SET NO.

TOWN OF MILLERSBURG
ELKHART COUNTY, INDIANA

WWTP IMPROVEMENTS
NEW UV AND CLARIFIER COVER

SEPTEMBER 2025

TOWN COUNCIL

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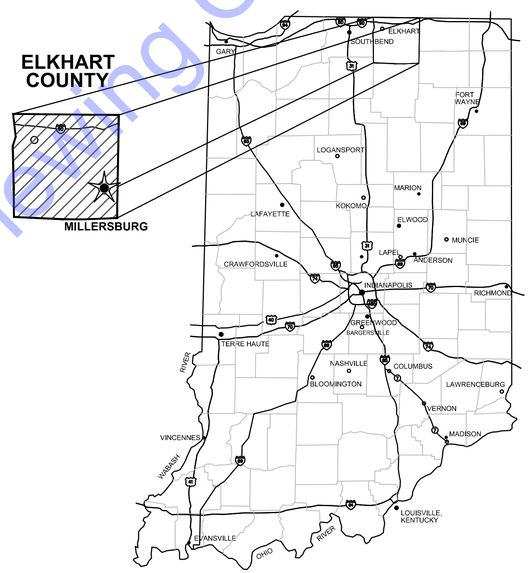
LARRY RANDOLPH.....MEMBER
DANA RUTTER.....MEMBER
MACKENZIE TAYLOR.....CLERK-TREASURER

AVERY FERGUSON.....UTILITIES SUPERINTENDENT

JACKSON W. BECK.....ATTORNEY



GENERAL LOCATION MAP

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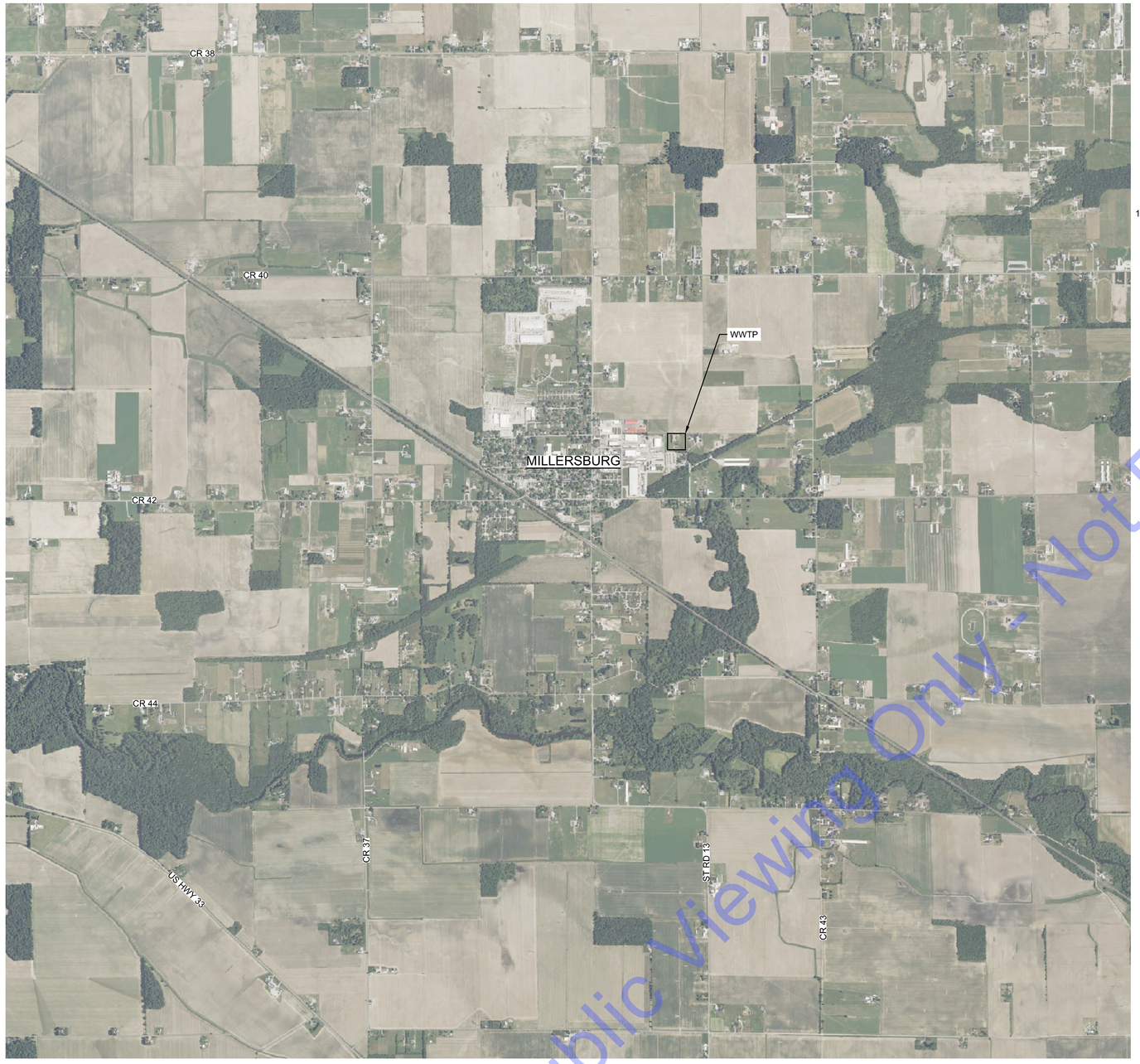
QA/QC BY : JEREMY D. HARDY, P.E. 9/9/25
DATE :

CERTIFIED BY : Natalie Schelling 9/9/25
NATALIE M. SCHELLING, P.E.
INDIANA P.E. No. 12000721
DATE :

NATALIE M. SCHELLING REGISTERED No. 12000721 STATE OF INDIANA PROFESSIONAL ENGINEER

CONTRACT NO. : S25012



SCALE: 1"=1500'

1500' 0 1500'

VICINITY MAP
SCALE: 1"=1500'-0"

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PROFESSIONAL ENGINEER

Signature 9/9/2025 Date

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No.	Submittal Revision	By	Date

Designed By:	Drawn By:	Checked By:
NS	CH	JH
Issue Date: 9/2025	Project No: S25012	Scale: AS SHOWN

VICINITY MAP AND INDEX TO SHEETS

Drawing No: G2

Sheet: 2 OF 19

File: Z:\SHARED\IN CLIENTS M-Z\MILLERSBURG\S25012 WWTP IMPROVEMENTS\06 CAD\A CURRENT FILES\1 DRAWINGS\02 - VICINITY MAP.DWG
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GENERAL ABBREVIATIONS

A	AIR
AB	ANCHOR BOLT
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
@	AT
APP.	APPARENT
ATT	AERATION TANK TRANSFER
AUTO	AUTOMATIC
AVG	AVERAGE
B	BAFFLE
BLDG	BUILDING
BM	BENCH MARK
BOT	BOTTOM
BRG	BEARING
CFM	CUBIC FEET PER MINUTE
CL	CENTERLINE
CO	CLEAN OUT
COL/C	COLUMN
CONC	CONCRETE
COP	COPPER
CJ	CONSTRUCTION JOINT
CW	COLD WATER
CY	CUBIC YARD
D	DRAIN
DEC	DECANT
DIA	DIAMETER
DIM	DIMENSION
DI	DUCTILE IRON PIPE
DL	DEAD LOAD
DSPT	DOWN SPOUT
DWG	DRAWING
E	ELECTRICAL CONDUIT
EA	EACH
EF	EACH FACE
EFFL	EFFLUENT
EL	ELEVATION
EW	EACH WAY
EX	EXISTING
EXF	EXHAUST FAN
EXP JP	EXPANSION JOINT
F	FILTER
FCAR	FLANGED COUPLING ADAPTER, RESTRAINED
FD	FLOOR DRAIN
FDN	FOUNDATION
FH	FIRE HYDRANT

FLD	FILTRATE DRAIN
FLG	FLANGE
FL	FLUSHING LINE
FLR	FLOOR
FM	FORCE MAIN
FRP	FIBER REINFORCED PLASTIC
FT	FEET OR FOOT
FTG	FOOTING
FW	FINISHED WATER
G	GAS
GALV	GALVANIZED
GEN	GENERAL
GRD	GROUND OR GRADE
HB	HOSE BIBB
HORIZ	HORIZONTAL
HP	HORSEPOWER
HW	HOT WATER
ID	INSIDE DIAMETER
IJ	ISOLATION JOINT
INV	INVERT
IP	IRON PIN
LAV	LAVATORY
LB	POUND
LL	LIVE LOAD
LLV	LONG LEG VERTICAL
LTG	LIGHTING
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MGD	MILLIONS GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM, MINUTE
MJ	MECHANICAL JOINT
NC	NORMALLY CLOSED
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NPW	NON-POTABLE WATER
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPG	OPENING
OPP	OPPOSITE
PB	PULL BOX
PE	POLYETHYLENE EXP. JT. MATERIAL

P/L	PROPERTY LINE
POJ	PUSH ON JOINT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PW	POTABLE WATER
R	RECIRCULATION
RAD	RADIUS
RAS	RETURN ACTIVATED SLUDGE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REINF	REINFORCING
REQ'D	REQUIRED
R/W (ROW)	RIGHT-OF-WAY
SAN	SANITARY
SAS	SANITARY SEWER
SCH	SCHEDULE
SECT	SECTION
SF	SQUARE FEET
SHT	SHEET
SL	SAMPLE LINE
SOS	STORM SEWER
SP	STOP PLATE
SQ	SQUARE
STD	STANDARD
S STL, SS	STAINLESS STEEL
STL	STEEL
SUP	SUPERNATANT
SY	SQUARE YARD
TOS	TOP OF SLAB
TOW	TOP OF WALL
TW	TERTIARY WATER
TYP	TYPICAL
V	VACUUM OR VALVE
VAR	VARIES
VERT	VERTICAL
W	WEIR
W/	WITH
W/O	WITHOUT
WAS	WASTE ACTIVATED SLUDGE
WC	WATER CLOSET
WH	WATER HEATER
WL	WATER LINE
WWF	WELDED WIRE FABRIC
YH	YARD HYDRANT

GENERAL NOTES

1. ALL PROPERTY AND RIGHT-OF-WAY LINE INFORMATION SHOWN IN DRAWING SET ARE APPARENT AND SHALL NOT BE DEEMED EXACT LOCATIONS, UNLESS OTHERWISE NOTED. INFORMATION WAS OBTAINED VIA "INDIANA ON-LINE" GIS SHAPE FILES.
2. EXISTING UTILITY INFORMATION SHOWN IN DRAWING SET, MEETS "ASCE 36-02" QUALITY LEVEL **"D"**, UNLESS OTHERWISE NOTED.

   UTILITY COORDINATION AND PROJECT DIRECTION OF EXISTING SUBSURFACE UTILITY DATA:

   UTILITY QUALITY LEVEL DESCRIPTIONS:

   UTILITY QUALITY LEVEL A - PRECISE HORIZONTAL AND VERTICAL LOCATION OF UTILITIES OBTAINED BY THE ACTUAL EXPOSURE (OR VERIFICATIONS OF PREVIOUSLY EXPOSED AND SURVEYED UTILITIES) AND SUBSEQUENT MEASUREMENT OF SUBSURFACE UTILITIES, USUALLY AT A SPECIFIC POINT. ACCURACY OF LOCATION MATCHES PROJECT SURVEY TOLERANCE.

   UTILITY QUALITY LEVEL B - INFORMATION OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION SUBSURFACE UTILITIES. THE RELIABILITY OF THIS INFORMATION IS SURVEYED TO PROJECT CONTROL AND SUBJECT TO ACCURACY LEVELS OF THE GEOPHYSICAL TOLERANCE DEFINED BY THE PROJECT.

   UTILITY QUALITY LEVEL C - INFORMATION OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE GROUND UTILITY FEATURES AND CORRELATING QUALITY LEVEL "D" INFORMATION.

   UTILITY QUALITY LEVEL D - INFORMATION DERIVED FROM EXISTING RECORDS OR VERBAL RECOLLECTIONS.
3. NORTHING AND EASTING COORDINATES SHOWN ON ALL MANHOLE, INLETS, ETC. ARE SHOWN FROM CENTER OF STRUCTURE NOT CASTING, UNLESS OTHERWISE NOTED.
4. ALL MANHOLES THAT HAVE PIPE INVERT DIFFERENTIAL OF 2' OR GREATER, SHALL BE CONSIDERED A DROP MANHOLE. CONTRACTOR SHALL REFER TO MISCELLANEOUS DETAILS AND DETAILED SPECIFICATIONS FOR MORE INFORMATION.

PROJECT NOTES

1. THE EXISTING UTILITY INFORMATION SHOWN ON THESE DRAWINGS CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. LOCATION OF SIZE AND MATERIAL SHOWN ON UTILITIES ARE FROM AVAILABLE RECORDS AND AVAILABLE FIELD MARKINGS, SUPPLIED BY THE RESPECTIVE UTILITY COMPANY. THE INDIANA UNDERGROUND PLANT PROTECTION SERVICE (IUPPS) MUST BE NOTIFIED 48 HOURS PRIOR TO ANY EXCAVATION FOR VERIFICATION OF LOCATION, SIZE AND MATERIAL FOR EXISTING UNDERGROUND UTILITIES (1-800-382-5544).
2. SIZE, MATERIAL, DEPTH AND LOCATION OF KNOWN EXISTING SEWER FACILITIES IS FROM AVAILABLE HISTORIC INFORMATION AND ABOVE-GROUND INSPECTION AND MEASUREMENT. THE CONTRACTOR SHALL VERIFY ALL SEWER INFORMATION CONTAINED IN THE CONTRACT DOCUMENTS PRIOR TO ANY CONSTRUCTION WHICH WOULD BE IMPACTED BY FACILITIES NOT LOCATED AS SHOWN IN THE CONTRACT DOCUMENTS. THE COST TO CORRECT ANY FACILITIES INSTALLED PRIOR TO VERIFICATION OF EXISTING CONDITIONS BY THE CONTRACTOR SHALL BE AT NO COST TO THE OWNER OR ENGINEER. DIFFERING CONDITIONS DISCOVERED DURING VERIFICATION WILL BE HANDLED PER THE CONTRACT DOCUMENTS.
3. THE LOCATION OF UTILITIES AND STRUCTURES, BOTH SURFACE AND SUBSURFACE, ARE SHOWN ON THE PLANS FROM DATA AVAILABLE AT THE TIME OF SURVEY AND ARE NOT NECESSARILY COMPLETE OR CORRECT. DETERMINING THE EXACT LOCATION AND PROTECTING UTILITIES AND STRUCTURES IS THE RESPONSIBILITY OF THE CONTRACTOR. DURING CONSTRUCTION, THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. IF DAMAGE IS CAUSED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR AND RESTORATION OF SAME IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY OWNER AND FOR ANY RESULTING CONTINGENT DAMAGE AND COST.
4. IF UTILITY FACILITIES OTHER THAN THOSE SHOWN ARE LOCATED, OR IF UTILITIES ARE LOCATED WHICH ARE NOT IN ACCORDANCE WITH THE LOCATIONS SHOWN ON THE DRAWINGS, THE ENGINEER SHALL BE NOTIFIED TO DETERMINE IF PLAN REVISIONS ARE NEEDED.
5. ALL EXISTING UTILITIES SHOWN IN PROFILE ARE INDICATED AT THEIR ASSUMED ELEVATION. CONTRACTOR TO FIELD VERIFY PRIOR TO CONSTRUCTION.
6. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN IN SERVICE ALL EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION UNLESS OTHERWISE INDICATED IN THE DRAWINGS. ANY UTILITY WHICH CAN BE REMOVED DURING CONSTRUCTION WITHOUT UNDUE INTERRUPTION OF SERVICE MAY BE REMOVED AND REPLACED BY THE CONTRACTOR WITH THE PERMISSION OF THE OWNER AND THE APPLICABLE UTILITY OWNER.
7. THE CONTRACTOR SHALL PROTECT ALL POWER POLES FROM DAMAGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES. WHERE REQUIRED, ALL UTILITY POLES ARE TO BE SUPPORTED IN A MANNER APPROVED BY THE APPROPRIATE UTILITY DURING INSTALLATION OF SEWER PIPE.
8. THE CONTRACTOR SHALL MAKE PROVISIONS TO MAINTAIN FLOWS IN ALL SANITARY, COMBINED SEWERS, AND OVERFLOWS AT ALL TIMES. BYPASS PUMPING OR ALTERNATE PROVISIONS MAY BE REQUIRED AND SHALL BE SUFFICIENT TO CONVEY FLOWS UNDER ALL CONDITIONS.

UTILITY / PROJECT CONTACT INFORMATION

HIGHWAY
ELKHART COUNTY HIGHWAY DEPT.
574-533-0538
610 STEURY AVE.
GOSHEN, IN 46528

UTILITIES
TOWN OF MILLERSBURG
SEWER, WATER

COMMUNICATIONS
BRIGHTSPEED
SONNI SMITH
704-314-2662
1120 S. TRYON ST., SUITE 700
CHARLOTTE, NC 28203
sonni.smith@brightspeed.com

NATURAL GAS
NIPSCO GAS (FORT WAYNE)
UTILITY COORDINATION
UTILITYCOORDINATION@NISOURCE.COM
DAMAGE PREVENTION SCREENING CENTER
CDCDAMAGEPREVENTIONCENTER@NISOURCE.COM

GENERAL SCHEMATIC LEGEND

- QUICK DISCONNECT
- FLANGED SPOOL SECTION
- PRV — PRESSURE REDUCER VALVE
- FLANGED COUPLING ADAPTER
- BALL CHECK VALVE
- MOTOR ACTUATOR
- FLEXIBLE CONNECTION
- SCR — FLANGE FILLER & S.S. MESH SCREEN
- V90 — 90° V-NOTCH WEIR
- MAGNETIC FLOW METER
- ULTRASONIC SENSOR
- SUBMERSIBLE PUMP
- NEW PIPING AND EQUIPMENT
- EXISTING PIPING AND EQUIPMENT
- FUTURE PIPING AND EQUIPMENT
- BOOSTER PUMP
- ARV — AIR RELIEF VALVE
- FM — FLOW METER
- GV — GATE VALVE
- FCV — FLOW CONTROL VALVE
- VALVE
- ECCENTRIC PLUG VALVE
- CHECK VALVE
- INCREASER / REDUCER
- BV — BUTTERFLY VALVE
- PIPE THROUGH FLOOR / WALL
- BALL VALVE
- BLIND FLANGE OR PLUG
- HOSE BIBB
- STOP PLATE
- W — WEIR

HATCHING SYMBOLS

- -CMU WALL (PLAN VIEW)
  -GRANULAR BACKFILL (PROFILE VIEW)
- - DEMOLITION (CONTRACTOR SHALL REFER TO DETAILED SPECIFICATIONS)
- - GROUT
- - CONCRETE
- - STEEL
- - COMPACTED GRANULAR BACKFILL OR COMPACTED FOUNDATION
- - ABANDONED IN PLACE

DRAWING SET LEGEND

- EXOHT — EXISTING OVERHEAD TELEPHONE LINE
- EXG — EXISTING GAS LINE AND VALVE
- EXW — EXISTING WATER LINE AND VALVE
- EXF/O — EXISTING FIBER OPTIC LINE
- EXOHE — EXISTING OVERHEAD ELECTRIC LINE
- EXBE — EXISTING BURIED ELECTRIC
- NPW — EXISTING NON-POTABLE WATER LINE
- POT — EXISTING POTABLE WATER LINE
- EXBT — EXISTING BURIED TELEPHONE LINE
- X — EXISTING FENCE
- APP. R/W — APPARENT RIGHT-OF-WAY
- APP. P/L — APPARENT PROPERTY LINE
- EDGE OF ROAD
- EDGE OF ROAD WITH CURB
- 785 — EXISTING MAJOR CONTOUR LINE
- 784 — EXISTING MINOR CONTOUR LINE
- W — **NEW WATER LINE**
- 785 — **PROPOSED MAJOR CONTOUR LINE**
- 784 — **PROPOSED MINOR CONTOUR LINE**
- AC UNIT
- BOLLARD
- BOULDER / LARGE ROCK
- CL — CENTER LINE MONUMENT
- CONTROL POINT / BENCH MARK
- DRILL HOLE
- MB — MAIL BOX
- FLAG POLE
- POST
- STUMP
- BUSH / HEDGE
- DECIDUOUS TREE
- CONIFEROUS TREE
- SIGN
- UTILITY LOCATE FLAG
- GAS LINE MARKER
- GV — GAS VALVE
- GAS METER
- GUY POLE
- POWER POLE
- LIGHT POLE
- GUY WIRE
- EM — ELECTRIC METER
- ELECTRIC PANEL
- ET — ELECTRIC TRANSFORMER
- HAND HOLE BOX
- FIBER OPTIC MARKER
- TP — TEL/TV PEDESTAL
- TELEPHONE MANHOLE
- TELEPHONE LINE MARKER
- TR — TRAFFIC MANHOLE
- WATER LINE MARKER
- WATER METER
- WV — VALVE
- IV — IRRIGATION CONTROL VALVE
- FIRE HYDRANT
- FLUSH HYDRANT
- YARD HYDRANT
- WALL SPIGOT
- EXISTING PIPE PLUG
- STORM CATCH BASIN (SQUARE)
- STORM CATCH BASIN (ROUND)
- STORM CURB INLET
- STORM MANHOLE
- SANITARY MANHOLE
- SV — SANITARY VALVE
- CLEANOUT
- VENT
- **NEW VALVE**
- **NEW FIRE HYDRANT**
- **NEW FLUSH HYDRANT**
- **NEW WET SADDLE AND VALVE BODY**
- **NEW PLUG**
- LS — **NEW LINE STOP**
- **NEW CUT AND CAP**
- **NEW SANITARY MH**

