

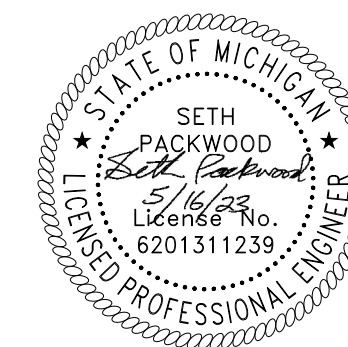
Irontown Substation

504 Peninsula St. Negaunee, MI. 49866

City of Negaunee

Drawing Title	Substation Acronym	Dwg. No.	Revision	Status	Rev Date	Revised Drawing By	Original Drawing By	PSE Issued for Bid	Individually Stamped by Others	Issued for Reference
Substation drawings										
Title Sheet Index	IRT	01-01	0	Bid	5/16/2023		PSE	X		
Site Plan	IRT	02-01	3	Bid	5/16/2023		PSE	X		
Site Survey Plan	IRT	02-02	1	Bid	5/16/2023		Coleman	X		
Grading and Erosion Control Plan	IRT	02-05	1	Bid	4/11/2023		SCS		X	
Grading and Erosion Control Details	IRT	02-06	1	Bid	4/11/2023		SCS		X	
Grading and Erosion Control Details	IRT	02-07	1	Bid	4/11/2023		SCS		X	
Fence Plan	IRT	02-10	0	Bid	5/16/2023		PSE	X		
Fence Details	IRT	02-11	0	Bid	5/16/2023		PSE	X		
Foundation Plan	IRT	03-01	1	Bid	5/16/2023		PSE	X		
Foundation Details	IRT	03-04	0	Bid	5/16/2023		PSE		X	
Foundation Details	IRT	03-05	0	Bid	5/16/2023		PSE		X	
Foundation Details	IRT	03-06	0	Bid	5/16/2023		PSE		X	
Conduit Plan	IRT	03-10	1	Bid	5/16/2023		PSE	X		
Conduit Details	IRT	03-11	0	Bid	5/16/2023		PSE	X		
Grounding Plan	IRT	03-20	1	Bid	5/16/2023		PSE	X		
Grounding Details	IRT	03-21	0	Bid	5/16/2023		PSE	X		
Oil Containment Plan	IRT	03-30	1	Bid	4/11/2023		SCS		X	
Oil Containment Details	IRT	03-31	1	Bid	4/11/2023		SCS		X	
Cable Schedule	IRT	04-01	0	Bid	5/16/2023		PSE	X		
Cable Schedule	IRT	04-02	0	Bid	5/16/2023		PSE	X		
Control Building Plan View	IRT	05-01	3	Bid	5/16/2023		PSE	X		
Control Building Ceiling Plan	IRT	05-02	0	Bid	4/11/2023		PSE	X		
Control Building Elevations	IRT	05-03	0	Bid	4/11/2023		PSE	X		
Control Building Bill of Material	IRT	05-04	0	Bid	4/11/2023		PSE	X		
Overall Plan View	IRT	06-01	1	Bid	5/16/2023		PSE	X		
Plan View	IRT	06-10	2	Bid	5/16/2023		PSE	X		
Profile Views A-A, B-B	IRT	06-11	0	Bid	5/16/2023		PSE	X		
15kV Metering Structure, Elevations C-C	IRT	06-12	0	Bid	5/16/2023		PSE	X		
Feeder Bay Elevation D-D	IRT	06-13	0	Bid	5/16/2023		PSE	X		
Feeder Bay Elevation E-E	IRT	06-14	0	Bid	5/16/2023		PSE	X		
Typical Riser Structure	IRT	06-15	0	Bid	5/16/2023		PSE	X		
Bill of Material	IRT	06-20	0	Bid	5/16/2023		PSE	X		
Bill of Material	IRT	06-21	0	Bid	5/16/2023		PSE	X		
Bill of Material	IRT	06-22	0	Bid	5/16/2023		PSE	X		
1-Line Diagram	IRT	10-02	2	Bid	5/16/2023		PSE	X		
3-Line Diagram Sht. 1 of 2	IRT	11-10	2	Bid	5/16/2023		PSE	X		
3-Line Diagram Sht. 2 of 2	IRT	11-11	2	Bid	5/16/2023		PSE	X		
3-Line Diagram Sht. 1 of 2	IRT	11-20	2	Bid	5/16/2023		PSE	X		
3-Line Diagram Sht. 2 of 2	IRT	11-21	2	Bid	5/16/2023		PSE	X		
AC Panel Wiring	IRT	19-01	1	Bid	5/16/2023		PSE	X		
DC Panel Wiring	IRT	19-02	0	Bid	5/16/2023		PSE	X		
RP1 Relay Panel Layout	IRT	22-01	0	Bid	5/16/2023		PSE	X		
RP1 Relay Panel Wiring	IRT	22-02	0	Bid	5/16/2023		PSE	X		
RP2 Relay Panel Layout	IRT	22-03	0	Bid	5/16/2023		PSE	X		
RP2 Relay Panel Wiring	IRT	22-04	0	Bid	5/16/2023		PSE	X		

Drawing Title	Substation Acronym	Dwg. No.	Revision	Status	Rev Date	Revised Drawing By	Original Drawing By	PSE Issued for Record	Individually Stamped by Others	Issued for Reference



PRELIMINARY
NOT FOR
CONSTRUCTION

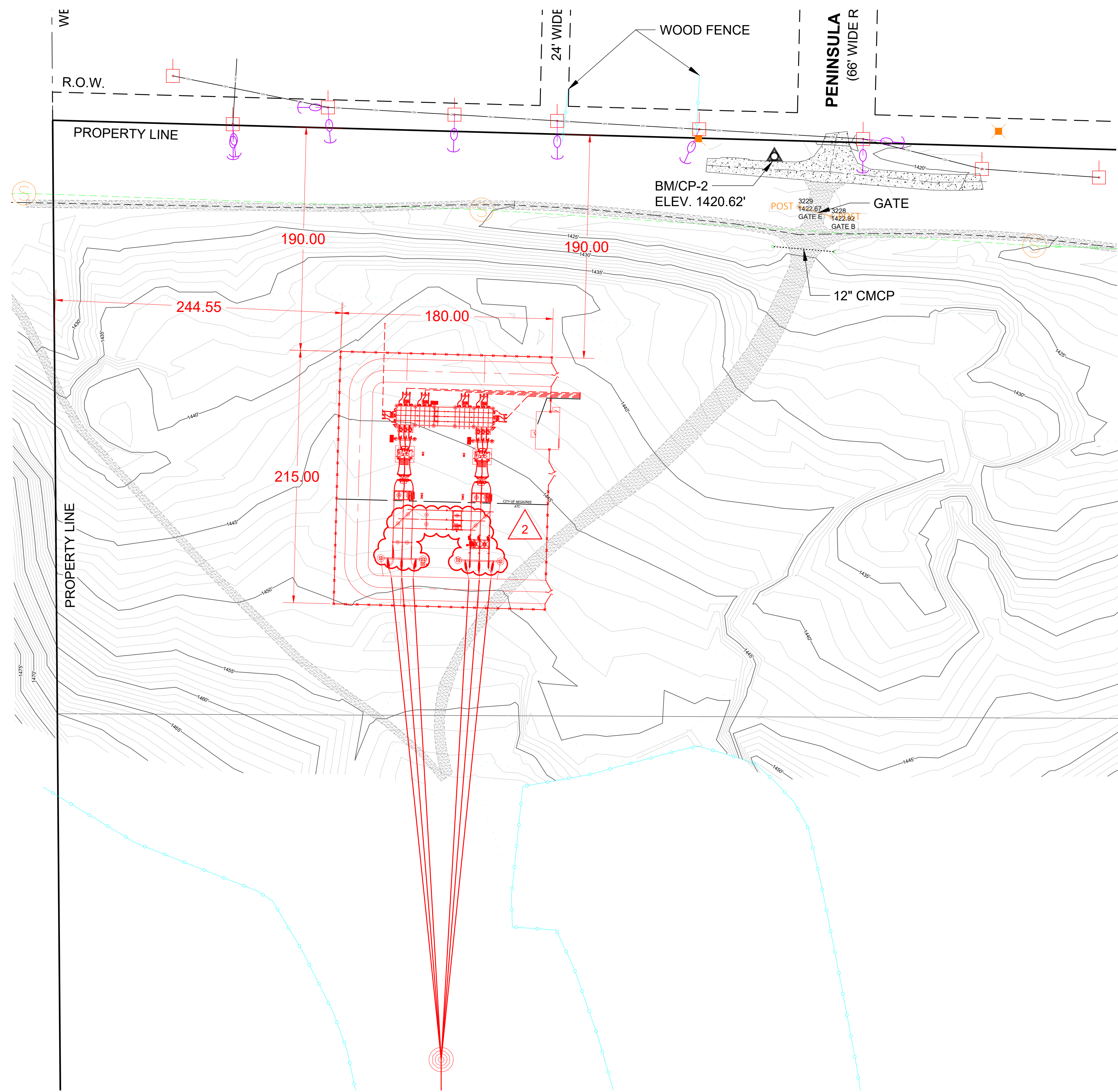
				PSE Power System Engineering, Inc. www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8995		TITLE SHEET INDEX IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI			
0	ISSUED FOR BID	GB	NH	05/16/2023	ENGR. N. HALL	CHIEF/APPD. S. PACKWOOD	SCALE NONE	PROJECT NO. M10592107	DRAWING NO. 01-01
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 12/28/2022	FILE NAME IRT-01-01		

TOPOGRAPHIC SURVEY

PREPARED FOR: POWER SYSTEM ENGINEERING, INC.

PART OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER
(SW 1/4 X SW 1/4) OF SECTION 6, TOWNSHIP 47 NORTH, RANGE 26 WEST,
CITY OF NEGAUNEE, MARQUETTE COUNTY, MICHIGAN

Bearings are referenced to Grid North NAD83 Michigan
State Plane, North Zone (2111). Elevation is referenced to
NAVD88.



LEGEND

- = POWER POLE
- = BENCHMARK / CONTROL POINT
- = TELEPHONE PEDESTAL
- = GUY ANCHOR
- = POST
- = EDGE OF ASPHALT
- = EDGE OF CRUSHED AGGREGATE
- = SANITARY CLEANOUT
- = CORRUGATED METAL CULVERT PIPE
- = TREELINE
- = CHAIN LINK FENCE
- = SANITARY FORCEMAIN
- = ROAD CENTERLINE
- = OVERHEAD ELECTRIC
- = UNDERGROUND TELEPHONE
- = MAJOR CONTOUR (5' INTERVAL)
- = MINOR CONTOUR (1' INTERVAL)
- = PROPERTY BOUNDARY (SEE BOUNDARY SURVEY)

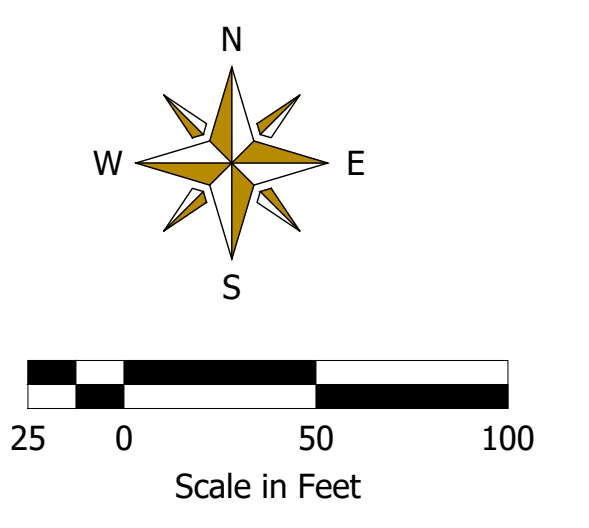
** UTILITIES LOCATED BASED ON A MISS DIG ONE-CALL UTILITY LOCATE
UTILITY LOCATIONS SHOULD BE FIELD VERIFIED BEFORE ANY EXCAVATION OR CONSTRUCTION

NOTES:

1. See drawing 02-02 for original property and topographic survey information.
2. American Transmission Company (ATC) is providing the design for the 138 kV Transmission Line and Substation loop through. A point of ownership line for the above grade structures and foundations is shown on the plan view.
3. Installation contractor to call in all locates for construction purposes.
4. Negaunee is the owner
ATC is American Transmission Company
Substation Material Packager TBD
Construction/Installation Contractor TBD
Distribution Line Contractor TBD

REV CLOUD LEGEND
 = REVISION CLOUD FOR ATC W.O. #605015

**PRELIMINARY
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CONSTRUCTION**



				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		SITE PLAN IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
3	ISSUED FOR BID	GB	NH	5/16/2023					
2	ISSUED FOR REVIEW - ATC W.O. #605015	KAW	JWS	03-22-23					
1	ISSUED FOR REVIEW	GB	NH	02/21/2023					
NO. REVISION AND RECORD OF ISSUE		BY	ENGR.	DATE	ENGR.	DATE	SCALE	PROJECT NO.	DRAWING NO.
		G. BODENSTEIN		8/10/2022		8/10/2022	1" = 50'-0"	M10592107	02-01

TOPOGRAPHIC SURVEY

PREPARED FOR: POWER SYSTEM ENGINEERING, INC.

PART OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER
(SW 1/4 X SW 1/4) OF SECTION 6, TOWNSHIP 47 NORTH, RANGE 26 WEST,
CITY OF NEGAUNEE, MARQUETTE COUNTY, MICHIGAN

Bearings are referenced to Grid North NAD83 Michigan
State Plane, North Zone (2111). Elevation is referenced to
NAVD88.



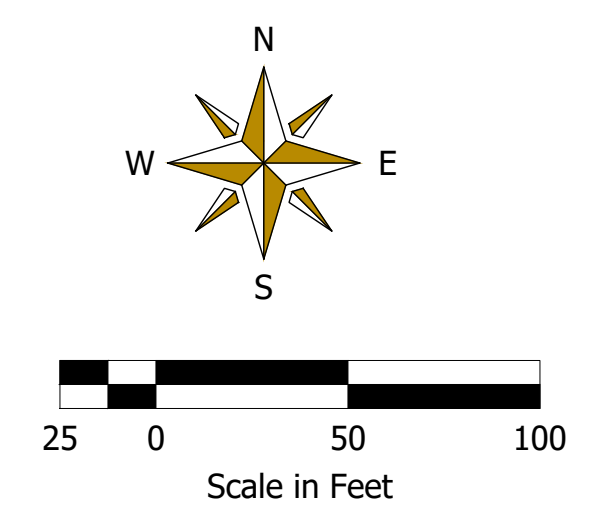
LEGEND

	= POWER POLE		= TREELINE
	= BENCHMARK / CONTROL POINT		= CHAIN LINK FENCE
	= TELEPHONE PEDESTAL		= SANITARY FORCEMAIN
	= GUY ANCHOR		= ROAD CENTERLINE
	= POST		= OVERHEAD ELECTRIC
	= EDGE OF ASPHALT		= UNDERGROUND TELEPHONE
	= EDGE OF CRUSHED AGGREGATE		= MAJOR CONTOUR (5' INTERVAL)
	= SANITARY CLEANOUT		= MINOR CONTOUR (1' INTERVAL)
	= CORRUGATED METAL CULVERT PIPE		= PROPERTY BOUNDARY (SEE BOUNDARY SURVEY)

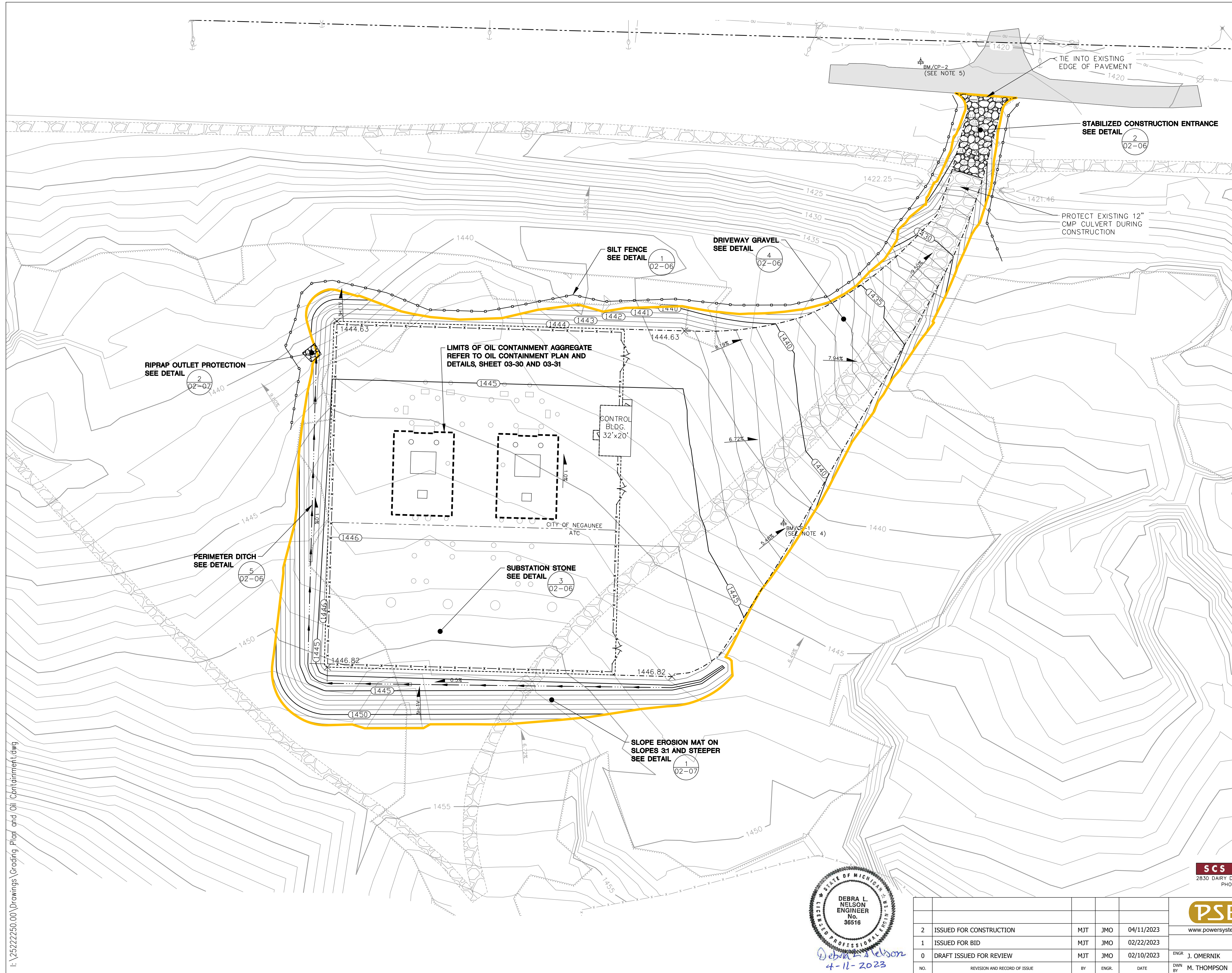
** UTILITIES LOCATED BASED ON A MISS DIG ONE-CALL UTILITY LOCATE
UTILITY LOCATIONS SHOULD BE FIELD VERIFIED BEFORE ANY EXCAVATION OR CONSTRUCTION

NOTES:
1. The survey information was prepared by Coleman Engineering Company (Coleman drawing #220452_Final.Dwg). The data was transferred to this drawing (02-02) for reference within the overall drawing packet.

**PRELIMINARY
NOT FOR
CONSTRUCTION**



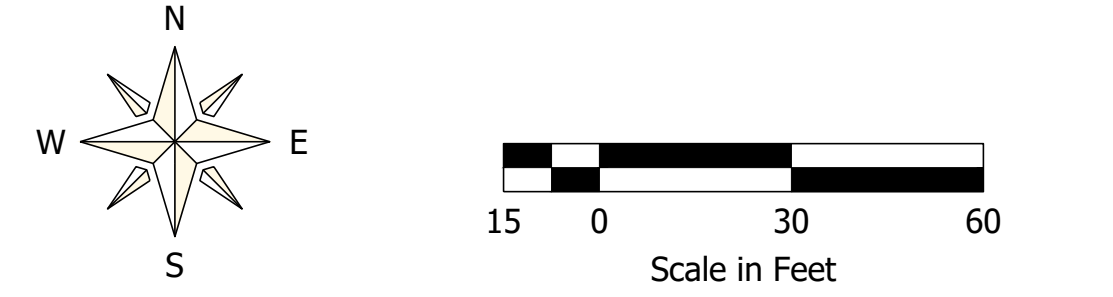
				Power System Engineering, Inc. 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		SITE SURVEY PLAN IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI			
1	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHK'D	---	
0	ISSUED FOR REVIEW - ATC W.O. #605015	KAW	JWS	03-22-23	DWN	G. BODENSTEIN	DATE	8/10/2022	
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	FILE NAME	IRT-02-02	PROJECT NO.	MI0592107	
						SCALE	1" = 50'-0"	DRAWING NO.	02-02



LEGEND

- 1425 — EXISTING GRADE (5' CONTOUR)
- 1425 — EXISTING GRADE (1' CONTOUR)
- - - - - PROPERTY LINE
- ▬ EXISTING PAVED ROAD
- ▬ EXISTING PATH/TRAIL
- x - x - x - EXISTING FENCE
- ▬ EXISTING TREELINE
- OH — EXISTING OVERHEAD ELECTRIC
- T — EXISTING TELEPHONE
- C — EXISTING CULVERT
- 1422.25 X EXISTING CULVERT INLET ELEVATION
- 1.0% EXISTING SLOPE
- x EXISTING TELEPHONE PEDESTAL
- ⊕ EXISTING GUY WIRE ANCHOR
- ⊙ EXISTING POWER POLE
- ▲ BENCHMARK/CONTROL POINT
- ▭ PROPOSED FOUNDATION
- x - x - x - PROPOSED FENCE
- - - - - PROPOSED NEW DRIVEWAY GRAVEL
- - - - - PROPOSED LIMITS OF SUBSTATION GRAVEL
- - - - - PROPOSED LIMITS OF OIL CONTAINMENT AGGREGATE
- 1.0% PROPOSED SLOPE
- 1440 PROPOSED GRADE (5' CONTOUR)
- 1440 — PROPOSED GRADE (1' CONTOUR)
- 1430.00 X PROPOSED SPOT ELEVATION
- ▬ PROPOSED LIMITS OF DISTURBANCE
- ▬ PROPOSED DITCH
- ○ ○ ○ PROPOSED SILT FENCE

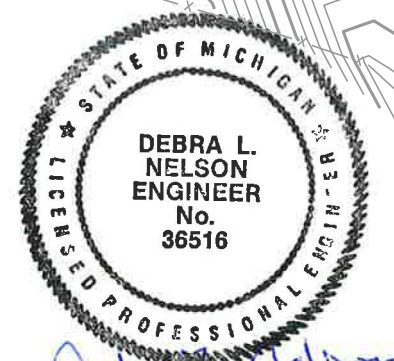
- NOTES**
1. EXISTING SITE FEATURES AND TOPOGRAPHY FROM TOPOGRAPHIC SURVEY BY COLEMAN ENGINEERING COMPANY DATED 7/25/2022.
 2. PROPOSED FOUNDATIONS FROM ISSUED FOR BID FOUNDATION PLAN, DRAWING 03-01 BY PSE DATED 04/04/2023.
 3. SEE GRADING AND EROSION CONTROL PLAN DETAILS (SHEET 02-06 AND 02-07) FOR ADDITIONAL REQUIREMENTS.
 4. BM/CP-1 ELEVATION = 1441.66', NORTHING = 624321.6, EASTING = 26092696.6
 5. BM/CP-2 ELEVATION = 1420.62', NORTHING = 624613.6, EASTING = 26092783.3
 6. BENCHMARKS ARE REFERENCED TO GRID NORTH NAD83 MICHIGAN STATE PLANE, NORTH ZONE. ELEVATION IS REFERENCED FOR NAVD88.



