICATING TRANSMITTER
SSL	SPEED SWITCH LOW
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH-HIGH
TAL	TEMPERATURE ALARM LOW
TDI	DIFFERENTIAL TEMPERATURE INDICATOR (LED OR SCREEN)
TDIT	DIFFERENTIAL TEMPERATURE TRANSMITTER
TE	TEMPERATURE SENSOR/RESISTANCE
TI	TEMPERATURE DETECTOR
TG	TEMPERATURE GAUGE
TI	TEMPERATURE INDICATOR (LED OR SCREEN)
TIT	TEMPERATURE INDICATING TRANSMITTER
TSH	TEMPERATURE SWITCH HIGH
TSHH	TEMPERATURE SWITCH HIGH HIGH
TSL	TEMPERATURE SWITCH LOW
UA	MULTIVARIABLE/COMMON ALARM/COMMON FAULT
UCR	RUN COMMAND
UCS	STOP COMMAND
VAH	VIBRATION ALARM HIGH
WE	PRIMARY WEIGHT SENSOR/LOAD CELL
WG	WEIGHT GAUGE
WIT	WEIGHT INDICATING TRANSMITTER
YA	GENERAL ALARM EVENT
YI	EVENT INDICATION (LED OR SCREEN)
YIR	RUNNING INDICATION
YIS	STOPPED INDICATION
YL	EVENT INDICATING LIGHT
YLR	RUNNING INDICATING LIGHT
YLS	STOPPED INDICATING LIGHT
ZI	POSITION INDICATOR
ZIC	CLOSED INDICATION
ZIO	OPEN INDICATION
ZIT	POSITION INDICATING TRANSMITTER
ZLC	CLOSED INDICATING LIGHT
ZLO	OPEN INDICATING LIGHT
ZSC	CLOSED POSITION SWITCH
ZSO	OPEN POSITION SWITCH
ZT	POSITION TRANSMITTER

GENERAL INSTRUMENT SYMBOLS

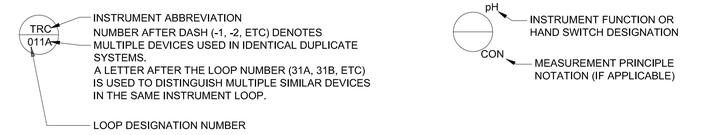


DIGITAL SYSTEMS INTERFACE SYMBOLS

NOTE: REFER TO DETAILED SYSTEM SPECIFICATIONS FOR FUNCTIONAL DESCRIPTION. ALSO SEE I/O SCHEDULES FOR COMPLETE INPUT AND OUTPUT LISTINGS.



INSTRUMENTATION SYMBOLOGY AND DESIGNATIONS



FUNCTION DESIGNATIONS AND ABBREVIATIONS

MEASUREMENT PRINCIPLE NOTATIONS

CON	CONDUCTANCE
DP	DIFFERENTIAL PRESSURE SENSING
FLN	FLOW NOZZLE
FLT	FLOW TUBE
GWR	GUIDED WAVE RADAR
RAD	RADAR
US	ULTRASONIC
VENT	VENTURI TUBE

CALCULATED ALARM DESIGNATIONS

H	HIGH
HH	HIGH-HIGH
L	LOW
LL	LOW-LOW

INDICATING LIGHT/ALARM DESIGNATIONS

OVRLD	OVERLOAD
TRQ HI	TORQUE HIGH
TRQ HI-HI	TORQUE HIGH HIGH

INSTRUMENT FUNCTIONS

Δ	SUBTRACT (DIFFERENCE)
Σ	ADD OR SUM (ADD AND SUBTRACT)
√‾	EXTRACT SQUARE ROOT
÷	DIVIDE
>	HIGH-SELECT
<	LOW-SELECT
X	MULTIPLY
∫	INTEGRATE (TIME INTEGRAL)
CH4	METHANE
CL2	CHLORINE RESIDUAL
CO2	CARBON DIOXIDE
COND	CONDUCTIVITY
DO	DISSOLVED OXYGEN
DWPT	DEWPOINT
F(X)	CHARACTERIZE SIGNAL
H2S	HYDROGEN SULFIDE
K	GAIN OR ATTENUATE (INPUT:OUTPUT)
-K	GAIN AND REVERSE
LEL	LOWER EXPLOSIVE LIMIT
MCC	MOTOR CONTROL CENTER
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
O2	OXYGEN (PURITY)
O3	OZONE
pH	pH
UVI	ULTRAVIOLET INTENSITY
UVT	ULTRAVIOLET TRANSMITTANCE
VAC	VACUUM

HAND SWITCH DESIGNATIONS

FR	FORWARD-REVERSE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LR	LOCAL REMOTE
OC	OPEN-CLOSE
OCA	OPEN-CLOSE-AUTO
OO	ON-OFF
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
OSC	OPEN-STOP-CLOSE

TRANSDUCER & CONVERTER DESIGNATION

E	VOLTAGE
FSK	FREQUENCY SHIFT KEYING
H	HYDRAULIC
I	CURRENT
P	PNEUMATIC PULSE
PD	PULSE DURATION
PF	PULSE FREQUENCY
R	RESISTANCE (ELECTRICAL)

EXAMPLE: I/P = CURRENT TO PNEUMATIC TRANSDUCER

POWER SUPPLY ABBREVIATIONS

—— 120V POWER SUPPLY SOURCE LABEL. USED ONLY WHERE NECESSARY TO HELP CLARIFY AN INSTRUMENT OR SYSTEM FUNCTION.