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Signature — Date 9/9/2025

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ELKHART COUNTY

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No.	Submittal / Revision	By	Date

Designed By:	Drawn By:	Checked By:
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LEGEND

Drawing No: G3

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GENERAL LOCATION PLAN
SCALE: 1"=50'-0"

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GENERAL LOCATION PLAN

Drawing No: G4

Sheet: 4 OF 19

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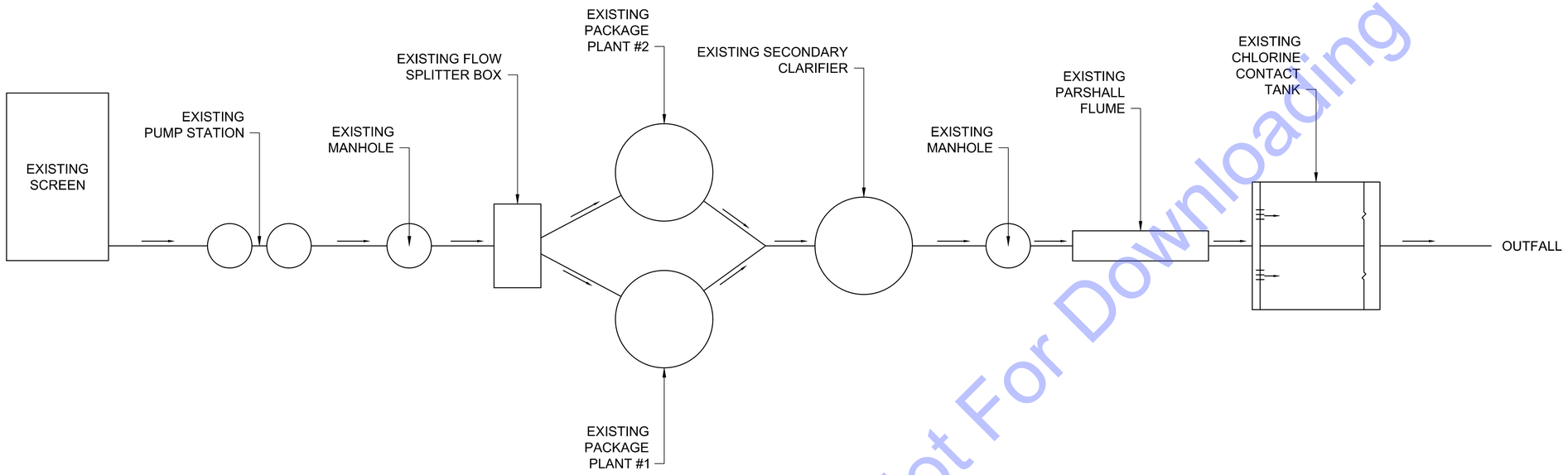

EXISTING PLANT PROCESS FLOW DIAGRAM
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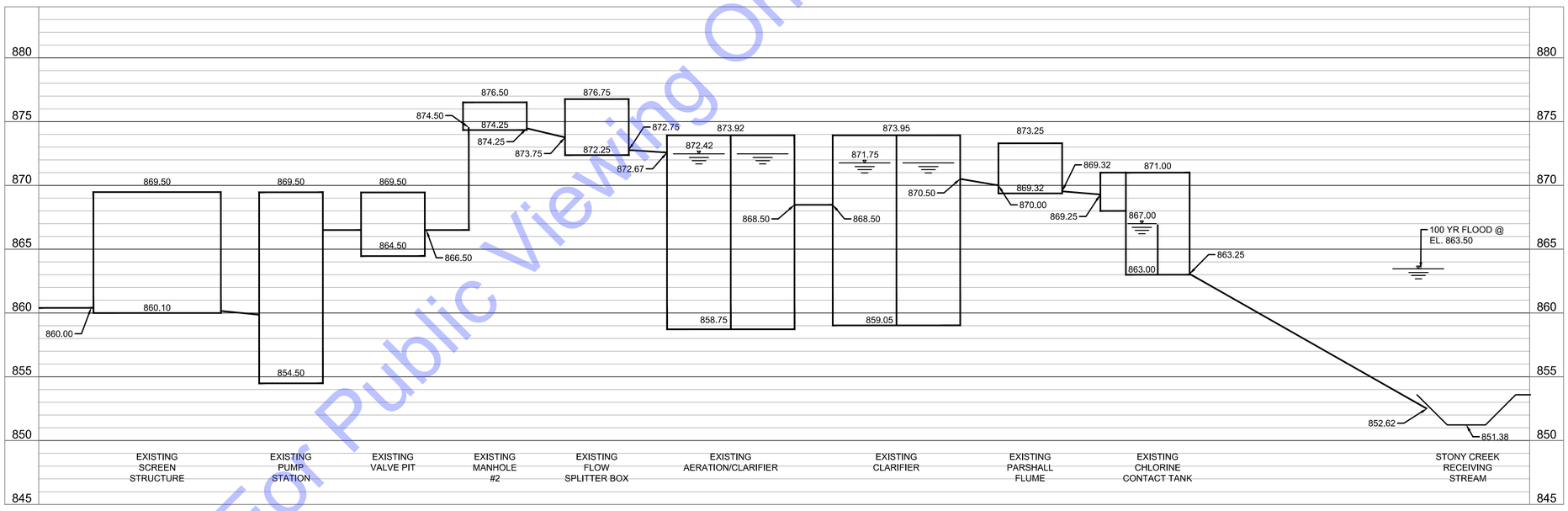

EXISTING HYDRAULIC PROFILE
NO SCALE

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EXISTING HYDRAULIC PROFILE

Drawing No: G5

Sheet: 5 OF 19

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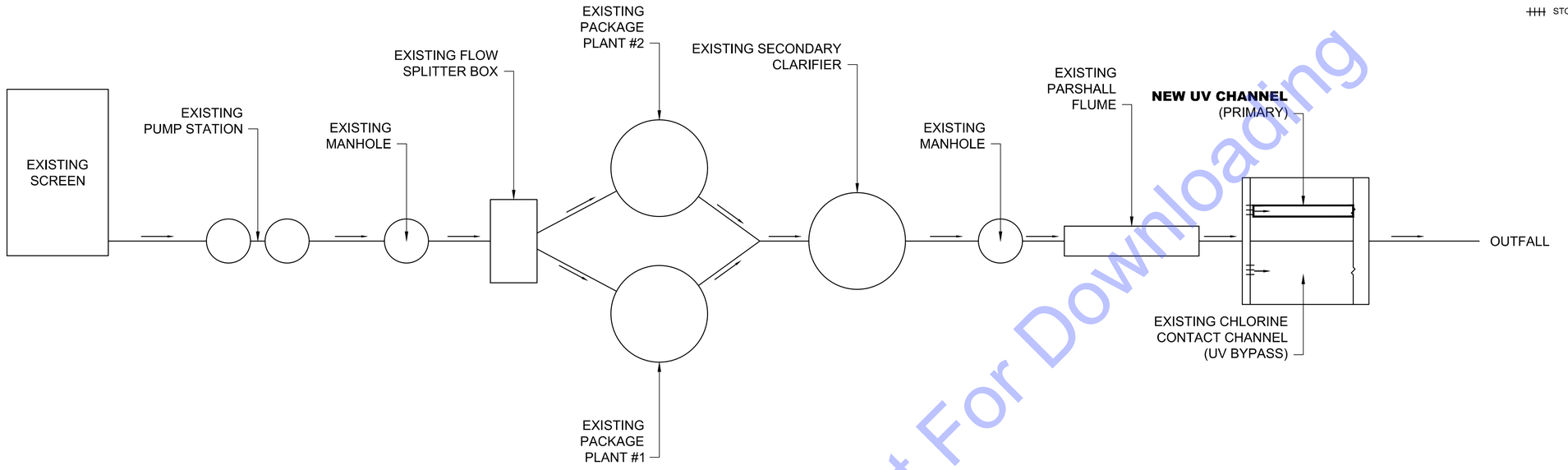
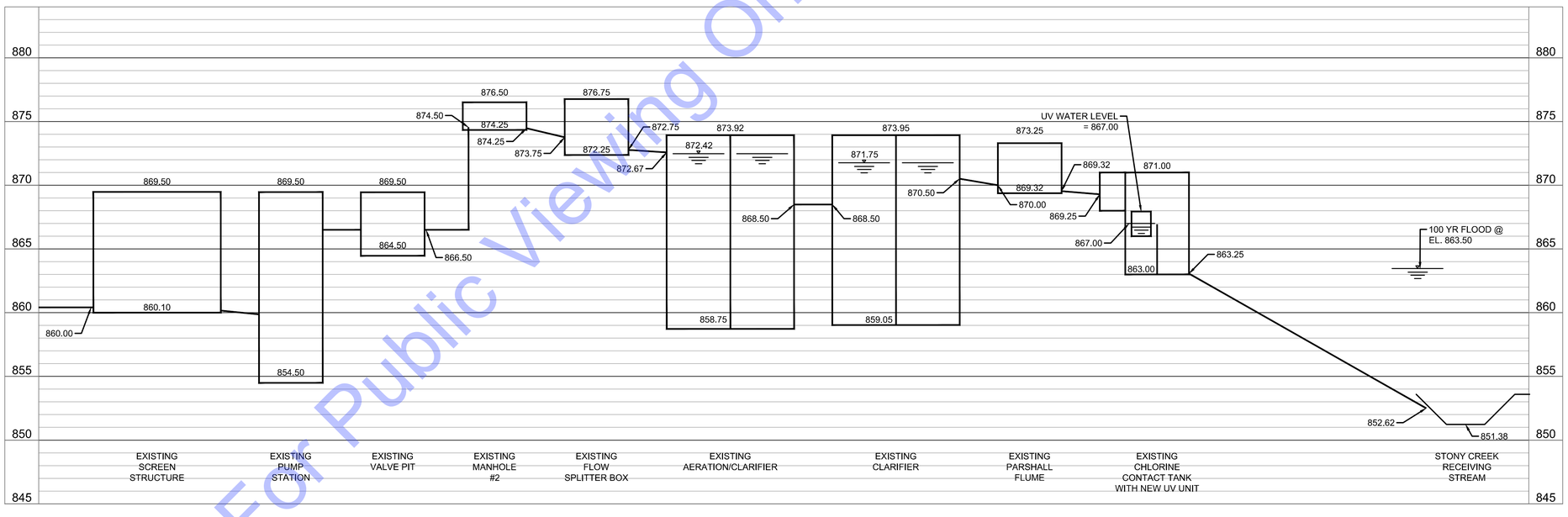


PROPOSED PLANT PROCESS FLOW DIAGRAM
NO SCALE



PROPOSED HYDRAULIC PROFILE
NO SCALE

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PROPOSED HYDRAULLIC PROFILE

Drawing No: G6

Sheet: 6 OF 19

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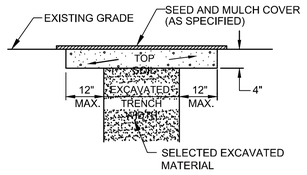


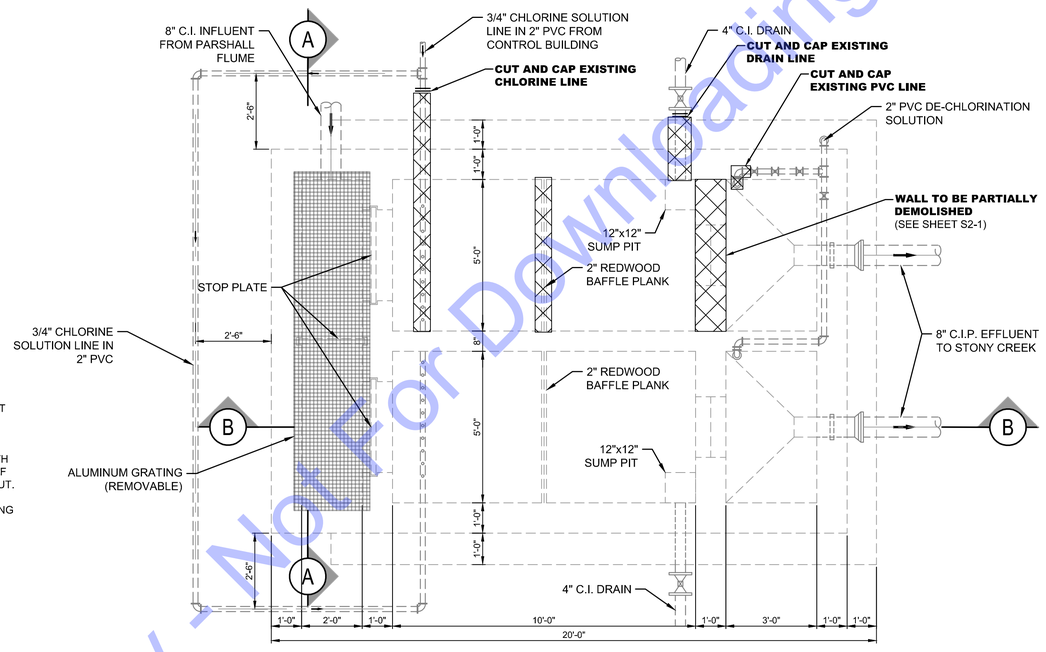
GRASSED AREA RESTORATION DETAIL

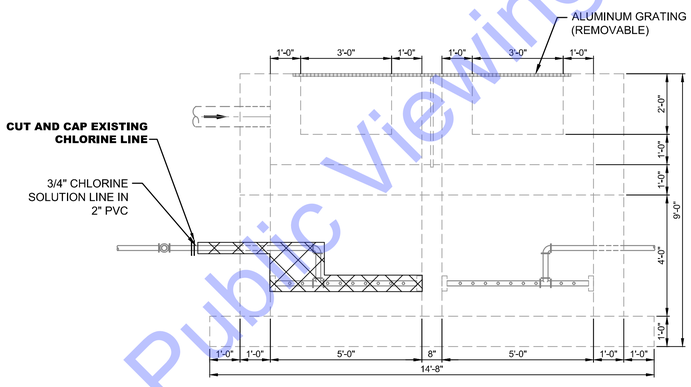
NOTES:

1. ITEMS LOCATED INSIDE THE CHLORINE CONTACT TANK THAT ARE SCHEDULED FOR DEMOLITION SHALL BE REMOVED IN THEIR ENTIRETY.
2. CHLORINE PIPING AND DRAIN PIPING SHALL BE CAPPED WITH WATERTIGHT PLUGS AT THE TANK WALLS. THE SECTIONS OF PIPING WITHIN THE TANK WALL SHALL BE FILLED WITH GROUT.
3. CUT, FILL WITH GROUT, AND PLUG EXISTING CHLORINE PIPING FROM EXISTING TEE TO CHLORINE CONTACT TANK.

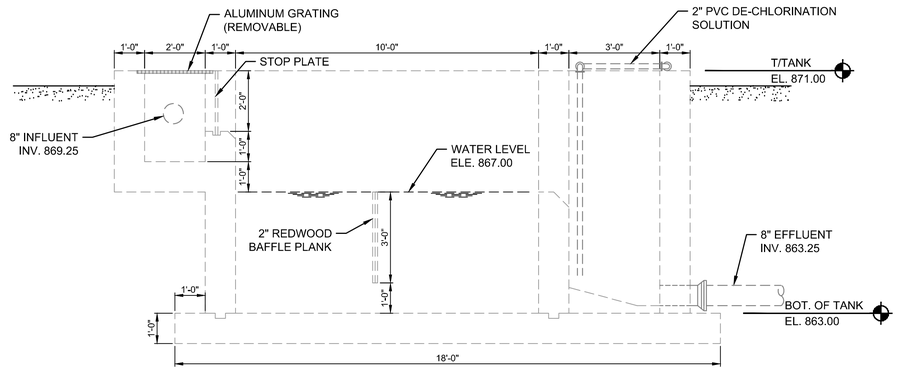
LEGEND

TO BE DEMOLISHED





SECTION A



SECTION B

SCALE: 1"=30'

30' 0 30'

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NATALIE M. SCHELLING
REGISTERED
No. 12000721
STATE OF INDIANA
PROFESSIONAL ENGINEER

Signature 9/9/2025 Date

TOWN OF MILLERSBURG, INDIANA
ELKHART COUNTY

WWTP IMPROVEMENTS
NEW UV AND CLARIFIER COVER

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No.	Submittal Revision	By	Date

Designed By:	Drawn By:	Checked By:
NS	CH	JH
Issue Date:	Project No:	Scale:
9/2025	S25012	AS SHOWN

EXISTING CHLORINE CONTACT TANK - DEMOLITION

Drawing No: DD1

Sheet: 7 OF 19

File: \\EONYTEDRIVE\COMMONWEALTHENGINEERS\SHARED\N CLIENTS M-Z\MILLERSBURG\S25012 WWTP IMPROVEMENTS\06 CAD\A CURRENT FILES\1 DRAWINGS\05 - UV STRUCTURE.DWG
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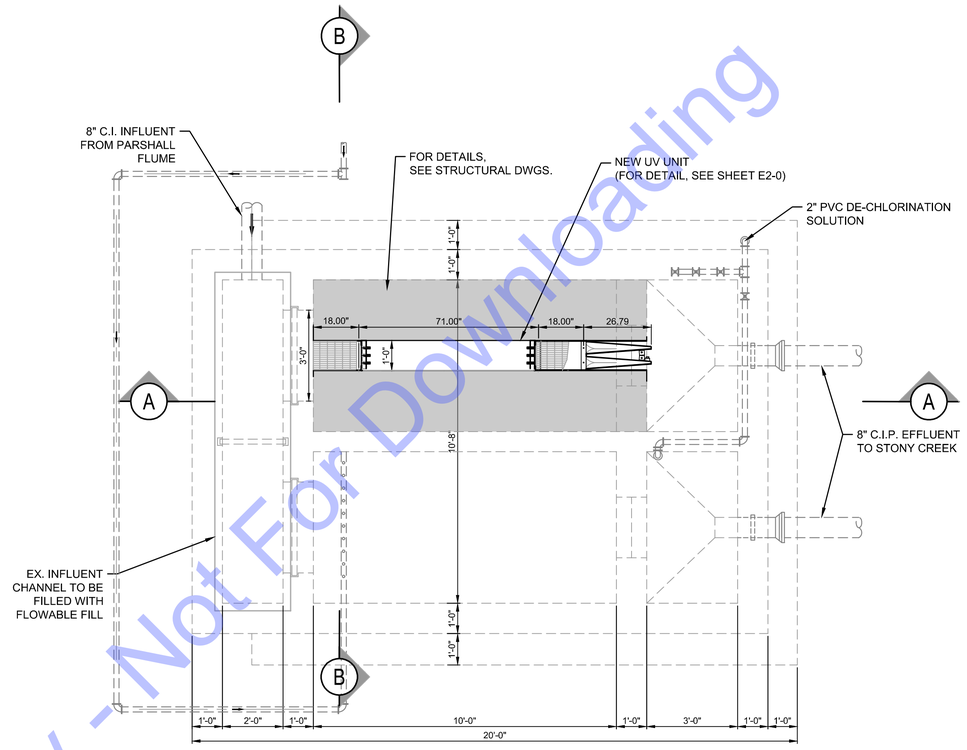
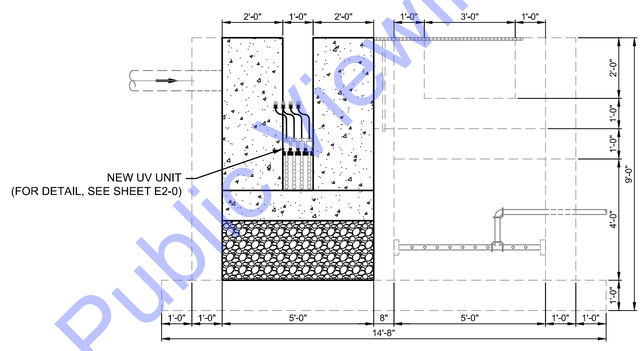
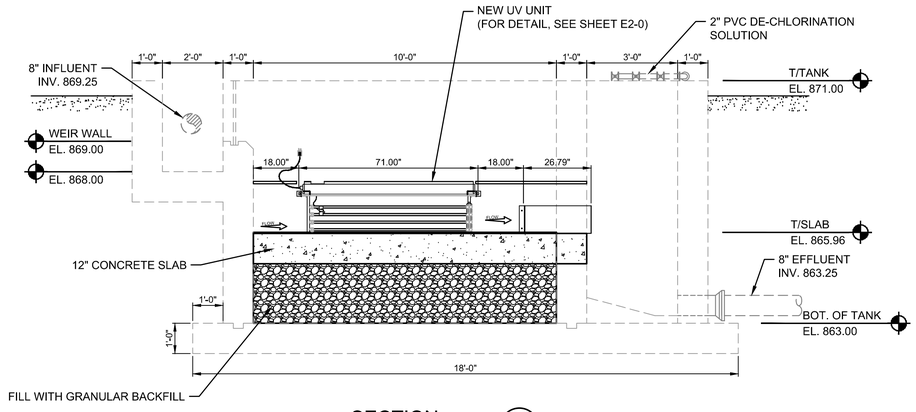