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 2830 DAIRY DRIVE MADISON, WI 53718-6751
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 www.powersystem.org 2424 Rimrock Rd, Suite 300
 Madison, WI 53713
 Tel: 866.825.8995

**GRADING AND EROSION CONTROL PLAN
 IRONTOWN SUBSTATION
 CITY OF NEGAUNEE, MI**



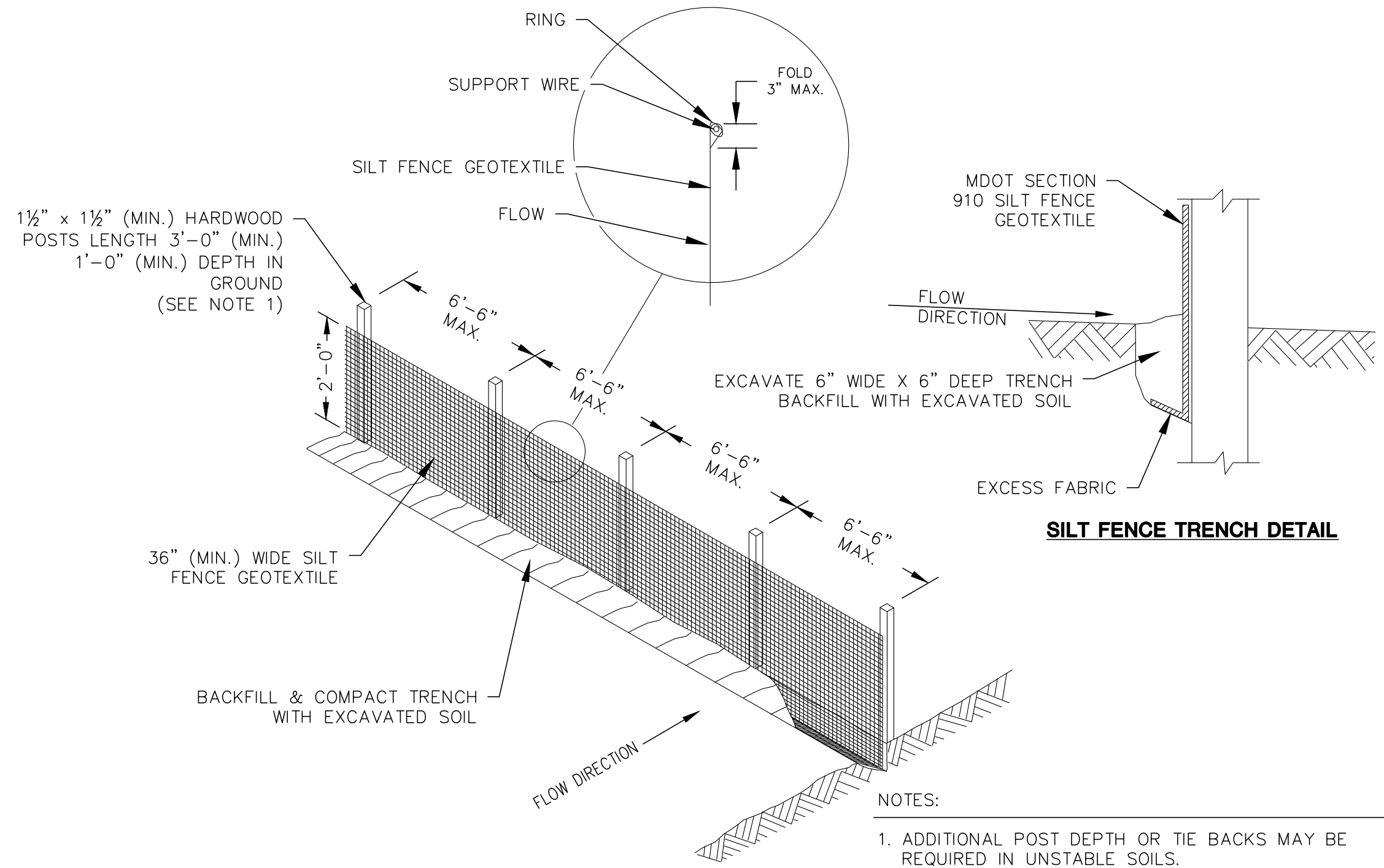
Debra L. Nelson
 4-11-2023

NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE
2	ISSUED FOR CONSTRUCTION	MJT	JMO	04/11/2023
1	ISSUED FOR BID	MJT	JMO	02/22/2023
0	DRAFT ISSUED FOR REVIEW	MJT	JMO	02/10/2023

ENGR. J. OMERNIK
 M. THOMPSON
 DATE 04/11/2023

SCALE 1" = 30'
 FILE NAME IRT-02-05
 PROJECT NO. MI0592107
 DRAWING NO. 02-05

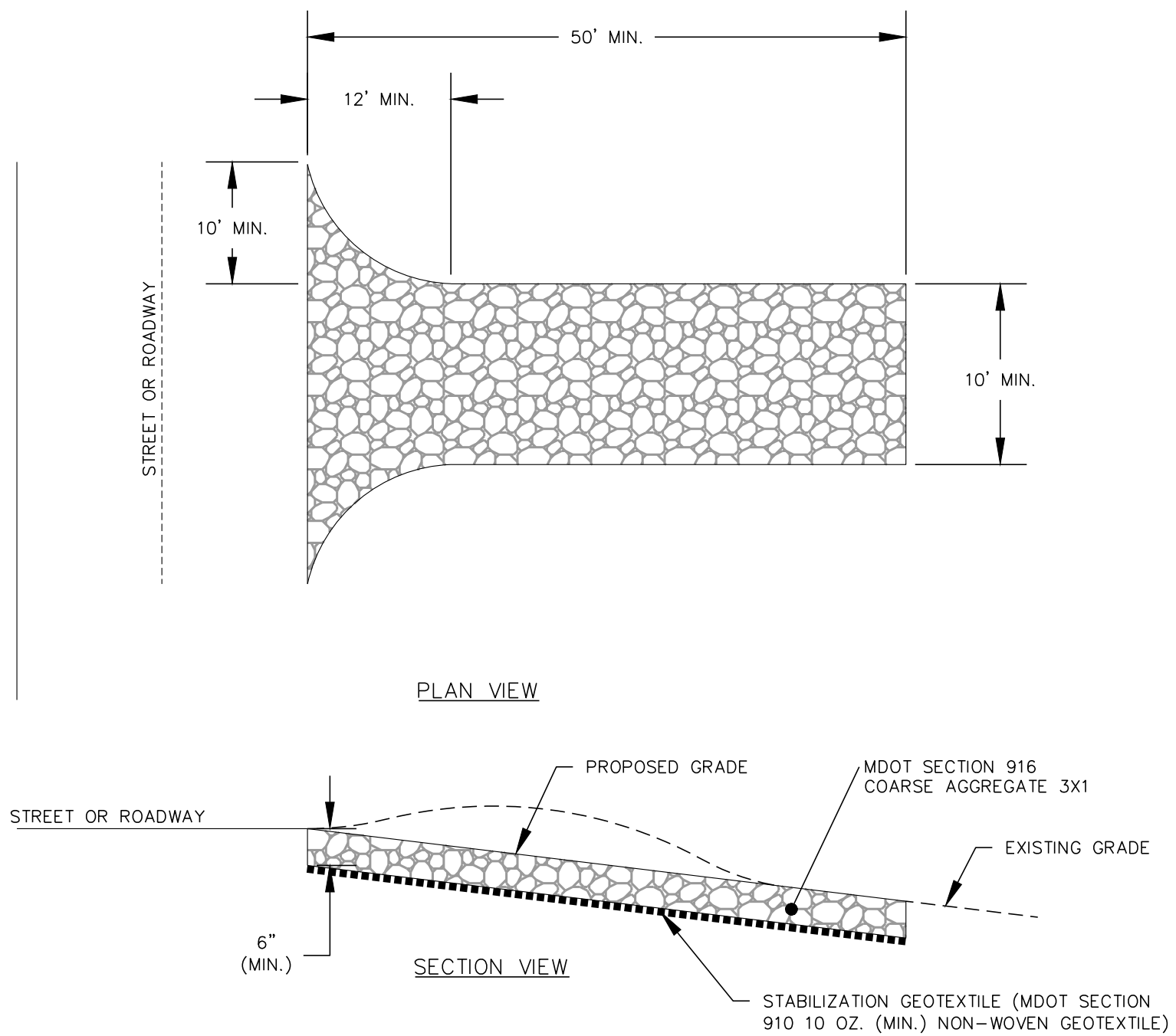
I:\25222250.00\Drawings\Grading Plan and Oil Containment.dwg



SILT FENCE TRENCH DETAIL

- NOTES:
1. ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS.
 2. ATTACH THE FABRIC TO THE POSTS WITH WIRE STAPLES OR WOODEN LATH AND NAILS.
 3. CONSTRUCT SILT FENCE FROM A CONTINUOUS ROLL IF POSSIBLE BY CUTTING LENGTHS TO AVOID JOINTS. IF A JOINT IS NECESSARY, OVERLAP THE END POSTS AND TWIST OR ROTATE, AT LEAST 180 DEGREES.
 4. TURN END POSTS 360 DEGREES SO THAT FABRIC SURROUNDS THE POSTS.

1
02-06
SILT FENCE
NOT TO SCALE



PLAN VIEW

SECTION VIEW

2
02-06
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

GRADING AND EROSION CONTROL NOTES

COMPLY WITH THE BID DOCUMENTS AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, LATEST EDITION.

SEE SPECIFICATIONS FOR ADDITIONAL SITE WORK REQUIREMENTS.

DO NOT EXTEND WORK, STOCKPILE MATERIAL, ETC. BEYOND PROPERTY/EASEMENT LIMITS UNLESS PRIOR APPROVAL IS GIVEN BY ENGINEER.

EROSION CONTROL IS THE RESPONSIBILITY OF THE CONTRACTOR DURING CONSTRUCTION AND UNTIL ACCEPTANCE OF THIS PROJECT BY THE OWNER. EROSION AND SEDIMENT CONTROL MEASURES, AS SHOWN ON THE DRAWINGS, ARE THE MINIMUM PRECAUTIONS REQUIRED. INSTALL ADDITIONAL EROSION CONTROL MEASURES DETERMINED NECESSARY, OR AS REQUESTED BY THE LOCAL INSPECTOR OR THE ENGINEER, WITHIN 24 HOURS.

INSTALL EROSION CONTROLS PRIOR TO LAND DISTURBING ACTIVITIES AND PROPERLY MAINTAIN THROUGHOUT CONSTRUCTION UNTIL VEGETATION IS ESTABLISHED.

INSPECT EROSION CONTROL MEASURES AND STRUCTURES SERVING THE SITE BY A CERTIFIED STORM WATER OPERATOR AT LEAST WEEKLY AND WITHIN 24 HOURS AFTER PRECIPITATION EVENTS THAT RESULTS IN A DISCHARGE FROM THE SITE. CARRY OUT CORRECTIVE ACTIONS, AS NEEDED. MAINTAIN A LOG OF INSPECTIONS AND CORRECTIVE ACTIONS AND PROVIDE TO OWNER AT PROJECT COMPLETION.

STRIP VEGETATION AND TOPSOIL FROM THE SITE WITHIN THE PROPOSED CONSTRUCTION AREA AS REQUIRED TO COMPLETE THE WORK. DO NOT DISTURB AREAS OUTSIDE THE PROPERTY/EASEMENT LINE UNLESS SPECIFICALLY IDENTIFIED. PROPERLY DISPOSE OF EXCESS MATERIALS OFFSITE OR AS DIRECTED BY OWNER.

REMOVE MATERIAL TRACKED ONTO PUBLIC ROADS BY STREET CLEANING (NOT FLUSHING) BEFORE THE END OF EACH WORKDAY.

FOR THE FIRST SIX WEEKS AFTER THE INITIAL SITE STABILIZATION OF VEGETATED AREAS, PROVIDE PROVISIONS FOR WATERING WHENEVER MORE THAN 7 DAYS OF DRY WEATHER ELAPSE.

STABILIZE SOIL STOCKPILES THAT ARE INACTIVE FOR MORE THAN 7 CONSECUTIVE DAYS WITH SEED AND MULCH, EROSION MAT, POLYMER, OR COVERED WITH TARPS OR SIMILAR TO PREVENT OR REDUCE THE DISCHARGE OF SEDIMENT ERODING FROM THE STOCKPILE.

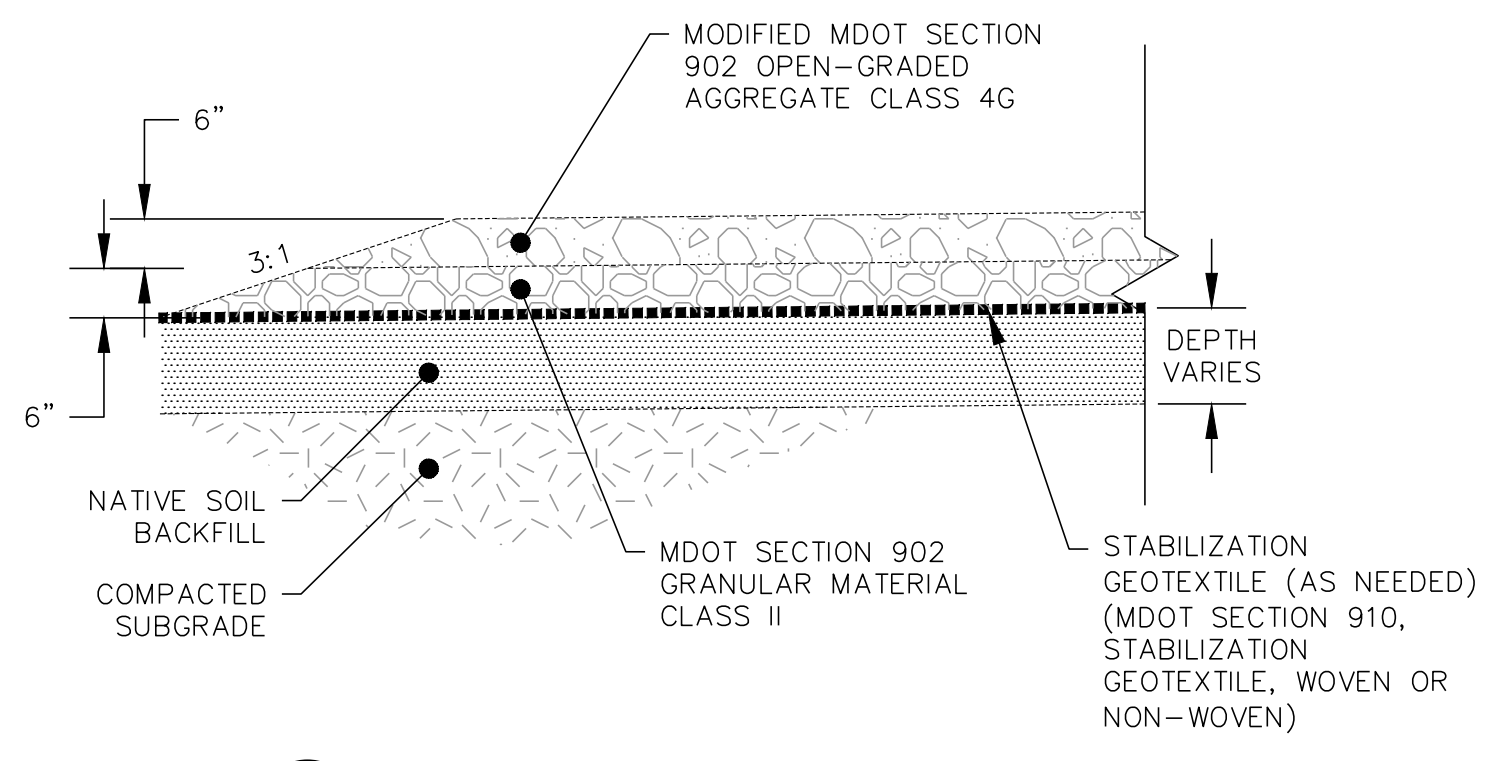
PROVIDE TEMPORARY STABILIZATION MEASURES WHEN LAND DISTURBING CONSTRUCTION ACTIVITIES HAVE TEMPORARILY CEASED AND WILL NOT RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS. TEMPORARY STABILIZATION MAY INCLUDE TEMPORARY SEEDING OR MULCHING. APPLY TEMPORARY SEED IN ACCORDANCE WITH THE MDOT STANDARD SPECIFICATIONS.

SUBGRADE WITHIN THE SUBSTATION FENCE SHALL BE GRADED TO DRAIN. MAINTAIN MINIMUM DEPTHS OF COVER FOR CONDUIT AND GROUNDING.

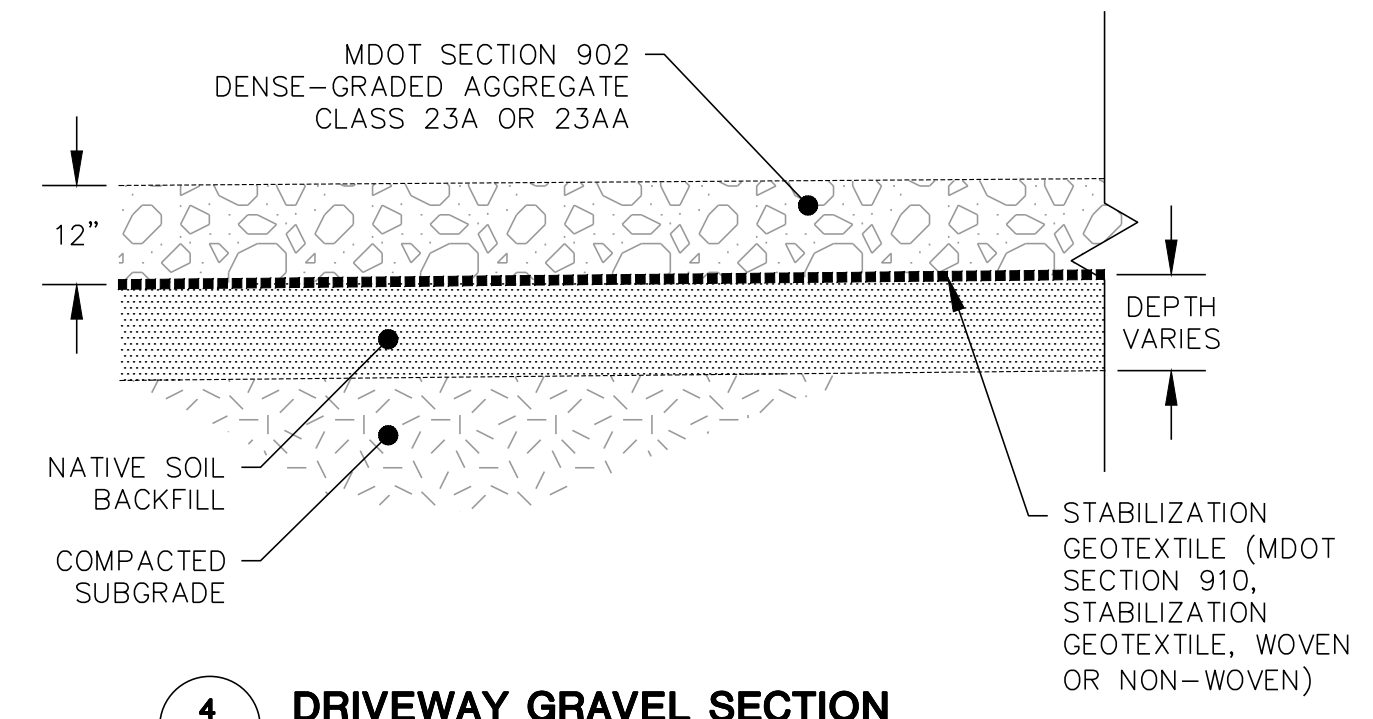
PROPOSED GRADES SHOWN ARE FINISH GRADES. SUBGRADE WITHIN THE SUBSTATION FENCE IS 1-FOOT BELOW FINISHED GRADE. USE OIL CONTAINMENT AGGREGATE WITHIN OIL CONTAINMENT AREAS AND LIMITS SHOWN ON OIL CONTAINMENT PLAN.

GRADING MAY BE REQUIRED IN STAGES SUCH AS ROUGH GRADING AND FINISH GRADING (AFTER FOUNDATIONS, CONDUIT, AND GROUNDING HAVE BEEN INSTALLED) TO PLACE BASE GRANULAR MATERIALS.

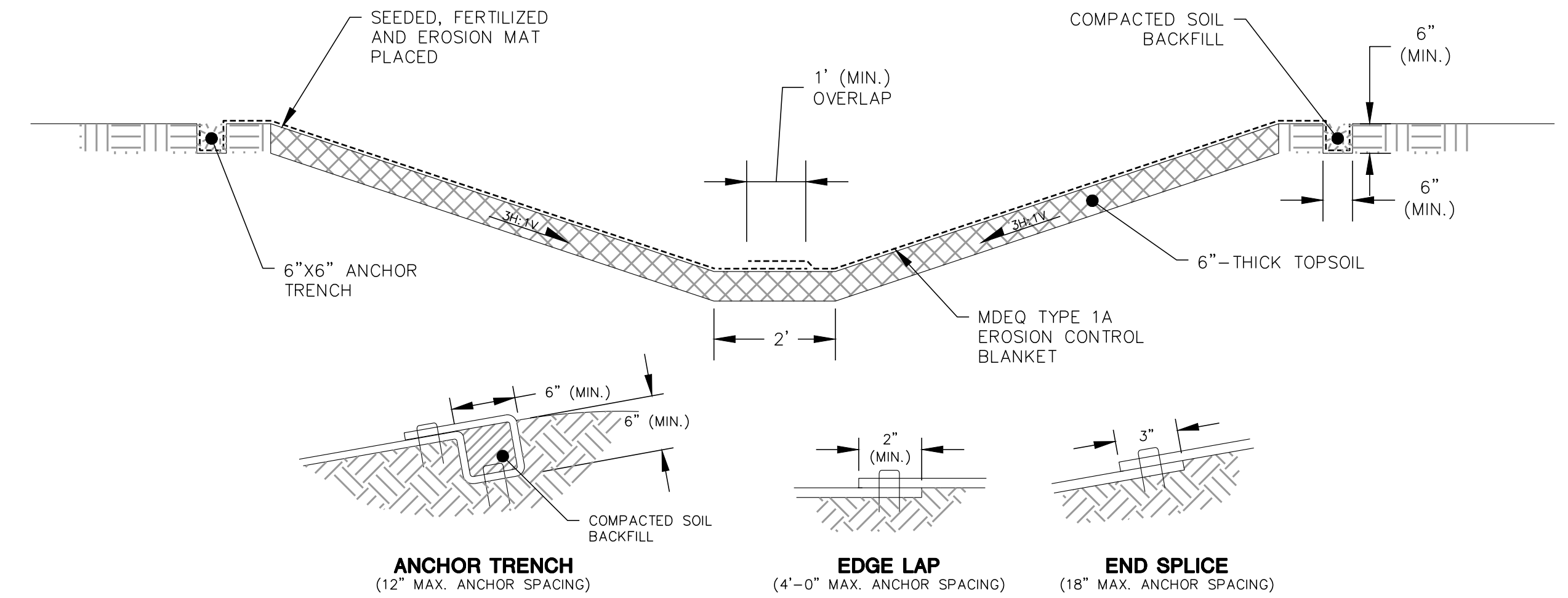
DISTURBED AREAS (EXCEPT ROADS AND STONE TRACKING PAD) SHALL BE RESTORED WITH 4 INCHES (MIN.) SALVAGED TOPSOIL/TOPSOIL, SEEDING (MDOT SEED MIXTURE CR, TSM 6/24 OR TSM 24+ AS DIRECTED BY OWNER), FERTILIZER (MDOT SECTION 917), AND MULCHING (MDOT SECTION 816).