120V	120VAC
AS	AIR SUPPLY
ES	ELECTRIC SUPPLY
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
SS	STEAM SUPPLY
WS	WATER SUPPLY

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INSTRUMENTATION
P&ID LEGEND AND ABBREVIATIONS SHEET 2 OF 3

SCALE

DRAWING No. I-002

SHEET No. 49 OF 52

SYSTEM CODE ABBREVIATIONS

ACE	ACETIC ACID	FLC	FLOCCULATION	RES	RESIDUALS
ACT	ACETYLENE	FLS	FLUORIDE SYSTEM	RAS	RETURN ACTIVATED SLUDGE
GAC	ACTIVATED CARBON - GRANULAR	GOX	GASEOUS OXYGEN	ROS	REVERSE OSMOSIS
AIR	AERATION AIR/PROCESS AIR	GSL	GASOLINE	SCR	SCREENINGS
AER	AERATION SYSTEM	GRS	GREASE	SCL	SECONDARY CLARIFICATION
ARW	AIR WASH	GRT	GRIT	SSC	SECONDARY SCUM
ALS	ALUMINUM SULFATE	GEN	GENERATOR	SEP	SEPTAGE
NSO4	AMMONIUM SULFATE	HEL	HELIUM	SET	SETTLED WATER
NH3	ANHYDROUS AMMONIA	HFL	HYDRAULIC FLUID	SEW	SEWAGE
AS	ANTI-SEALANT	HCL	HYDROCHLORIC ACID	NAC	SODA ASH
NHOH	AQUA AMMONIA	HFS	HYDROFLUOSILIC ACID (FLUORIDE)	NAL	SODIUM ALUMINATE
ARG	ARGON	HYD	HYDROGEN	NAM	SODIUM ALUMINATE
ASH	ASH	PER	HYDROGEN PEROXIDE	NBC	SODIUM BICARBONATE
BWH	BACKWASH - MEMBRANE/FILTER	INC	INCINERATION	NHS	SODIUM BISULFITE
BAL	BALLASTED FLOCCULATION	INFP	INFLUENT PUMPING	NCL	SODIUM CHLORIDE
BIO	BIOSOLIDS	INT	INTAKE	NCL2	SODIUM CHLORITE
BIT	BIOTOWER	LAG	LAGOON STORAGE	NAF	SODIUM FLUORIDE
BLS	BLENDED SLUDGE	LAP	LAND APPLICATION	NAX	SODIUM HEXAMETAPHOSPHATE
BNR	BNR	CAH	LIME - HYDRATED	NAOH	SODIUM HYDROXIDE
BRN	BRINE	CAO	LIME - QUICKLIME	NOCL	SODIUM HYPOCHLORITE
CACL	CALCIUM HYPOCHLORITE	LIM	LIME STABILIZATION	NASF	SODIUM SILICOFLUORIDE
CATS	CALCIUM THIOSULFATE	LOX	LIQUID OXYGEN	STM	STEAM
CO2	CARBON DIOXIDE	LPG	LP GAS OR PROPANE GAS	STS	STORM SEWER
CAS	CARBON SLURRY	MGOH	MAGNESIUM HYDROXIDE	STW	STORM WATER
HCO3	CARBONIC ACID	MEM	MEMBRANE	SO2	SULFUR DIOXIDE
CEN	CENTRATE	MEG	METHANE GAS	HSO4	SULFURIC ACID
CEB	CHEMICAL ENHANCED BACKWASH - MEMBRANE	MTH	METHANOL	SW	SURFACE WASH
CL2	CHLORINE	MXL	MIXED LIQUOR	TERT	TERTIARY TREATMENT
CLO2	CHLORINE DIOXIDE	NG	NATURAL GAS	TPRS	THICKENED PRIMARY SLUDGE
CA	CITRIC ACID	NIT	NITROGEN	TWAS	THICKENED WASTE ACTIVATED SLUDGE
CIP	CLEAN IN PLACE	NIO	NITROUS OXIDE	THCK	THICKENING
COA	COAGULATION	ODC	ODOR CONTROL	TW	TREATED WATER
CAI	COMPRESSED AIR - INSTRUMENT	OIL	OIL	TF	TRICKLING FILTER
CMS	COMPRESSED AIR - SERVICE	FO	OIL - FUEL	UV	ULTRAVIOLET
CUS	COPPER SULFATE	OZN	OZONE	VAC	VACUUM
CI	CORROSION INHIBITOR	OZD	OZONE DESTRUCT	WW	WASH WATER
DCL	DECHLORINATION	PPP	PHOSPHATE	WAS	WASTE ACTIVATED SLUDGE
DET	DETERGENT	PO4	PHOSPHORIC ACID	WWW	WASTE WASH WATER
DWT	DEWATERING	PCL	POLYALUMINUM CHLORIDE	CDW	WATER - CONDENSATE
FUE	DIESEL FUEL	POLF	POLYMER	COLW	WATER - COOLING
DGG	DIGESTER GAS	KMN	POTASSIUM PERMANGANATE	DW	WATER - DISTILLED WATER
DGM	DIGESTER GAS MIXING	PAC	POWDERED ACTIVATE CARBON	FW	WATER - FINISH
DGS	DIGESTER SLUDGE	PAR	PRE-AERATION	IRW	WATER - IRRIGATION
DGA	DIGESTION - AEROBIC	PSD	PRESEDIMENTATION	OZW	WATER - OZONATED
DIG	DIGESTION - ANAEROBIC	PRC	PRIMARY CLARIFICATION	SWT	WATER - SEAL
DCB	DISINFECTION CONTACT BASIN	PSC	PRIMARY SCUM	HW	WATER - WATER HEATING
DAF	DISSOLVED AIR FLOTATION	PRS	PRIMARY SLUDGE	DEIW	WATER DEIONIZED
DRN	DRAINAGE	WWP	RAW WASTEWATER PUMPING	NPW	WATER NON-POTABLE
EFP	EFFLUENT PUMPING	RWP	RAW WATER PUMPING	PEW	WATER PLANT EFFLUENT
EXH	ENGINE EXHAUST	RWS	RAW WATER STORAGE	PW	WATER POTABLE
EQB	EQUALIZATION BASIN	RCS	RECIRCULATED SLUDGE	RW	WATER RAW
FEC	FERRIC CHLORIDE	RCW	RECLAIMED WATER	WWT	WET WEATHER TREATMENT
FES	FERRIC SULFATE	REF	REFRIGERANT	ZOP	ZINC ORTHOPHOSPHATE
FRC	FERROUS CHLORIDE				
FRS	FERROUS SULFATE				
FLT	FILTRATION				