SECTION B



SECTION A

SCALE: 1"=30'

30' 0 30'

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NEW UV CHANNEL

Drawing No:
D1-01
Sheet: 8 OF 19

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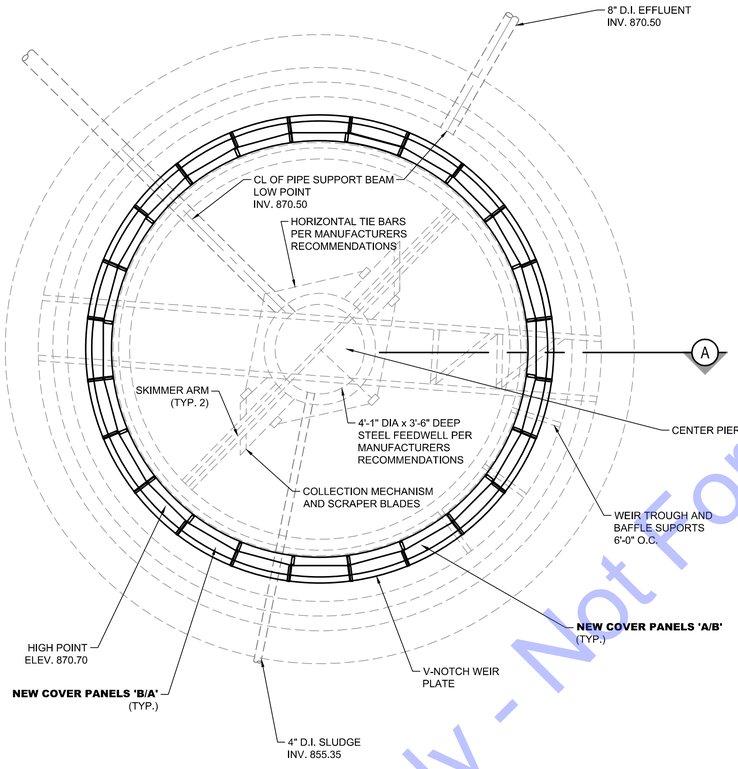

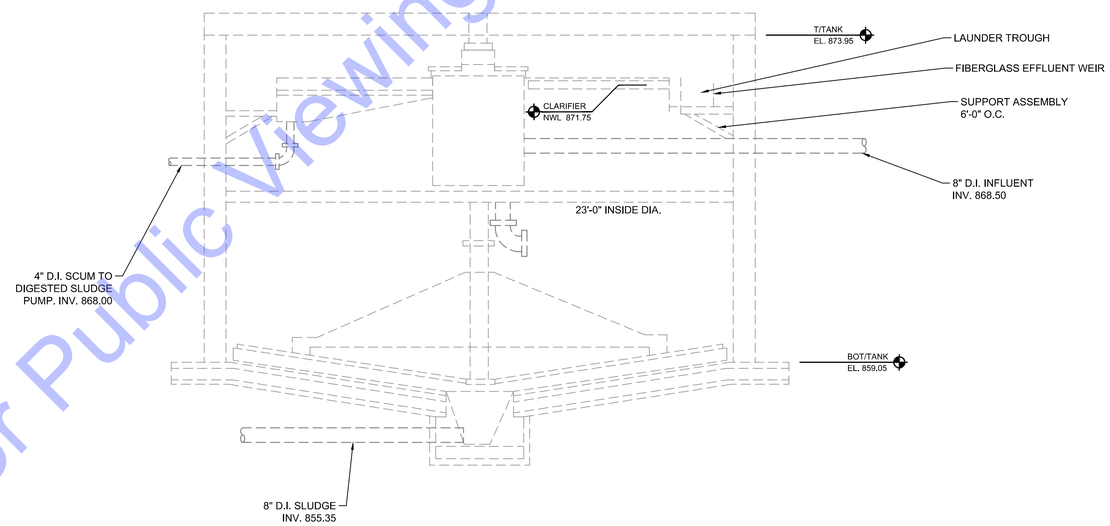

SECTION A

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NEW UV AND CLARIFIER COVER

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Issue Date:	**Project No:**	**Scale:**
9/2025	S25012	AS SHOWN

EXISTING FINAL CLARIFIER - PLAN AND SECTION

Drawing No:
D2-01
Sheet: 9 OF 19

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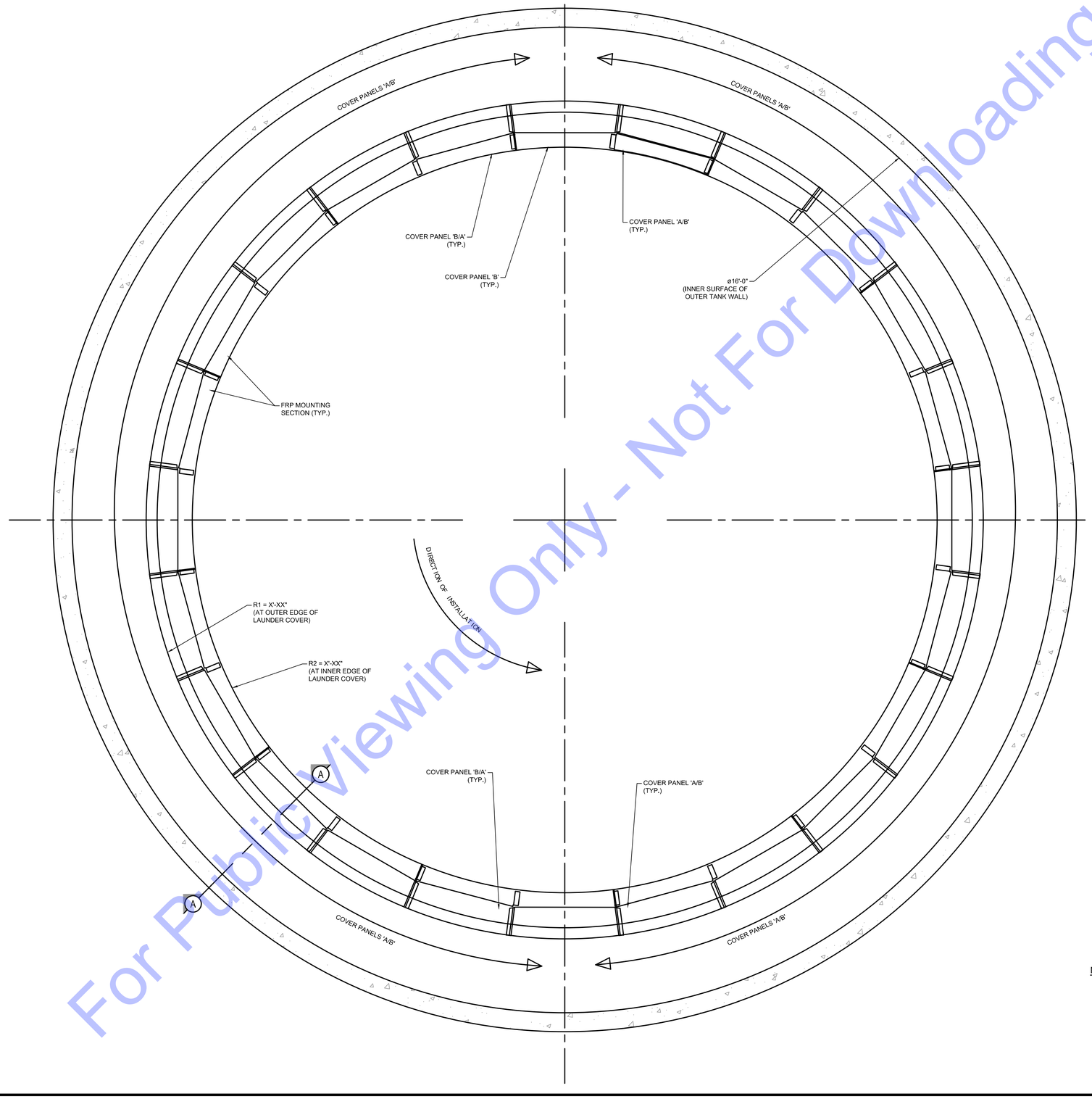

NOTE:

1. NEFCO WILL PROVIDE CUSTOM DRAWINGS/DIMENSIONS FOR THE CLARIFIER LAUNDER COVERS AFTER A PURCHASE ORDER HAS BEEN ISSUED.
2. CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO CONSTRUCTION.

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No.	Submittal / Revision	By	Date

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Issue Date: 9/2025	Project No: S25012	Scale: AS SHOWN

NEW CLARIFIER LAUNDER COVER - MANDATORY ALTERNATE - PLAN VIEW

Drawing No: D2-02

Sheet: 10 OF 19

File: Z:\SHARED\IN CLIENTS M-Z\MILLERSBURG\S25012 WWTP IMPROVEMENTS\06 CAD\A CURRENT FILES\! DRAWINGS\06 - CLARIFIER.DWG
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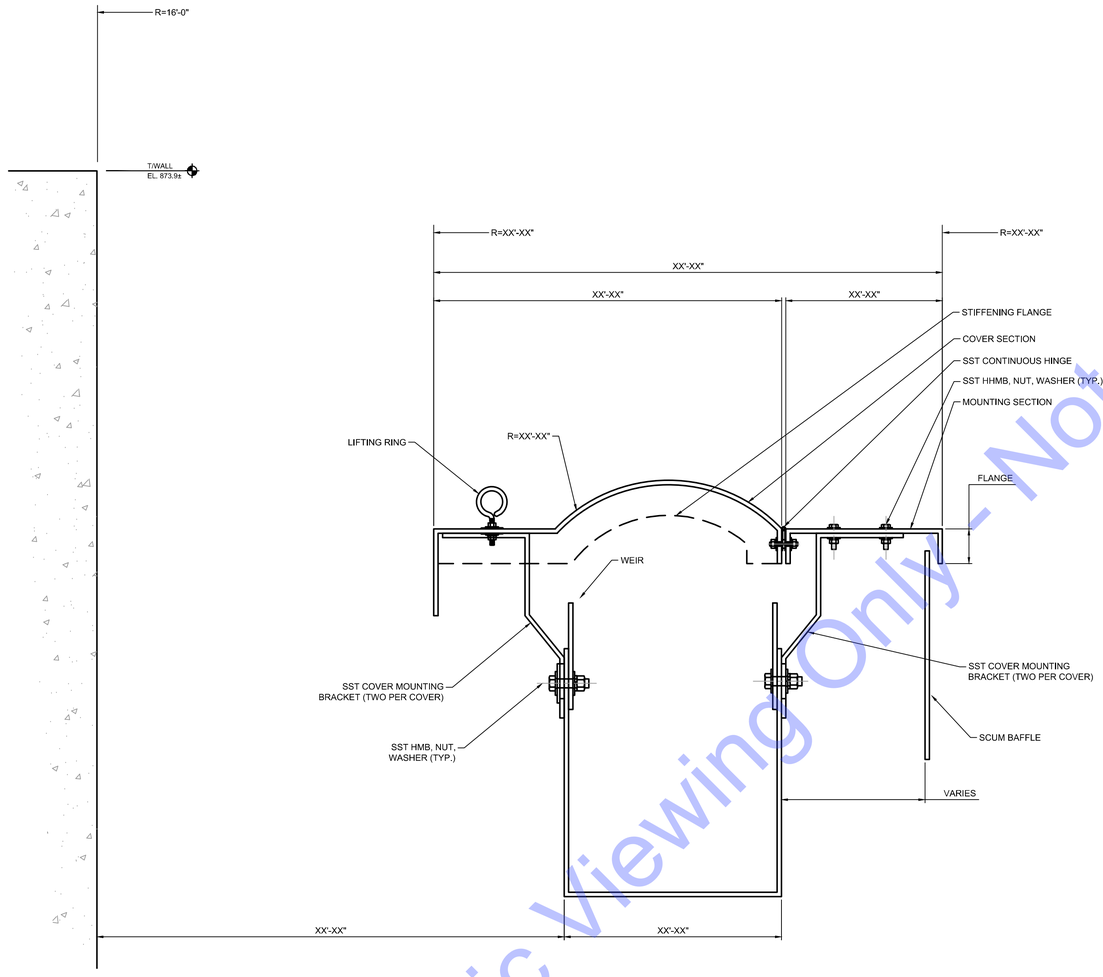

EFFLUENT TROUGH DUAL WEIR COVER
CROSS SECTION A-A
(NO SCALE)

NOTE:

1. NEFCO WILL PROVIDE CUSTOM DRAWINGS/DIMENSIONS FOR THE CLARIFIER LAUNDER COVERS AFTER A PURCHASE ORDER HAS BEEN ISSUED.
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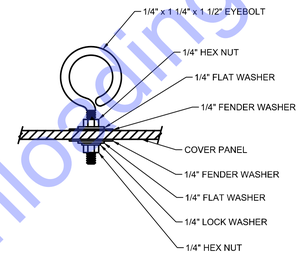
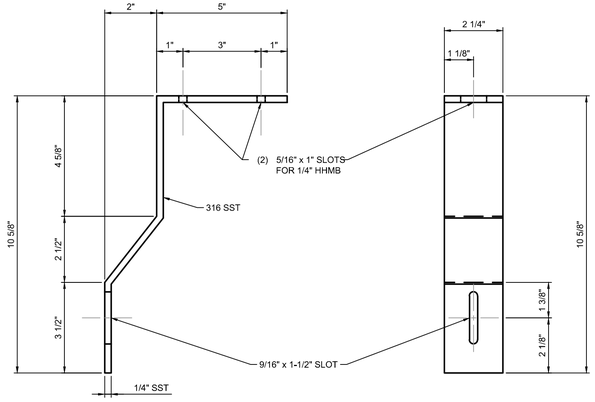
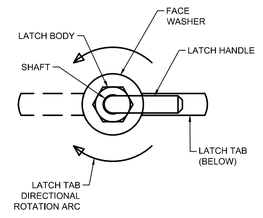


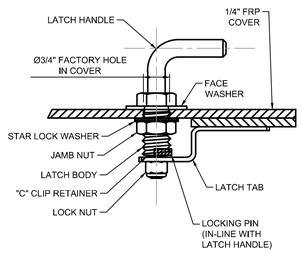
316 SST LIFTING RING
(50 PCS/TANK - 200 TOTAL)



SIDE FRONT

SST SIDE MOUNTING BRACKET





NOTE:
LATCH HANDLE AND TAB ASSEMBLY MUST POINT IN THE SAME DIRECTION WITH THE LOCKING PIN SET DOWN INTO THE LOCKING PIN DETENT SLOT TO INDICATE IF LATCH IS OPEN OR CLOSED.

TOP VIEW CROSS SECTION DETAIL

316 SST LATCH
(1 PCS/TANK - 4 TOTAL)

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Issue Date: 9/2025	Project No: S25012	Scale: AS SHOWN

NEW CLARIFIER LAUNDER COVER - MANDATORY ALTERNATE - DETAILS

Drawing No: D2-03
Sheet: 11 OF 19

File: Z:\SHARED\N CLIENTS M-Z\MILLERSBURG\S25012 WWTP IMPROVEMENTS\06 CAD\A CURRENT FILES\1 DRAWINGS\06 - CLARIFIER.DWG
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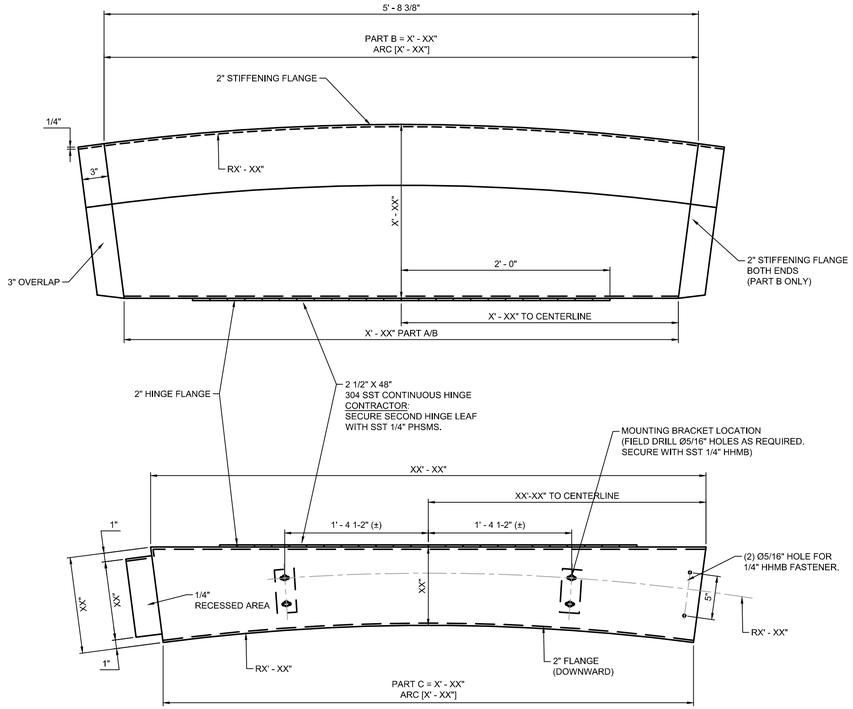
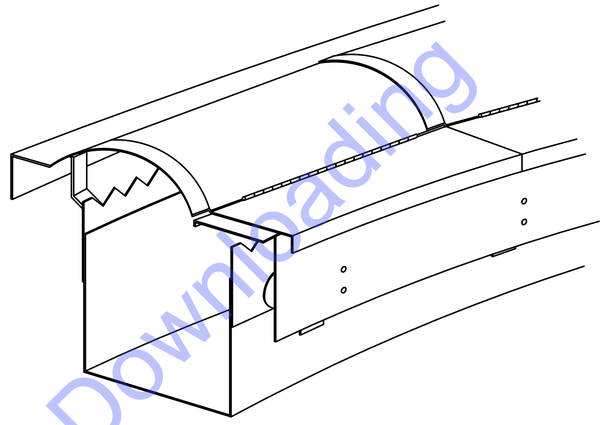


TOP VIEW

A/B LAUNDER COVER PANEL UNIT

(B-A LAUNDER COVER PANEL MIRRORED)



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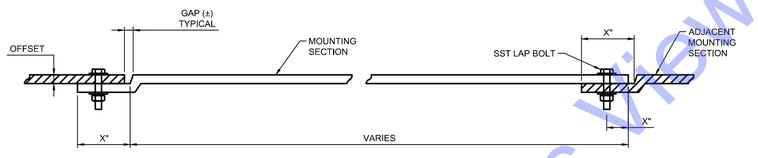
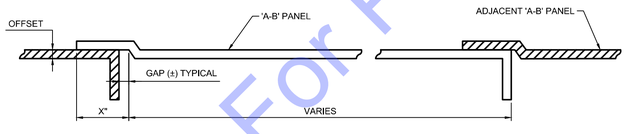


MOUNTING SECTION
RECESSED TAB PROFILE



COVER PANEL RAISED TAB PROFILE

NOTE:

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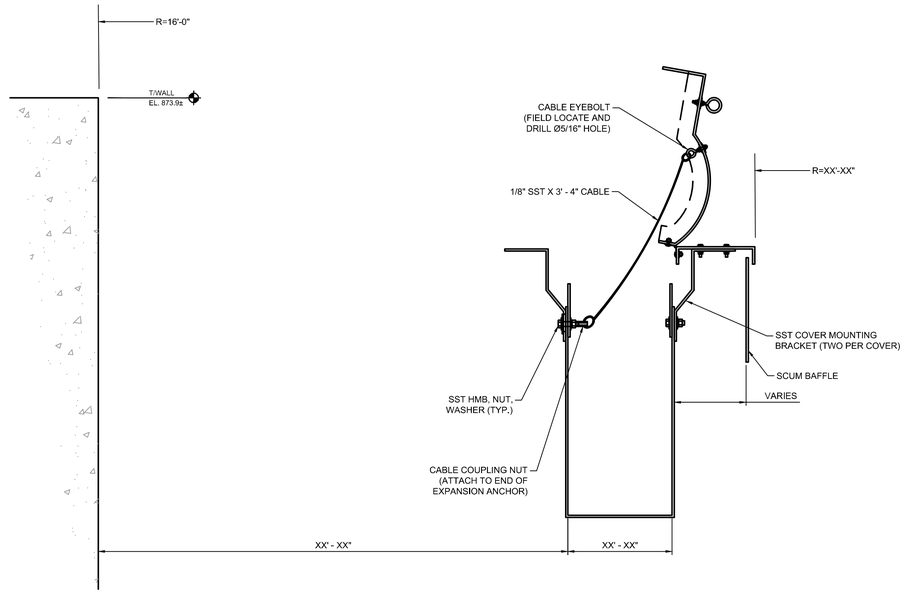

EFFLUENT TROUGH DUAL WEIR COVER
CROSS SECTION A-A

(NO SCALE)

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Issue Date: 9/2025	Project No: S25012	Scale: AS SHOWN

NEW CLARIFIER LAUNDER COVER - MANDATORY ALTERNATE - DETAILS

Drawing No: D2-04

Sheet: 12 OF 19

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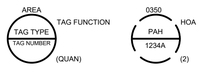

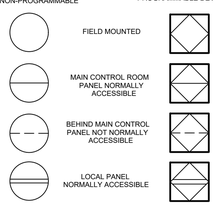

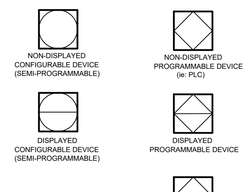

PROCESS AND INSTRUMENTATION DIAGRAM LEGEND

INSTRUMENT TAG IDENTIFICATION

COMPONENT DESIGNATOR

AREA 035D: BUILDING OR PROCESS AREA NUMBER

TAG TYPE P: FIRST LETTER, SEE ISA TABLE BELOW
AH: SUCCEEDING LETTERS, SEE ISA TABLE BELOW

TAG NUMBER 12: P&ID NUMBER
3: LOOP NUMBER
4: EQUIPMENT NUMBER
A: DEVICE LETTER IF MULTIPLE DEVICES

TAG FUNCTION HOA: TAG FUNCTION ABBREVIATION, SEE LISTING AT RIGHT

(QUANTITY) (2): TOTAL NUMBER OF DEVICES WHERE MORE THAN ONE DEVICE IS REQUIRED. DEVICE NUMBERS ARE SEQUENTIAL BEGINNING WITH THE TAG NUMBER SHOWN. IF QUANTITY IS NOT SHOWN, THEN ONE DEVICE ONLY IS REQUIRED.