3
02-06
SUBSTATION STONE SECTION
NOT TO SCALE



4
02-06
DRIVEWAY GRAVEL SECTION
NOT TO SCALE



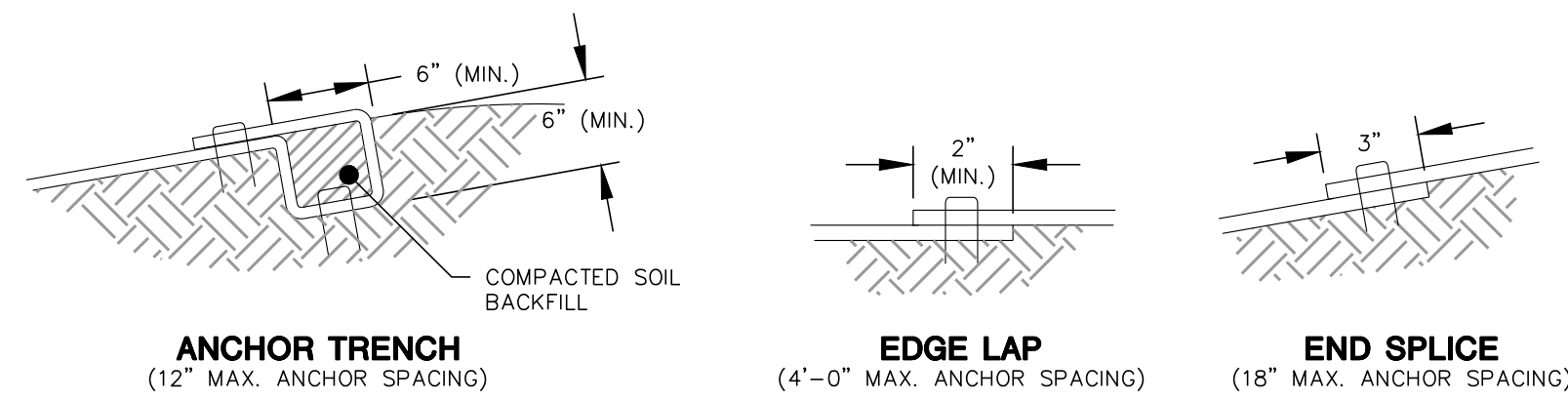
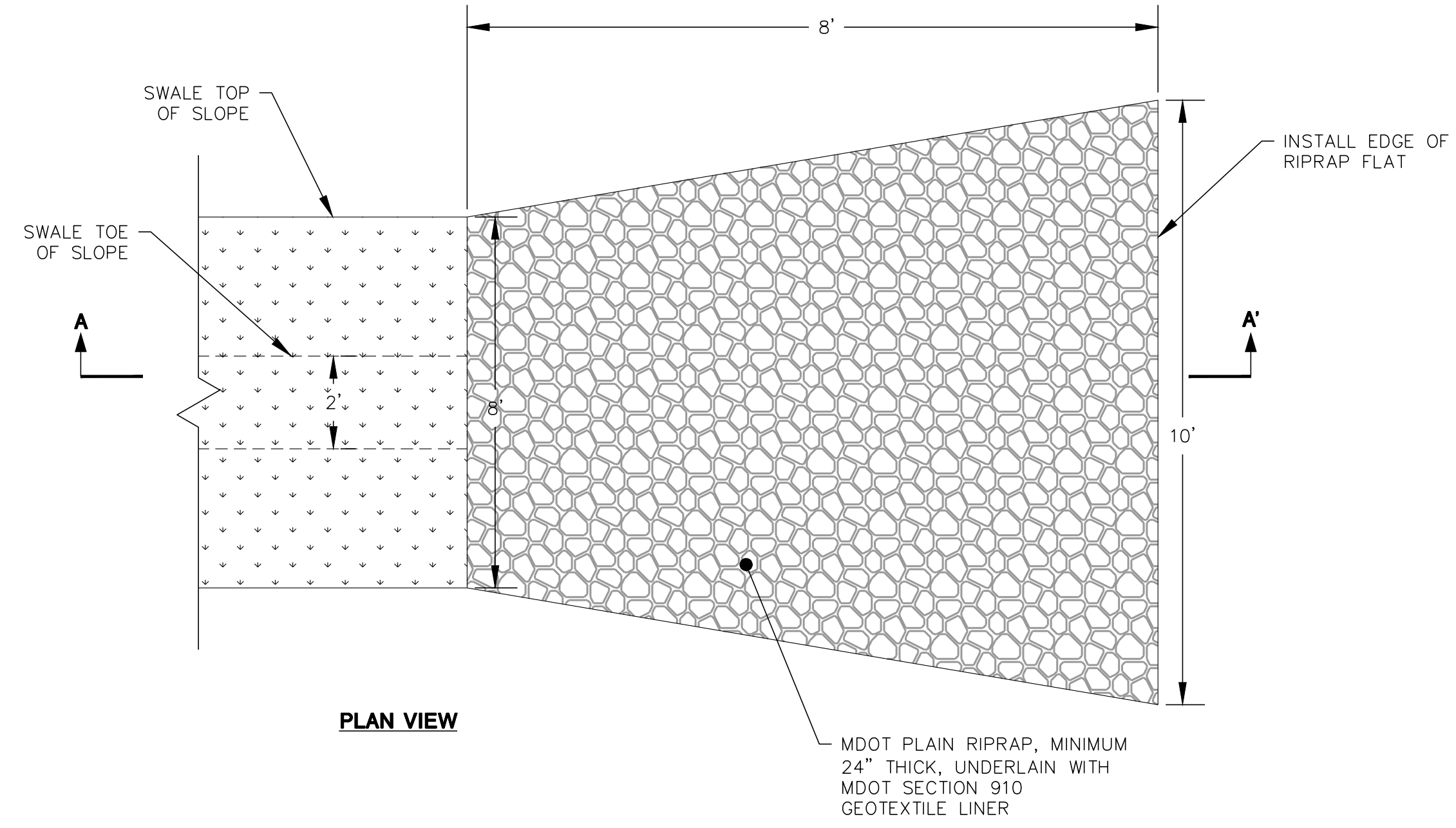
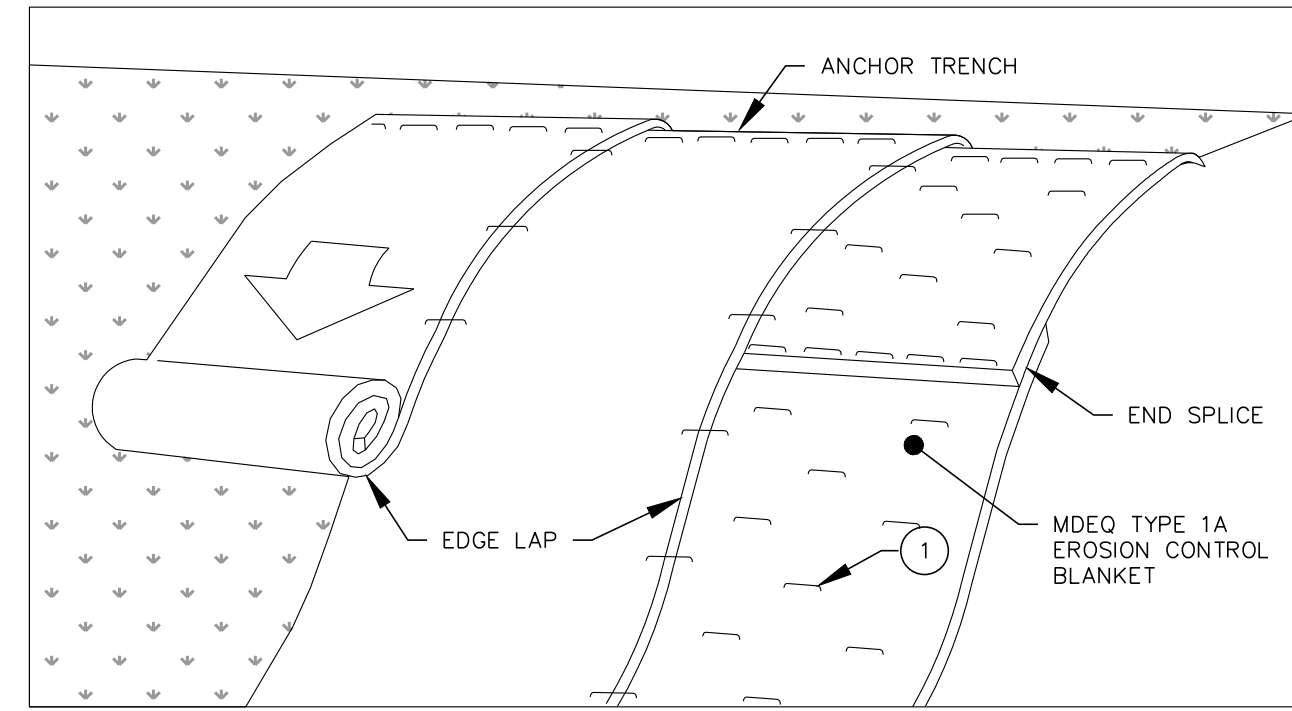
5
02-06
PERIMETER DITCH
NOT TO SCALE

- NOTES:
1. SECURE BLANKET TO GROUND ACCORDING TO MANUFACTURER'S RECOMMENDED ANCHORING PATTERN.
 2. STAGGER END SPLICE ON ADJACENT STRIPS OF MATTING A MINIMUM OF 4 FEET (1.219 M) APART.
 3. IMPRESS EDGES OF THE EROSION CONTROL BLANKET INTO THE SOIL.
 4. INSTALL EROSION CONTROL BLANKET OVER SEEDING AND FERTILIZER.



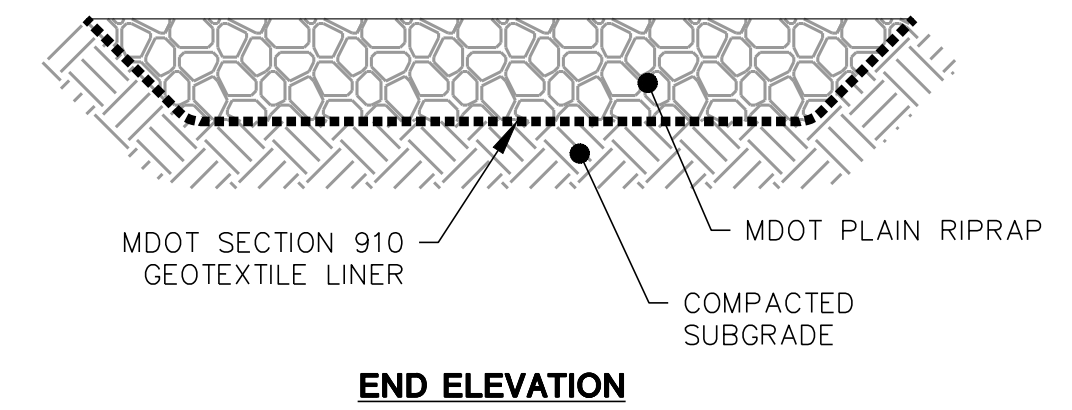
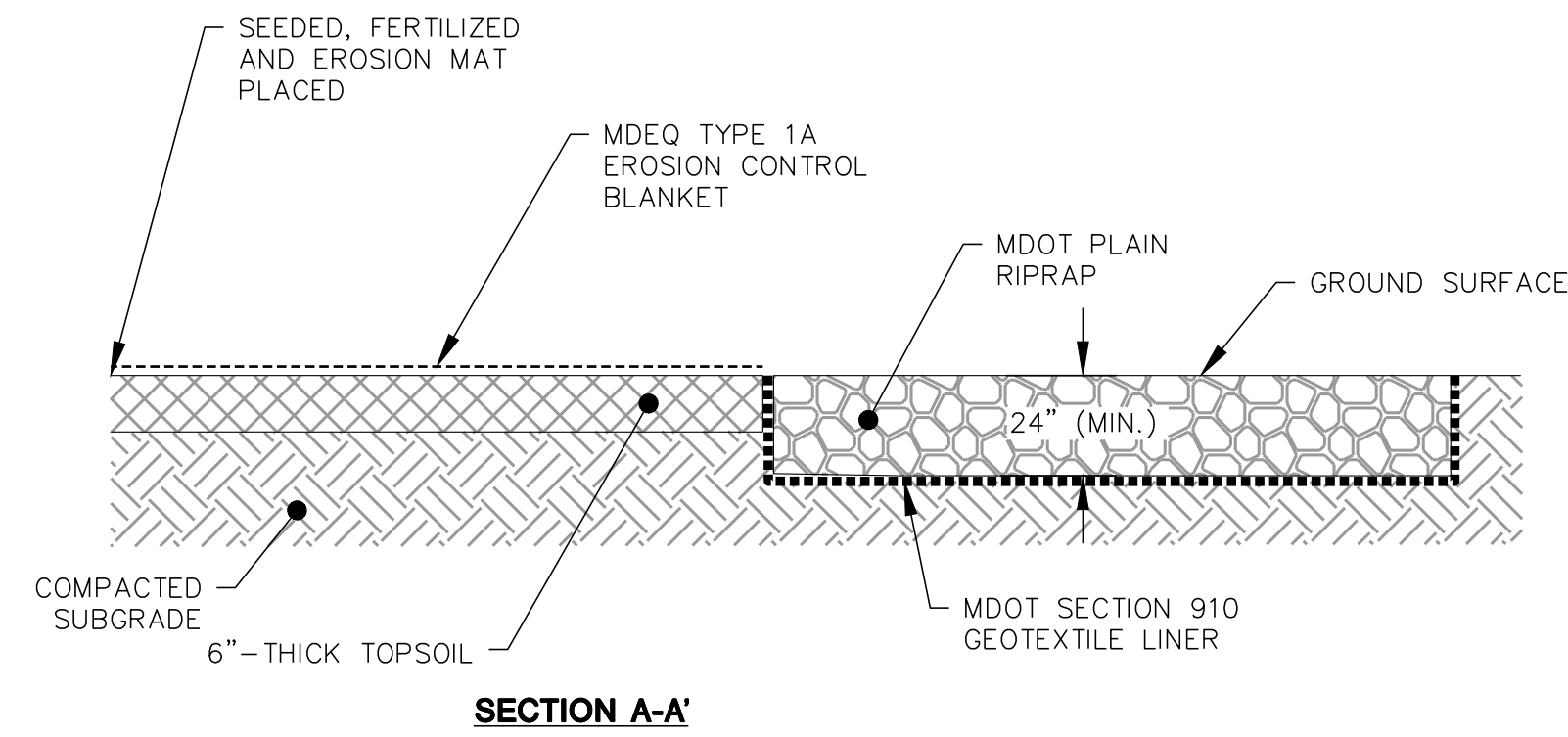
Debra L. Nelson
4-11-2023
SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

				PSE Power System Engineering, Inc.		GRADING AND EROSION CONTROL DETAILS	
				www.powersystem.org		IRONTOWN SUBSTATION	
				2424 Rimrock Rd, Suite 300		CITY OF NEGAUNEE, MI	
				Madison, WI 53713			
				Tel: 866.825.8895			
2	ISSUED FOR CONSTRUCTION	MJT	JMO	04/11/2023	ENGR. J. OMERNIK	CRKT/APPD. D. NELSON	SCALE NOT TO SCALE
1	ISSUED FOR BID	MJT	JMO	02/22/2023	DWN BY M. THOMPSON	DATE 04/11/2023	PROJECT NO. MI0592107
0	DRAFT ISSUED FOR REVIEW	MJT	JMO	02/10/2023	FILE NAME IRT-02-06		DRAWING NO. 02-06
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE			



- NOTES:**
1. SECURE BLANKET TO GROUND ACCORDING TO MANUFACTURER'S RECOMMENDED ANCHORING PATTERN.
 2. STAGGER END SPLICE ON ADJACENT STRIPS OF MATTING A MINIMUM OF 4 FEET (1.219 M) APART.
 3. IMPRESS EDGES OF THE EROSION CONTROL BLANKET INTO THE SOIL.
 4. INSTALL EROSION CONTROL BLANKET OVER SEEDING AND FERTILIZER.

1
02-07
SLOPE EROSION MAT
NOT TO SCALE

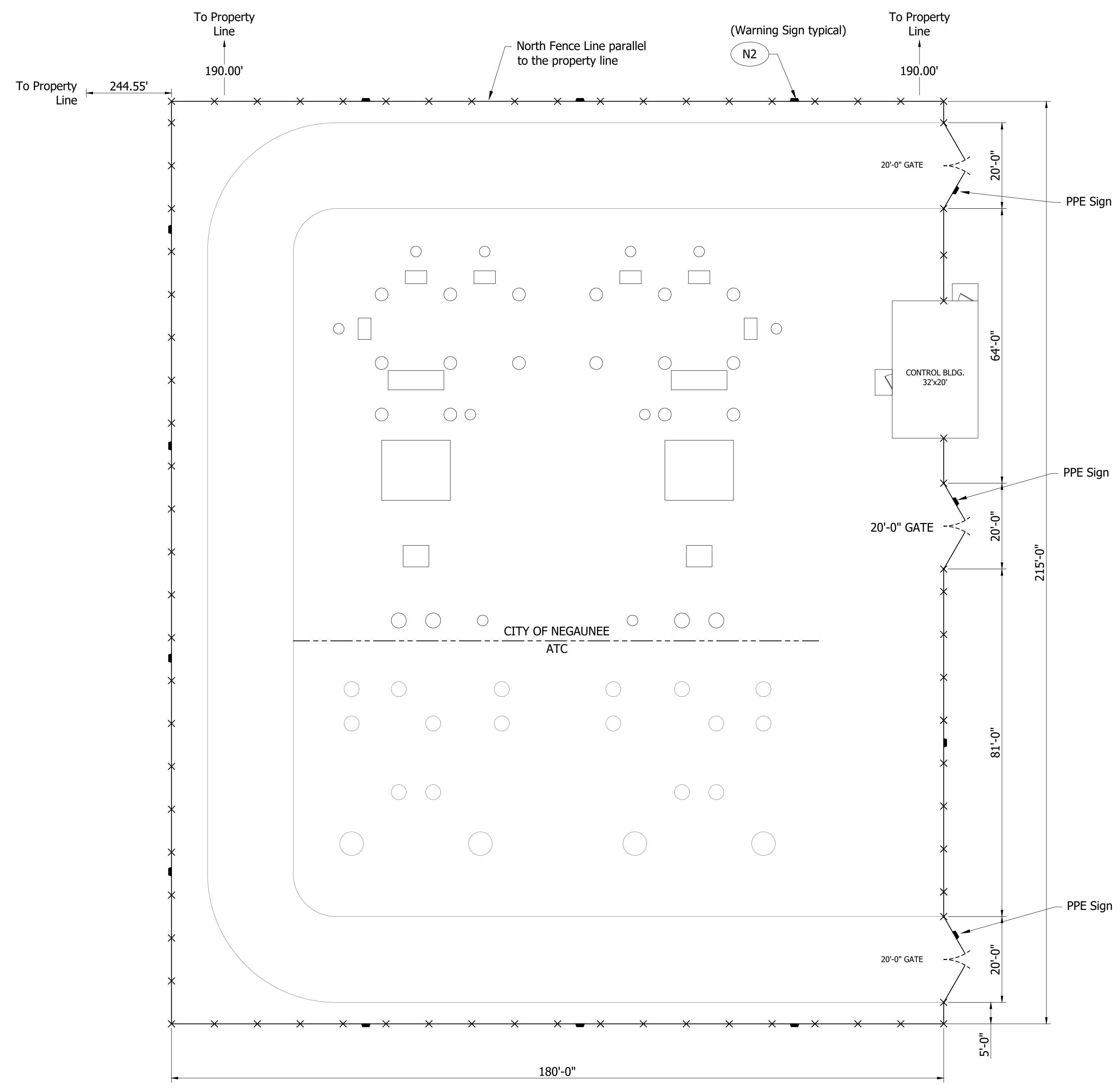


2
02-07
RIPRAP OUTLET PROTECTION
NOT TO SCALE



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2830 DAIRY DRIVE MADISON, WI 53718-6751
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				Madison, WI 53713			
				Tel: 866.825.8895			
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	ENGR.	DATE	SCALE
2	ISSUED FOR CONSTRUCTION	MJT	JMO	04/11/2023	J. OMERNIK	04/11/2023	NOT TO SCALE
1	ISSUED FOR BID	MJT	JMO	02/22/2023	D. NELSON	04/11/2023	NOT TO SCALE
0	DRAFT ISSUED FOR REVIEW	MJT	JMO	02/10/2023	M. THOMPSON	04/11/2023	NOT TO SCALE
				ENGR. J. OMERNIK		SCALE NOT TO SCALE	
				DWN BY M. THOMPSON		PROJECT NO. MI0592107	
				DATE 04/11/2023		DRAWING NO. 02-07	
				FILE NAME IRT-02-07			

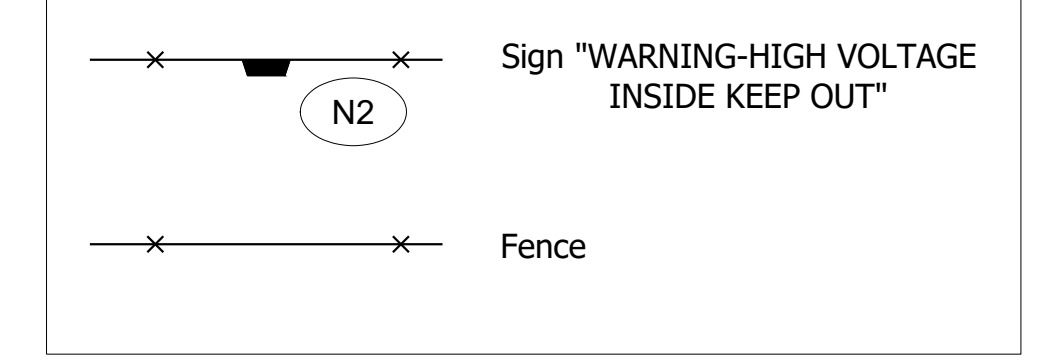


CONTRACTOR IS RESPONSIBLE FOR LOCATING AND AVOIDING ALL UNDERGROUND UTILITIES

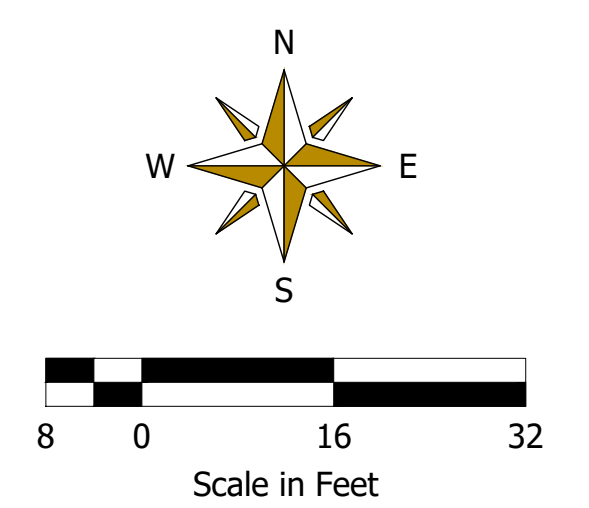
NOTES:

1. See fence details drawing 02-11.
2. See specification section 32 31 00 chain link fencing for additional information.
3. Intermediate posts may be driven posts if approved by the owner and engineer. (This does not include gate, corner, end posts or the post adjacent to a gate corner or end post.)
4. Contractor to provide warning signs and PPE signs. See drawing 02-11 for details. Warning signs shall be spaced no greater than 40 ft. apart. Approximate locations are shown on this drawing.
5. See drawing 02-01 for location of the fence and foundations in relation to the property lines.
6. The fence is owned by Negaunee as part of common facilities.