PROCESS CODE ABBREVIATIONS

ACE_X	ACETIC ACID	FLC_X	FLOCCULATION	RES_X	RESIDUALS
ACT_X	ACETYLENE	GOX_X	GASEOUS OXYGEN	RAS_X	RETURN ACTIVATED SLUDGE
GAC_X	ACTIVATED CARBON - GRANULAR	GSL_X	GASOLINE	ROS_X	REVERSE OSMOSIS
AIR_X	AERATION AIR/PROCESS AIR	GRS_X	GREASE	SCR_X	SCREENINGS
AER_X	AERATION SYSTEM	GRT_X	GRIT	SCL_X	SECONDARY CLARIFICATION
ARW_X	AIR WASH	HEL_X	HELIUM	SSC_X	SECONDARY SCUM
ALS_X	ALUMINUM SULFATE	HFL_X	HYDRAULIC FLUID	SEP_X	SEPTAGE
NSO4_X	AMMONIUM SULFATE	HCL_X	HYDROCHLORIC ACID	SET_X	SETTLED WATER
NH3_X	ANHYDROUS AMMONIA	HFS_X	HYDROFLUOSILIC ACID (FLUORIDE)	SEW_X	SEWAGE
AS_X	ANTI-SEALANT	HYD_X	HYDROGEN	NAC_X	SODA ASH
NHOH_X	AQUA AMMONIA	PER_X	HYDROGEN PEROXIDE	NAL_X	SODIUM ALUMINATE
ARG_X	ARGON	INC_X	INCINERATION	NAM_X	SODIUM ALUMINATE
ASH_X	ASH	INFP_X	INFLUENT PUMPING	NBC_X	SODIUM BICARBONATE
BWH_X	BACKWASH - MEMBRANE/FILTER	INT_X	INTAKE	NHS_X	SODIUM BISULFITE
BAL_X	BALLASTED FLOCCULATION	LAG_X	LAGOON STORAGE	NCL_X	SODIUM CHLORIDE
BNR_X	BIOSOLIDS	LAP_X	LAND APPLICATION	NCL2_X	SODIUM CHLORITE
BIO_X	BIOTOWER	CAH_X	LIME - HYDRATED	NAF_X	SODIUM FLUORIDE
BIT_X	BLENDED SLUDGE	CAO_X	LIME - QUICKLIME	NAX_X	SODIUM HEXAMETAPHOSPHATE
BLS_X	BNR	LIM_X	LIME STABILIZATION	NAOH_X	SODIUM HYDROXIDE
BRN_X	BRINE	LOX_X	LIQUID OXYGEN	NOCL_X	SODIUM HYPOCHLORITE
CACL_X	CALCIUM HYPOCHLORITE	LPG_X	LP GAS OR PROPANE GAS	NASF_X	SODIUM SILICOFLUORIDE
CATS_X	CALCIUM THIOSULFATE	MGOH_X	MAGNESIUM HYDROXIDE	STM_X	STEAM
CO2_X	CARBON DIOXIDE	MEM_X	MEMBRANE	STS_X	STORM SEWER
CAS_X	CARBON SLURRY	MEG_X	METHANE GAS	STW_X	STORM WATER
HCO3_X	CARBONIC ACID	MTH_X	METHANOL	SO2_X	SULFUR DIOXIDE
CEN_X	CENTRATE	MXL_X	MIXED LIQUOR	HSO4_X	SULFURIC ACID
CEB_X	CHEMICAL ENHANCED BACKWASH - MEMBRANE	NG_X	NATURAL GAS	SW_X	SURFACE WASH
CL2_X	CHLORINE	NIT_X	NITROGEN	TERT_X	TERTIARY TREATMENT
CLO2_X	CHLORINE DIOXIDE	NIO_X	NITROUS OXIDE	TPRS_X	THICKENED PRIMARY SLUDGE
CA_X	CITRIC ACID	ODC_X	ODOR CONTROL	TWAS_X	THICKENED WASTE ACTIVATED SLUDGE
CIP_X	CLEAN IN PLACE	FO_X	OIL	THCK_X	THICKENING
COA_X	COAGULATION	OIL_X	OIL - FUEL	TW_X	TREATED WATER
CAI_X	COMPRESSED AIR - INSTRUMENT	OZN_X	OZONE	TF_X	TRICKLING FILTER
CMS_X	COMPRESSED AIR - SERVICE	OZD_X	OZONE DESTRUCT	UV_X	ULTRAVIOLET
CUS_X	COPPER SULFATE	PPP_X	PHOSPHATE	VAC_X	VACUUM
CI_X	CORROSION INHIBITOR	PO4_X	PHOSPHORIC ACID	WW_X	WASH WATER
DCL_X	DECHLORINATION	PCL_X	POLYALUMINUM CHLORIDE	WAS_X	WASTE ACTIVATED SLUDGE
DET_X	DETERGENT	POLF_X	POLYMER	WWW_X	WASTE WASH WATER
DWT_X	DEWATERING	KMN_X	POTASSIUM PERMANGANATE	CDW_X	WATER - CONDENSATE
FUE_X	DIESEL FUEL	PAC_X	POWDERED ACTIVATE CARBON	COLW_X	WATER - COOLING
DGG_X	DIGESTER GAS	PAR_X	PRE-AERATION	DW_X	WATER - DISTILLED WATER
DGM_X	DIGESTER GAS MIXING	PSD_X	PRESEDIMENTATION	FW_X	WATER - FINISH
DGS_X	DIGESTER SLUDGE	PRC_X	PRIMARY CLARIFICATION	IRW_X	WATER - IRRIGATION
DGA_X	DIGESTION - AEROBIC	PSC_X	PRIMARY SCUM	OZW_X	WATER - OZONATED
DIG_X	DIGESTION - ANAEROBIC	PRS_X	PRIMARY SLUDGE	SWT_X	WATER - SEAL
DCB_X	DISINFECTION CONTACT BASIN	WWP_X	RAW WASTEWATER PUMPING	HW_X	WATER - WATER HEATING
DAF_X	DISSOLVED AIR FLOTATION	RWP_X	RAW WATER PUMPING	DEIW_X	WATER DEIONIZED
DRN_X	DRAINAGE	RWS_X	RAW WATER STORAGE	NPW_X	WATER NON-POTABLE
EFP_X	EFFLUENT PUMPING	RCS_X	RECIRCULATED SLUDGE	PEW_X	WATER PLANT EFFLUENT
EXH_X	ENGINE EXHAUST	RCW_X	RECLAIMED WATER	PW_X	WATER POTABLE
EQB_X	EQUALIZATION BASIN	REF_X	REFRIGERANT	RW_X	WATER RAW
FEC_X	FERRIC CHLORIDE			WWT_X	WET WEATHER TREATMENT
FES_X	FERRIC SULFATE			ZOP_X	ZINC ORTHOPHOSPHATE
FRC_X	FERROUS CHLORIDE				
FRS_X	FERROUS SULFATE			X =	PROCESS CODE SUFFIX USED TO FURTHER SPECIFY A PROCESS STREAM (I.E. CL2_G FOR CHLORINE GAS OR CL2_S FOR CHLORINE SOLUTION)
FLT_X	FILTRATION				