COMPONENT DESIGNATOR SEE LISTING AT RIGHT

PLC POINT TYPE

ANALOG INPUT	▲
ANALOG OUTPUT	▼
DISCRETE INPUT	△
DISCRETE OUTPUT	▽
NETWORK CONNECTION	⧗

TAG FUNCTION ABBREVIATIONS

ALT	ALTERNATE
C	CLOSED(C)
CM	COMPUTER-MANUAL
DIFF	DIFFERENCE OR DIFFERENTIAL
DO	DISSOLVED OXYGEN
F	FAIL
F(X)	CHARACTERIZED
FOR	FOWARD-STOP(OFF)-REVERSE(MAINTAINED CONTACT)
FSR	FOWARD-STOP-REVERSE(MOMENTARY CONTACT)
HOA	HAND-OFF-AUTOMATIC(MAINTAINED CONTACT)
HOR	HAND-OFF-REMOTE(MAINTAINED CONTACT)
II	CURRENT TO CURRENT
IP	CURRENT TO PNEUMATIC
LL	LEAD-LAG(MAINTAINED CONTACT)
LOE	LOSS OF ECHO(ULTRASONIC SENSOR FAILURE)
LOR	LOCAL-OFF-REMOTE(MAINTAINED CONTACT)
LOS	LOCKOUT STOP(LOCKABLE IN "STOP" POSITION MOMENTARY CONTACT)
L/R	LOCAL/REMOTE(MAINTAINED CONTACT)
MA	MANUAL-AUTOMATIC(MAINTAINED CONTACT)
MOA	MANUAL-OFF-AUTOMATIC(MAINTAINED CONTACT)
O	OPEN
OA	OFF-AUTOMATIC
OCA	OPEN-CLOSE-AUTOMATIC(MAINTAINED CONTACT)
OC	OPEN-CLOSE(D)(MAINTAINED CONTACT)
OSC	OPEN-STOP-CLOSE(MOMENTARY CONTACT SPRING RETURN TO CENTER POSITION)
00	ON-OFF(MAINTAINED CONTACT)
OOA	ON-OFF-AUTOMATIC(MAINTAINED CONTACT)
OOR	ON-OFF-REMOTE(MAINTAINED CONTACT)
R	RUN
SBL	SLUDGE BLANKET INTERFACE LEVEL
SP	SPEED POT
SQRT	SQUARE ROOT
SS	START-STOP
SSA	START-STOP-AUTOMATIC
SSL	START-STOP-LOCK (LOCKABLE IN "STOP" POSITION. MOMENTARY CONTACT)
SUM	SUMMMATION
VIB	VIBRATION
X	MULTIPLY
FWD	FOWARD
REV	REVERSE
F/R	FOWARD/REVERSE(MOTOR STARTER COILS)
ESTP	ESTOP(EMERGENCY STOP)
SPD	(SPEED POT)
SUSP	SUSPEND
ALRT	ALERT
RSET	RESET
STRT	START

TAG SYMBOLS

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER(S)		SUCCEEDING LETTER(S)		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM(W. LOGGING)	ANNUNCIATE	
B	BURNER COMBUSTION		USERS CHOICE(*)	USERS CHOICE(*)	USERS CHOICE(*)
C	USERS CHOICE(*)			CONTROL	CLOSE
D	USERS CHOICE(*)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			FEEDBACK
G	USERS CHOICE(*)		GLASS		
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE	TIME RATE OF CHANGE	KEYPAD(DATA ENTRY)	CONTROL STATION	
L	LEVEL		LIGHT(PILOT)		LOW
M	MOTOR	MOMENTARY			MONITORING
N	USERS CHOICE(*)		USERS CHOICE(*)	USERS CHOICE(*)	USERS CHOICE(*)
O	USERS CHOICE(*)		ORIFICE		
P	PRESSURE OR VACUUM		POINT TEST CONNECTION		
Q	QUANTITY	INTEGRATE			
R	RADIATION		RECORD, TREND, LOG		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSIT	
U	UNIVERSAL/MULTIVARIABLE(*)		MULTIFUNCTION(*)	MULTIFUNCTION(*)	MULTIFUNCTION(*)
V	VIBRATION		VALUE	VALVE	
W	WEIGHT, FORCE, TORQUE		WELL	W	
X	UNCLASSIFIED(*)	X AXIS	UNCLASSIFIED(*)	UNCLASSIFIED(*)	UNCLASSIFIED(*)
Y	EVENT, STATE	Y AXIS		RELAY OR COMPUTE(*)	
Z	POSITION, DIMENSION	Z AXIS		DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL

SPECIAL CASES:
ETM - ELAPSED TIME METER
JBX - JUNCTION BOX
NDX - INDEX #
MS - MOTOR STARTER
MOR - MOTOR OVERLOAD RELAY
MPR - MOTOR PROTECTION RELAY

CONDUIT NOTES

PVC SCHEDULE 40 BELOW GRADE.

RIGID ALUMINUM OR PVC COATED RGS CONDUIT ABOVE GRADE OUTDOORS.

RIGID ALUMINUM OR PVC COATED RGS CONDUIT IN CLASSIFIED AND CORROSIVE SPACES.

NO CONDUIT SHALL BE INSTALLED ON TOP OF A DECK, ON A WALKWAY, OR IN AN AREA THAT MAY POSE A TRIP HAZARD. NO CONDUIT SHALL BE INSTALLED ABOVE A DECK, ABOVE A WALKWAY, OR IN AN AREA THAT IS COMMONLY TRAVELED. ALL CONDUIT IN SUCH AREAS SHALL BE COORDINATED WITH THE OWNER/ENGINEER AND SHALL BE INSTALLED BELOW GRADE OR IN THE CONCRETE DECKING OR PAD. CONDUIT INSTALLED IN CONCRETE DECKING OR PAD SHALL BE AVOIDED WHEN POSSIBLE. IF CONDUIT IS TO BE ROUTED IN A STRUCTURAL CONCRETE DECK, PAD, WALL, ETC. IT SHALL BE COORDINATED AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. CONDUIT INSTALLED IN CONCRETE CAN IMPACT THE STRUCTURAL INTEGRITY OF CONCRETE. IT IS THE CONTRACTORS RESPONSIBILITY TO CONFORM TO ANY REQUIREMENTS REQUIRED OF THE STRUCTURAL ENGINEER TO ACCOMMODATE THE INTEGRITY OF THE INSTALLATION AT NO COST TO THE OWNER. FOR A CONDUIT EMBEDDED IN CONCRETE TO BE CONSIDERED IT MUST BE THE ONLY REASONABLE SOLUTION AS DETERMINED BY THE ENGINEER. ALL PROPOSED INSTALLATIONS MUST COMPLY WITH ACI 318 AND BE ENGINEER APPROVED.

ALL UNDERGROUND CONDUITS SHALL BE SEALED AT BOTH ENDS.

NO CONDUIT PENETRATIONS ON THE TOP OF ANY OUTDOOR PANELS/ENCLOSURES.

EMT IS ACCEPTABLE IN CONDITIONED ELECTRICAL ROOMS AND OFFICE/BREAK AREAS ONLY. EMT SHALL BE TRANSITIONED PRIOR TO EXITING NON CORROSIVE SPACES. EMT SHALL NOT BE USED WHEN IT CAN BE EXPOSED TO ANY CORROSIVE GASES.

CONTROL WIRING REQUIREMENTS

EACH ANALOG INPUT REQUIRES AN 18/2 TWISTED SHIELDED PAIR IN 3/4" CONDUIT UNLESS NOTED OTHERWISE.

EACH ANALOG OUTPUT REQUIRES AN 18/2 TWISTED SHIELDED PAIR IN 3/4" CONDUIT UNLESS NOTED OTHERWISE.

EACH DISCRETE INPUT REQUIRES 2 #14's IN 3/4" CONDUIT UNLESS NOTED OTHERWISE.

EACH DISCRETE OUTPUT REQUIRES 2 #14's IN 3/4" CONDUIT UNLESS NOTED OTHERWISE.

CONTROL WIRING OF THE SAME TYPE MAY BE COMBINED INTO THE SAME CONDUIT. EXAMPLES: TWO 4-20MA ANALOG SIGNALS MAY BE COMBINED, TWO 24VDC DISCRETE SIGNALS MAY BE COMBINED, AND TWO 120VAC DISCRETE SIGNALS MAY BE COMBINED.

NOTE: INSTRUMENTS AND CABLE SHALL BE AS REQUIRED BY THE INSTRUMENT MANUFACTURER.

INSTRUMENT POWER

INSTRUMENTS REQUIRING 120 VAC:

1. MAGNETIC FLOW METERS
2. TURBIDITY TRANSMITTERS
3. pH TRANSMITTERS
4. ORP TRANSMITTERS
5. DO TRANSMITTERS
6. ULTRASONIC LEVEL TRANSMITTERS
7. ULTRASONIC FLOW TRANSMITTERS
8. INFLUENT AND EFFLUENT SAMPLERS

NOTE: THIS LIST IS PROVIDED AS A REFERENCE AND IS NOT ALL INCLUSIVE. COORDINATE WITH THE GENERAL CONTRACTOR AND THE EQUIPMENT SUPPLIERS FOR DETAILED WIRING REQUIREMENTS OF INSTRUMENTS, SENSORS, AND EQUIPMENT.

ELECTRICAL GENERAL NOTES

(GENERAL NOTES APPLICABLE TO ALL ELECTRICAL SHEETS)

1. CONTRACTOR SHALL EXAMINE NOT ONLY PLANS AND SPECIFICATIONS FOR ELECTRICAL AND INSTRUMENTATION, BUT PLANS AND SPECIFICATIONS FOR OTHER RELATED SECTIONS. VISIT THE SITE TO BECOME ACQUAINTED WITH ALL PROJECT CONDITIONS INCLUDING EXISTING CONDITIONS. EXECUTION OF CONTRACT IS EVIDENCE THAT THE CONTRACTOR HAS EXAMINED ALL DRAWINGS AND SPECIFICATIONS AND THAT ALL CONDITIONS OF INSTALLING THE WORK IN THIS SECTION ARE VERIFIED. LATE CLAIMS FOR LABOR AND MATERIALS REQUIRED DUE TO DIFFICULTIES ENCOUNTERED, WHICH COULD HAVE BEEN FORESEEN HAD EXAMINATIONS BEEN MADE WILL NOT BE RECOGNIZED.
2. THE DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO INCLUDE EVERY DETAIL OF REQUIRED CONSTRUCTION, EQUIPMENT, AND MATERIALS. PROVIDE ALL MATERIALS AND WORK NOT SPECIFICALLY MENTIONED, SHOWN, OR CAN BE REASONABLY INFERRED ON THE DRAWINGS BUT WHICH ARE NECESSARY TO FULLY COMPLETE THE WORK.
3. WHEN SUBSTITUTING OTHER EQUIPMENT, MATERIALS, AND PRODUCTS THAN SPECIFIED IN THE CONTRACT DOCUMENTS, INCLUDE IN PRICING ALL COSTS FOR OTHER DESIGN CHANGES TO THE PROJECT (ALL DIVISIONS) WHICH WILL RESULT FROM USE OF THE SUBSTITUTED ITEM(S).
4. REVIEW THE CONTRACT DOCUMENTS OF OTHER DIVISIONS, AND COORDINATE ELECTRICAL AND CONTROL WORK WITH THE WORK OF OTHER DISCIPLINES TO AVOID CONFLICTS AND INTERFERENCE.
5. UPON COMPLETION OF THE WORK REQUIRED UNDER THIS CONTRACT, PROVIDE TYPED UPDATED DIRECTORY WITHIN DOOR OF EACH AFFECTED PANELBOARD. LEAVE "SPARE" BREAKERS IN "OFF" POSITION.
6. ALL MOUNTING HEIGHTS INDICATED ON DRAWINGS ARE TO CENTERLINE, UON.
7. PROVIDE LIGHTING FIXTURES COMPATIBLE WITH CEILING CONSTRUCTION. COORDINATE WITH ARCHITECTURAL ROOM FINISH SCHEDULES.
8. IN AREAS HAVING FINISHED CEILINGS, LOCATE CEILING-MOUNTED ELECTRICAL DEVICES AND FIXTURES ACCORDING TO ARCHITECTURAL REFLECTED CEILING PLAN. DO NOT INSTALL CEILING-MOUNTED SMOKE DETECTORS WITHIN 4 FEET OF HVAC SUPPLY DIFFUSERS.
9. IN ELECTRICAL AND MECHANICAL EQUIPMENT SPACES, COORDINATE EXACT LOCATIONS OF LIGHTING FIXTURES WITH CONDUIT BANKS, DUCTWORK, PIPING, STRUCTURE, SUPPORTS, AND OTHER OBSTRUCTIONS. LOCATE FIXTURES SUCH THAT DIALS, GAUGES, METERS, ETC. ARE PROPERLY ILLUMINATED.
10. DO NOT USE ANY LIGHTING FIXTURE AS A RACEWAY FOR CONDUCTORS NOT SERVING THAT PARTICULAR FIXTURE.
11. CONNECT BATTERY-OPERATED EMERGENCY LIGHTING UNITS AND EXIT SIGNS HAVING BATTERY BACK-UP TO UNSWITCHED LEG OF LOCAL LIGHTING CIRCUIT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND NEC SUCH THAT FAILURE OF CIRCUIT TRANSFERS UNIT FROM NORMAL TO EMERGENCY MODE, CAUSING LAMPS TO RE-ENERGIZE.
12. DO NOT INSTALL OUTLET BOXES BACK-TO-BACK IN NON-RATED PARTITIONS. OFFSET AND SEAL, SIMILAR TO REQUIREMENTS FOR RATED PARTITIONS, TO MINIMIZE SOUND TRANSMISSION.
13. COORDINATE ROUTING OF ALL LARGE CONDUITS (2" DIA AND LARGER) AND PULL BOX LOCATIONS WITH GENERAL CONTRACTOR PRIOR TO INSTALLATION TO AVOID CONFLICTS AND TO GUARANTEE REQUIRED CLEARANCE AND ACCESSIBILITY OF ELECTRICAL AND OTHER SYSTEMS.
14. COORDINATE WITH OWNER OR OWNER'S SELECTED VENDOR PRIOR TO ROUGH-IN FOR EXACT LOCATIONS OF SPECIAL PURPOSE OUTLETS DEDICATED TO SPECIFIC EQUIPMENT. VERIFY REQUIRED NEMA CONFIGURATION OF ALL SUCH OUTLETS.
15. PROVIDE APPROPRIATE PULL WIRE IN EACH EMPTY SYSTEMS CONDUIT INCLUDED IN THIS PROJECT.
16. INCLUDE GREEN-INSULATED GROUNDING CONDUCTOR SIZED PER 2002 NEC TABLE 250-122 WITH ALL BRANCH CIRCUIT CONDUCTORS SERVING LIGHTING FIXTURES, RECEPTACLES, MECHANICAL OR OTHER DEVICES INSTALLED AT OR BELOW 8'-0".
17. MATCH A.I.C. RATINGS AND OTHER CHARACTERISTICS OF EXISTING DEVICES IN PANELBOARD WHEN ADDING BREAKERS TO EXISTING PANELBOARDS.
18. ALL WORK SHALL BE IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE - LATEST EDITION ADOPTED BY INDIANA, THE INDIANA CODE AMENDMENT, LOCAL/MUNICIPAL CODE, AND THE AUTHORITIES HAVING JURISDICTION.
19. ALL CONNECTIONS TO EQUIPMENT SUBJECT TO MOVEMENT OR VIBRATION SHALL BE LIQUID TIGHT FLEXIBLE METAL CONDUIT, NOT LESS THAN 12" IN LENGTH, NOR GREATER THAN 36" IN LENGTH.
20. ALL CONDUIT PENETRATIONS SHALL BE SEALED WITH APPROPRIATE CONDUIT SEALING MATERIAL.
21. ALL CABLE SIZES SHALL UTILIZE COPPER CONDUCTORS.
22. FIELD VERIFY LOCATIONS OF BUILDING EXPANSION JOINTS WHEN ROUTING CONDUIT. ALL CONDUITS CROSSING EXPANSION JOINTS SHALL BE INSTALLED WITH THE EXPANSION FITTINGS. EXPANSION FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE NEC AND MANUFACTURERS WRITTEN RECOMMENDATIONS.
23. FEEDERS FROM PANELBOARDS BACK TO MAIN SWITCHBOARD, BETWEEN AUTO TRANSFER SWITCHES AND THEIR SOURCES/LOADS, BETWEEN DRY TRANSFORMERS AND THEIR SOURCES/LOADS ARE NOT INDICATED. FEEDERS ARE PART OF THE WORK, AND SHALL BE SIZED AS INDICATED ON THE LINE DIAGRAM.
24. HOMERUNS SHALL NOT BE COMBINED IN A RACEWAY UNLESS SHOWN ON THE CONTRACT DRAWINGS. SINGLE PHASE BRANCH CIRCUIT HOMERUNS MAY BE COMBINED AT THE CONTRACTORS DISCRETION NOT GREATER THAN (3) PHASE CONDUCTORS, NEUTRAL CONDUCTORS, AND A GROUNDING CONDUCTOR.
25. EACH SINGLE PHASE BRANCH CONDUCTOR SHALL HAVE A DEDICATED NEUTRAL BACK TO THE PANEL.
26. ALL PENETRATIONS BELOW GRADE SHALL USE LINK SEALS.
27. WHERE LOW VOLTAGE (CONTROL) CABLING IS ALLOWED TO BE INSTALLED WITHOUT A RACEWAY, IT SHALL BE SUPPORTED NOT EXCEEDING INTERVALS OF 48", AND NOT MORE THAN 6" FROM THE CABINETS, BOXES, FITTINGS, OUTLETS, RACKS, FRAMES AND TERMINALS.
28. ALL MOUNTING HARDWARE INCLUDING NUTS, BOLTS, SCREWS, WASHERS, ETC. SHALL BE STAINLESS STEEL.
29. MOUNT JUNCTION BOXES AND DISCONNECT SWITCHES ON STAINLESS STEEL UNISTRUT.
30. ALL UNISTRUT, MOUNTING BRACKETS AND SUPPORTING STRUCTURES SHALL BE STAINLESS STEEL.
31. DO NOT MIX CONTROL AND POWER CONDUCTORS IN THE SAME CONDUIT. DO NOT MIX DISCRETE AND ANALOG CONTROL CONDUCTORS IN THE SAME CONDUIT.
32. ADJUSTABLE SPEED DRIVES (ASD) LINE AND LOAD WIRE SHALL BE RUN IN SEPARATE RACEWAYS.
33. CONTRACTOR SHALL COORDINATE WITH HEAT TRACE MANUFACTURER DURING BIDDING AND CONSTRUCTION AND SHALL PROVIDE ALL CONDUIT, WIRING, AND CIRCUITS AS REQUIRED. HEAT TRACE SHALL BE PROVIDED/INSTALLED COMPLETE. ALL HEAT TRACE IS REQUIRED TO BE GFI PROTECTED.
34. CONTRACTOR SHALL NOT COMBINE POWER FEEDS FOR THREE PHASE LOADS.
35. THE BELOW LOCATIONS ARE WHERE GFCI OUTLETS ARE REQUIRED:
    - 35.1. KITCHENS: ALL KITCHEN OUTLETS.
    - 35.2. BATHROOMS: GFCI OUTLETS ARE REQUIRED IN BATHROOMS NEAR THE SINK.
    - 35.3. GARAGES: GFCI OUTLETS ARE REQUIRED IN GARAGES THAT HAVE SINKS.
    - 35.4. BASEMENTS: UNFINISHED BASEMENTS REQUIRE AT LEAST ONE GFCI OUTLET.
    - 35.5. OUTDOOR SPACES: GFCI OUTLETS ARE REQUIRED IN OUTDOOR AREAS THAT ARE ACCESSIBLE OR AT GRADE LEVEL.
    - 35.6. LAUNDRY ROOMS: ALL LAUNDRY ROOM OUTLETS.
    - 35.7. CRAWL SPACES: GFCI OUTLETS ARE REQUIRED IN CRAWL SPACES WHERE MECHANICAL EQUIPMENT IS LOCATED.
    - 35.8. UTILITY ROOMS: ALL UTILITY ROOM OUTLETS.
36. LIMIT CAT 6E INSTALLATION TO 230' MAXIMUM DISTANCE. CONTRACTOR SHALL FURNISH AND INSTALL FIBER OPTIC CABLE AND MEDIA CONVERTERS IF CONDUIT ROUTING EXCEEDS CAT 6E LIMITS.