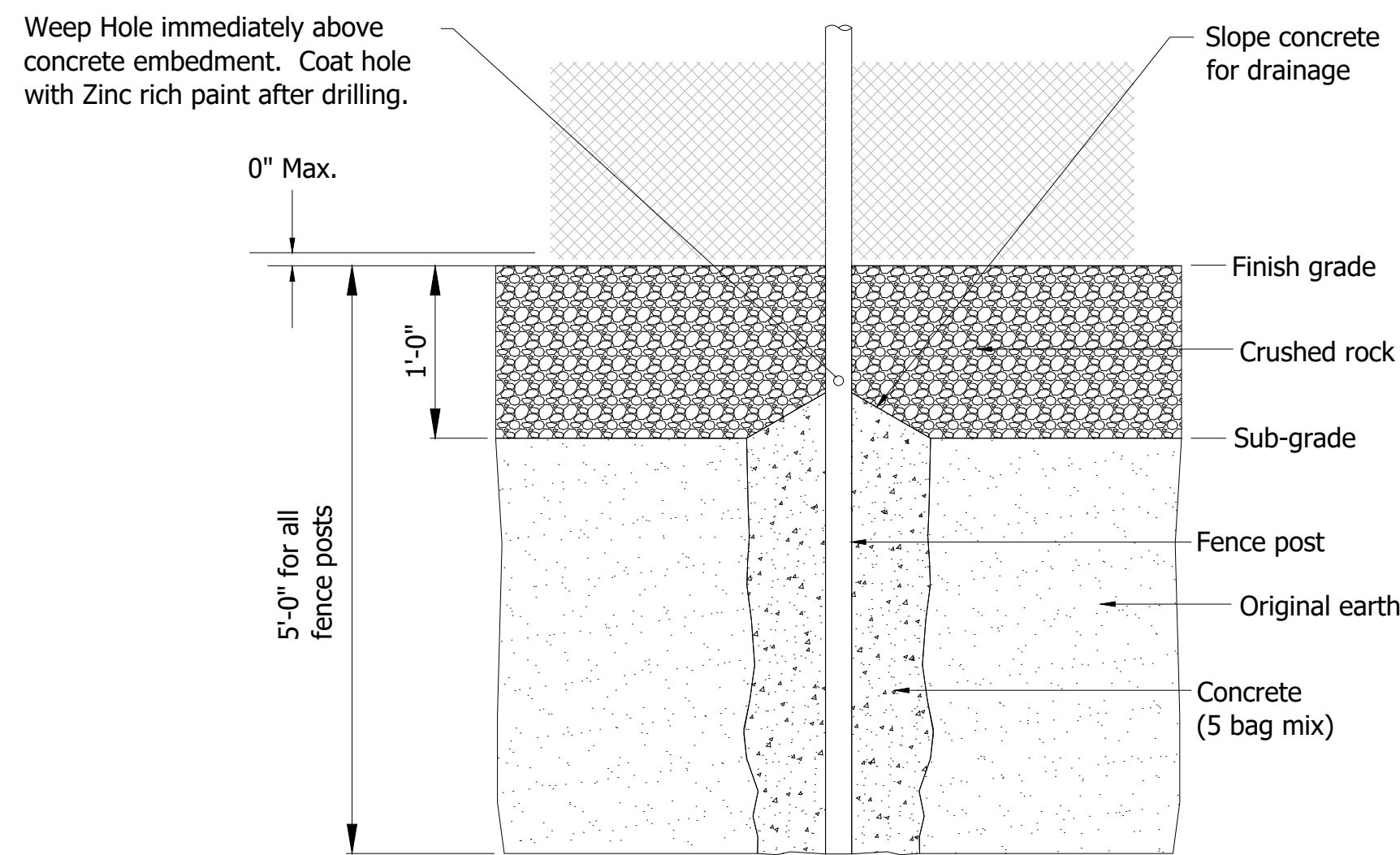
LEGEND:



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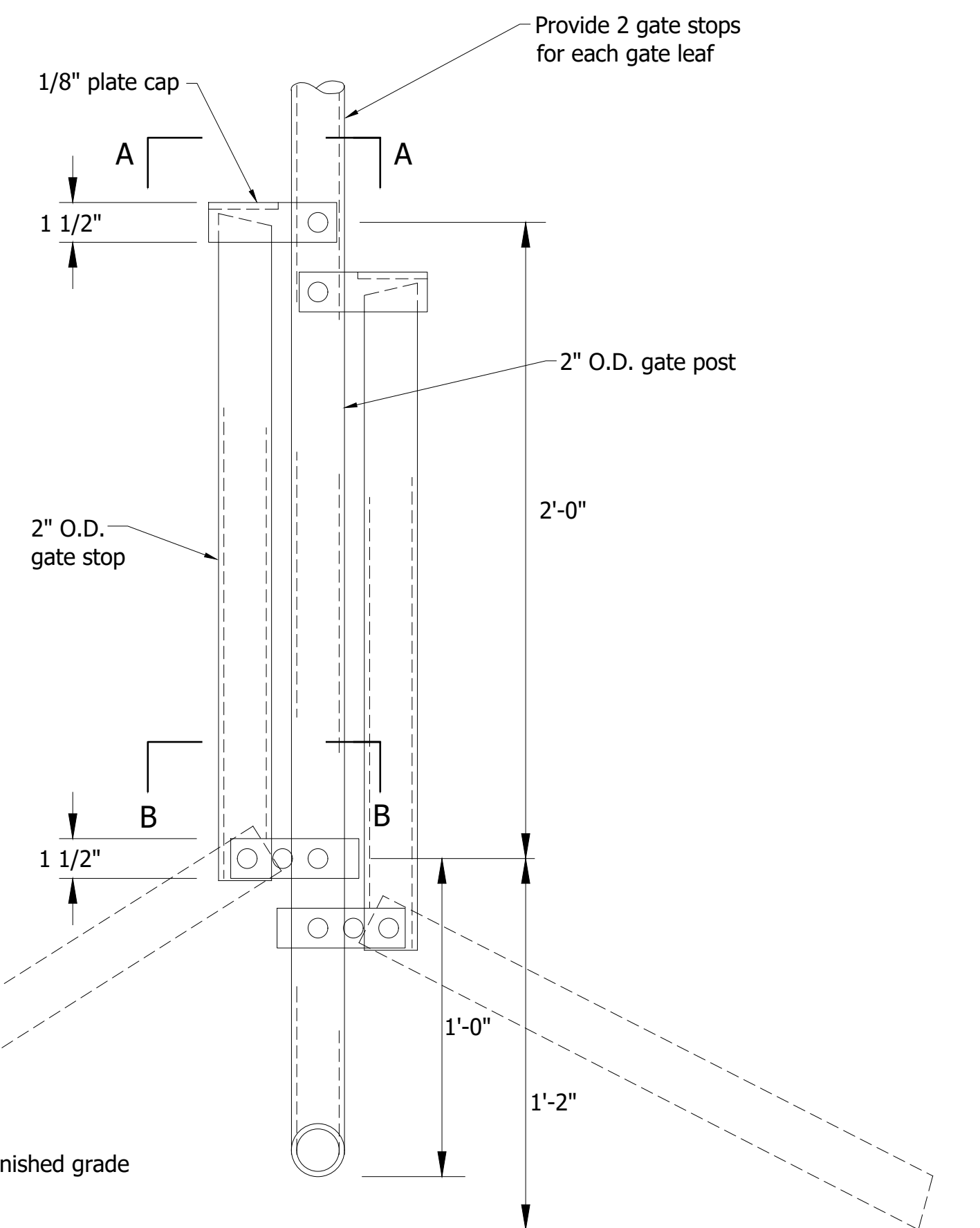
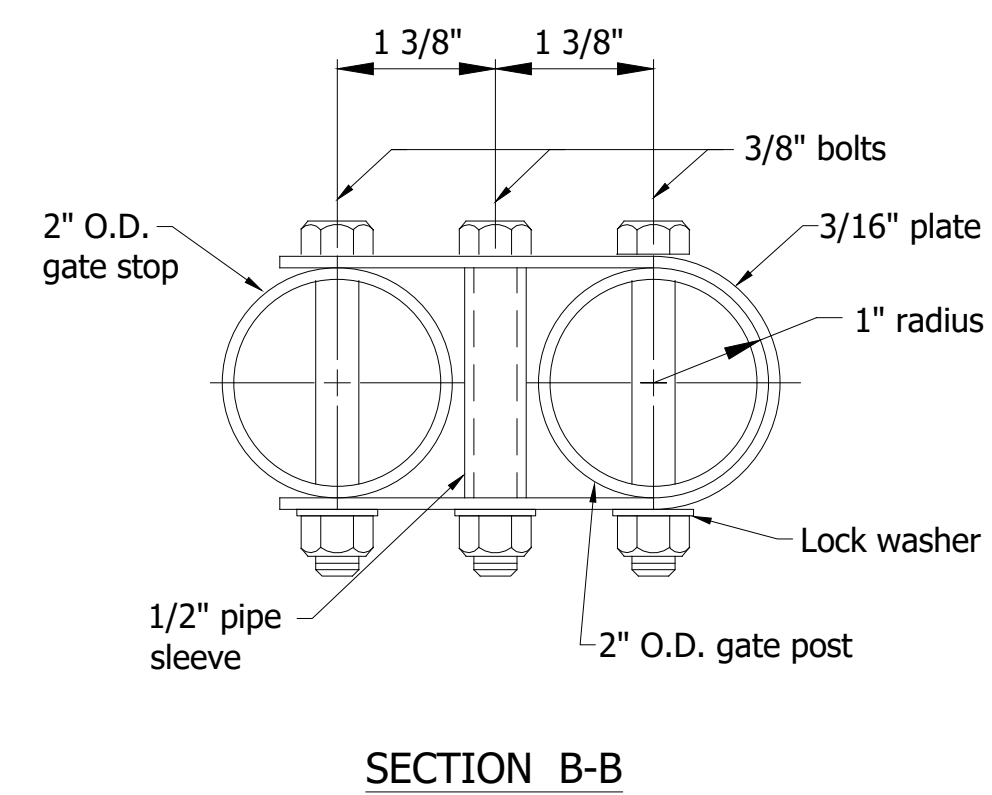
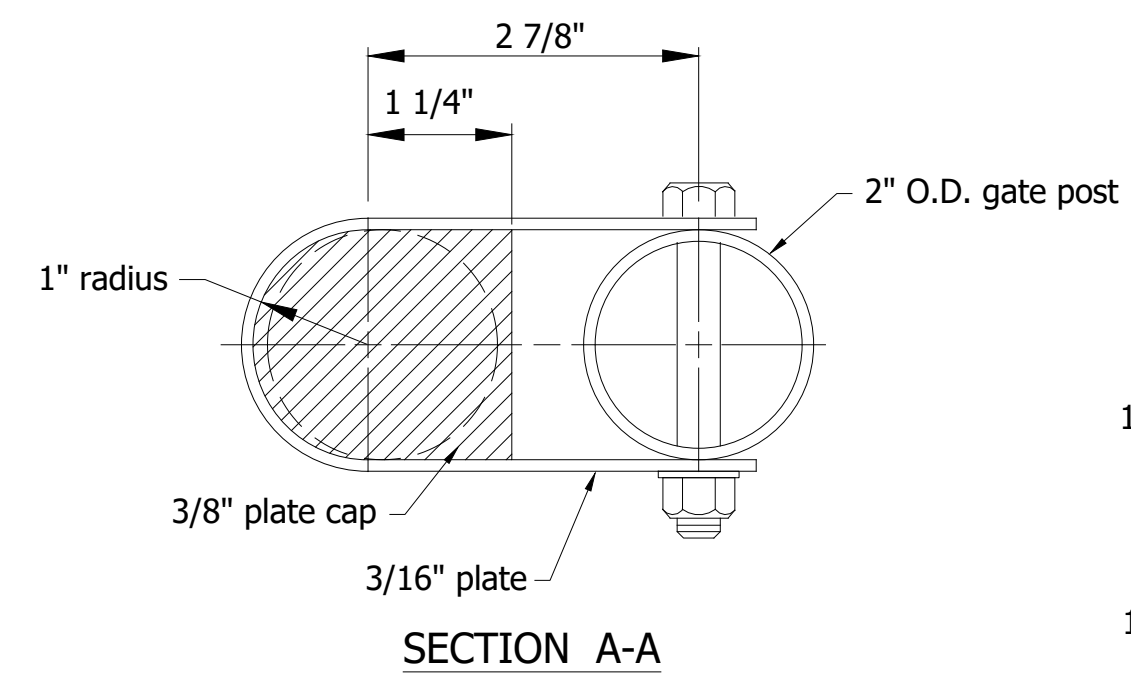


						2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		FENCE PLAN IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI						
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHK'D	S. PACKWOOD	SCALE	1/16" = 1'-0"	PROJECT NO.	MI0592107	DRAWING NO.	02-10
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DATE	2/2/2023	FILE NAME	IRT-02-10				

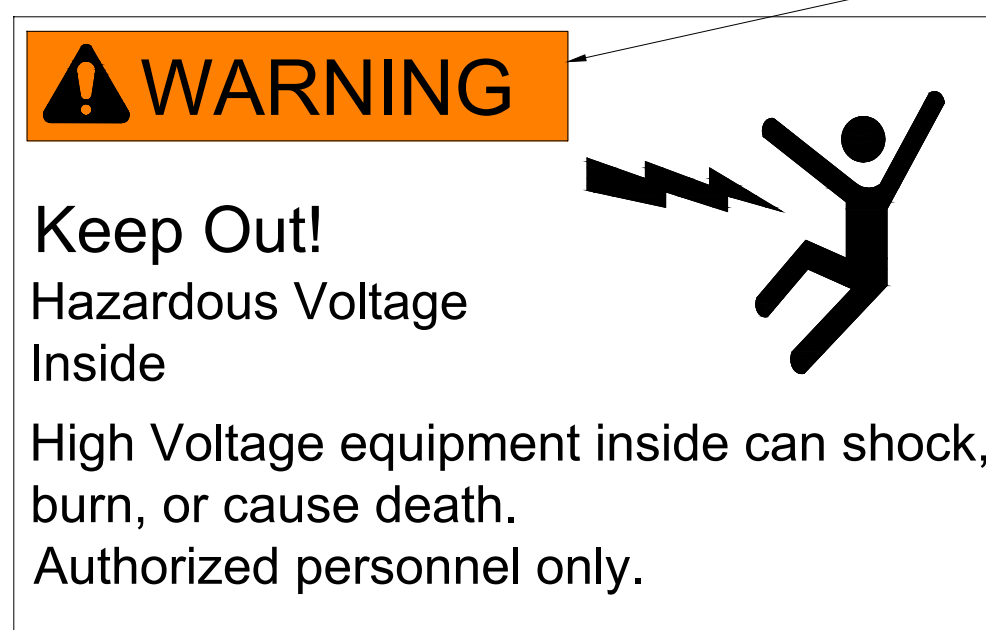


NOTE: All corner & gate post foundations shall be 12" dia. or greater as required to prevent gates from sagging unless noted otherwise. All other post foundations shall be 8" or 10" dia. See Typical Chain Link Gate Post Foundation Detail for 25 and 30 feet gates.