EQUIPMENT CODE ABBREVIATIONS

ACMB	ACTIVATION CHAMBER	DWS	DEWATERING SCREW	HSE	HOIST, WIRE ROPE	RSV	RESERVOIR	VB	VACUUM BREAK
AFD	ADJUSTABLE FREQUENCY DRIVE	DPS	DIAPHRAGM SEAL	HYDF	HYDRANT, FIRE	RCO	RESIDUAL COLLECTOR	VRG	VACUUM REGULATOR
ACD	AERATOR, COARSE BUBBLE DIFFUSED	DIF	DIFFUSER, CHANNEL	HYDW	HYDRANT, WALL	RM	ROTAMETER	AVR	VALVE, AIR RELEASE
AEFD	AERATOR, FINE PORE DIFFUSED	DFB	DIFFUSER BANK	HSC	HYDRAULIC SYSTEM CENTER (UV)	RD	RUPTURE DISK	AVRV	VALVE, AIR-VACUUM
AFS	AERATOR, FLOATING SURFACE	DIP	DIFFUSER, PIPELINE	HYC	HYDROCYCLONE	SAMP	SAMPLER	VAG	VALVE, ANGLE
AES	AERATOR, SURFACE	DIR	DIFFUSER, TANK	INJ	INJECTOR, CHEMICAL	SCL	SCALE	VBM	VALVE, AWWA BALL
AFC	AFTERCOOLER	DGE	DIGESTER, AEROBIC	LS	LIME SLAKER	SC	SCALE, WEIGHT	VBF	VALVE, AWWA BUTTERFLY
AD	AIR DRYER	DGAP	DIGESTER, ANAEROBIC PRIMARY	MFM	MEMBRANE	SCRHT	SCREEN, HORIZONTAL	VBFP	VALVE, BACKFLOW PREVENTER
AF	AIR FILTER	DGAS	DIGESTER, ANAEROBIC SECONDARY	MBMF	MEMBRANE, MICROFILTRATION	SCRI	SCREEN, INLINE SLUDGE	VBM	VALVE, BALL MISCELLANEOUS
AR	AIR RECEIVER OR REGULATOR	DSUV	DISINFECTION UNIT, UV	MBNF	MEMBRANE, NANOFILTRATION	SCRA	SCREEN, MANUAL OR MECH CLEANED BAR	VCK	VALVE, CHECK
AS	AIR SEPARATOR	DAF	DISSOLVED AIR FLOTATION THICKENER	MBRO	MEMBRANE, REVERSE OSMOSIS	SCRS	SCREEN, STEP	VCN	VALVE, CONE
AST	AIR STRIPPER	DUC	DUST COLLECTOR	MBUF	MEMBRANE, ULTRAFILTRATION	SCT	SCREEN, TRAVELLING WATER	VDG	VALVE, DIAPHRAGM OPERATED
ATS	AUTOMATIC TRANSFER SWITCH	EDC	EDUCTOR	MELM	MIST ELIMINATOR	SCR	SCREEN, VIBRATORY	VGD	VALVE, DOUBLE DISC GATE
BFP	BACKFLOW PREVENTER	EQPE	ELECTRICAL EQUIPMENT, GENERAL	MXC	MIXER, CARBON	SCU	SCRUBBER	VPE	VALVE, ECCENTRIC PLUG
BSNA	BASIN, AERATION	EWSH	EMERGENCY EYE WASH FOUNTAIN	FLM	MIXER, FLOCCULATION	SMC	SCUM COLLECTOR	VER	VALVE, EXPLOSION RELIEF
BSNX	BASIN, ANOXIC/OXIC	ESHR	EMERGENCY SHOWER	MDM	MODEM	SCW	SCUM WEIR - ROTATING	VFW	VALVE, FOUR WAY
BNR	BASIN, BNR	EMEW	EMERGENCY SHOWER & EYEWASH	M	MOTOR	SEP	SEPARATOR, MOISTURE OR CYCLONE	VG	VALVE, GATE
BSNC	BASIN, CHLORINE CONTACT	EQPB	EQUIPMENT, BUILDING SERVICES	MXI	MIXER, IN-LINE	SGT	SIGHT GLASS - TALL	V	VALVE, GENERAL OR UNSPECIFIED