LEGEND

SYMBOL	DESCRIPTION	MTG HGT AFF TO CL, UON
□ □ ○	OPEN LIGHTING FIXTURE SYMBOLOGY DENOTING FIXTURES CONNECTED TO NORMAL POWER: FIXTURE TYPE DETERMINES MOUNTING.	-----
⧄ ⧄ ⊘	SINGLE DIAGONAL LIGHTING FIXTURE SYMBOLOGY DENOTING FIXTURES CONNECTED TO CRITICAL OR EQUIPMENT BRANCH (OR EMERGENCY POWER), UON: FIXTURE TYPE DETERMINES MOUNTING.	-----
⊠ ⊠ ⊗	DOUBLE DIAGONAL LIGHTING FIXTURE SYMBOLOGY DENOTING FIXTURES CONNECTED TO LIFE SAFETY BRANCH (OR EMERGENCY POWER), UON: FIXTURE TYPE DETERMINES MOUNTING.	-----
	BATTERY POWERED EMERGENCY LIGHTING UNIT	7'-6"
⊗ ⊗ ⊗	EXIT SIGN: ARROWS DENOTE DIRECTIONAL INDICATING CHEVRON RQMTS, SHADING DENOTES FACE(S) ORIENTATION.	-----
◑	WALLWASH OR OTHER DIRECTIONALLY ADJUSTABLE/AIMABLE FIXTURE: OPEN SIDE DENOTES ORIENTATION. TYPE DETERMINES MOUNTING.	-----
▽ ▽ ▽	TRACK LIGHTING FIXTURE: TYPE DETERMINES MOUNTING.	-----
○□ ○○	POLE-MOUNTED SITE LIGHTING FIXTURE: TYPE DETERMINES MTG.	-----
◁	FLOOD LIGHTING FIXTURE: TYPE DETERMINES MOUNTING.	-----
PC	PHOTO-CELL	-----
⬡	ALL FIXTURES IN THIS SPACE SHALL BE SAME TYPE INDICATED, U.O.N.	
S	SINGLE-POLE TOGGLE SWITCH	3'-10"
$	SINGLE-POLE TOGGLE SWITCH: SLASH DENOTES ESSENTIAL POWER SYSTEM CONNECTION - TYPICAL FOR ALL SWITCHES.	3'-10"
OS_W	DUAL TECHNOLOGY, WALL MNTD OCCUPANCY SENSOR WITH MANUAL OVERRIDE SWITCH	3'-10"
OS_C	DUAL TECHNOLOGY, CEILING MNTD OCCUPANCY SENSOR WITH REMOTE MANUAL OVERRIDE SWITCH	
S_{OR}	SINGLE-POLE REMOTE OVERRIDE SWITCH FOR CEILING MNTD OCCUPANCY SENSOR	3'-10"
S_D	DIMMER SWITCH	3'-10"
S_D3	THREE-WAY DIMMER SWITCH	3'-10"
S_P	SINGLE-POLE TOGGLE SWITCH WITH PILOT LIGHT	3'-10"
S_M	SINGLE-POLE MOTOR-RATED TOGGLE SWITCH DISCONNECT	3'-10"
S_T	SINGLE-POLE OR DOUBLE-POLE MANUAL MOTOR STARTER WITH MELTING ALLOY ELEMENTS FOR THERMAL OVERLOAD PROTECTION	3'-10"
S_{IR}	OCCUPANCY SENSOR SWITCH	3'-10"
S_{IT}	INTERVAL TIMER RESET AND CONTROL SWITCH	3'-10"
S_J	JOG SWITCH	3'-10"
▣	MUSHROOM HEAD TYPE PUSHBUTTON STATION	5'-0"
P	AUTO DOOR CONTROL PUSHPLATE	-----
S_V	VARIABLE INTENSITY CONTROLLER INCLUDED WITH OWNER-FURNISHED-CONTRACTOR-INSTALLED SURGICAL LIGHTING FIXTURE	5'-0"
S_{LV}	LOW VOLTAGE CONTROL SWITCH	3'-10"
WS	FACTORY SUPPLIED WALL CONTROLLER FOR CEILING MOUNTED LIGHT-INSTALLED BY ELECTRICAL CONTRACTOR	3'-10"
⊖	120V DUPLEX RECEPTACLE, STANDARD MOUNTING HEIGHT	1'-6"
⊖	120V DUPLEX RECEPTACLE, SPECIAL MOUNTING HEIGHT INSTALL AT SAME HEIGHT AS SWITCHES IF NO HEIGHT IS INDICATED	ABOVE COUNTER
⊕	120V QUADRUPLEX RECEPTACLE, STANDARD MOUNTING HEIGHT	1'-6"
⊕	120V QUADRUPLEX RECEPTACLE, SPECIAL MOUNTING HEIGHT INSTALL AT SAME HEIGHT AS SWITCHES IF NO HEIGHT IS INDICATED	ABOVE COUNTER
⊖	120V SINGLE RECEPTACLE, AMP RATING (IF OTHER THAN 20A) SHOWN: STANDARD MOUNTING HEIGHT, OR OTHER HEIGHT AS NOTED	1'-6", UON
⊖ GFCI	120V GFCI DUPLEX RECEPTACLE, STANDARD MOUNTING HEIGHT	1'-6"
⊕	120V GFCI QUADRUPLEX RECEPTACLE, SPECIAL MOUNTING HEIGHT INSTALL AT SAME HEIGHT AS SWITCHES IF NO HEIGHT IS INDICATED	ABOVE COUNTER
◐	120V GFCI DUPLEX RECEPTACLE, SPECIAL MOUNTING HEIGHT INSTALL AT SAME HEIGHT AS SWITCHES IF NO HEIGHT IS INDICATED	ABOVE COUNTER
⊖	SINGLE RECEPTACLE (OTHER THAN 120V), VOLTAGE, AMP RATING, NEMA CONFIGURATION, AND MOUNTING HEIGHT AS NOTED	-----
⊟	RECPTACLE OR J-BOX CONNECTION FOR X-RAY VIEWER: VERIFY CONNECTION RQMTS WITH UNIT FURNISHED PRIOR TO ROUGH-IN	-----
⊙	120V DUPLEX RECEPTACLE IN FLUSH FLOOR-MOUNTED BOX	-----
TP	TELE-POWER POLE	-----
H	HALON DUMP STATION	-----
F	FIRE ALARM MANUAL PULL STATION	3'-10"
FK	FIRE ALARM MANUAL PULL STATION, KEY-OPERATED	3'-10"
D	FIRE ALARM CEILING-MOUNTED SMOKE DETECTOR	-----
H	FIRE ALARM CEILING-MOUNTED HEAT DETECTOR	-----
D_S	FIRE ALARM SUPPLY AIR DUCT-MOUNTED SMOKE DETECTOR	-----
D_R	FIRE ALARM RETURN AIR DUCT-MOUNTED SMOKE DETECTOR	-----
DR◁	FIRE ALARM PROJECTED BEAM SMOKE DETECTOR - RECEIVER	AS NOTED
DT◁	FIRE ALARM PROJECTED BEAM SMOKE DETECTOR - TRANSMITTER	AS NOTED
Y	FIRE ALARM CONNECTION TO SPRINKLER SYSTEM VALVE STATUS SWITCH (TAMPER SWITCH)	-----
FS	FIRE ALARM CONNECTION TO SPRINKLER SYSTEM WATER FLOW SWITCH	-----
F○	FIRE ALARM AUDIO/VISUAL NOTIFICATION DEVICE-CHIME & STROBE	6'-8"
F◁	FIRE ALARM AUDIO/VISIUAL NOTIFICATION DEVICE-HORN & STROBE	6'-8"
F	FIRE ALARM VISUAL ONLY NOTIFICATION DEVICE - STROBE LIGHT	6'-8"
FS FS	FIRE ALARM SPEAKER: CEILING-MOUNTED, WALL-MOUNTED	6'-8"
FH◁	FIRE ALARM HORN, WALL-MOUNTED	AS NOTED
RI RI	DUCT SMOKE DETECTOR ALARM REMOTE INDICATOR LIGHT: CEILING-MOUNTED, WALL-MOUNTED	6'-8"
SAI SAI	DUCT SMOKE DETECTOR ALARM REMOTE INDICATOR LIGHT AND TEST SWITCH: CEILING-MOUNTED, WALL-MOUNTED	6'-8"
Z	FIRE ALARM ZONE ADDRESSABLE MODULE	-----
I	FIRE ALARM INDIVIDUAL ADDRESSABLE MODULE	-----
◆	FIRE ALARM ELECTRO-MAGNETIC DOOR HOLDER	6'-4"
FR	FIRE RELAY	-----
ID	DESK MOUNTED INTERCOM	-----
IW	WALL MOUNTED INTERCOM	-----
$\$_X$	EXPLOSION PROOF SWITCH	3'-10"
$\$_3$	3 WAY SWITCH	3'-10"
$\$_4$	4 WAY SWITCH	3'-10"
$\$_{WP}$	NEMA 4X SWITCH	3'-10"

PUMP AND METER LEGEND

SYMBOL	DESCRIPTION
M	MAGNETIC FLOW METER
	SONIC FLOW METER
	CENTRIFUGAL PUMP
	LOBE PUMP
	PERISTALTIC PUMP
	SUBMERSIBLE PUMP
	GRINDER PUMP

LEGEND

ABBREVIATIONS

ABV	ABOVE	IG	ISOLATED GROUND
AFF	ABOVE FINISHED FLOOR	MON	MONITOR
ACLG	ABOVE FINISHED CEILING	MTG	MOUNTING
BFC	BELOW FINISHED CEILING	MV	MULTI-VIEWER
C	CRITICAL BRANCH OR EMERG PWR-RED DEVICE & PLATE, UON.	MW	MICROWAVE OVEN
CL	CENTER-LINE	NEC	NATIONAL ELECTRICAL CODE
CLG	CEILING-MOUNTED	OCPD	OVERCURRENT PROTECTIVE DEVICE
COF	COFFEE MAKER	OFCI	OWNER-FURNISHED-CONTRACTOR-INSTALLED
COP	COPIER	OFE	OWNER-FURNISHED EQUIPMENT
CTR	COUNTER	PRT	PRINTER
ECB	ENCLOSED CIRCUIT BREAKER	PTS	PNEUMATIC TUBE STATION
EMER	EMERGENCY	Q	EQUIP BRANCH OR EMERG PWR-RED DEVICE & PLATE, UON.
EWC	ELECTRIC WATER COOLER	REF	REFRIGERATOR
EWH	ELECTRIC WATER HEATER	RQMTS	REQUIREMENTS
FAX	FACSIMILE MACHINE	T	TAMPERPROOF DEVICE
FBO	FURNISHED BY OTHERS	TSP	TWISTED SHIELDED PAIR
GFCI	GROUND FAULT CIRCUIT INTERRUPT-ING - PERSONNEL PROTECTION	UON	UNLESS OTHERWISE NOTED
GFI	GROUND FAULT INTERRUPTING - EQUIPMENT PROTECTION	UCR	UNDER-COUNTER REFRIGERATOR
HGT	HEIGHT	WP	WEATHERPROOF
FPMR	FUSED PER MANUFACTURE'S RECOMMENDATIONS		

SYMBOL	DESCRIPTION	MTG HGT AFF TO CL, UON
	EXPOSED RACEWAY	-----
⌒	RACEWAY CONCEALED IN OR ABOVE CEILINGS AND WITHIN WALLS	-----
⌒	BRANCH CIRCUIT RACEWAY CONCEALED IN OR BELOW FLOOR SLAB OR BELOW GRADE	-----
╲	FEEDER RACEWAY CONCEALED BELOW FLOOR SLAB OR BELOW GRADE	-----
	LIGHTNING PROTECTION CABLING	-----
↘	HOMERUN RACEWAY: NUMBER OF ARROWHEADS DENOTES NUMBER OF CIRCUITS.	-----
—○	RACEWAY TURNING UP AS VIEWED FROM THE LOAD	-----
—●	RACEWAY TURNING DOWN AS VIEWED FROM THE LOAD	-----
—●—	RACEWAY VERTICAL RISER WITH HORIZONTAL CONTINUATION AT TWO LEVELS SHOWN	-----
	CAPPED RACEWAY	-----
↘	GENERAL LIGHTING OR OUTLET CIRCUIT - MAY BE DAISY CHAINED	
J	JUNCTION BOX	AS NOTED
◩	ENCLOSED BREAKER	
	FUSIBLE SAFETY SWITCH (AMP RATING, POLES, FUSE SIZE, AND NEMA ENCLOSURE TYPE IF OTHER THAN 1 NOTED)	-----
	NON-FUSIBLE SAFETY SWITCH (AMP RATING, POLES, AND NEMA ENCLOSURE TYPE IF OTHER THAN 1 NOTED)	-----
⊠	COMBINATION MAGNETIC ACROSS-THE-LINE STARTER WITH MOTOR CIRCUIT PROTECTOR (NEMA STARTER SIZE NOTED)	-----
▩	CONTROL PANEL FURNISHED INTEGRAL TO EQUIPMENT (SINGLE-POINT ELECTRICAL CONNECTION REQUIRED)	-----
	MOTOR	-----
—∿	FLEXIBLE CONDUIT CONNECTION	-----
▬ ▬	SURFACE- OR FLUSH-MOUNTED LIGHTING/RECEPTACLE PANELBOARD	-----
▨	POWER DISTRIBUTION PANELBOARD	-----
T T	DRY TYPE TRANSFORMER	-----
XXX	MISCELLANEOUS SYSTEMS PANEL OR CABINET: REFER TO ABBREVIATIONS.	-----

NOTE !! ALL ABBREVIATIONS, NOTES, AND SYMBOLS SHOWN ON THIS DRAWING DO NOT NECESSARILY APPEAR IN THIS SET OF CONTRACT DOCUMENTS. REFER ONLY TO THOSE THAT APPLY.

MOTOR CONTROLLER LEGEND

SYMBOL	DESCRIPTION
⊠ MS	ACROSS THE LINE MOTOR STARTER
SS	SOFT STARTER
VFD	VARIABLE FREQUENCY DRIVE
MS ⊠	ACROSS THE LINE MOTOR STARTER WITH INTEGRAL DISCONNECT
SS	SOFT STARTER WITH INTEGRAL DISCONNECT
VFD	VARIABLE FREQUENCY DRIVE WITH INTEGRAL DISCONNECT

LIGHTING LEGEND

SYMBOL	DESCRIPTION
○	FIXTURE WITH STANDARD BALLAST.
●	FIXTURE WITH STANDARD BALLAST AND EMERGENCY BALLAST.

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SOUTH BEND, IN.

MICHAEL A. MIRANDE, II
No. 19800084

Michael A. Mirande II
Signature

09/09/2025
Date

TOWN OF MILLERSBURG, INDIANA
ELKHART COUNTY

WWTP IMPROVEMENTS
NEW UV AND CLARIFIER COVER

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Designed By:	Drawn By:	Checked By:
DS	DS	MM
Issue Date:	Project No:	Scale:
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ELECTRICAL LEGENDS & SCHEDULES

Drawing No:
E0-0

Sheet: 13 OF 19

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IMPROVEMENTS SITE PLAN

SCALE: 1"=20'-0"

0 20' 40'

GENERAL NOTES

1. SEE E0.0 FOR PROJECT CONDUIT REQUIREMENTS.
2. PLANT IS TO REMAIN FULLY FUNCTIONAL DURING DEMOLITION AND CONSTRUCTION.
3. THE CONTRACTOR IS RESPONSIBLE FOR WIRE SIZE BASED UPON CONDUIT ROUTING AND LENGTH OF FINAL WIRE RUN. THE CONTRACTOR SHALL SIZE WIRE BASED UPON A MAXIMUM 3% VOLTAGE DROP. THE CONTRACTOR IS RESPONSIBLE FOR ANY COSTS INCURRED BY INCREASED WIRE SIZE.
4. THE CONTRACTOR SHALL EXAMINE NOT ONLY PLANS AND SPECIFICATIONS FOR ELECTRICAL AND INSTRUMENTATION, BUT PLANS AND SPECIFICATIONS FOR OTHER RELATED SECTIONS. VISIT THE SITE TO BECOME ACQUAINTED WITH ALL PROJECT CONDITIONS INCLUDING EXISTING CONDITIONS EXECUTION OF CONTRACT IS EVIDENCE THAT THE CONTRACTOR HAS EXAMINED ALL DRAWINGS AND SPECIFICATIONS AND THAT ALL CONDITIONS OF INSTALLING THE WORK IN THIS SECTION ARE VERIFIED. CLAIMS FOR LABOR, MATERIAL, OR TIME EXTENSIONS REQUIRED DUE TO DIFFICULTIES ENCOUNTERED, WHICH COULD HAVE BEEN FORESEEN HAD EXAMINATIONS BEEN MADE WILL NOT BE RECOGNIZED, REFER TO PROCESS AND STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS REGARDING BURIED EQUIPMENT.

ELECTRICAL NOTES

1. EXISTING CHLORINE CONTACT TANK. THE NEW UV CHANNEL IS TO BE INSTALLED INSIDE THE EXISTING CHLORINE CONTACT TANK STRUCTURE. THE CONTRACTOR SHALL INSTALL NEW UV SPLITTER PANEL AND SYSTEM MONITOR OUTSIDE ADJACENT TO NEW UV CHANNEL. THE CONTRACTOR SHALL COORDINATE WITH STRUCTURAL WHEN DETERMINING EXACT FINAL LOCATION AND SHALL ENSURE THERE IS ENOUGH SPACE PROVIDED FOR PROPER CLEARANCE PER NEC. THE CONTRACTOR SHALL PROVIDE CONCRETE PADS, UNISTRUT, MOUNTING HARDWARE, AND MISCELLANEOUS APPURTENANCES AS REQUIRED FOR PROPER INSTALLATION. REFER TO PROCESS AND STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS REGARDING NEW UV CHANNEL INSTALLATION.
2. 120/240V EXISTING PANEL LP. THE CONTRACTOR SHALL FURNISH AND INSTALL TWO (2) NEW 1P 20AT BREAKERS IN EXISTING PANEL LP TO FEED NEW UV SPLITTER PANEL AND SYSTEM MONITOR. THE CONTRACTOR SHALL FURNISH AND INSTALL CONDUIT AND WIRE FROM NEW BREAKERS IN PANEL LP IN THE EXISTING CONTROL BUILDING TO NEW UV CHANNEL EQUIPMENT. THE CONTRACTOR IS RESPONSIBLE FOR WIRE SIZE BASED UPON CONDUIT ROUTING AND LENGTH OF FINAL WIRE RUN. MINIMUM 2 #4 COPPER CONDUCTORS WITH #12 GROUND IN 1" CONDUIT BASED ON A WIRE RUN OF 300 FT. WIRE CALCULATED BASED ON A 20A 120V CIRCUIT.

CONTROL BUILDING MOTOR CONTROL CENTER (MCC)

PANEL LP
2

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SOUTH BEND, IN.