CHAIN LINK FENCE POST FOUNDATION DETAIL



GATE STOP DETAIL



NOTE: Provide a sign on every gate and a minimum of every 40 feet on fence

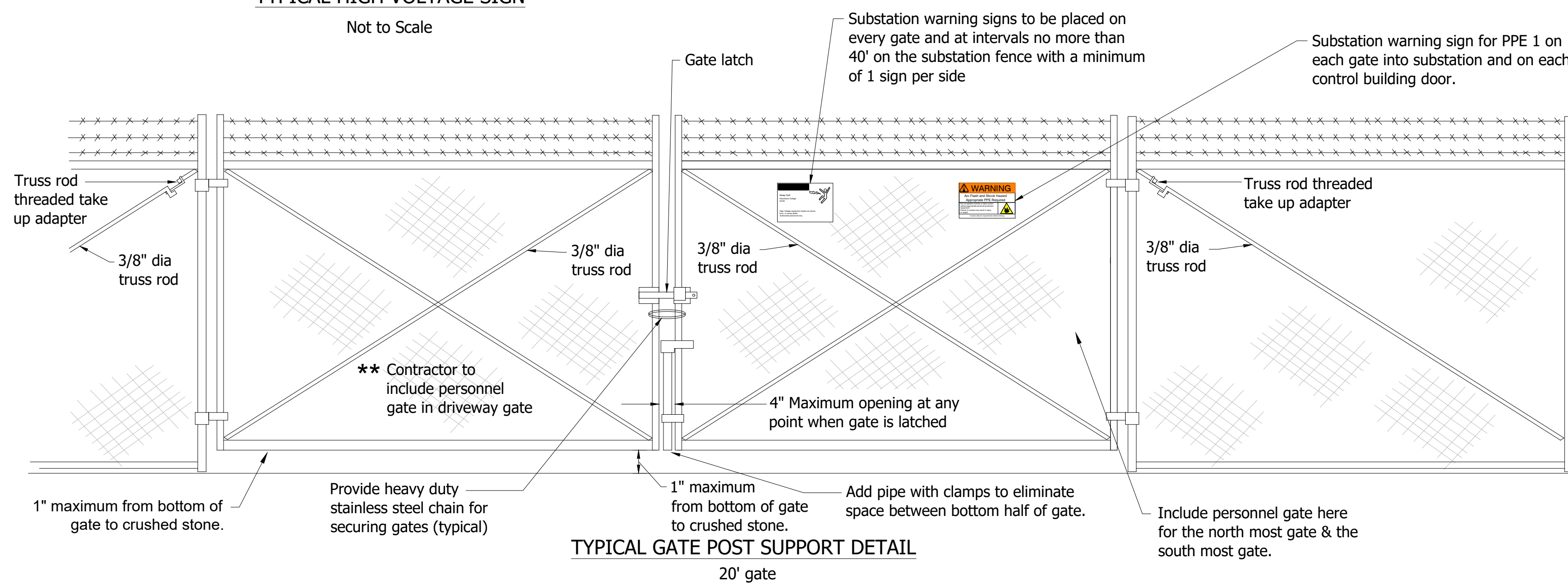
TYPICAL HIGH VOLTAGE SIGN

Not to Scale

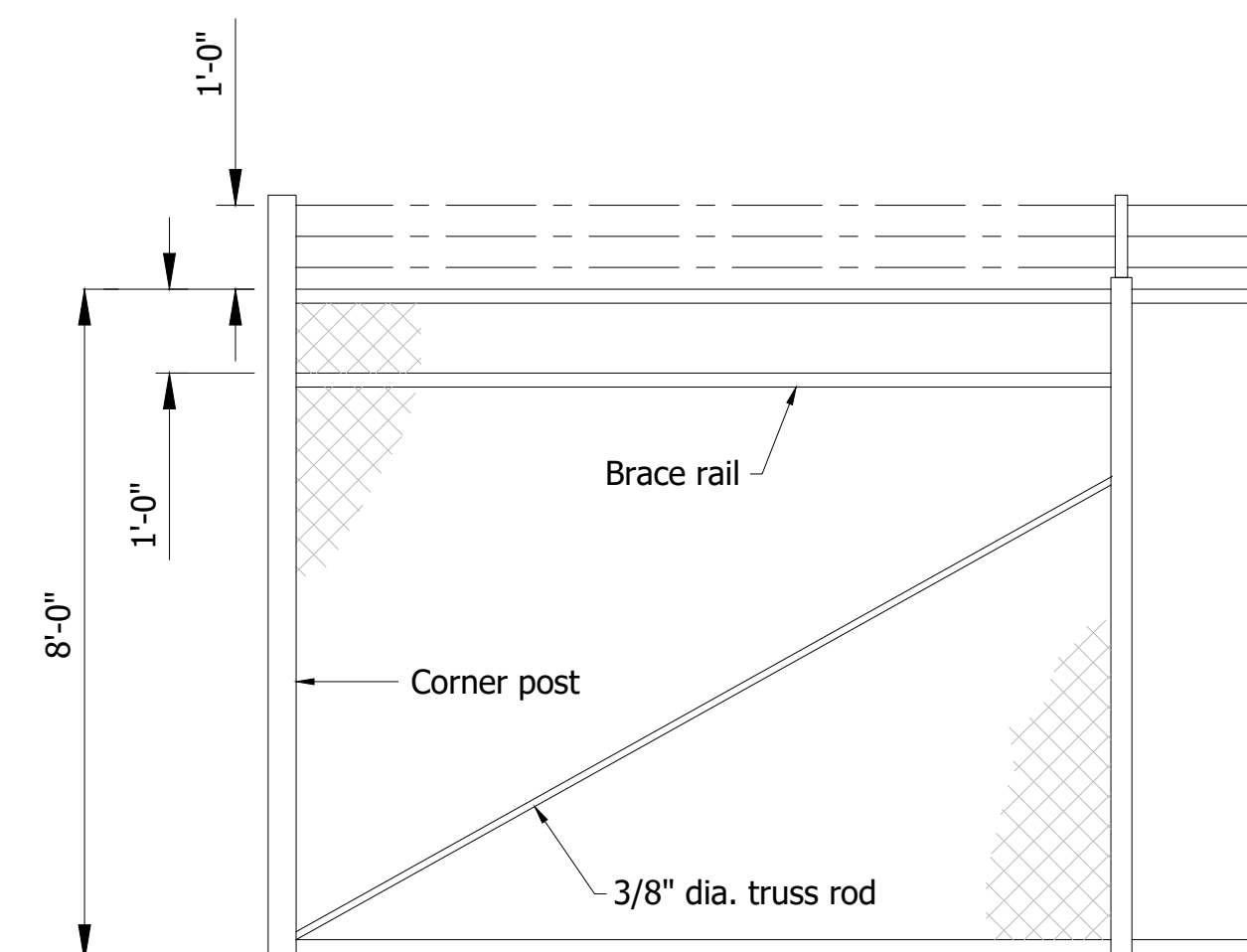


TYPICAL PPE SIGN

Not to Scale



TYPICAL GATE POST SUPPORT DETAIL
20' gate

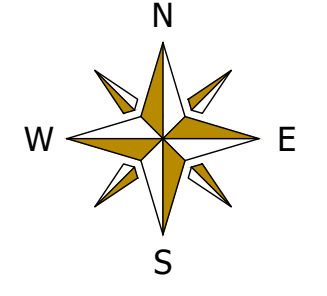
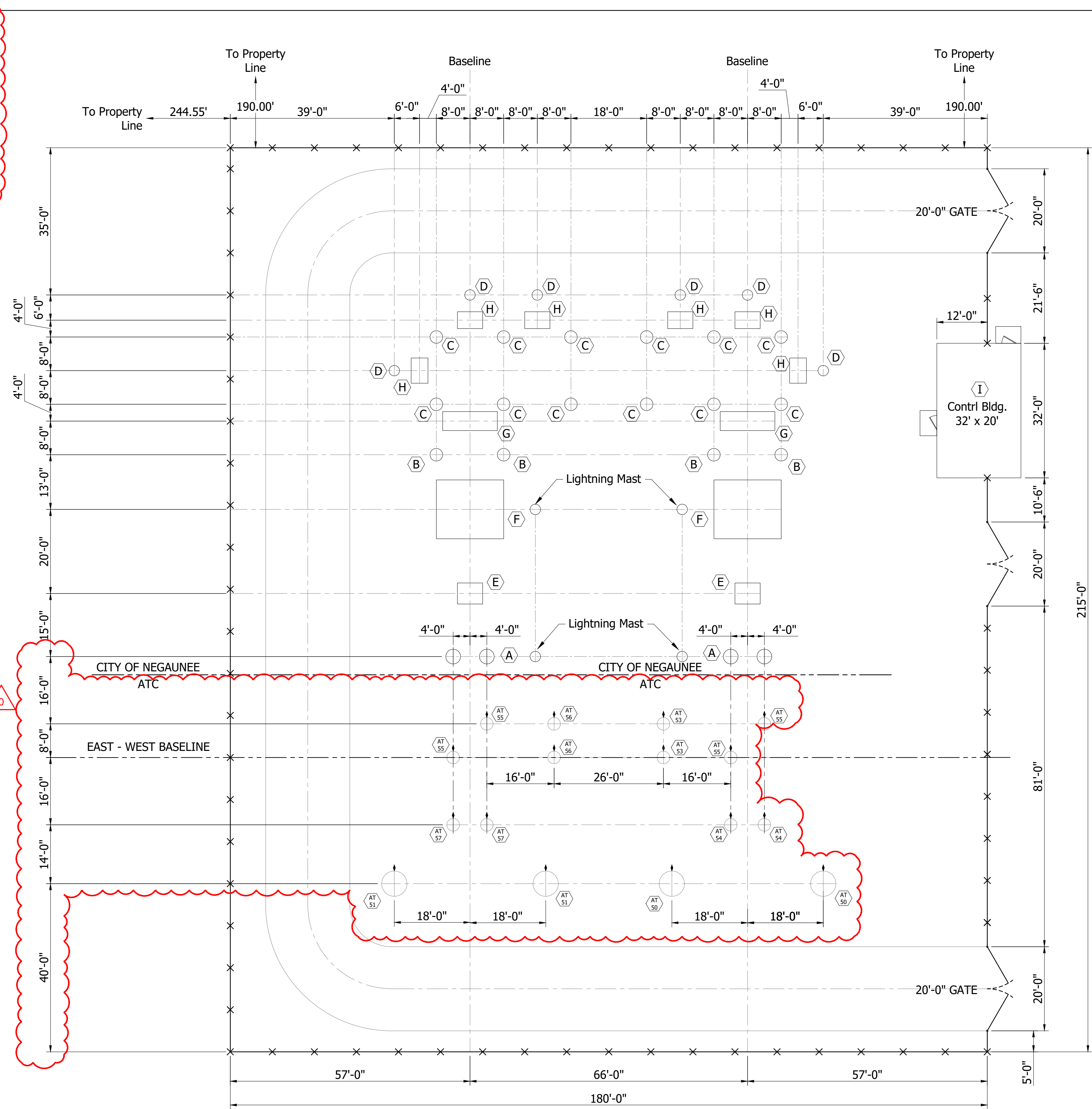


TYPICAL CORNER POST BRACING ARRANGEMENT

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						2424 Rimrock Rd, Suit 300 Madison, WI 53713 Tel: 866.825.8895		FENCE DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI			
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHIEF APPR	S. PACKWOOD	SCALE	3/8" = 1'-0"	
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DATE	7/27/2022	FILE NAME	IRT-02-11	
								PROJECT NO.	MI0592107	DRAWING NO.	02-11

ATC FOUNDATION SCHEDULE				
FDN. NO.	QTY	FOUNDATION TYPE	ELEVATION	FDN DWG
AT 50	2	138KV DEADEND H-FRAME DRILLED PIER	1446.75'	IRT-03-02
AT 51	2	138KV DEADEND H-FRAME DRILLED PIER	1446.75'	IRT-03-02
AT 53	2	138KV HIGH SWITCH SUPPORT DRILLED PIER	1446.75'	IRT-03-02
AT 54	2	138KV LOW MOTOR OPERATED SWITCH SUPPORT DRILLED PIER	1446.75'	IRT-03-02
AT 55	4	138KV LOW 45 DEG BUS SUPPORT DRILLED PIER	1446.75'	IRT-03-02
AT 56	2	138KV HIGH BUS SUPPORT DRILLED PIER	1446.75'	IRT-03-02
AT 57	2	138KV LOW BUS SUPPORT DRILLED PIER	1446.75'	IRT-03-02



NEGAUNEE NOTES:

BENCHMARKS:

- See drawing 02-02(Survey) and 02-05 (Grading) Note 6 for benchmark information.

SITE NOTES:

- Top of foundations: Noted on foundation details.
- Top of crushed stone - varies. See grading plan 02-05 for elevation.
- Top of subgrade: 1 foot below top of crushed stone surface.
- Ground grid 1'-6" depth from top of crushed stone surface.
- 120/240V conduit min. 2'-6" depth from top of crushed stone surface.
- 15 kV conduit min. 3'-6" depth from top of crushed stone surface.

GENERAL NOTES:

- The subgrade within the substation fence shall be slightly sloped to allow for site drainage. Minimum depths of coverage for conduit and grounding must be maintained.
- The crushed stone surface shall extend a minimum of 5' outside the substation fence or 1' beyond limits of the ground grid, whichever is greater.
- Each contractor shall call for locates as required for their work.

FOUNDATION NOTES:

- See foundation detail drawings 03-04 thru 03-06, specifications and geotechnical investigation for foundations A thru I.
- Add concrete pad with W/W reinforcing at door of building. Minimum size 5' wide x 3' deep x 4" thick.
- ATC's contractor will provide and install the ATC foundations. A coordinated installation is required by all involved contractors.

FOUNDATION DESCRIPTIONS:

- A- 138kV Switch Structure
- B- 15kV Metering Structure
- C- 15kV Distribution Structure
- D- 15kV Riser Stand
- E- 138kV Breaker Pad
- F- Transformer Pad
- G- Regulator Pad
- H- Recloser Pad
- I- Control Building Pad

DRAWING APPROVAL
PLEASE CIRCULATE DRAWING(S)
IN ORDER SHOWN BELOW:
Comments are needed by : BV, 04/17/23

Name	Initial	Code	Date
PLN			
OPS			
PROT			
SCADA			
MAINT			
DE			
IT			
OTHER			

Codes: A = Approved for final
B = Approved with comments
C = Revise and resubmit

LEGEND:

	ATC FOUNDATION IDENTIFICATION
	BASE LINE
	ORIENTATION MARK

ATC GENERAL NOTES:

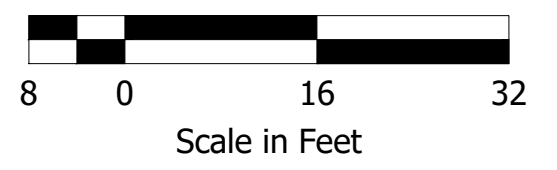
- ALL DIMENSIONS ARE TO FOUNDATION CENTERLINES.
- FOUNDATION CONSTRUCTION SHALL BE IN ACCORDANCE WITH ATC CONSTRUCTION SPECIFICATIONS.

REFERENCE DRAWINGS

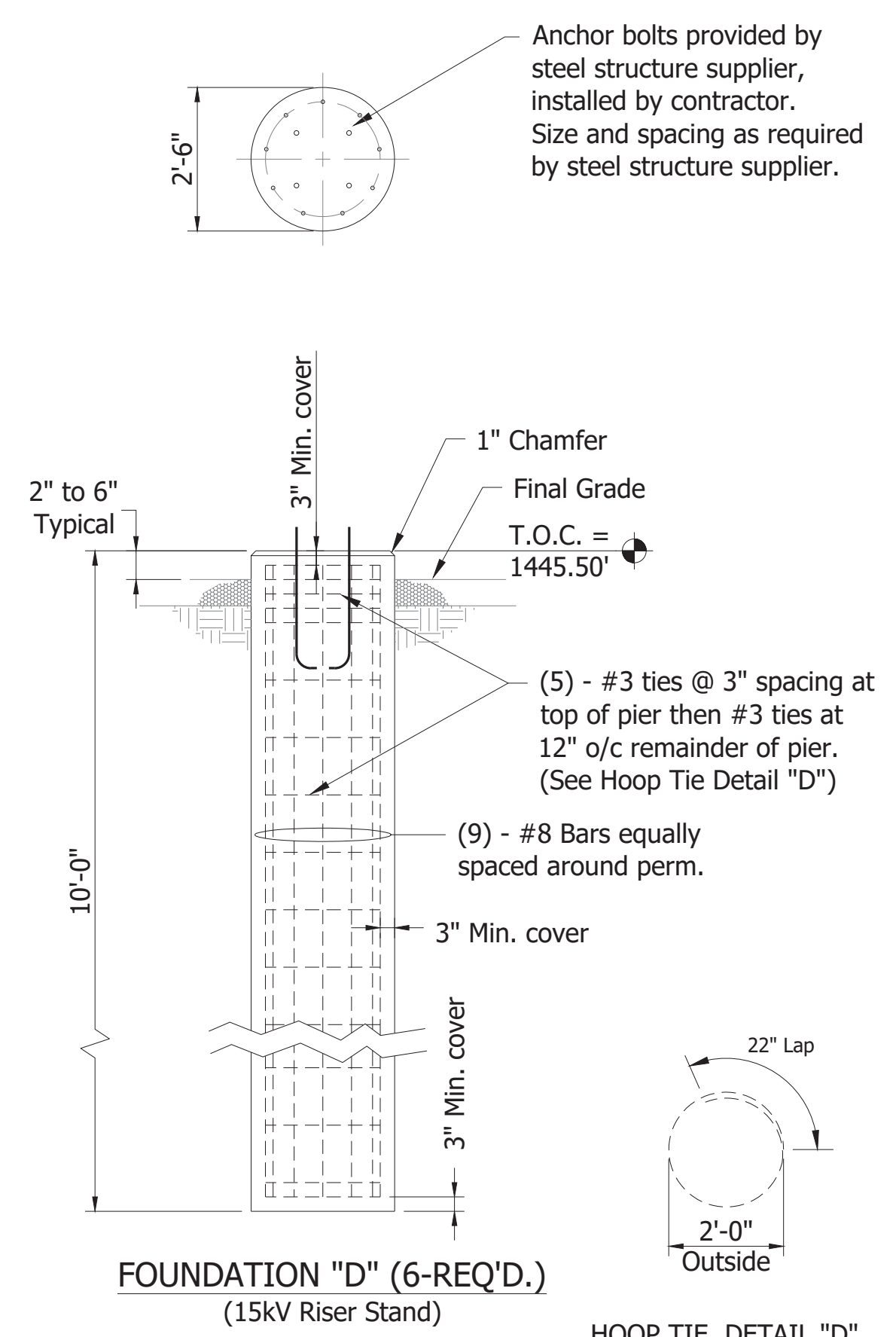
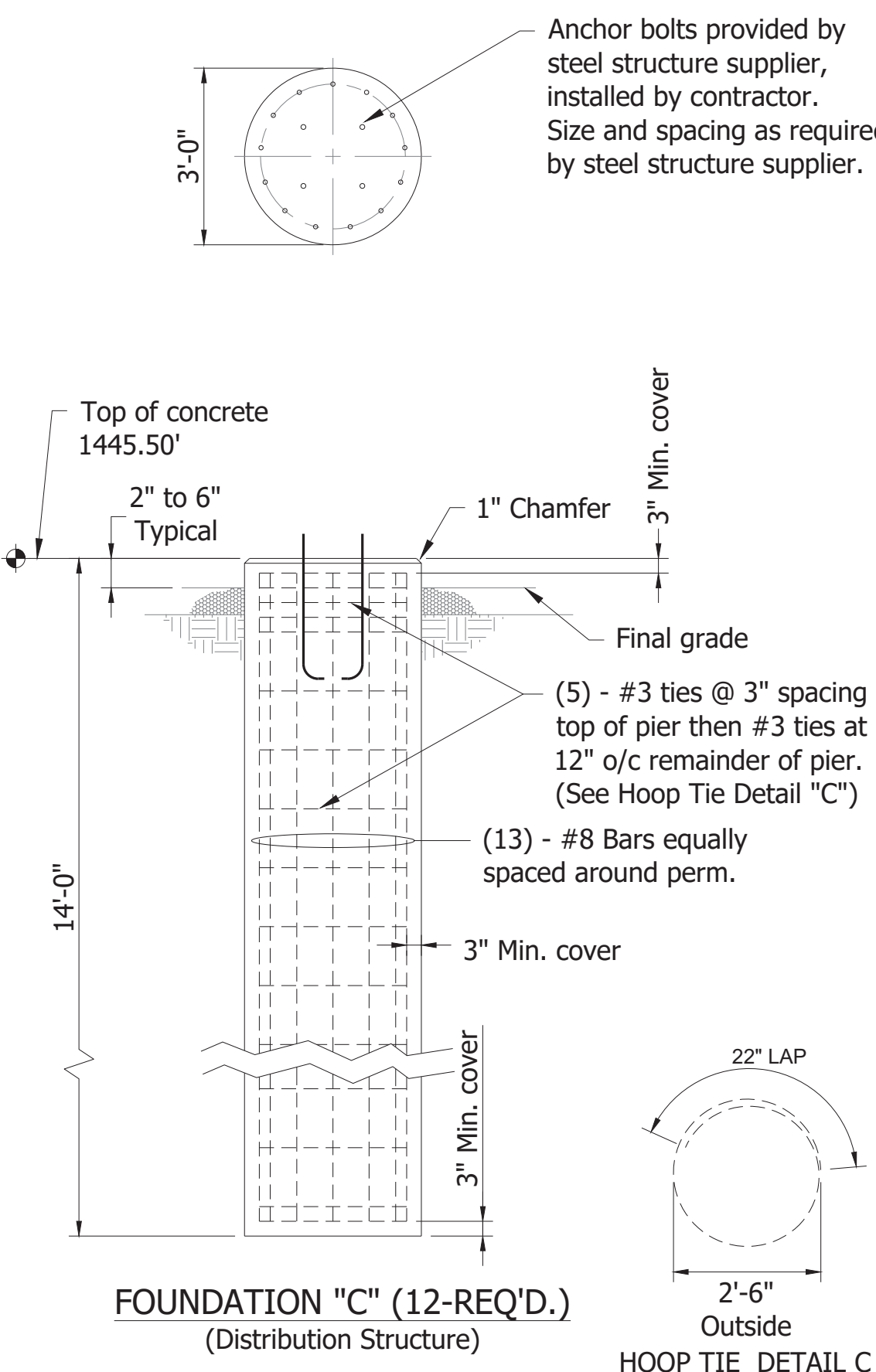
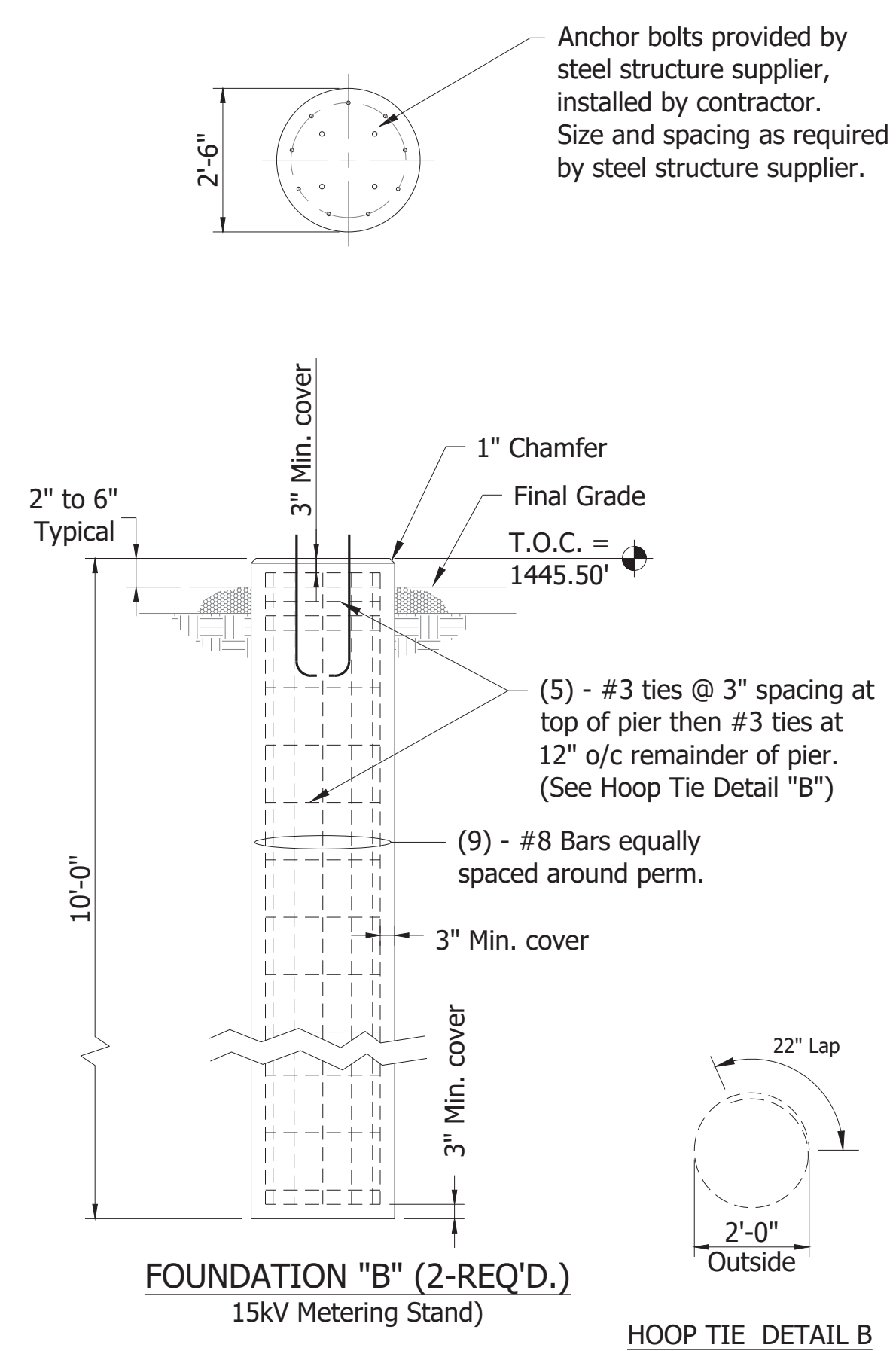
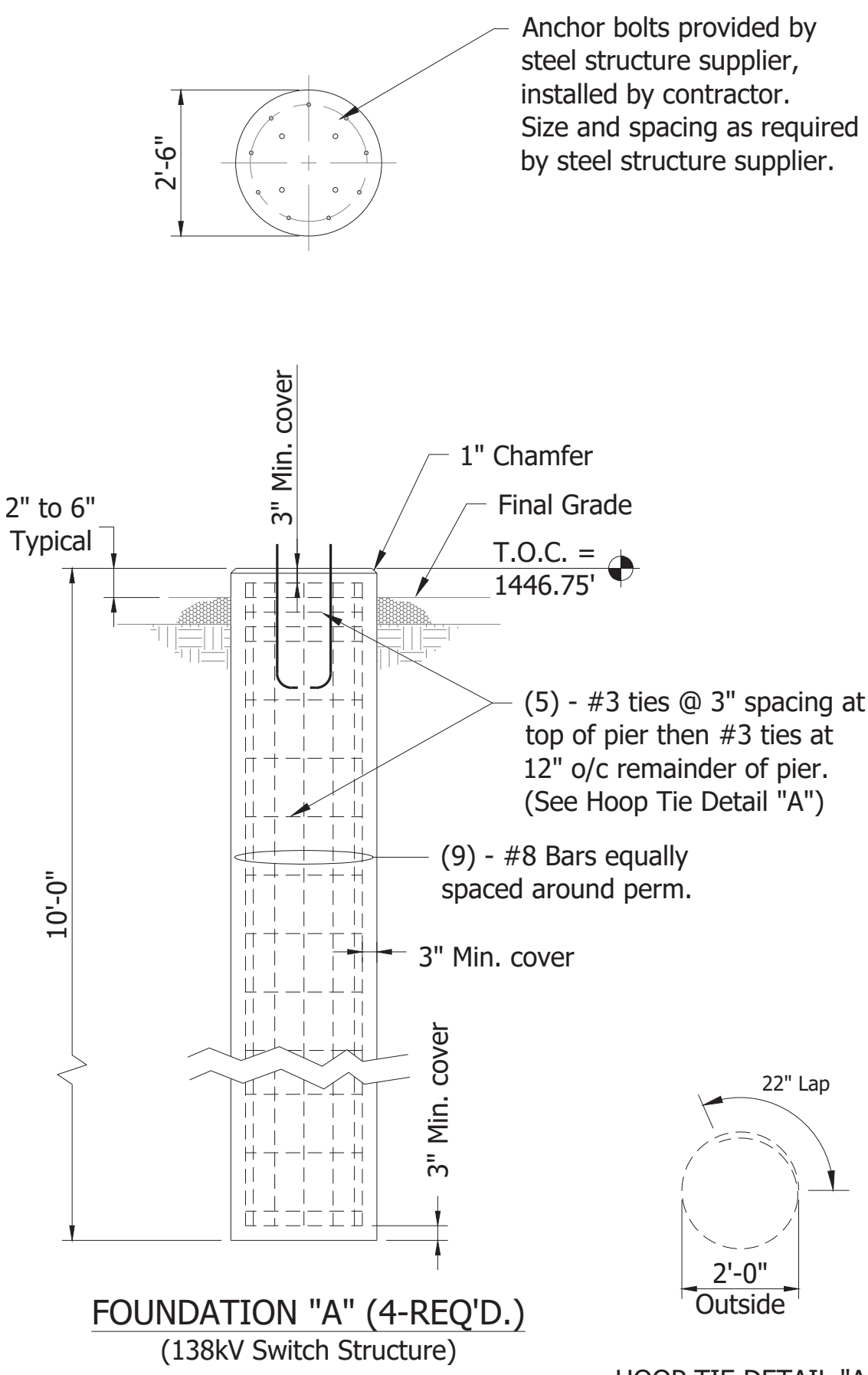
PLAN VIEW	IRT-06-01
ATC FOUNDATION DETAILS	IRT-03-02