BSNO	BASIN, OXIC	EQPT	EQUIPMENT, GENERAL OR UNSPECIFIED	MXPG	MIXER, PUGMILL	SG	SIGHT GAUGE	VGL	VALVE, GLOBE
RBSN	BASIN, RECTANGULAR SEDIMENTATION	EV	EVAPORATOR	MXR	MIXER, RAPID	SIL	SILENCER	VBI	VALVE, INDUSTRIAL BUTTERFLY
BFPS	BELT FILTER PRESS	EXC	EXPANSION CHAMBER	MXS	MIXER, STATIC	SLC	SLUDGE COLLECTOR, CIRCULAR	VKG	VALVE, KNIFE GATE
B	BIN (STORAGE - ALL TYPES)	FAX	FAN, AXIAL FLOW	MXP	MIXER, SUBMERSIBLE, PROP OR BLENDER	GCLR	SLUDGE COLLECTOR, CROSS	VMR	VALVE, MATERIAL HANDLING ROTARY
BA	BIN ACTIVATOR	FAN	FAN, CENTRIFUGAL	MM	MUFFIN MONSTER	SFC	SLUDGE COLLECTOR, FLOC-CLARIFYING	VMD	VALVE, MUD
BLC	BLOWER, CENTRIFUGAL	FST	FENCE STIRRER	ORD	OVERFLOW ROOF DRAIN	SCS	SLUDGE COLLECTOR, SEC CLARIFIERS	VND	VALVE, NEEDLE
BL	BLOWER, POSITIVE DISPLACEMENT	FTSP	FILTER GAS PARTICULATE	ODU	OZONE DESTRUCT UNIT	SSC	SLUDGE COLLECTOR, SOLIDS CONTACT	PTV	VALVE, PILOT
BLR	BOILER	FLC	FILTER, CARTRIDGE TYPE	OGEN	OZONE GENERATOR	SLCS	SLUDGE COLLECTOR, STRAIGHT LINE	VPN	VALVE, PINCH
BDZ	BULLDOZER	FLCO	FILTER, COALESCING	PSU	OZONE POWER SUPPLY UNIT	GRD	SLUDGE GRINDER, INLINE OR CHANNEL	VPO	VALVE, PISTON OPERATED
CCLM	CALIBRATION COLUMN	FLT	FILTER, UNDERDRAINS OR PRESSURE	PP	PACKAGED PLANT	SBL	SOLIDS BLENDER-INLINE	VPL	VALVE, NON-ECCENTRIC PLUG
CFG	CENTRIFUGE	FSW	FILTER. SURFACE WASH EQUIPMENT	PCN	PARTICLE COUNTER	STR	STRAINER	VPC	VALVE, PRESSURE REDUCING
CHF	CHEMICAL FEEDER	FTTNG	FITTING, MISCELLANEOUS	PLT	PELLETIZER	STRB	STRAINER BASKET TYPE	VPC	VALVE, PRESSURE SUSTAINING
CGS	CHLORINE GAS SCRUBBER	FAR	FLAME ARRESTER	PS	PENSTOCK	STRY	STRAINER Y TYPE	VSP	VALVE, PRESSURE RELIEF
PCLR	CLARIFIER, PRIMARY	FC	FLAME CHECK	PIPE	PIPE	SRCH	SURGE CHAMBER	VSPV	VALVE, PRESSURE/VACUUM RELIEF
SCLR	CLARIFIER, SECONDARY	FLCH	FLOCCULATOR, HORIZONTAL	PSE	PLATE SETTLER	SCC	SYSTEM CONTROL CENTER (UV)	VP	VALVE, PROCESS
CGR	CLASSIFIER, GRIT	FLCV	FLOCCULATOR, VERTICAL	INJ	POLYMER INJECTOR RING	TSA	TANK, ABOVE GROUND STORAGE	VGR	VALVE, RESILIENT SEATED GATE
CW	CLEARWELL	FD	FLOOR DRAIN	PDC	POWER DISTRIBUTION CENTER (UV)	TCN	TANK, AMMONIA STORAGE	VS	VALVE, SAFETY
CMP	COMPRESSOR	FS	FLOW SPLITTER	PBC	PRESSURE BUILDING COIL	TCR	TANK, CRYOGENIC STORAGE	VSLV	VALVE, SLEEVE