MICHAEL A. MIRANDE
REGISTERED
No. 19800084
STATE OF INDIANA
PROFESSIONAL ENGINEER

Signature 09/09/2025 Date

TOWN OF MILLERSBURG, INDIANA
ELKHART COUNTY

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WWTP ELECTIRCAL SITE PLAN

Drawing No:
E1-0
Sheet: 14 OF 19

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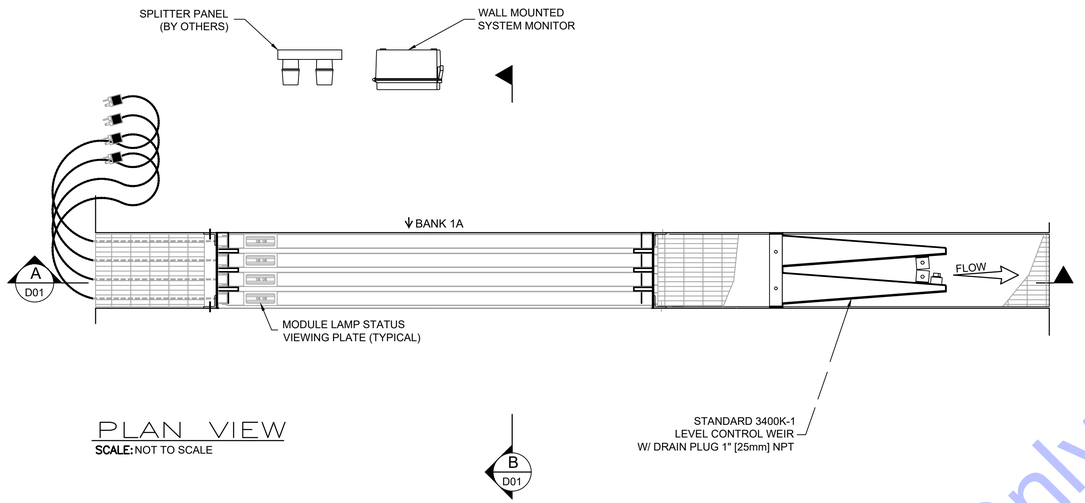
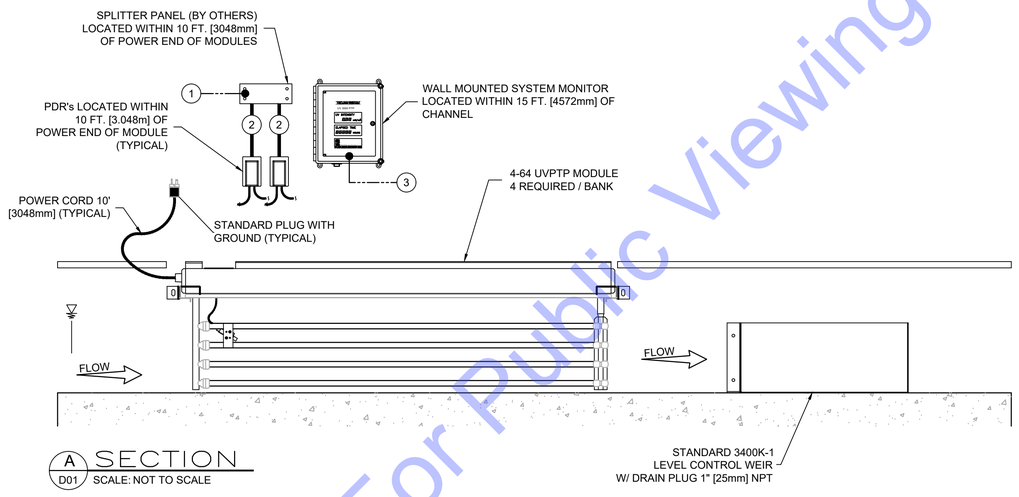


PLAN VIEW

SCALE: NOT TO SCALE



A SECTION

D01 SCALE: NOT TO SCALE

GENERAL NOTES

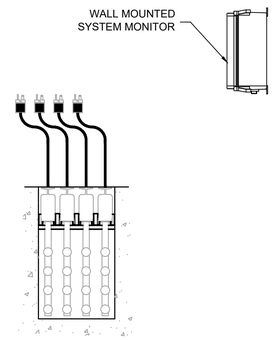
1. BASIS OF DESIGN IS TROJAN TECHNOLOGIES. DRAWING PROVIDED BY UV MANUFACTURER AND IS GENERIC IN NATURE. PROVIDED AS A REFERENCE FOR CONTRACTOR CONVENIENCE. THE CONTRACTOR SHALL COORDINATE WITH MANUFACTURER DURING BIDDING AND CONSTRUCTION TO ENSURE A COMPLETE AND FULLY OPERATIONAL SYSTEM IS INSTALLED.
2. SYSTEM CONDUIT, WIRING, DISTRIBUTION PANELS AND INTERCONNECTIONS BY CONTRACTOR. EQUIPMENT SHALL BE INSTALLED AND WIRED COMPLETE BY CONTRACTOR.
3. ELECTRICAL REQUIREMENTS SHOWN ARE TO SUPPLY TROJAN UV EQUIPMENT ONLY.
4. THE CONTRACTOR SHALL REVIEW ALL TROJAN TECHNOLOGIES INSTALLATION INSTRUCTIONS PRIOR TO EQUIPMENT INSTALLATION.

TROJAN UV3000™ PTP
EQUIPMENT INTERCONNECTIONS

No.	DESCRIPTION	TO	FROM
1	SPLITTER PANEL POWER SUPPLY 120V, 1 PHASE, 2 WIRE, ACTUAL DRAW 12.7 AMPS / SPLITTER PANEL	SPLITTER PANEL (BY OTHERS)	EXISTING PANEL LP
2	POWER DISTRIBUTION RECEPTACLE (PDR) POWER SUPPLY 120V, 1 PHASE, 2 WIRE, ACTUAL DRAW 6.4 AMPS / PDR	PDR	SPLITTER PANEL (BY OTHERS)
3	SYSTEM MONITOR POWER SUPPLY 120V, 1 PHASE, 2 WIRE, 5 AMPS	SYSTEM MONITOR	EXISTING PANEL LP

NOTES:

: DO NOT SLOPE CHANNEL FLOOR.
: CHANNEL WIDTH & DEPTH MUST BE KEPT WITHIN A TOLERANCE OF + OR −¼" [6mm].
: ANCHOR BOLTS ARE NOT SUPPLIED BY TROJAN TECHNOLOGIES INC.
: SYSTEM CONDUIT, WIRING, DISTRIBUTION PANELS & INTERCONNECTIONS BY OTHERS.
: ELECTRICAL REQUIREMENTS SHOWN ARE TO SUPPLY TROJAN UV EQUIPMENT ONLY. ELECTRICAL INRUSH FACTOR TO BE ADDED AS PER LOCAL CODE.
: ANY EXTRA OUTLETS NOT BEING USED BY TROJAN EQUIPMENT HAVE NOT BEEN INCLUDED IN THE INTERCONNECT AMPERAGE.
: CONTRACTOR TO REVIEW ALL TROJAN TECHNOLOGIES INC. INSTALLATION INSTRUCTIONS PRIOR TO EQUIPMENT INSTALLATION.
: ACCESS IS REQUIRED FOR MODULE REMOVAL – NOTE THE CHANNEL WIDTH AND ENSURE ADEQUATE ACCESS IS PROVIDED.



B SECTION

D01 SCALE: NOT TO SCALE

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OFFICE LOCATIONS IN:
INDIANAPOLIS, IN. (2)
EVANSVILLE, IN.
FORT WAYNE, IN.
CROWN POINT, IN.
BOWLING GREEN, KY.
SOUTH BEND, IN.

MICHAEL A. MIRANDE
REGISTERED
No. 19800084
STATE OF INDIANA
PROFESSIONAL ENGINEER

Signature 09/09/2025 Date

TOWN OF MILLERSBURG, INDIANA
ELKHART COUNTY

WWTP IMPROVEMENTS
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Designed By:	Drawn By:	Checked By:
DS	DS	MM
Issue Date: 9/2025	Project No: S25012	Scale: AS SHOWN

UV ELECTRICAL PLAN

Drawing No:
E2-0
Sheet: 15 OF 19

File: Z:\SHARED\IN CLIENTS M-Z\MILLERSBURG\S25012 WWTP IMPROVEMENTS\06 CAD\X MECH-ELECT\ DRAWINGS\ELECTRICAL DRAWINGS.DWG
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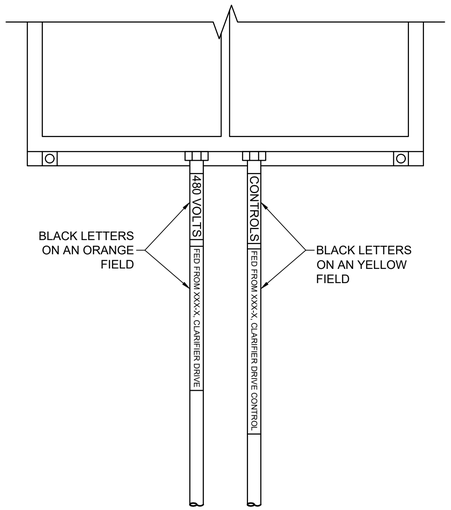
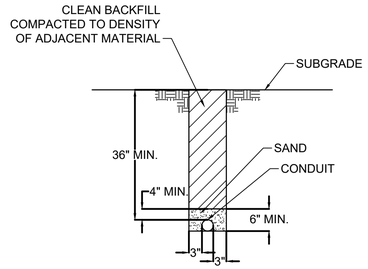


CONDUIT IDENTIFICATION

NOT TO SCALE

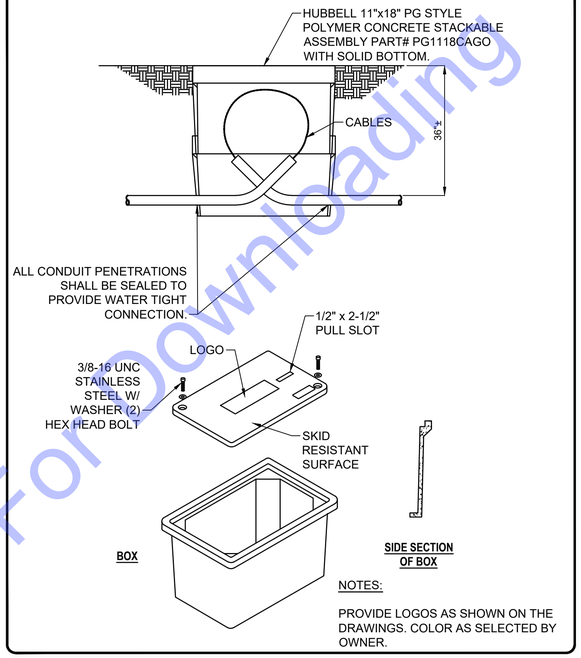


NOTE:

WHERE THERE IS MORE THAN ONE CONDUIT PER TRENCH, CONDUITS SHALL NOT BE PLACED CLOSER THAN 8" CENTER TO CENTER.

DIRECT BURIAL CONDUIT DETAILS IN EARTH

NOT TO SCALE

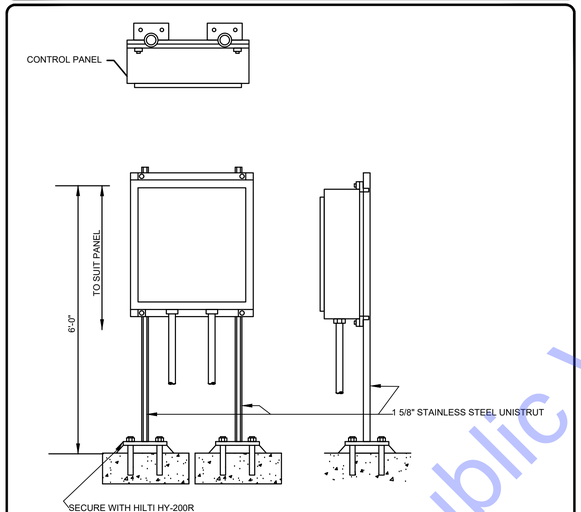


NOTES:

PROVIDE LOGOS AS SHOWN ON THE DRAWINGS. COLOR AS SELECTED BY OWNER.

YARD PULL/JUNCTION BOX DETAIL

NOT TO SCALE

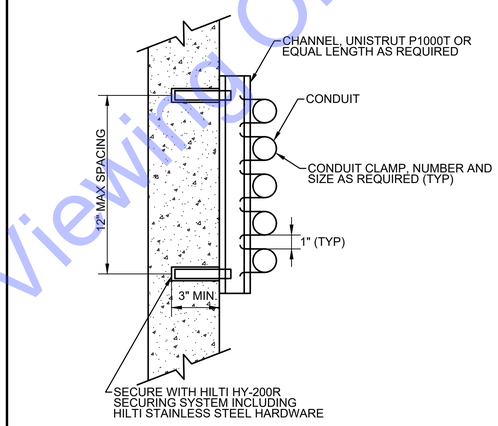


NOTE:

1. ROUND OFF ALL EXPOSED EDGES & CORNERS.
2. PAINT METAL IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.
3. ALL BOLTS, ANCHORS, AND OTHER HARDWARE SHALL BE STAINLESS STEEL.

UNISTRUT MOUNT SMALL PANEL

NOT TO SCALE



WALL MOUNTED CONDUIT RACK

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SOUTH BEND, IN.

MICHAEL A. MIRANDE
REGISTERED
No. 19800084
STATE OF INDIANA
PROFESSIONAL ENGINEER

Signature 09/09/2025 Date

TOWN OF MILLERSBURG,
INDIANA
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Designed By:	Drawn By:	Checked By:
DS	DS	MM
Issue Date:	Project No:	Scale:
9/2025	S25012	AS SHOWN

ELECTRICAL DETAILS

Drawing No:
E3-0
Sheet: 16 OF 19

File: Z:\SHARED\IN CLIENTS M-Z\MILLERSBURG\S25012 WWTP IMPROVEMENTS\06 CAD\X MECH-ELECT\1 DRAWINGS\ELECTRICAL DRAWINGS.DWG
Saved: 9/9/2025 1:06:14 PM Plotted: 9/9/2025 4:13:02 PM Current User: Daniel Salazar El LastSavedBy: dsalazar

GENERAL

1. The structure has been designed for the in-service loads only. The methods, procedures, and sequences of construction are the responsibility of the Contractor. The Contractor shall take all necessary precautions to maintain and ensure the integrity of the structure at all stages of construction.
2. All work shall be performed in accordance with the Indiana Building Code, 2014 Edition (2012 International Building Code, first printing, with Indiana Amendments).
3. Where new work is to be fitted to old work, the Contractor shall check all dimensions and conditions in the field, and report any errors or discrepancies to the Structural Engineer prior to the fabrication and erection of any new members.
4. Do not determine dimensions by "scaling" off the plans. The Contractor shall accept all risk associated with "scaling" and shall be responsible for all inadequate work resulting therefrom. Questions regarding missing or conflicting dimensions shall be directed, in writing, to the Structural Engineer.
5. Existing materials to be removed and reinstalled as part of this contract, but become damaged, shall be replaced with approved new material of equivalent quality and appearance at the Contractor's expense.
6. All work shall be performed without damage to adjacent retained work. Adequate protection of areas nearby work against dust, dirt and debris accumulation shall be maintained at all times.
7. Principal openings in the structure are indicated on the structural drawings. Refer to the architectural, mechanical, electrical, and plumbing drawings for sleeves, curbs, inserts, etc. not herein indicated. Openings in slabs with a maximum side dimension or diameter of 10 inches or less shall not require additional framing or reinforcement, unless noted otherwise. The location of sleeves or openings not shown in structural members shall be approved by the Structural Engineer.
8. The location of sleeves or openings not shown in structural members shall be approved by the Structural Engineer.
9. The Contractor shall relocate all mechanical piping, ducts, equipment, electrical conduits, wiring and plumbing that interfere with the proposed construction. Service shall be maintained to all equipment that is served by mechanical, electrical or plumbing conduit being relocated.
10. The Contractor shall relocate all utilities which interfere with the proposed construction. Service shall be maintained at all times during utility relocation unless otherwise noted.

CONCRETE

1. Reinforced concrete has been designed in accordance with the latest editions of the Building Code Requirements for Reinforced Concrete (ACI 318) and Environmental Engineering Concrete Structures (ACI 350R) by the American Concrete Institute (ACI).
2. Slabs-on-grade shall be constructed in accordance with the latest edition of the Guide for Concrete Floor and Slab Construction (ACI 302.1R).
3. Mixing, transporting, and placing of concrete shall conform to the latest edition of the Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete (ACI 211.1) and the Standard Specifications for Structural Concrete (ACI 301). Concrete curing shall conform to the latest editions of the Standard Practice for Concrete Curing (ACI 308) and the Standard Specification for Curing Concrete (ACI 308.1). In case of a discrepancy, the plans and specifications shall govern.
4. Unless noted otherwise, concrete shall have natural sand fine aggregate and normal weight coarse aggregates conforming to ASTM C33, and Type I or III Portland Cement conforming to ASTM C150. Type III Portland Cement shall not be used in mass concrete. The Contractor shall submit a mix design for each proposed class of concrete. Mix designs shall indicate proportions by weight, water-cement ratio, slump, air content, synthetic fiber size and quantity, sieve analyses of fine and coarse aggregates, standard deviation analysis, and required average strength and documentation of average strength verifying compliance with ACI 318. The Contractor shall not vary from the mix design without approval from the Structural Engineer.
5. Unless noted otherwise, fly ash may be used as a pozzolan to replace a portion of the Portland Cement in a concrete mix. Fly ash, when used, shall conform to ASTM C618, Type C. Concrete mixes using fly ash shall be proportioned to account for the properties of the specific fly ash used and to account for the specific properties of the fly ash concrete thus resulting. The ratio of the amount of the fly ash to the total amount of fly ash plus cement in the mix shall not exceed 20 percent.
6. Water-reducing admixtures conforming to ASTM C494 may be used in the concrete mix design. Maximum slump shall be 5 inches for mixes containing water-reducing admixtures and 5 to 8 inches for mixes containing high range water-reducing admixtures.
7. Concrete compressive strength tests shall be performed in accordance with ASTM C39. Copies of the test results shall be forwarded to the Structural Engineer. One set of specimens shall be taken for each day's pour of appreciable size and for each 50 cubic yards in accordance with the latest edition of ASTM C31. Each set shall include one specimen tested at 7 days, 2 specimens tested at 28 days and one specimen retained in reserve. Two additional reserve specimens shall be retained for all mass concrete pours. These test cylinders shall be laboratory cured.
8. When the ambient temperature is expected to fall below 40 degrees during the course of a concrete pour or subsequent curing period, it shall be placed and cured in accordance with the latest edition of Cold Weather Concreting (ACI 306R) and an additional set of concrete test cylinders shall be made. These cylinders shall be stored immediately adjacent to, and cured under the same conditions as the building concrete. Special curing boxes are not permitted for these test cylinders.
9. Concrete mixed, transported, placed, and cured under conditions of high ambient temperature, low humidity, solar radiation, or high winds shall conform to the latest edition of Hot Weather Concreting (ACI 305R) and an additional set of concrete test cylinders shall be made. These cylinders shall be stored immediately adjacent to, and cured under the same conditions as the building concrete. Special curing boxes are not permitted for these test cylinders.
10. Slump tests shall be made prior to and following the addition of plasticizers. Where concrete is placed by pumping methods, concrete for test cylinders and slump tests shall be taken at the point of final placement.
11. Water shall not be added to the concrete at the job site. The Contractor is responsible for coordinating a pumpable and workable mix without the addition of water at the job site. The use of plasticizers, retardants and other additives shall be at the option of the Contractor subject to the approval of the Structural Engineer. Follow the recommendations of the manufacturer for the proper use of additives. Use of calcium chloride or other chloride bearing salts is prohibited.
12. Place concrete in a manner so as to prevent segregation of the mix. Delay floating and trowelling operations until the concrete has lost surface water sheen or all free water. Do not sprinkle free cement on the slab surface. Finishing of slab surfaces shall conform to the latest editions of ACI 302.1R and ACI 304R (Guide for Measuring, Mixing, Transporting and Placing Concrete).
13. Maintain concrete in a moist condition for at least 5 days at ambient temperatures above 70 degrees, and at least 7 days at ambient temperatures above 50 degrees. Curing compounds or moisture retention covers shall be used for all non-formed surfaces. Formed surfaces shall be cured by leaving forms in place. During hot, dry weather, keep forms moist by sprinkling. When forms are removed prior to the end of the curing period, apply curing compound to the exposed surfaces.
14. All interior slabs shall receive a hard “troweled finish”. Exterior slabs, sidewalks, and stoops shall receive a “broom (or other type of slip resistant) finish”. All formed surfaces not exposed to public view shall receive a “rough form finish”, exposed surfaces shall receive a “smooth form finish”. Concrete finishes shall be as defined in ACI 301.
15. Protect finished concrete surfaces from damage, rain, hail, running water, other injurious effects.
16. Protect the concrete surface between finishing operations on hot, dry days or any time plastic shrinkage cracks could develop by using wet burlap, plastic membranes or fogging.
17. Horizontal and vertical joints are not permitted in concrete construction except where indicated.
18. Construction joints and/or contraction joints at locations other than where indicated shall be submitted to the Structural Engineer for approval.
19. Construction joints shall be prepared by roughening the contact surface in an approved manner to a full amplitude of approximately 1/4 inch leaving the contact surface clean and free of laitance.
20. Contraction joints shall be made in concrete slabs-on-grade at major column centerlines, at points of discontinuity, at reentrant corners, and at other locations shown on the plans.
21. Provide 3/4 inch chamfers on all exposed corners of concrete except those abutting masonry.
22. The Contractor shall verify the location of sleeves, openings, embedded items, etc. and shall ensure that they are in place prior to the placement of the concrete.
23. Earth cuts shall not be used as forms (“bank forming”) for vertical or sloping surfaces unless otherwise approved by the Structural Engineer. Where bank forming is permitted, the concrete element shall be increased at least 3 inches on all sides exposed to earth to account for possible soil contamination during concrete placement.