REV CLOUD LEGEND
 = REVISION CLOUD FOR ATC W.O. #605015

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						PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895						
1	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHKD/ APPD	---	SCALE	1/16" = 1'-0"	PROJECT NO.	MI0592107	DRAWING NO.	03-01
0	ISSUED FOR REVIEW - ATC W.O. #605015	KAW	JWS	03-22-23	DWN BY	G. BODENSTEIN	DATE	7/27/2022	FILE NAME	IRT-03-01				
www.powersystem.org														

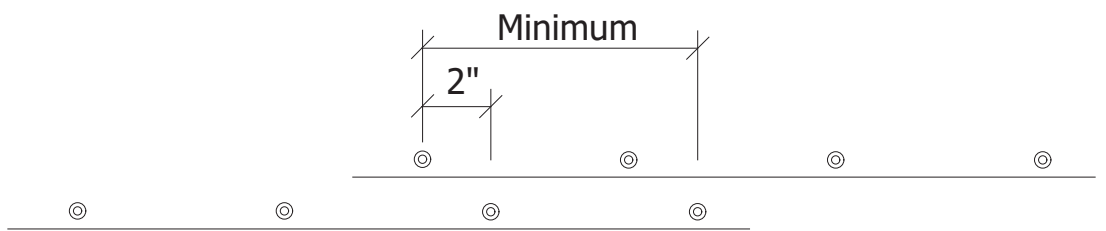


GENERAL NOTES:

1. Footing subgrades shall be observed by the geotechnical engineer before placing concrete. The installation contractor shall coordinate the installation with the engineer for timing of the geotechnical inspection.
2. See drawing 03-01 for foundation plan and notes.
3. Reference the subsurface investigation report prepared by Coleman Engineering Company (CEC) dated September 16, 2022 referred to hereafter as CEC Report for recommendations for site preparation and construction considerations.
4. Reference specification sections 310100 (site work) and 030100 (cast in-place concrete) for additional information.
5. Earthwork shall conform to the specifications for construction. The work shall involve excavation of existing fill and a portion of natural ground to reach the elevations indicated on the plans, followed by placement and compaction of granular backfill at all excavations.
6. Excavate to grades shown and check that all disturbed or weak materials have been removed. If disturbance is indicated, compact the base of excavation with hand guided compaction equipment.
7. All lean topsoil, vegetation, roots and other organic matter shall be removed and replaced with compacted frost resistant sand and gravel fill. Refer to subsurface investigation report.
8. Excavated materials may not be used for fill under slabs or reinforced foundations.
9. All excavations shall meet the requirements of the CEC Report.
10. Backfill and compaction of backfill shall be per CEC Report. Pay close attention to Appendix D of the report.

FOUNDATION NOTES

1. Minimum concrete compressive strength at 28 days shall be 4000 psi. All concrete work shall conform to ACI standard 301.
2. Top surfaces of all piers and pads to be level, smooth and at the elevation noted on the details. Top of concrete shall be 6" above final grade or as noted.
3. Contractor shall verify dimensions and anchor bolts with equipment shop drawings before construction.
4. The contractor shall provide anchor bolts as required, unless otherwise noted.
5. All foundations shall be constructed to the depths and size indicated on the drawing and as approved by the Engineer.
6. Vibrate concrete as required to consolidate and eliminate voids in the concrete placement.
7. All excavations shall be dewatered before placing concrete. Water accumulating at the base of excavations as a result of precipitation or groundwater seepage should be quickly removed using pumps operating from filtered sump pits.
8. For placing concrete underwater, an approved tremie method shall be used. During tremie placement, the bottom of the tremie pipe shall not be lifted above the concrete level. Placement of concrete by tremie shall continue until water and contaminated concrete are displaced out of the top of the shaft.
9. No chamfer for building slab. 1" x 45 degree chamfer on all exposed edges.
10. All new foundations shall not be loaded with equipment until a minimum of 14 days after installation.
11. Construction of drilled piers shall be in accordance with these drawings, the specifications, and ACI 336.1-01.
12. Excavation for the drilled piers shall be encased if required to prevent collapse of side material into the shaft or for the purpose of dewatering. Encasement shall be withdrawn as concrete is placed to allow full contact of concrete surface with the undisturbed soil surface. The slurry displacement method will not be allowed without approval by the engineer.
13. The top three feet of concrete of the drilled piers shall be consolidated by means of mechanical vibrators for all placement methods.
14. Placement of concrete for the drilled piers shall be by the tremie methods or by pumping.
15. Drilled piers- provide centering rollers, one per quadrant, at 6'-0" maximum spacing to assure specified clearance between the reinforcement and side of excavation. Rollers should be made of non-metallic material.
16. Longitudinal reinforcement steel in drilled piers shall not be spliced. The reinforcing steel shall be 100% double tied.



REINFORCING NOTES

1. Reinforcing steel: Bars: ASTM A-615, grade 60. All work shall conform to ACI standard 318.
2. Reinforcing shall be detailed in accordance with ACI SP-66.
3. All laps shall be Class "B" unless noted otherwise on the design drawings or unless the detailer takes special care to provide staggered laps. Use top bar lap lengths for all horizontal wall bars and for top bars in slabs and beams over 14" deep.
4. Lap length shall be specifically noted on placing drawings where more than one bar makes up a continuous string.
5. Horizontal bars, except for continuous strings from one corner or opening to another, shall be detailed to show the distance from at least one end of the bar to the nearest building grid line or wall.
6. Welded Wire Fabric shall be lapped and/or anchored to develop f_y per ACI SP-66.

DESIGN CODES

2015 Michigan Building Code
ACI 318-14
ASCE 7-10

SPECIAL INSPECTIONS

The Owner shall provide Special Inspections as required by the International Building Code Chapter 17.

- The Special Inspection will include but is not limited to:
1. Comparison of shop drawings to bid documents for conformance to intent.
 2. Review of concrete mix design.
 3. Field review of construction.
 4. Review of test results of materials.
 5. Steel reinforcement placement.
 6. Field testing of concrete.
 7. Foundation excavation, aggregate fill, compaction of aggregate, and other items noted in the geotechnical report.

TEMPORARY SHORING/SHEETING/BRACING

Temporary shoring, sheeting, bracing or soil retention is the sole responsibility of the Contractor. Refer to subsurface investigation report for additional information.

DESIGN STRESSES

Cast-In-Place Concrete $f'_c = 4,000$ PSI
Soil Bearing Pressure for Mat Foundations $q_b = 4,000$ PSF

DESIGN LOADS

Equipment loads per the equipment manufacturer.

Seismic Loads:
Importance Factor = 1.0
Risk Category I
 $S_s = 0.045$
 $S_1 = 0.02$
Site Class D
 $S_{DS} = 0.048$
 $S_{D1} = 0.031$
Seismic Design Category A

Digitally signed by Brian C Giltner
DN: cn=US,
E=b.giltner@chastainengineers.com,
O=Chastain & Associates LLC,
OU=Paducah KY Office, CN=Brian C
Giltner
Location: Paducah, KY 42001
Reason: I am the author of this
document
Contact Info: 6186388703
Date: 2023.05.17 12:02:53-05'00'

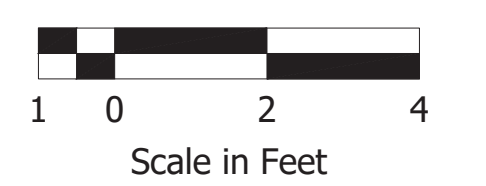


May 17, 2023

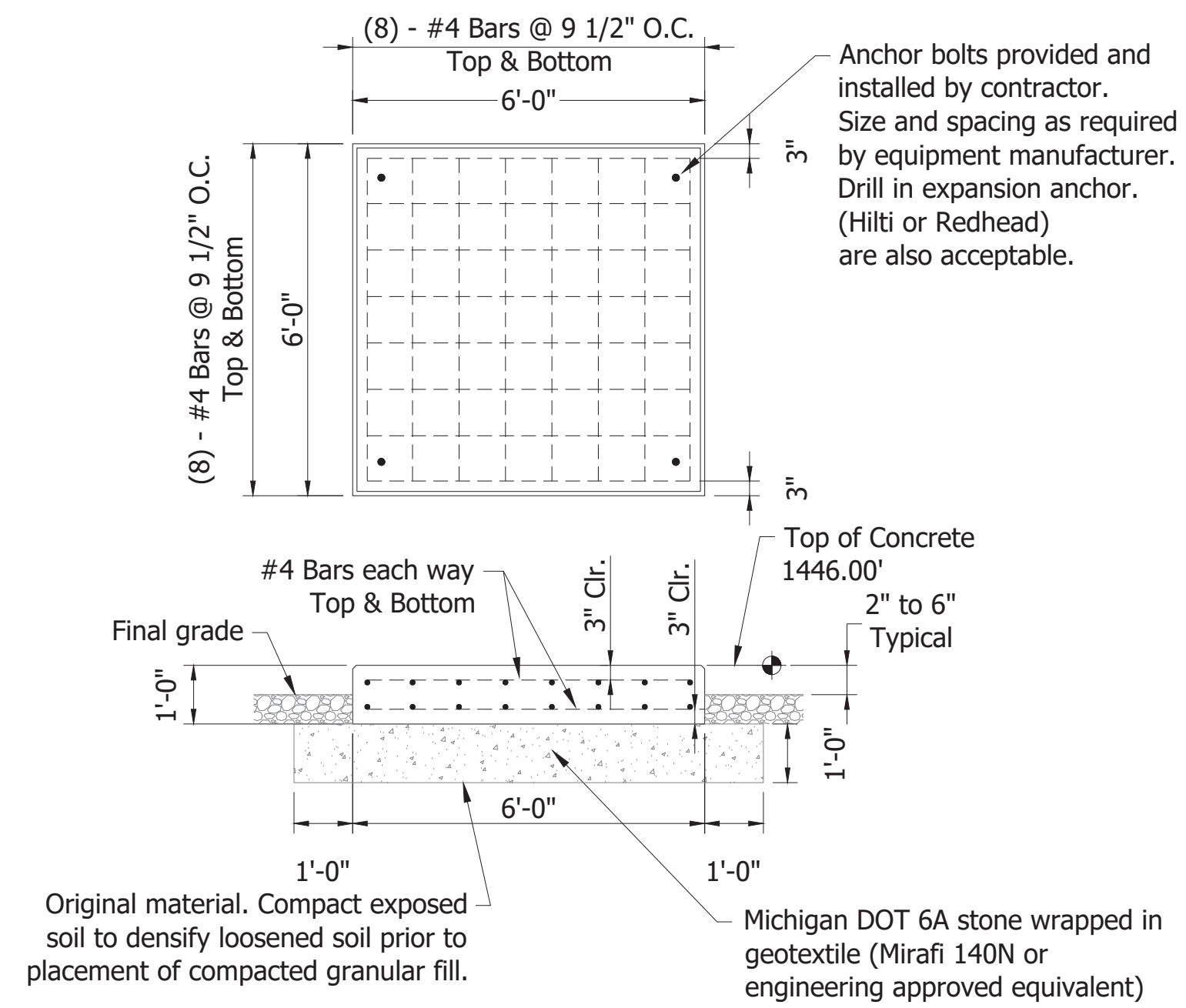
Wind Loads:
Design Wind Speed
 $V_{ULT} = 105$ mph
 $V_{ASD} = 90$ mph
Importance Factor = 1.0
Risk Category II
Exposure C

Ice Load:
1/2" Radial Ice
Importance Factor = 1.0

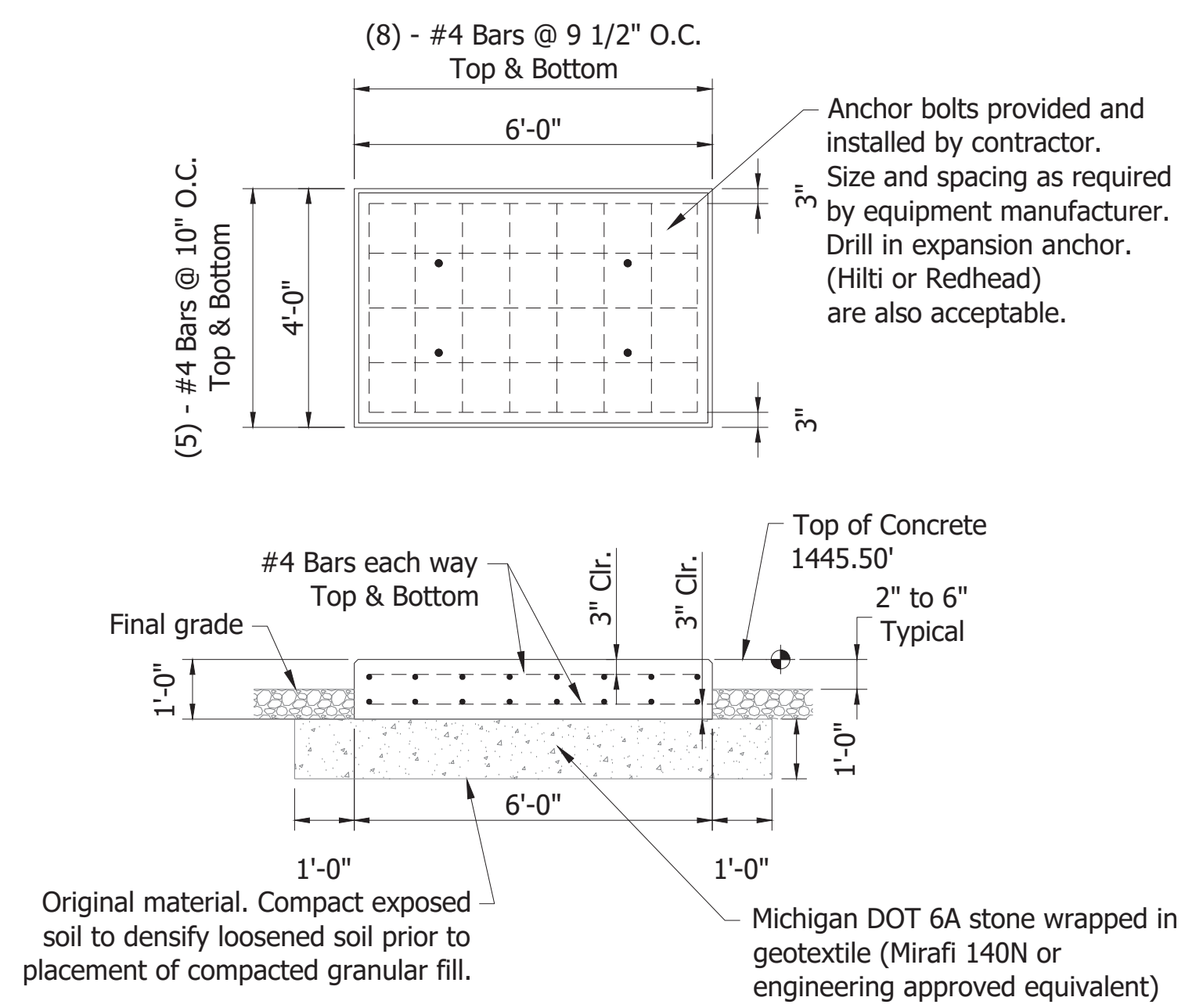
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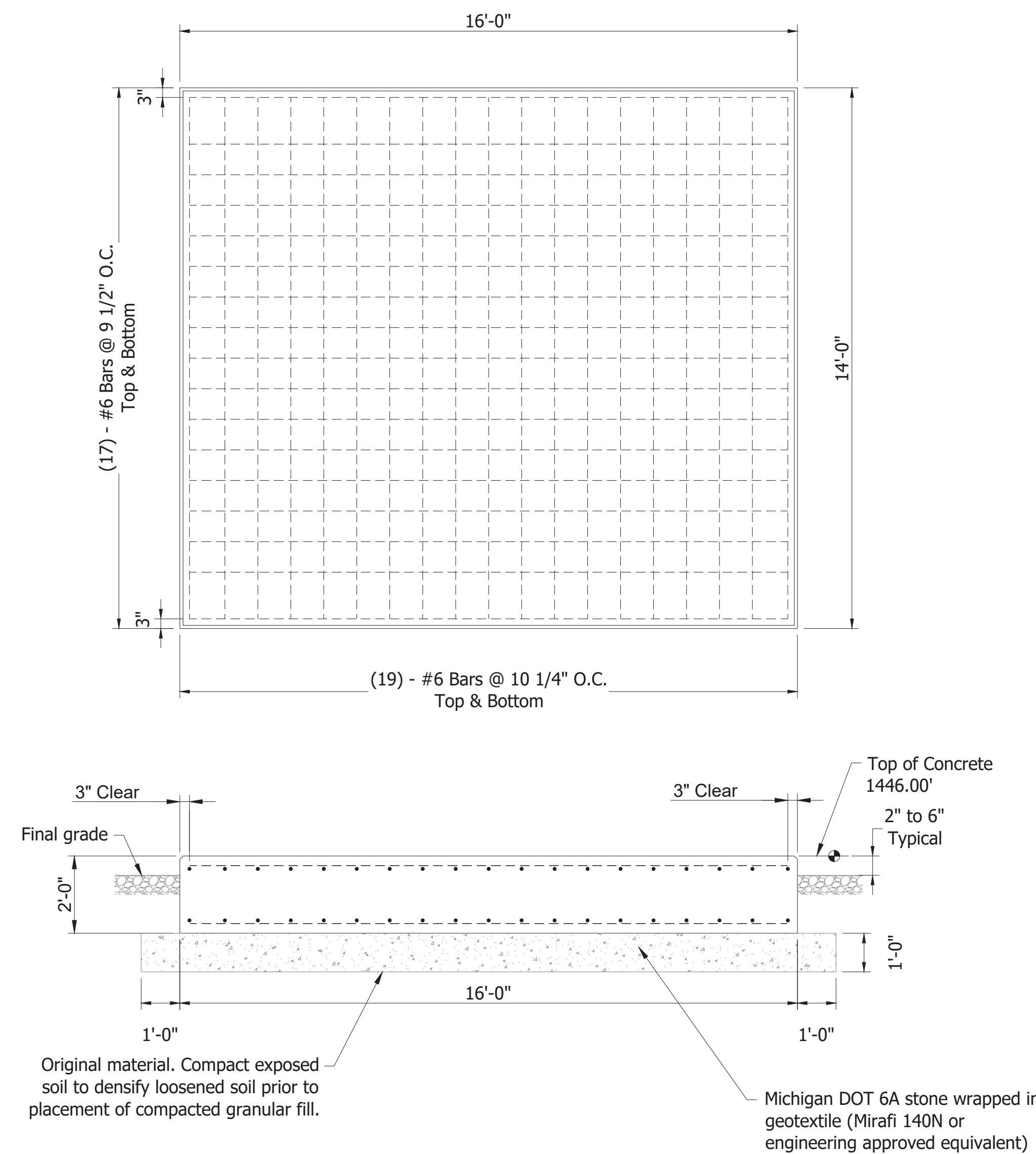
				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suit 300 Madison, WI 53713 Tel: 866.825.8895		FOUNDATION DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				www.powersystem.org					
0	ISSUED FOR BID	GB	BG	05/16/2023	ENGR	N. HALL	CHK'D/ APP'D	SCALE	3/8" = 1'-0"
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DATE	FILE NAME	PROJECT NO. M10592107
							7/27/2022	IRT-03-04	DRAWING NO. 03-04



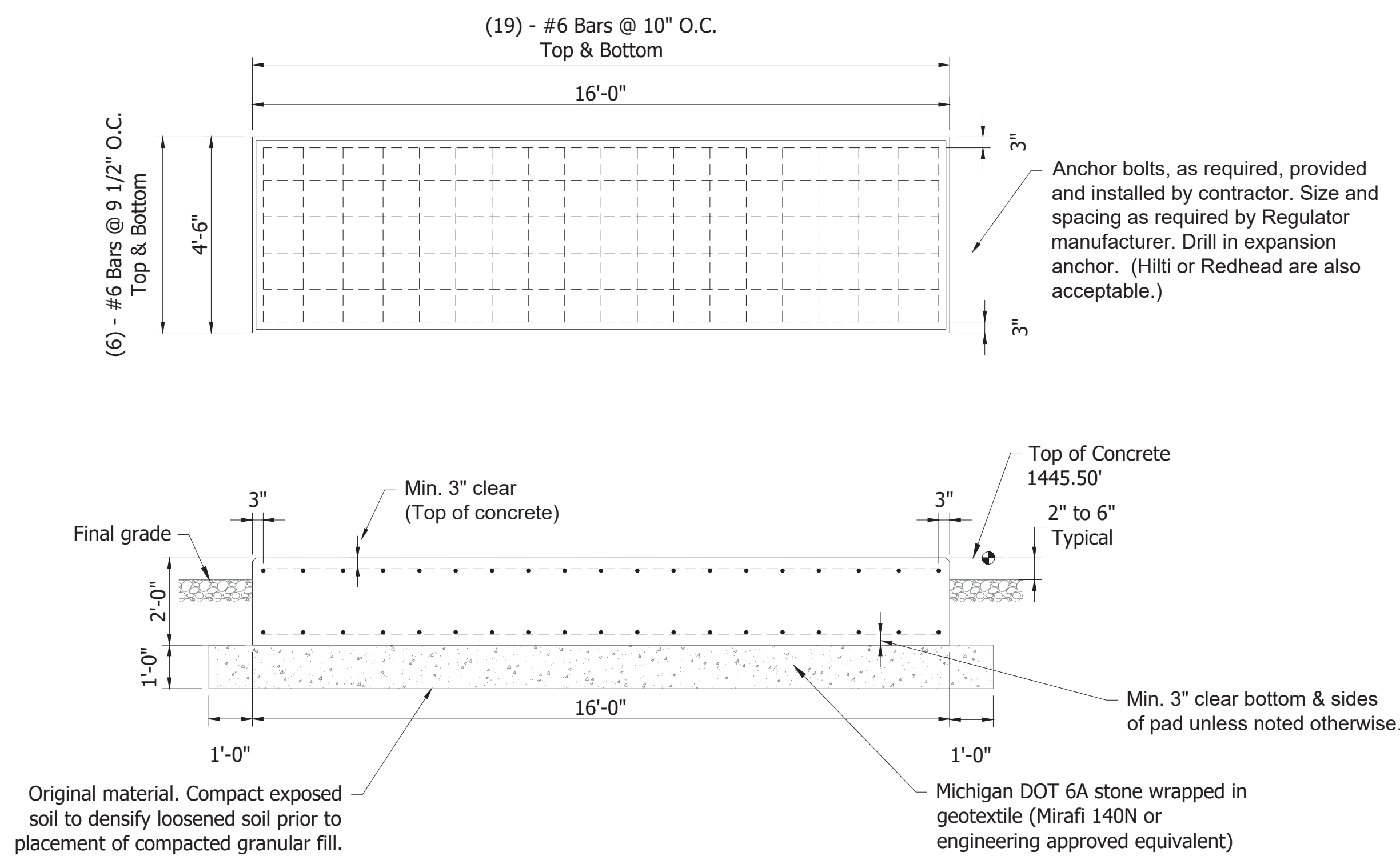
FOUNDATION "E" (2-REQ'D)
(138kV Breaker Pad)



FOUNDATION "H" (6-REQ'D)
(Recloser Pad)



FOUNDATION "F" (2-REQ'D)
(Transformer Pad)



FOUNDATION "G" (2-REQ'D)
(Regulator Pad)

A Geotechnical Engineer shall inspect the soil at footing grades to verify adequate bearing capacity or determine if undercutting is necessary.