CMB	COMPRESSOR, LIQUID RING	FE	FLUME, PARSHALL	PD	PULSATION DAMPNER	DWT	TANK, DOUBLE WALL	VSL	VALVE, SOLENOID
CMR	COMPRESSOR, ROTARY SCREW	FMSP	FOAM SEPARATOR	PAD	PUMP, AIR DIAPHRAGM	TSE	TANK, ELEVATED STORAGE	VTV	VALVE, TELESCOPING
CMPS	COMPRESSOR, STEAM	FL	FORKLIFT	PCL	PUMP, CENTRIFUGAL	TX	TANK, EXPANSION	VTS	VALVE, THERMAL SHUTOFF
CTR	CONTAINER, PROCESS	CHF	GAS FEEDER	PDM	PUMP, DIAPHRAGM METERING	TNK	TANK, FRP CHEMICAL STORAGE	VTW	VALVE, THREE WAY
COB	CONVEYOR, BELT	GF	GAS FLARE	PHW	PUMP, HEATING WATER	TNK	TANK, GENERAL OR UNSPECIFIED	VVB	VALVE, VACUUM BREAKER
COS	CONVEYOR, SCREW	GWH	GAS WATER HEATER	PHE	PUMP, HORIZONTAL END SUCTION	TCP	TANK, METHANOL	VSV	VALVE, VACUUM RELIEF
CFA	COVER, ALUMINUM DOME BASIN	GFL	GATE, FLAP	PSC	PUMP, HORIZONTAL SPLIT CASE	SMPT	TANK, SAMPLER	VVP	VALVE, V-PORT BALL
CFD	COVER, FIXED DIGESTER	GSD	GATE, SLIDE	PPS	PUMP, PERISTALTIC	TCS	TANK, CHLORINE CONTACTOR	VAP	VAPORIZER
CFL	COVER, FLOATING DIGESTER	GSC	GATE, SLUICE	PPL	PUMP, PLUNGER	TSW	TANK, FLAT TOP STEEL WATER	VSLB	VESSEL, BOOT
DCG	COVER, GAS HOLDER	G	GATE, WEIR	PPC	PUMP, PROGRESSING CAVITY	TRP	TRAP, DRIP	WC	WEIR, CIPOLETTI
DCM	COVER, MEMBRANE	GEN	GENERATOR, ENGINE (BACKUP POWER)	PSE	PUMP, SCREW ENCLOSED	TRPS	TRAP, SEDIMENT	WR	WEIR, RECTANGULAR
CRN	CRANE	GBT	GRAVITY BELT THICKENER	PSE	PUMP, SCREW OPEN	TRK	TRUCK	WV	WEIR, V-NOTCH
CRG	CRANE, GANTRY	GVT	GRAVITY THICKENER	PCL	PUMP, SUBMERSIBLE	TB	TURBINE	WLHC	WELL, HORIZONTAL COLLECTOR
CRJ	CRANE, JIB	GRD	GRINDER PULVERIZER	PCH	PUMP, SUBMERSIBLE CHOPPER	TBC	TURBINE COMPRESSOR	WLV	WELL, VERTICAL
CRP	CRANE, PORTABLE GANTRY	GRB	GRIT BASIN, VORTEX TYPE	PSS	PUMP, SUBMERSIBLE SUMP	TBG	TURBINE ENGINE		
CRT	CRANE, TRAVELLING BRIDGE	GRV	GRIT SCREW CONCENTRATOR	PSP	PUMP, SUMP	UPS	UNINTERRUPTABLE POWER SUPPLY		
CYL	CYLINDER, CHLORINE	HEX	HEAT EXCHANGER	P	PUMP, POSITIVE DISPLACEMENT, ROTARY, DRUM OR BELL MOUNTED	UVE	UV REACTOR		
CYG	CYLINDER, GAS	HST	HOIST			UVL	UV REACTOR, HORIZONTAL OR VERTICAL		
				PVD	PUMP, VERTICAL DIFFUSION VANE				
				PVE	PUMP, VERTICAL END SUCTION				
				PVW	PUMP, VERTICAL WET PIT				