CONCRETE SCHEDULE

CONCRETE SCHEDULE						
CLASS	f'_c	AIR CONTENT	MIN. CEMENT: LB/CY (SACKS/CY)	MAX. WATER/ CEMENT: RATIO	CONCRETE PLACEMENT	REMARKS
A	4,500 psi	6% ± 1.5%	611 (6.5)	0.45	new concrete slab and walls	crystalline waterproofing admixture

REINFORCING STEEL

1. Reinforcing bar detailing, fabricating, and placing shall conform to the latest edition of the following standards: Specifications for Structural Concrete for Buildings (ACI 301), ACI Detailing Manual (SP66). The latest editions of Concrete Reinforcing Steel Institute's Reinforcing Bar Detailing and Placing Reinforcing Bars may also be used.
2. Provide standard bar chairs, slab bolsters, spacers, etc. as required to maintain concrete protection specified. Reinforcing steel shall be tied to prevent displacement during concrete placement.
3. Reinforcement bars shall not be tack welded, welded, heated or cut unless otherwise indicated or approved by the Structural Engineer.
4. Welding of reinforcement bars, when approved by the Structural Engineer, shall conform to the latest edition of American Welding Society Standard D1.4. Electrodes for shop and field welding of reinforcement bars shall conform to ASTM A233, Class E90XX.
5. Synthetic fibers shall be used for temperature and shrinkage reinforcement in concrete slabs-on-grade. Synthetic fibers shall be virgin (non-recycled) nylon or polypropylene fibers conforming to ASTM C1116, Type III. Fibers shall be introduced into the mix at the plant in accordance with the manufacturer's recommendations. The Contractor shall submit the mix design, including the fiber size and quantity, to the Structural Engineer for approval prior to construction. The Contractor shall take adequate measures to manage any difficulty in concrete finishing associated with the use of the fibers.
6. Concrete cover over reinforcement, unless otherwise noted, shall be as specified in the latest editions of ACI 318 and ACI 350 with the most stringent requirements governing.
7. Unless noted otherwise, splicing of reinforcing bars shall conform to the latest edition of ACI 318.

CONCRETE REINFORCING STEEL LAP SPLICE SCHEDULE			
BAR SIZE	TENSION SPLICE		COMPRESSION SPLICE
	TOP BAR	OTHER	
#3	21"	16"	12"
#4	28"	24"	15"
#5	35"	30"	19"
#6	42"	36"	23"
#7	49"	42"	26"
#8	56"	48"	30"
#9	63"	57"	34"
#10	76"	66"	38"
#11	93"	72"	42"

8. Horizontal bars in walls, masonry bond beams, and continuous wall footings shall be bent at corners and intersections in such a way that continuity is provided through the joint. Separate corner bars of the same size and spacing as the horizontal reinforcing may be substituted for the bent portion of the continuous bars.
9. Unless noted otherwise, provide 2-#5 bars (one each face) around unframed openings and diagonally at reentrant corners of vertical height offsets in concrete walls. Place bars parallel to the sides of the opening and extend 24 inches beyond corners.
10. The Contractor shall prepare detailed working or shop drawings to enable him to fabricate, erect and construct all parts of the work in accordance with the drawings and specifications and shall submit one reproducible copy and one blue line copy to the Structural Engineer for review prior to fabrication. These shop drawings will be reviewed for design concepts only. The Contractor shall be responsible for all dimensions, accuracy, and fit of work.

COORDINATION WITH OTHER TRADES

1. The Contractor shall coordinate and check all dimensions relating to architectural finishes, structural framing, mechanical openings, equipment, etc. The Structural Engineer shall be notified of any discrepancies before proceeding with work in an area under question.

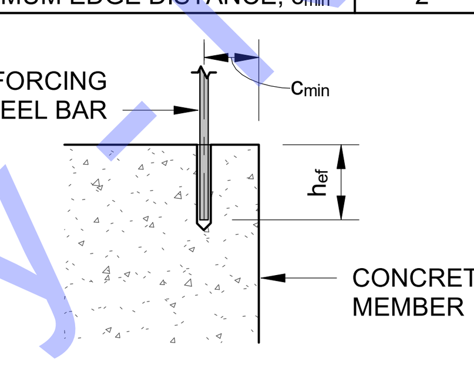
NON-SHRINK GROUT

1. Grout shall be a high early strength, non-metallic, shrinkage resistant (when tested in accordance with the latest edition of ASTM C827 or CRD-C621), premixed, non-corrosive, non-staining product conforming to the requirements of the latest edition of ASTM C1107 and containing Portland Cement, silica sands, shrinkage compensating agents and fluidity improving compounds.
2. Grout compressive strength tests shall be performed in accordance with the latest edition of ASTM C109, with a restraining plate placed over the molds.
3. Grout shall be installed in accordance with the manufacturer's instructions.
4. Grout shall be placed in a non-sag flowable state and shall have forms built around it for confinement. Grout shall be cured according to manufacturer's recommendations.

POST-INSTALLED EXPANSION/ADHESIVE ANCHORS

1. Post-installed anchors shall only be used where specified on the Construction Documents. The Contractor shall obtain approval from the Structural Engineer prior to installing the post-installed anchors in place of missing or misplaced cast-in-placed anchors.
2. Care shall be taken in placing post-installed anchors to avoid conflicts with existing reinforcing steel.
3. Post-installed anchors shall be installed by qualified personnel in accordance with the drawings and specifications.
4. Post-installed anchors shall be installed by qualified personnel in accordance with the Manufacturer’s Printed Installation Instructions (MPII), the drawings and specifications. Installation of adhesive anchors shall be performed by personnel trained to install adhesive anchors. Contractor shall submit installer training cards with anchor package.
5. Post-installed anchors shall be HILTI type as manufactured by HILTI Fastening Systems or approved equivalent. Substitution requests must be submitted by the Contractor to the Structural Engineer for review. Provide back-up technical data that demonstrates that the substituted product is capable of achieving the equivalent performance values (minimum) of the specified products using the appropriate design procedure and/or standard(s) as required by the building code.
6. Masonry cores receiving post-installed anchors shall be filled with course grout. Grout must comply with IBC Section 2103.12 or IRC Section R609.1.1, as applicable. Alternatively, the grout must have a minimum compressive strength, when tested in accordance with ASTM C1019, equal to its specified strength, but not less than 2,000 psi. Post-installed anchors shall not be installed in a masonry mortar joints.
7. The Contractor shall inspect the masonry or concrete surface at each proposed post-installed anchor location prior to installation. If the anchor locations align with mortar joints or the masonry or concrete is honeycombed, cracked or otherwise unsound, the post-installed anchors shall be repositioned so as to be located in sound material and be in accordance with the manufacturer’s minimum spacing and edge distance requirements.
8. Adhesive anchors shall be subject to the following additional requirements:
   A. Anchors shall meet the requirements of ACI 355.2 (mechanical anchors) and ACI 355.4 (adhesive anchors).
   B. Proof loading of adhesive anchors is not required.
   C. Anchors shall not be installed in concrete cured less than 21-days
   D. Anchors shall not be installed until the concrete has reached a minimum compressive strength of 2,500 psi.
   E. Concrete temperature must be greater than 50 ˚F and less than 80 ˚F prior to installation of the anchors unless otherwise permitted by the MPII.
   F. Anchors shall be installed in holes drilled with the HILTI Hollow Drill Bit (TE-CD (SDS Plus) or TE-YD (SDS Max)) and HILTI VC 20/40 Vacuum (VC 20-U or VC 40-U). Follow the MPII for size and depth of holes required.
   G. The acceptability of certification other than the ACI/CRSI Adhesive Anchor Installer Certification shall be the responsibility of the Structural Engineer.
   H. Adhesive anchors installed in horizontal or upwardly inclined orientations to resist sustained tension loads shall be continuously inspected during installation by an inspector specially approved for that purpose by the building official. The special inspector shall furnish a report to the licensed design professional and building official that the work covered by the report has been performed and that the materials used and the installation procedures used conform to the approved contract documents and MPII.

REINFORCING STEEL EPOXY DOWEL SCHEDULE						
BAR SIZE	#3	#4	#5	#6	#7	#8
STANDED EFFECTIVE EMBED, h_{ef}	3-3/8"	4-1/2"	5-5/8"	6-3/4"	7-7/8"	9"
MINIMUM EDGE DISTANCE, c_{min}	2"	2-1/2"	3-1/8"	3-3/4"	4-3/8"	5"



TYPICAL EPOXY DOWEL

NOTES:

1. EPOXY DOWELS SHALL UTILIZE HILTI HIT-HY 200 ADHESIVE SYSTEM OR APPROVED EQUIVALENT
2. STANDARD EMBED DEPTH AND MIN EDGE DISTANCES PROVIDED IN THIS SCHEDULE APPLY AT ALL LOCATIONS UNLESS OTHERWISE NOTED ON SECTIONS AND DETAILS.

DESIGN

1. Building Code: Indiana Building Code, 2014 Edition (2012 International Building Code, first printing, with Indiana Amendments).
2. Concrete:
   28 day compressive strength (f'c) — See Schedule
3. Non-shrink grout:
   28 day compressive strength — 5,000 psi
4. Risk Category: — IV
5. Wind loads:
   Basic wind speed (3-second gust) — 120 mph
   Importance factor, Iw — 1.00
   Exposure — C
6. Snow loads:
   Terrain Category — B
   Exposure Factor, Ce — 0.9
   Thermal Factor, Ct — 1.2
   Importance Factor, Is — 1.2
   Ground Snow Load, Pg — 20 psf
   Flat Roof Snow Load, Pf — 18 psf
   Rain-on-Snow Surcharge Load — 5 psf
   Design Flat Roof Snow Load, Pf — 25 psf
7. Seismic loads:
   Seismic importance factor, Ie — 1.25
   Mapped Spectral Response Acceleration at Short Periods, Ss — 9.8% g
   Mapped Spectral Response Acceleration at 1 Second, S1 — 5.7% g
   Site Class — D (assumed)
   Design Spectral Response Acceleration at Short Periods, Sds — 10.5% g
   Design Spectral Response Acceleration at 1 Second, Sd1 — 9.1% g
   Seismic Design Category — B

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JOHN DAVID TAYLOR
REGISTERED
No. PE19900097
STATE OF INDIANA
PROFESSIONAL ENGINEER
Signature
Date 09.18.25

CE Solutions
structural engineers
8770 North St., Ste. 100
Fishers, IN 46038
317.818.1912
cesolutionsinc.com

TOWN OF MILLERSBURG,
ELKHART COUNTY, INDIANA

WWTP IMPROVEMENTS - NEW UV AND CLARIFIER COVER

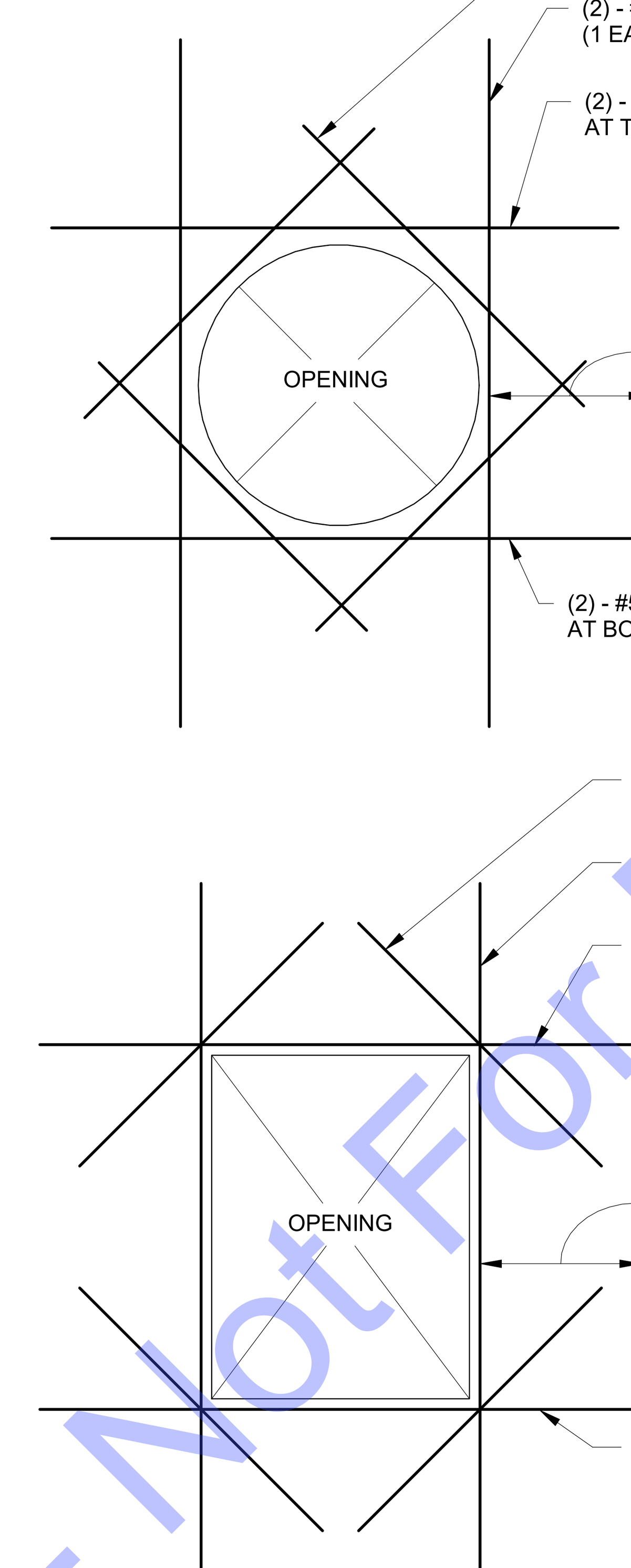
No.	Submittal / Revision	By	Date

Designed By:	Drawn By:	Checked By:
AJG	AJG	JDT
Issue Date:	Project No:	Scale:
09/18/2025	25-165	12" = 1'-0"

GENERAL STRUCTURAL NOTES

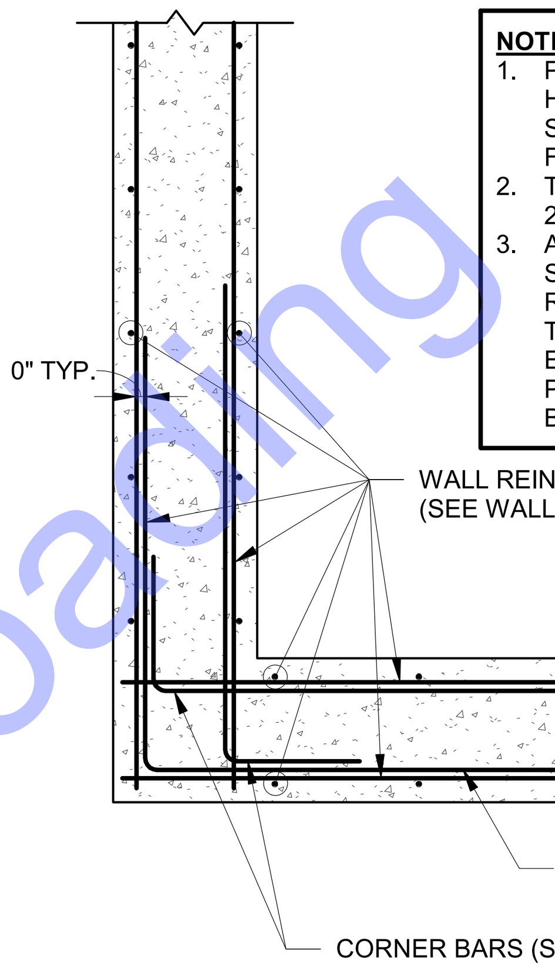
Drawing No:
S1-1

Saved: 9/18/2025 12:43:37 PM Current Local File: C:\Users\ceurbanski\Documents\25-165 Millersburg UV Disinfection System STRUCT_v23_ceurbanski.rvt



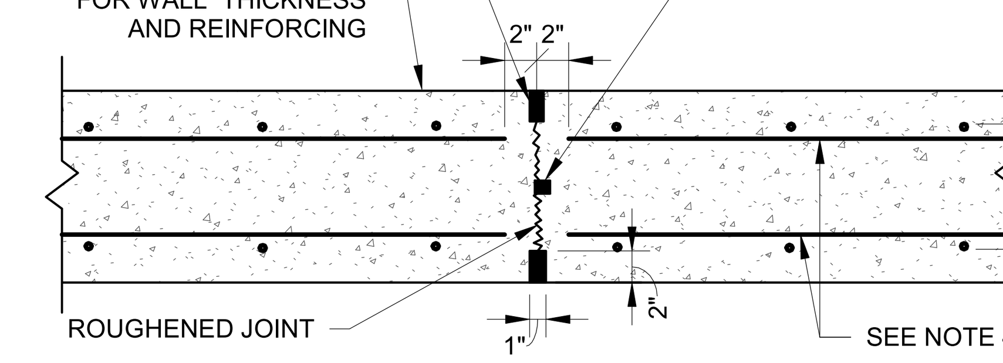
NOTES:
1. WHERE VERTICAL REINFORCING IS INTERRUPTED BY THE OPENING, ONE HALF OF THE INTERRUPTED STEEL SHALL BE ADDED TO EACH SIDE OF THE OPENING. USE FULL LENGTH BARS.
2. THIS DETAIL APPLIES TO ALL OPENINGS IN CONCRETE WALLS UNLESS DETAILED OTHERWISE ON THE PLANS.

4 S1-2 TYP. OPENING IN CONCRETE WALL
1/8" = 1'-0"



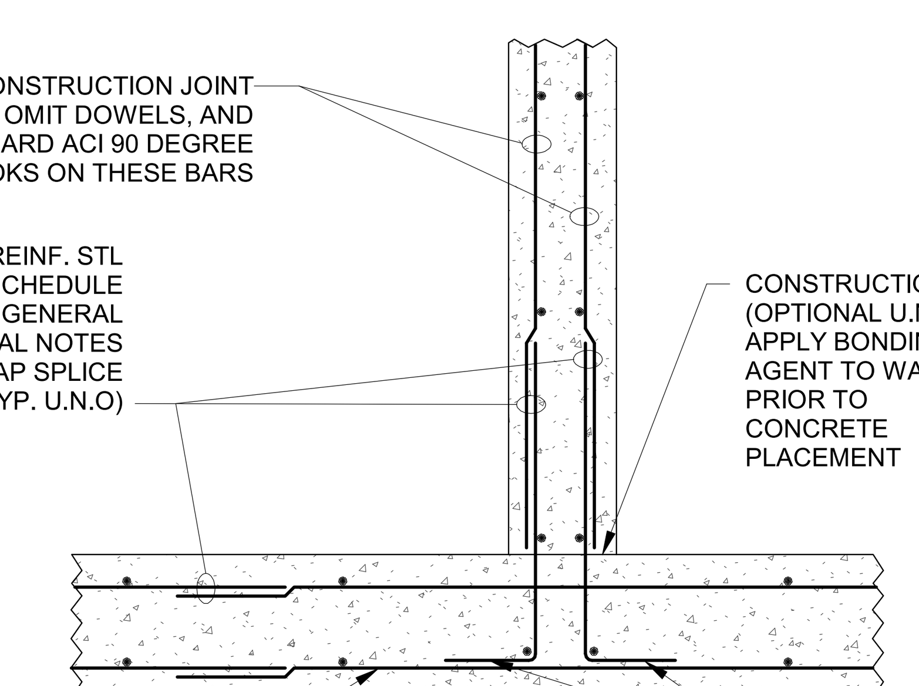
NOTES:
1. PROVIDE CORNER BARS AS SHOWN, MATCH HORIZONTAL WALL REINFORCING (SIZE AND SPACING). SEE GENERAL STRUCTURAL NOTES FOR LAP SPLICE REQUIREMENTS.
2. TERMINATE HORIZONTAL WALL REINFORCING 2" CLEAR FROM END OF WALL (TYPICAL U.N.O.).
3. AT THE CONTRACTOR'S OPTION, THE SEPARATE INSIDE-FACE CORNER BARS MAY BE REPLACED WITH STANDARD 90° ACI HOOKS AT THE ENDS OF THE MAIN INSIDE- FACE BARS, EXTENDED TO THE OUTSIDE FACE AS SHOWN. PROVIDE SEPARATE OUTSIDE-FACE CORNER BARS AS SHOWN, WITHOUT SUBSTITUTION.