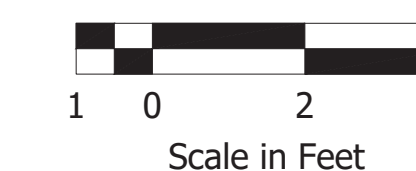
NOTES: (Typical for all details)

1. See drawing 03-01 for foundation plan.
2. See drawing 03-04 for foundation detail notes.
3. See specification 030100 for cast in place concrete requirements.

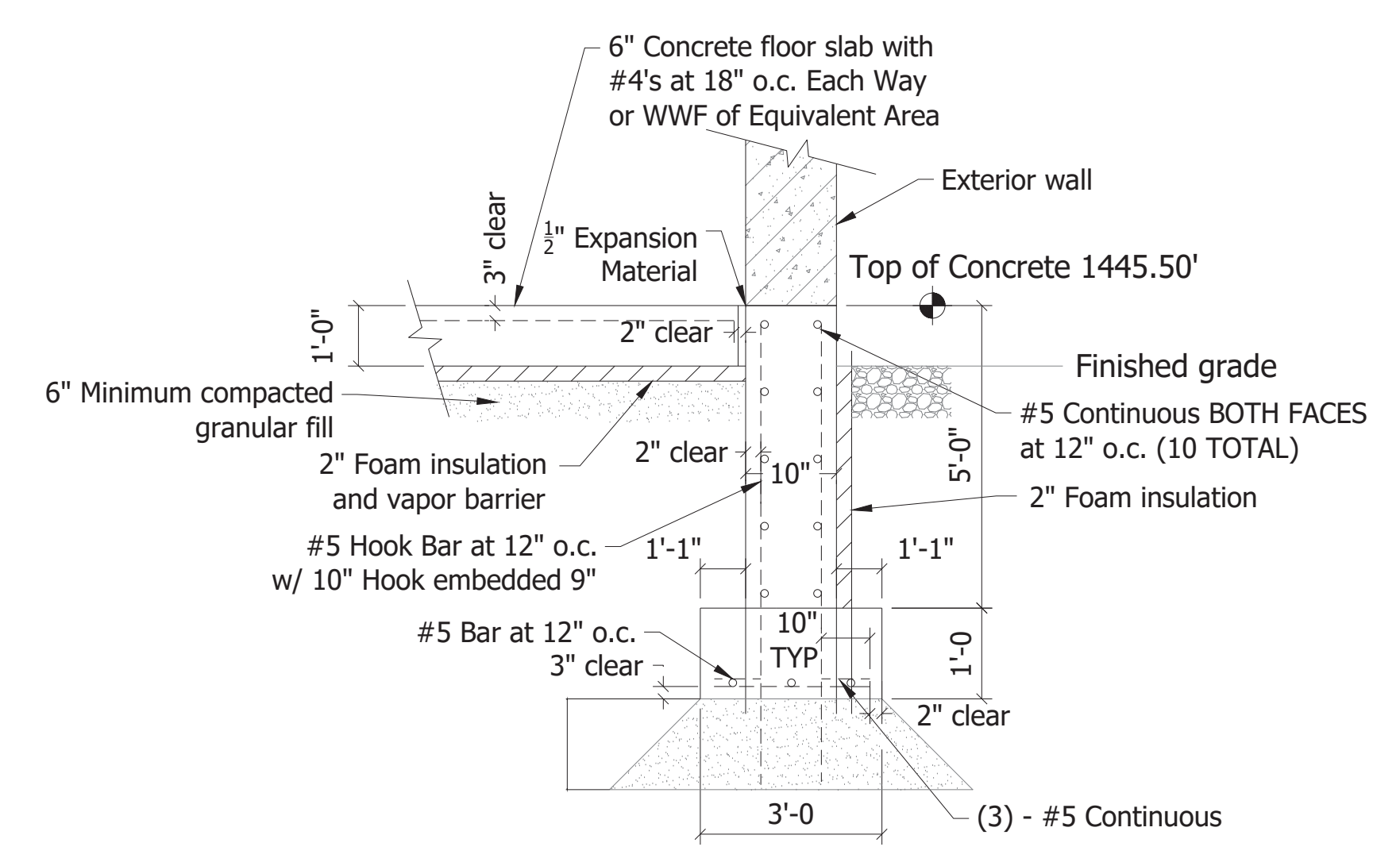
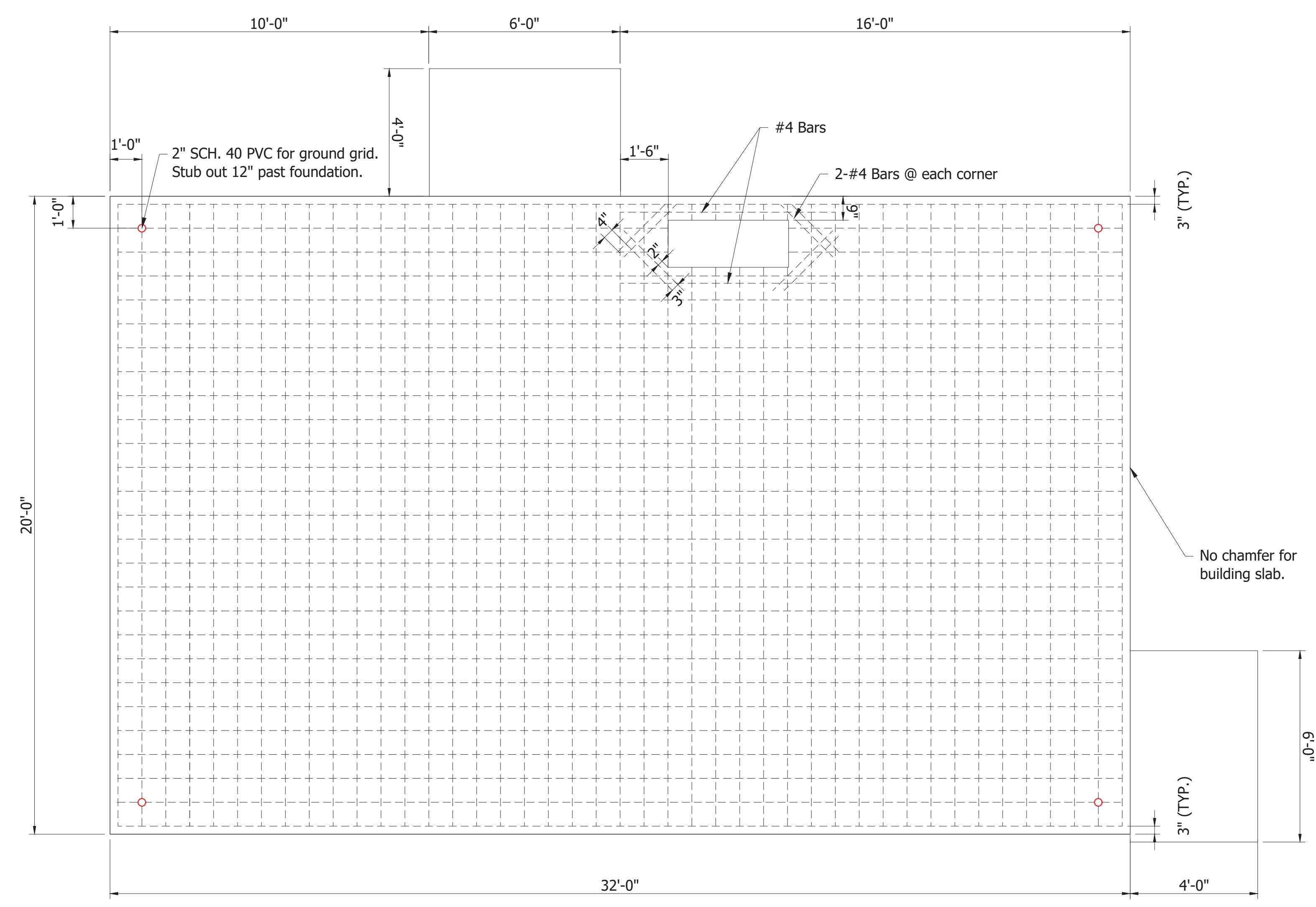


Brian C. Giltner
May 17, 2023

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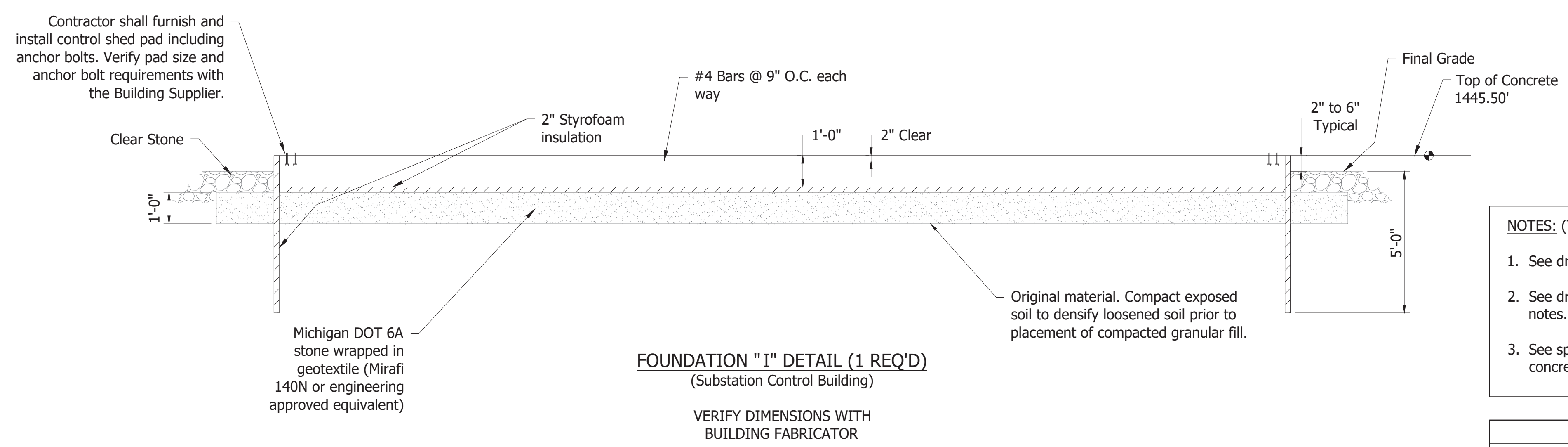


						FOUNDATION DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				www.powersystem.org 2424 Rimrock Rd., Suite 300 Madison, WI 53713 Tel: 866.825.8895			
0	ISSUED FOR BID	GB	BG	05/16/2023	ENGR	N. HALL	CHK'D/APP'D
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY	G. BODENSTEIN	DATE
				SCALE	3/8" = 1'-0"	PROJECT NO.	MI0592107
				FILE NAME	IRT-03-05	DRAWING NO.	03-05



FOUNDATION "I" DETAIL (ALTERNATE - SPREAD FOOTING)
(Substation Control Building)
Typical exterior wall section - N.T.S.

PLAN VIEW



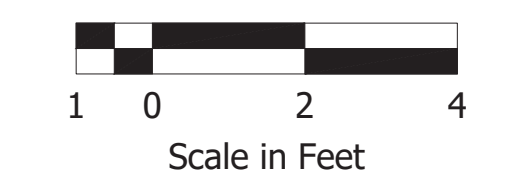
FOUNDATION "I" DETAIL (1 REQ'D)
(Substation Control Building)
VERIFY DIMENSIONS WITH BUILDING FABRICATOR

- NOTES: (Typical for all details)
1. See drawing 03-01 for foundation plan.
 2. See drawing 03-04 for foundation detail notes.
 3. See specification 030100 for cast in place concrete requirements.

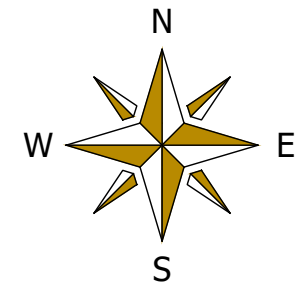
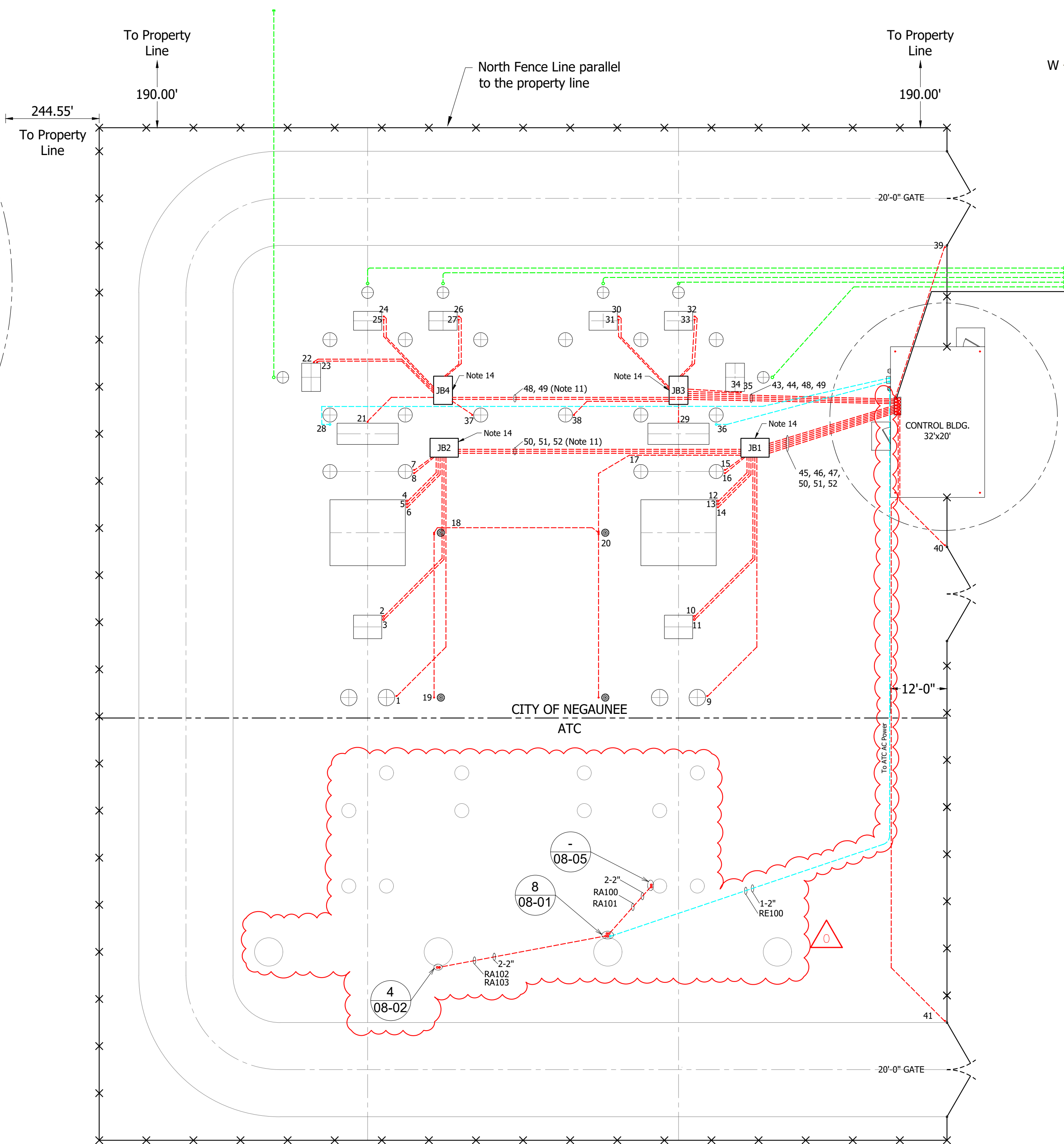
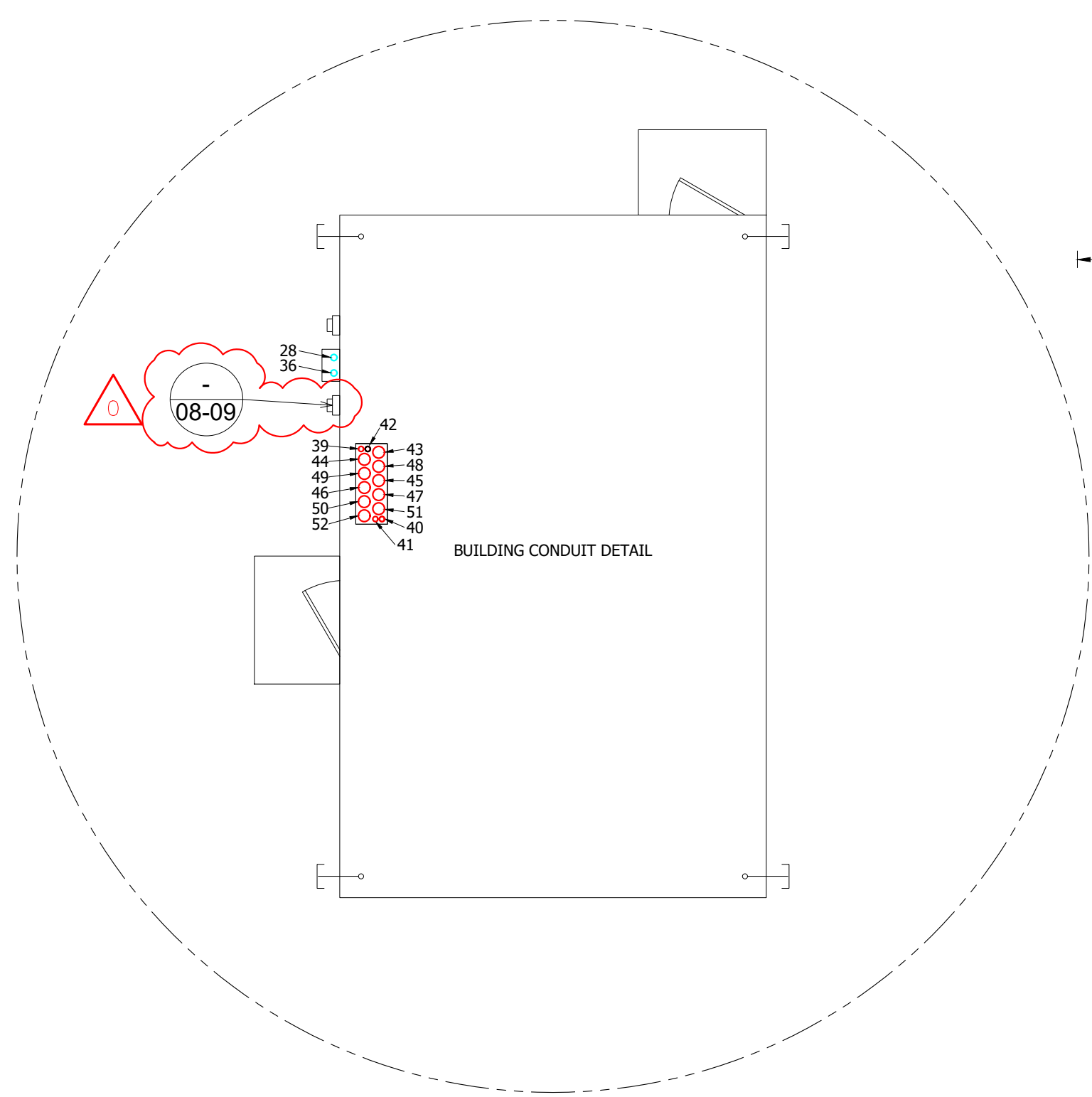


Signature of Brian C. Giltner
May 17, 2023

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						FOUNDATION DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				<small>www.powersystem.org 2424 Rimrock Rd., Suite 300 Madison, WI 53713 Tel: 866.825.8895</small>			
0	ISSUED FOR BID	GB	BG	05/16/2023	ENGR	N. HALL	CHK'D/APP'D ..
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY	G. BODENSTEIN	DATE 7/27/2022
				SCALE	3/8" = 1'-0"	PROJECT NO.	MI0592107
				FILE NAME	IRT-03-06	DRAWING NO.	03-06



NOTES:

- See cable schedule on drawing 04-01 for conductor information.
- PVC conduit shall have expansion couplings every 100' minimum, and at least one expansion coupling in each run.
- Control conduit shall be installed at approximately 2'-6" below top of crushed stone and may need to be deeper to accommodate wide sweep elbows.
- Power (Feeder) conduit shall be installed at approximately 3'-6" below top of crushed stone and may need to be deeper to accommodate wide sweep elbows. Run feeder conduit 10' outside fence.
- Conduit installations shall be complete including connections to equipment control cabinets.
- Conduits stubbed up for future use shall be capped with a durable weather resistant cap.
- All conduits that penetrate the oil containment systems geo composite clay liner shall be sealed at those locations as required by the liner manufacturer to maintain the integrity of the oil containment system.
- Conduit locations may need to be field modified to avoid conflicts. Contractor shall verify location of equipment and control boxes before installing conduit.
- Mark capped conduits for future locating.
- All conduits shall be permanently labeled to identify them per the conduit plan.
- Conduit buried and routed around junction box. This conduit shall not enter the junction box.
- Conduit under the drive area shall be covered with a 2" x 12" treated wood plank. Ground above feeder conduit shall be well compacted before ground covering and gravel is put down.
- All conduit shall have a nylon pull rope left in place.
- Direct buried junction box, fiberglass reinforced, polymer concrete, rated for heavy traffic. Box to include cover and any necessary extensions to coordinate with conduit installation. Approximate size 72" L x 48" W x 24" D. Quazite, CDR or approved equal.
- Maintain adequate space between conduits when entering junction box so cables do not cross other conduit openings.
- Location of emergency lighting. See Lighting and Conduit Detail on drawing 03-11.