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

REV.	DESCRIPTION	DATE	DRAWN	CHECKED
	100% ISSUE FOR BID/PERMITTING	SEPT 2023	HB	MP

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ANN ARBOR, MI 48107-8647
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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

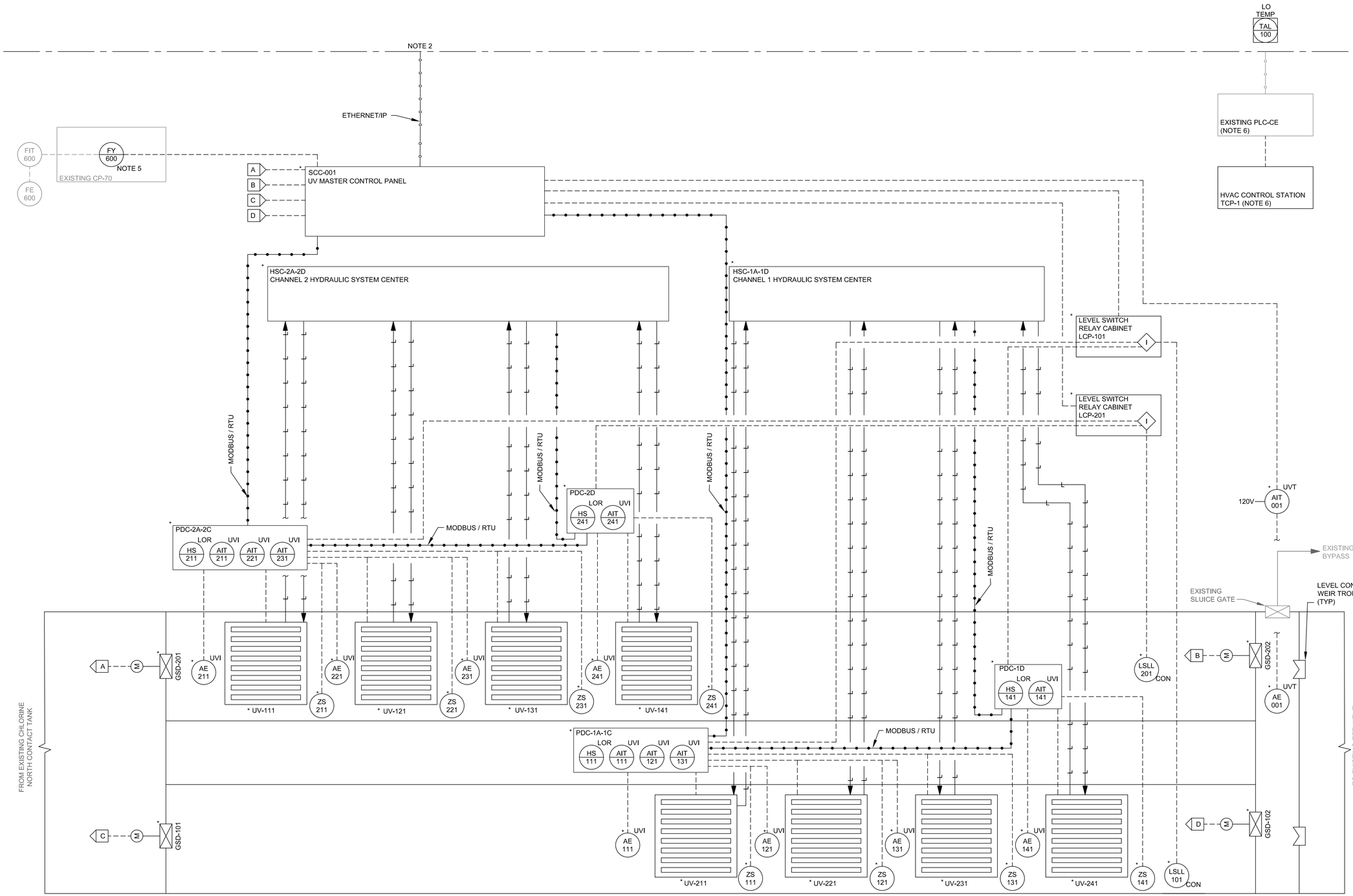
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