1 S1-2 TYPICAL CONCRETE WALL CORNER REINFORCEMENT - PLAN VIEW
3/4" = 1'-0"

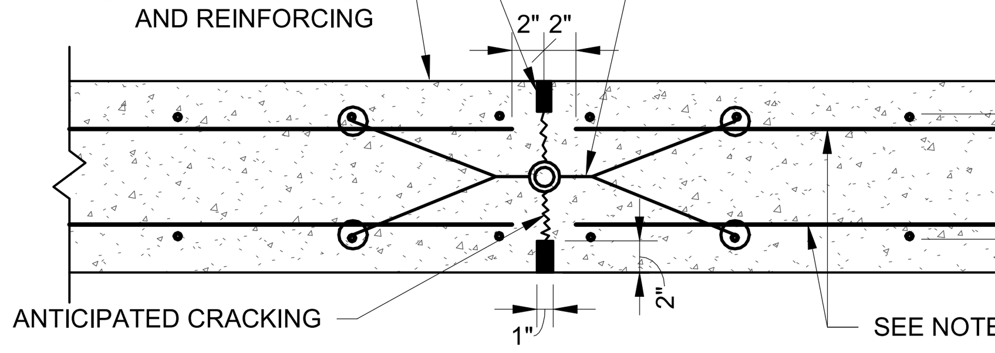


NOTES:
1. CONSTRUCTION JOINTS SHALL BE LOCATED AT JOINTS MARKED CJ.
2. WATERSTOPS AND DRY-PAC REQUIRED AT WATER RETAINING WALLS ONLY.
3. UNLESS NOTED OTHERWISE, CONSTRUCTION JOINT SPACING NOT TO EXCEED 75 FEET.
4. 50% OF THE HORIZ. REINF. STEEL SHALL BE CONTINUOUS THRU JOINT. HORIZONTAL BARS THAT STOP SHORT OF JOINT SHALL BE FABRICATED ACCORDINGLY AND SHALL NOT BE FIELD CUT. CONTINUOUS AND DISCONTINUOUS HORIZ. BARS SHALL BE ALTERNATED ALONG WALL HEIGHT.
5. SEE SPECIFIC DETAILS AT NOTED STRUCTURES WHERE 100% OF THE HORIZONTAL REINFORCING STEEL IS CONTINUOUS THRU JOINT.
6. CONSTRUCTION JOINTS SHALL NOT OCCUR WITHIN 5'-0" OF A CORNER.
7. SEE GENERAL STRUCTURAL NOTES FOR LAP SPLICE REQUIREMENTS.

2 S1-2 TYP. WALL CONSTRUCTION JOINT
1" = 1'-0"



5 S1-2 TYP. CONC. WALL INTERSECTION
1/8" = 1'-0"



NOTES:
1. CONTRACTION JOINTS SHALL BE LOCATED AT JOINTS MARKED CT.
2. WATERSTOPS AND DRY-PAC REQUIRED AT WATER RETAINING WALLS ONLY.
3. UNLESS NOTED OTHERWISE, CONTRACTION JOINT SPACING NOT TO EXCEED 25 FEET.
4. 50% OF THE HORIZ. REINF. STEEL SHALL BE CONTINUOUS THRU JOINT. HORIZONTAL BARS THAT STOP SHORT OF JOINT SHALL BE FABRICATED ACCORDINGLY AND SHALL NOT BE FIELD CUT. CONTINUOUS AND DISCONTINUOUS HORIZ. BARS SHALL BE ALTERNATED ALONG WALL HEIGHT.
5. SEE SPECIFIC DETAILS AT NOTED STRUCTURES WHERE 100% OF THE HORIZONTAL REINFORCING STEEL IS CONTINUOUS THRU JOINT.
6. CONTRACTION JOINTS SHALL NOT OCCUR WITHIN 5'-0" OF A CORNER.
7. SEE GENERAL STRUCTURAL NOTES FOR LAP SPLICE REQUIREMENTS.

3 S1-2 TYP. WALL CONTRACTION JOINT
1" = 1'-0"

COMMONWEALTH ENGINEERS, INC.
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STATE OF INDIANA
PROFESSIONAL ENGINEER
Signature 9.18.25 Date

CE Solutions structural engineers

TOWN OF MILLERSBURG, ELKHART COUNTY, INDIANA

WWTP IMPROVEMENTS - NEW UV AND CLARIFIER COVER

No.	Submittal / Revision	By	Date

Designed By:	Drawn By:	Checked By:
AJG	AJG	JDT
Issue Date:	Project No:	Scale:
09/18/2025	25-165	As indicated

TYPICAL STRUCTURAL DETAILS - CONCRETE - 01

Drawing No:
S1-2
Sheet: 16 OF 17

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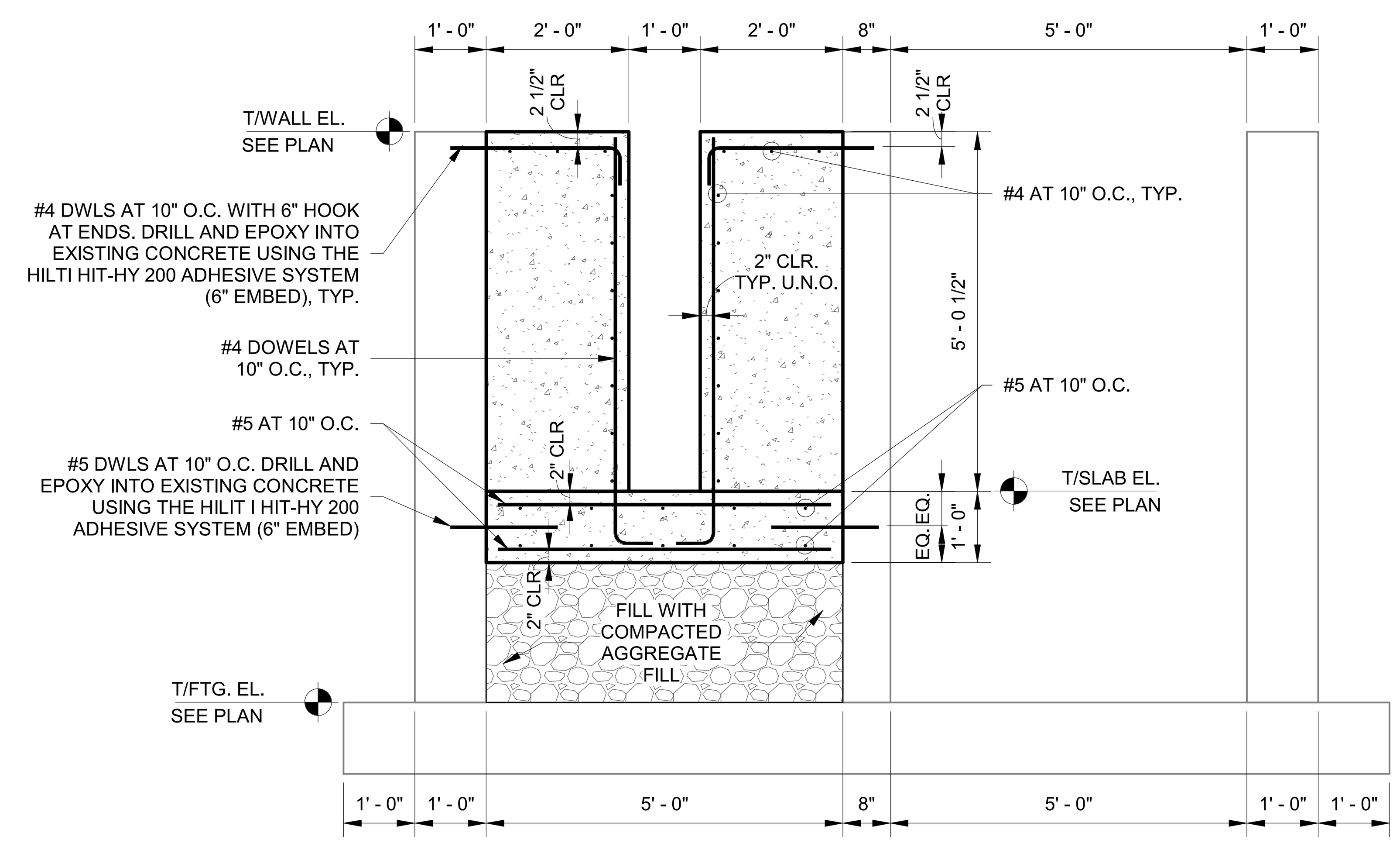
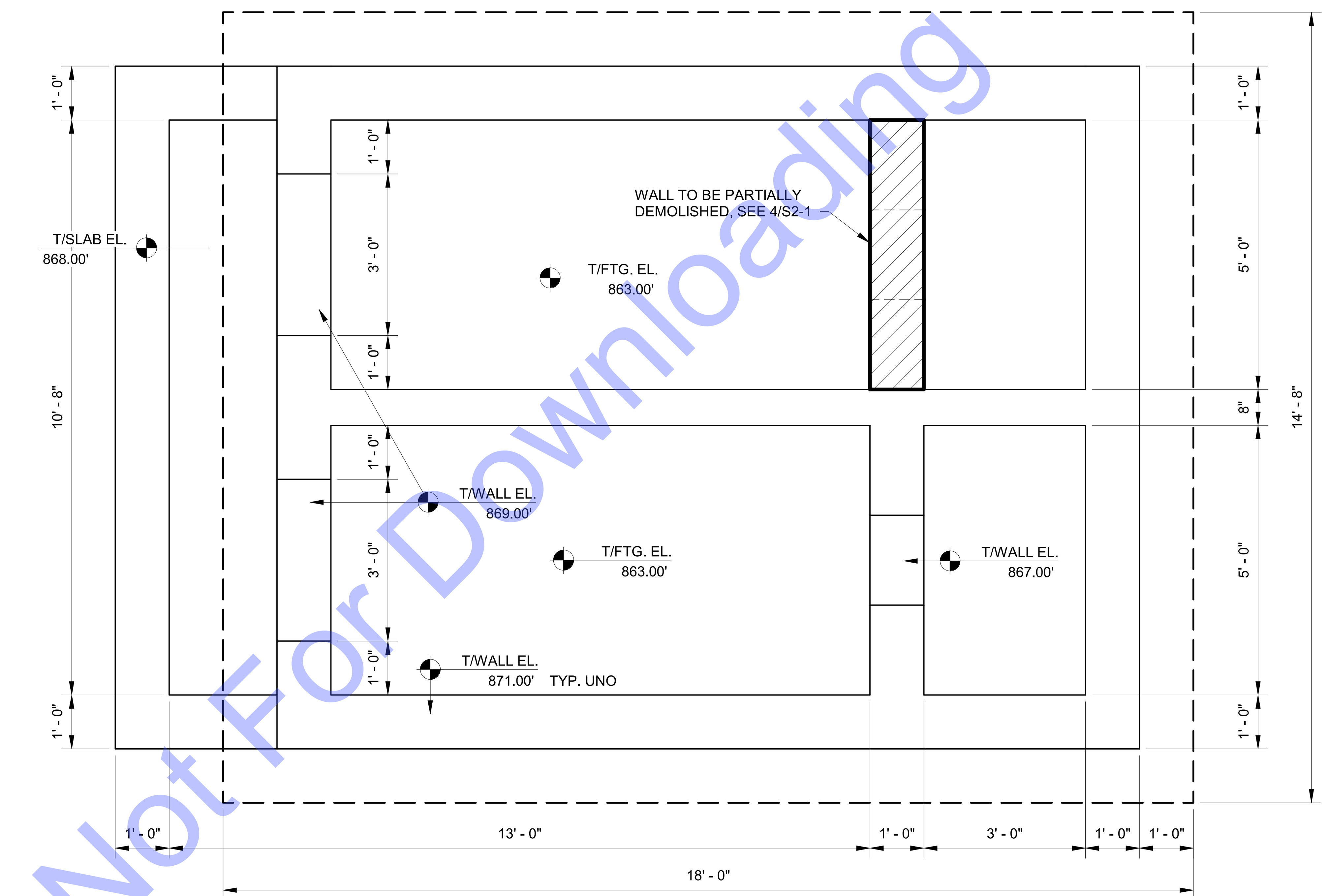
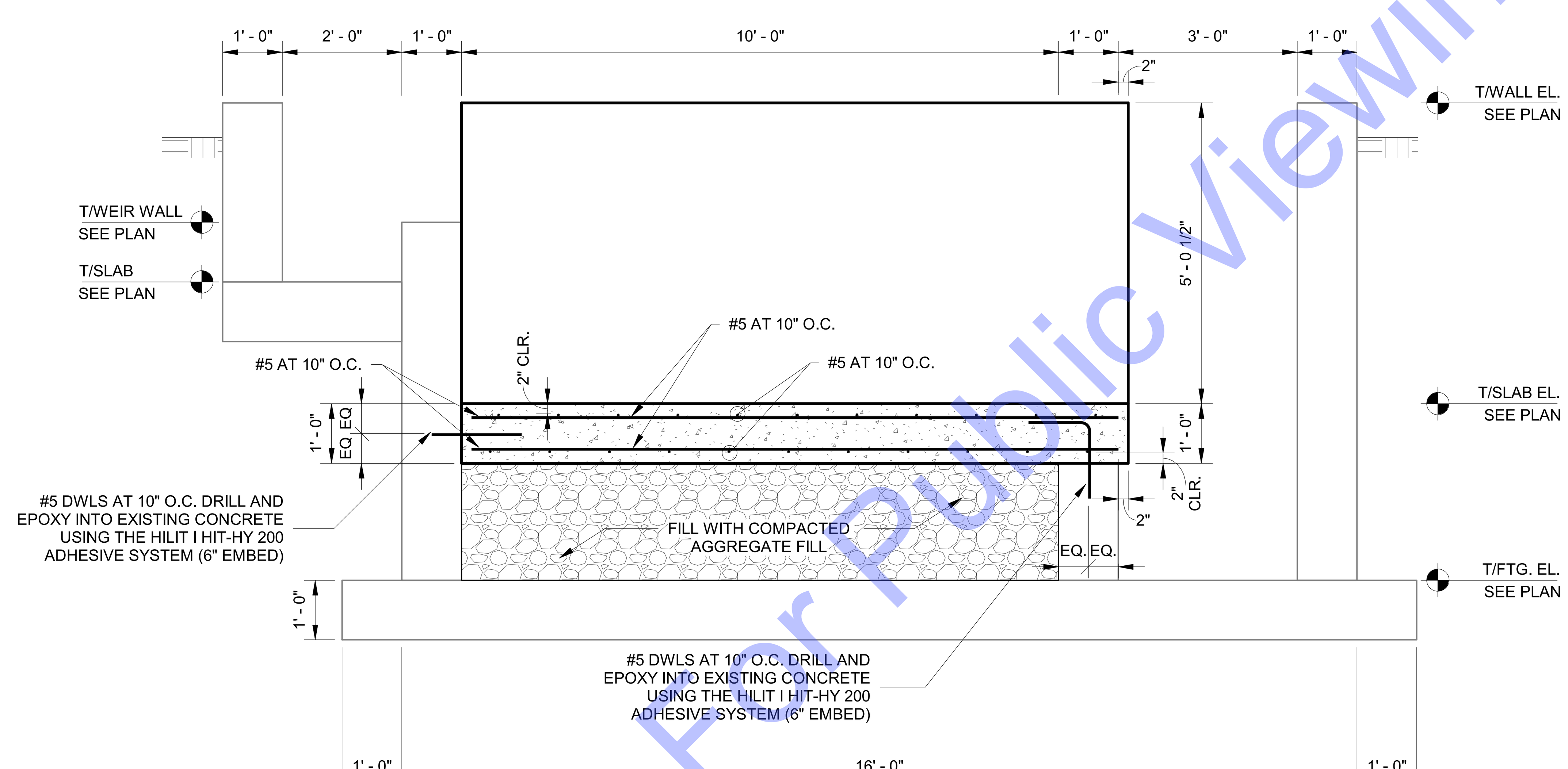


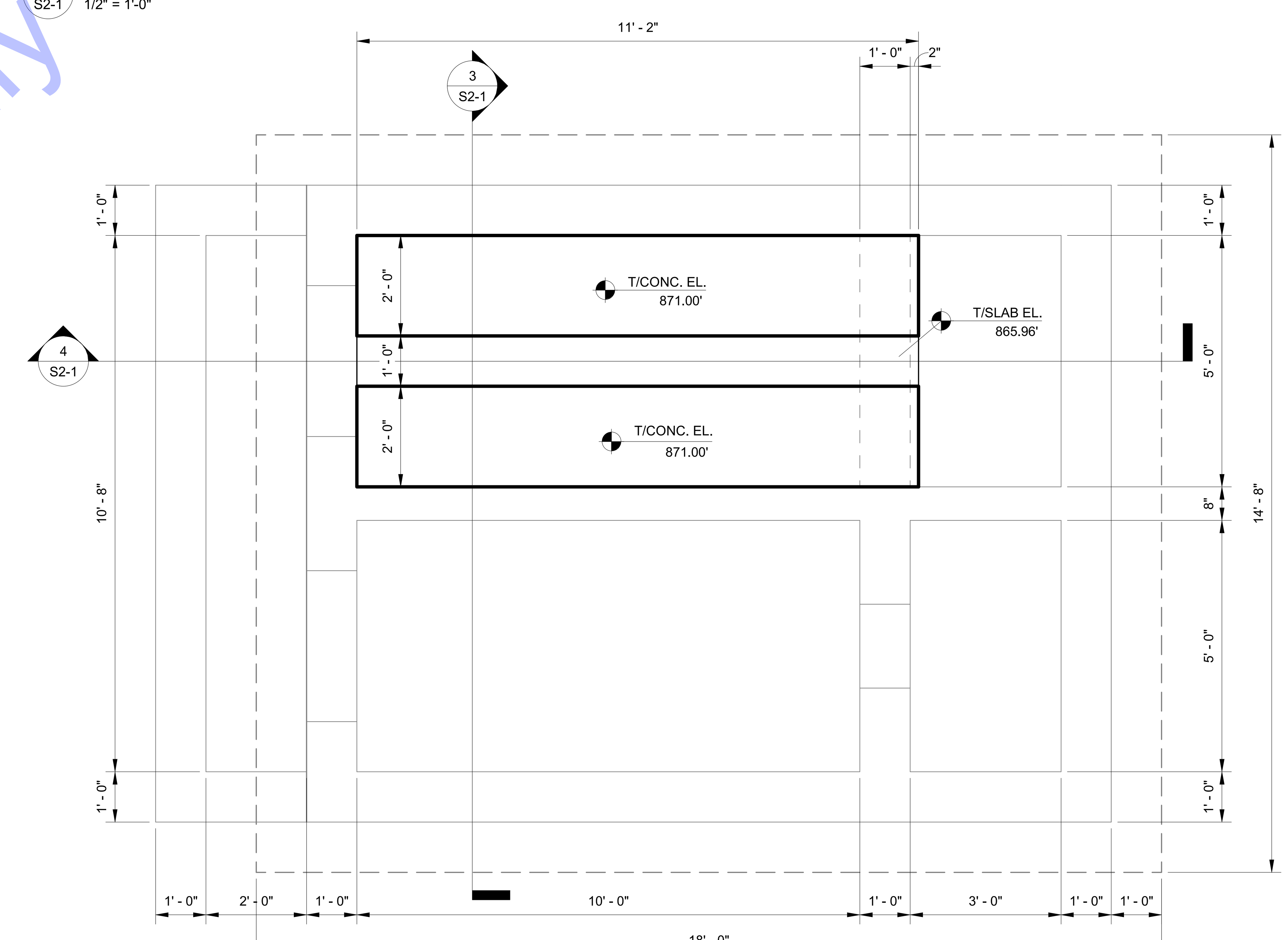
3 SECTION
S2-1 1/2" = 1'-0"



1 CHLORINE CONTACT STRUCTURE DEMOLITION PLAN
S2-1 1/2" = 1'-0"



4 SECTION
S2-1 1/2" = 1'-0"



2 CHLORINE CONTACT STRUCTURE NEW CONSTRUCTION
S2-1 1/2" = 1'-0"

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09/18/2025	25-165	1/2" = 1'-0"

CHLORINE CONTACT STRUCTURE DEMO PLAN, FOUNDATION PLAN, AND SECTIONS

Drawing No:
S2-1