INSTRUMENTATION
P&ID LEGEND AND ABBREVIATIONS SHEET 3 OF 3

SCALE

DRAWING No. I-003

SHEET No. 50 OF 52



NOTES:

1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I-001, I-002 AND I-003.
2. REFER TO SPECIFICATION 46 66 56 FOR DATA INTEGRATION WITH PLANT CONTROL SYSTEM REQUIREMENTS.
3. ALL EQUIPMENT, VALVES AND INSTRUMENTS MARKED BY AN " * " SHALL BE PROVIDED BY THE UV SUPPLIER AND SHIPPED LOOSE TO BE INSTALLED BY THE CONTRACTOR.
4. SYSTEM CODE IS "UV" UNLESS OTHERWISE NOTED.
5. CONTRACTOR SHALL FURNISH AND INSTALL A SIGNAL SPLITTER IN EXISTING CP-70, WHICH SHALL MAINTAIN EXISTING FLOW SIGNAL TO EXISTING PLC, AND ADD A FLOW SIGNAL TO BE ROUTED AND TERMINATED AT THE NEW UV MASTER CONTROL PANEL.
6. CONTRACTOR SHALL WIRE LOW TEMPERATURE SIGNAL FROM TCP-1 TO SPARE DIGITAL INPUT IN EXISTING PLC-CE.

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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

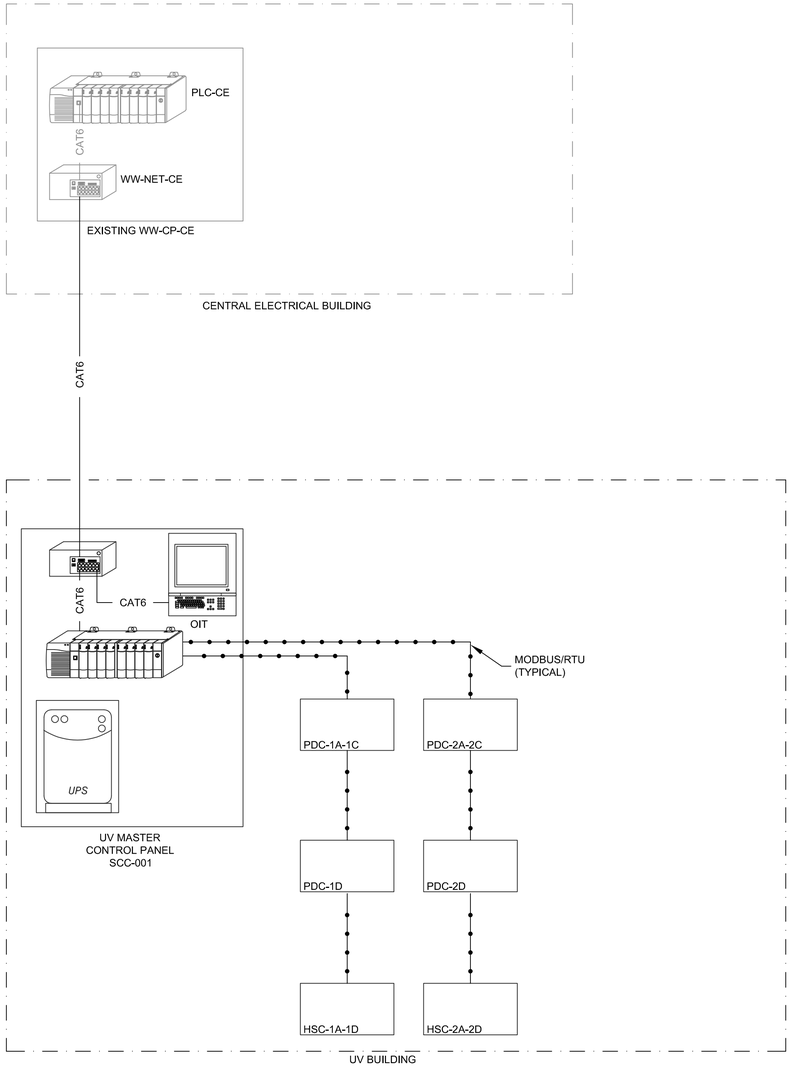
ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

INSTRUMENTATION
P&ID - UV SYSTEM

SCALE

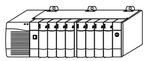
DRAWING No. I-101

SHEET No. 51 OF 52



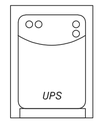
LEGEND :

PLC



ETHERNET SWITCH

OPERATOR INTERFACE TERMINAL (OIT)



UNINTERRUPTIBLE POWER SUPPLY (UPS)

NOTES:

1. THIS DRAWING DEPICTS THE FUNCTIONAL SCADA NETWORK DIAGRAM FOR THIS PROJECT ONLY.

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REV.	DESCRIPTION	DATE	DRAWN	CHECKED
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CITY OF ANN ARBOR - WATER RESOURCE RECOVERY FACILITY

ULTRAVIOLET (UV) DISINFECTION SYSTEM REPLACEMENT PROJECT

INSTRUMENTATION
CONTROL BLOCK DIAGRAM

SCALE

DRAWING No. I-501

SHEET No. 52 OF 52