ATC NOTES:

- All conduit shall be constructed in accordance with the ATC Construction Specification Section 26 05 43, latest edition.

REFERENCE DRAWINGS:

ATC EXTERIOR CABLE CHART ----- IRT-04-03

Conduit #	Conduit Size	Cables
1	2 1/2" Sch 40 PVC	Future
2	4" Sch 40 PVC	110, 111, 112
3	4" Sch 40 PVC	113, 114, 115
4	4" Sch 40 PVC	120, 121, 125
5	4" Sch 40 PVC	122, 123, 124
6	2 1/2" Sch 40 PVC	Future
7	2 1/2" Sch 40 PVC	130, 131
8	2 1/2" Sch 40 PVC	Future
9	2 1/2" Sch 40 PVC	Future
10	4" Sch 40 PVC	210, 211, 212
11	4" Sch 40 PVC	213, 214, 215
12	4" Sch 40 PVC	220, 221, 225
13	4" Sch 40 PVC	222, 223, 224
14	2 1/2" Sch 40 PVC	Future
15	2 1/2" Sch 40 PVC	230, 231
16	2 1/2" Sch 40 PVC	Future
17	2 1/2" Sch 40 PVC	20
18	2 1/2" Sch 40 PVC	20A
19	2 1/2" Sch 40 PVC	20B
20	2 1/2" Sch 40 PVC	20C
21	2 1/2" Sch 40 PVC	Future
22	2 1/2" Sch 40 PVC	Future
23	2 1/2" Sch 40 PVC	Future
24	2 1/2" Sch 40 PVC	301
25	2 1/2" Sch 40 PVC	Future
26	2 1/2" Sch 40 PVC	302
27	2 1/2" Sch 40 PVC	Future
28	3" Sch 40 PVC	1
29	2 1/2" Sch 40 PVC	Future
30	2 1/2" Sch 40 PVC	303
31	2 1/2" Sch 40 PVC	Future
32	2 1/2" Sch 40 PVC	304
33	2 1/2" Sch 40 PVC	Future
34	2 1/2" Sch 40 PVC	Future
35	2 1/2" Sch 40 PVC	Future
36	3" Sch 40 PVC	2
37	2 1/2" Sch 40 PVC	Future
38	2 1/2" Sch 40 PVC	Future
39	2 1/2" Sch 40 PVC	Future
40	2 1/2" Sch 40 PVC	Future
41	2 1/2" Sch 40 PVC	Future
42	2 1/2" Sch 40 PVC	Fiber
43	6" Sch 40 PVC	JB3 to Control Building
44	6" Sch 40 PVC	JB3 to Control Building
45	6" Sch 60 PVC	JB1 to Control Building
46	6" Sch 60 PVC	JB1 to Control Building
47	6" Sch 60 PVC	JB1 to Control Building
48	6" Sch 40 PVC	JB4 to Control Building
49	6" Sch 40 PVC	JB4 to Control Building
50	6" Sch 60 PVC	JB2 to Control Building
51	6" Sch 60 PVC	JB2 to Control Building
52	6" Sch 60 PVC	JB2 to Control Building

Other conduits as shown on the conduit plan, drawing 03-10, and cable schedule drawings 04-01 and 04-02.

CONDUIT LEGEND

- Conduit for 15kV cable (6" PVC)
- Conduit for control & communications
- Conduit for service power
- Conduit for Future Fiber
- RX### ATC Conduit Identification
- Direct buried pvc conduit (Qty and size indicated)

REV CLOUD LEGEND

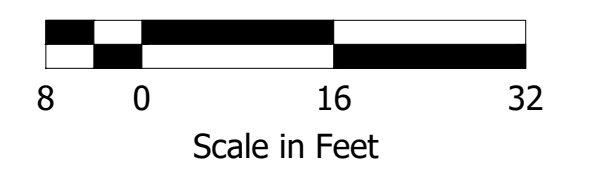
 = REVISION CLOUD FOR ATC W.O. #605015

DRAWING APPROVAL
PLEASE CIRCULATE DRAWING(S)
IN ORDER SHOWN BELOW:
Comments are needed by : BV, 04/17/23

	Name	Initial	Code	Date
PLN				
OPS				
PROT				
SCADA				
MAINT				
DE				
IT				
OTHER				

Codes: A = Approved for final
B = Approved with comments
C = Revise and resubmit

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NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	ENGR. APPROV.	DATE	FILE NAME
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0	ISSUED FOR REVIEW - ATC W.O. #605015	KAW	JWS	03-22-23			

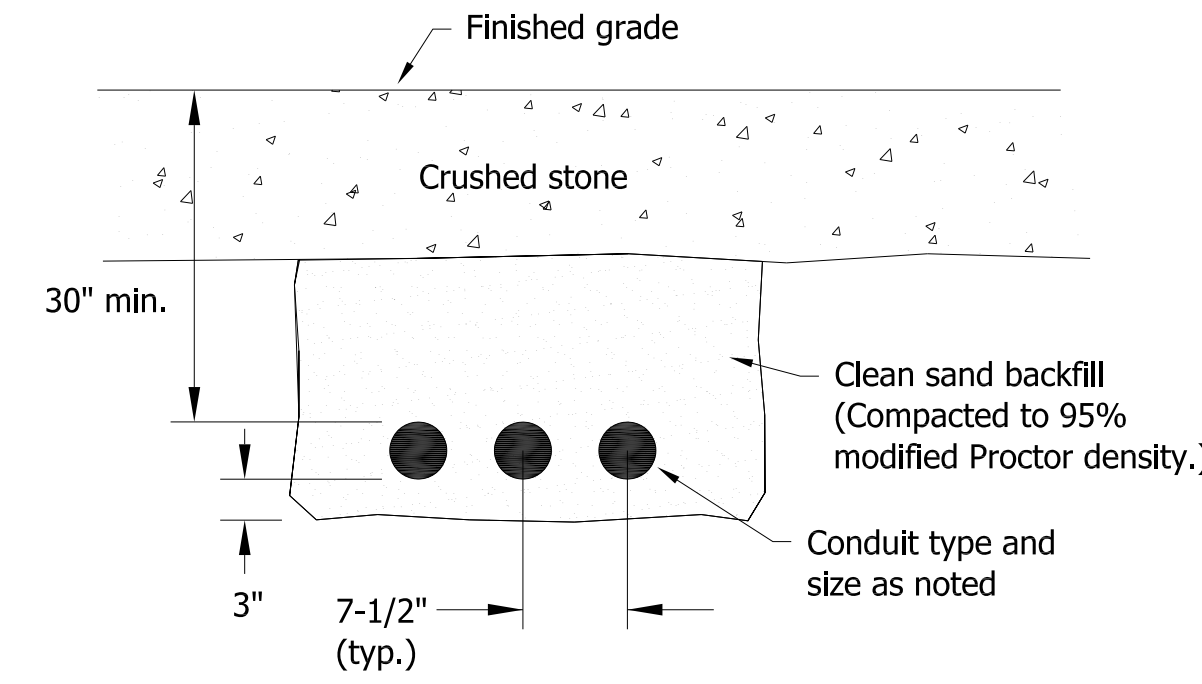
www.powersystem.org 2424 Rimrock Rd, Suite 300
Madison, WI 53713
Tel: 866.825.8995

**CONDUIT PLAN
IRONTOWN SUBSTATION
CITY OF NEGAUNEE, MI**

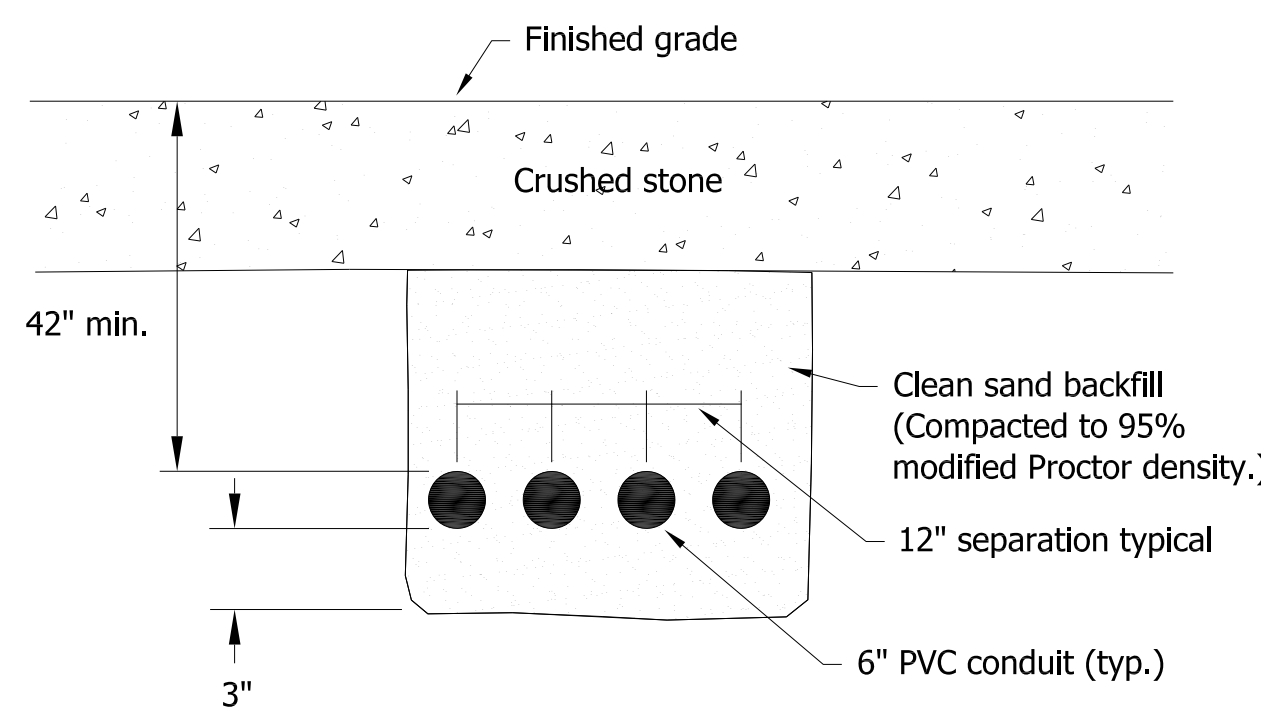
SCALE 1/16" = 1'-0"
PROJECT NO. MI0592107
DRAWING NO. 03-10

NOTE:

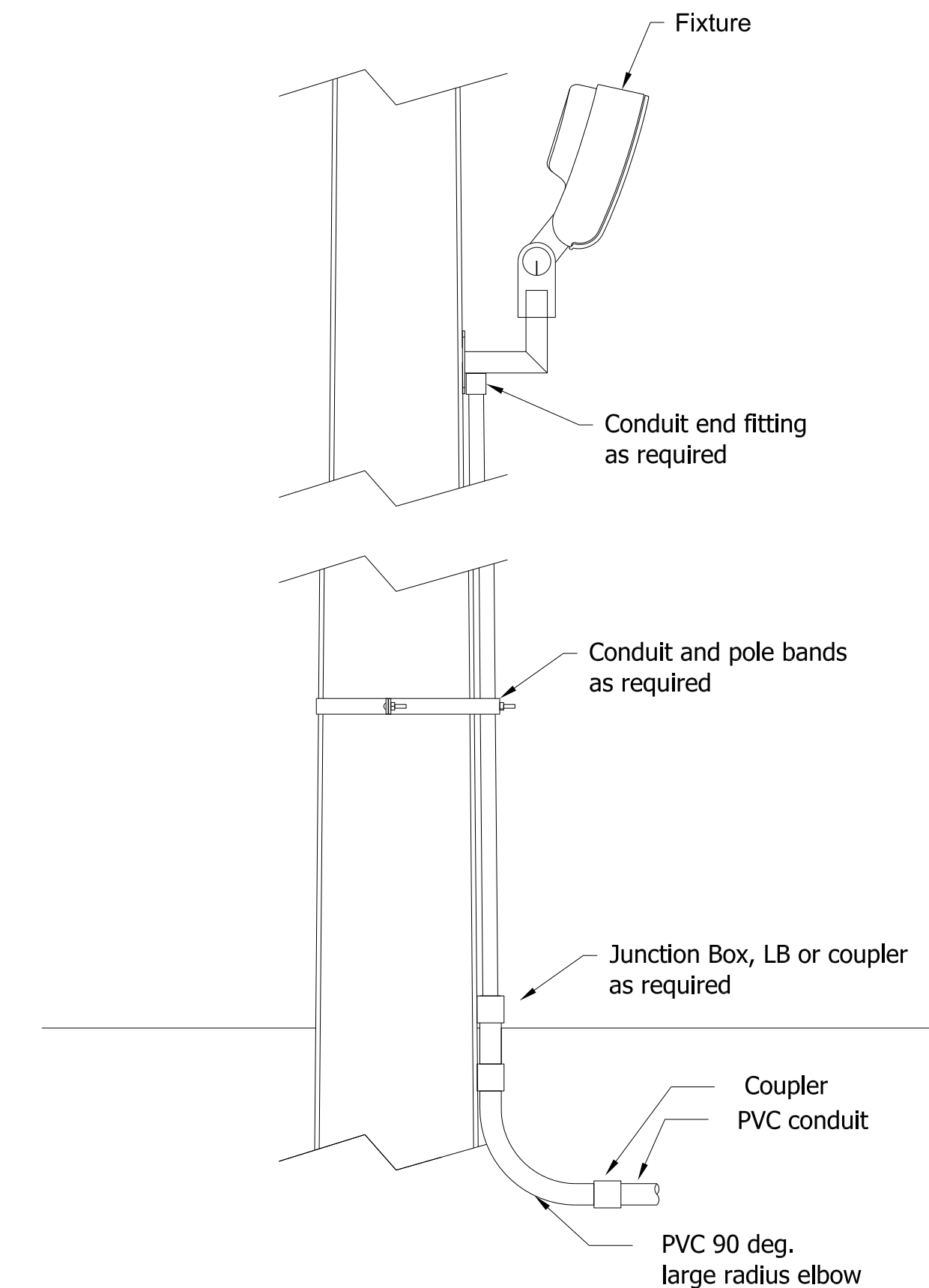
1. Minimum depth of conduit is 30" below top of crushed stone for 600V cable and 42" for 15kV cable. Conduit may need to be deeper to allow room for elbows to stub up into box/trench.
2. See conduit plan drawing for additional conduit information.
3. Conduit can enter box/trench through the side or at an angle if required.
4. Slope conduit to drain away from building.
5. See drawing 03-10 for conduit locations.
6. Fixture for Emergency Lighting 400 Watt equivalent 120 Volt LED Floodlight or equal, furnished by owner. Mounting swivel, galvanized pipe, light base and all other necessary components furnished and installed by above grade contractor. Lighting foundation furnished and installed by below grade contractor.



CONTROL, METERING, OR 120/240 VOLT POWER CONDUIT BURIAL DETAIL
Not to scale

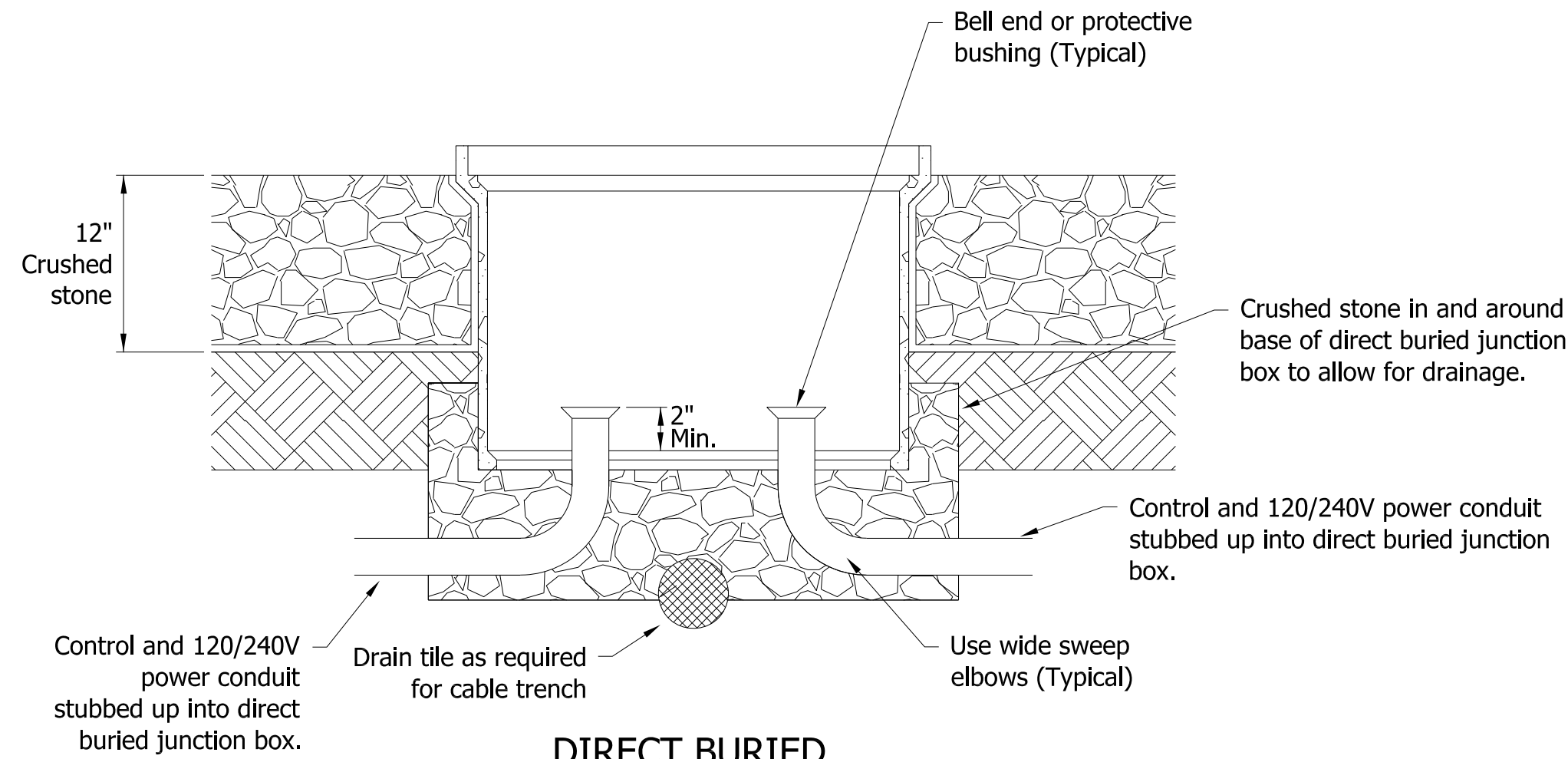


HIGH VOLTAGE POWER CONDUIT BURIAL DETAIL
Not to scale

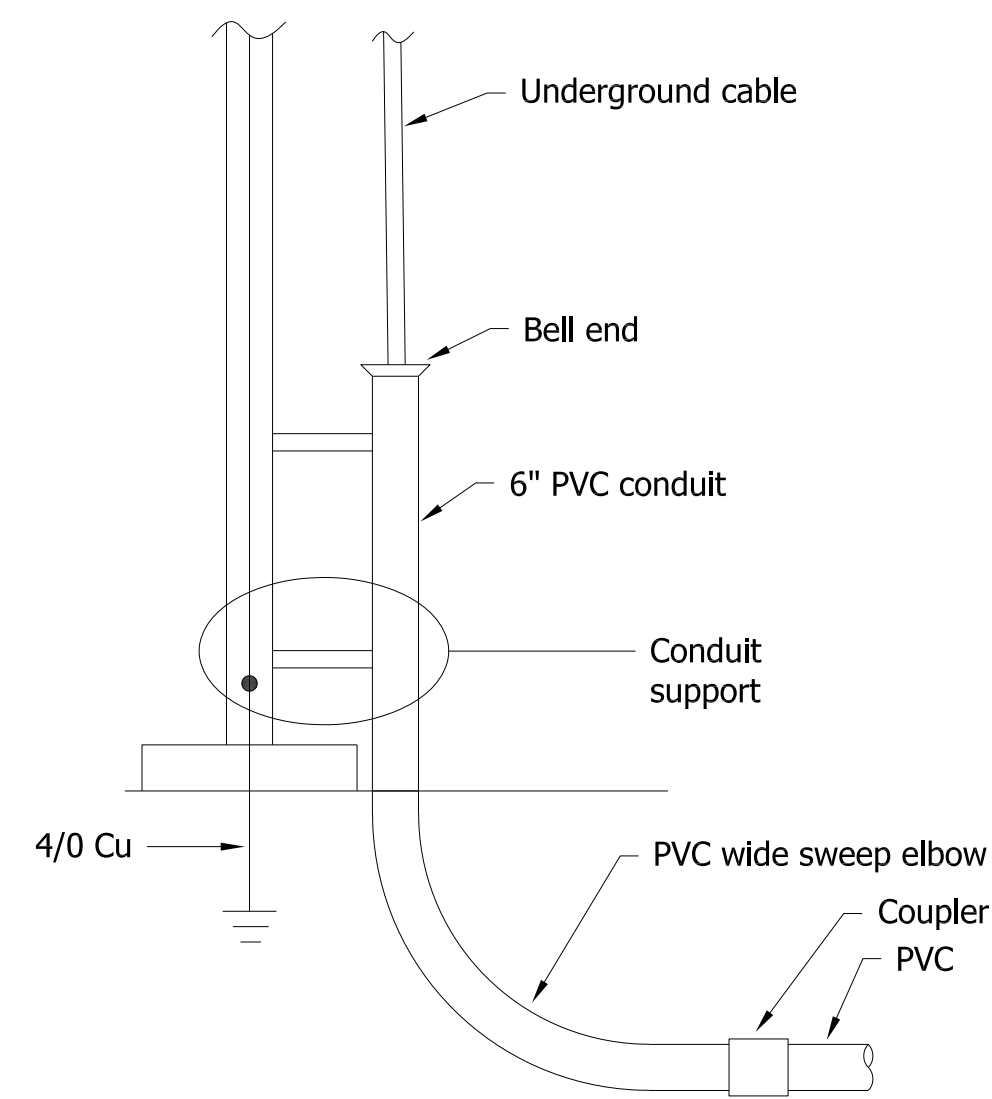


LIGHTING AND CONDUIT DETAIL FOR DIRECT BURIED MAST
Not to Scale

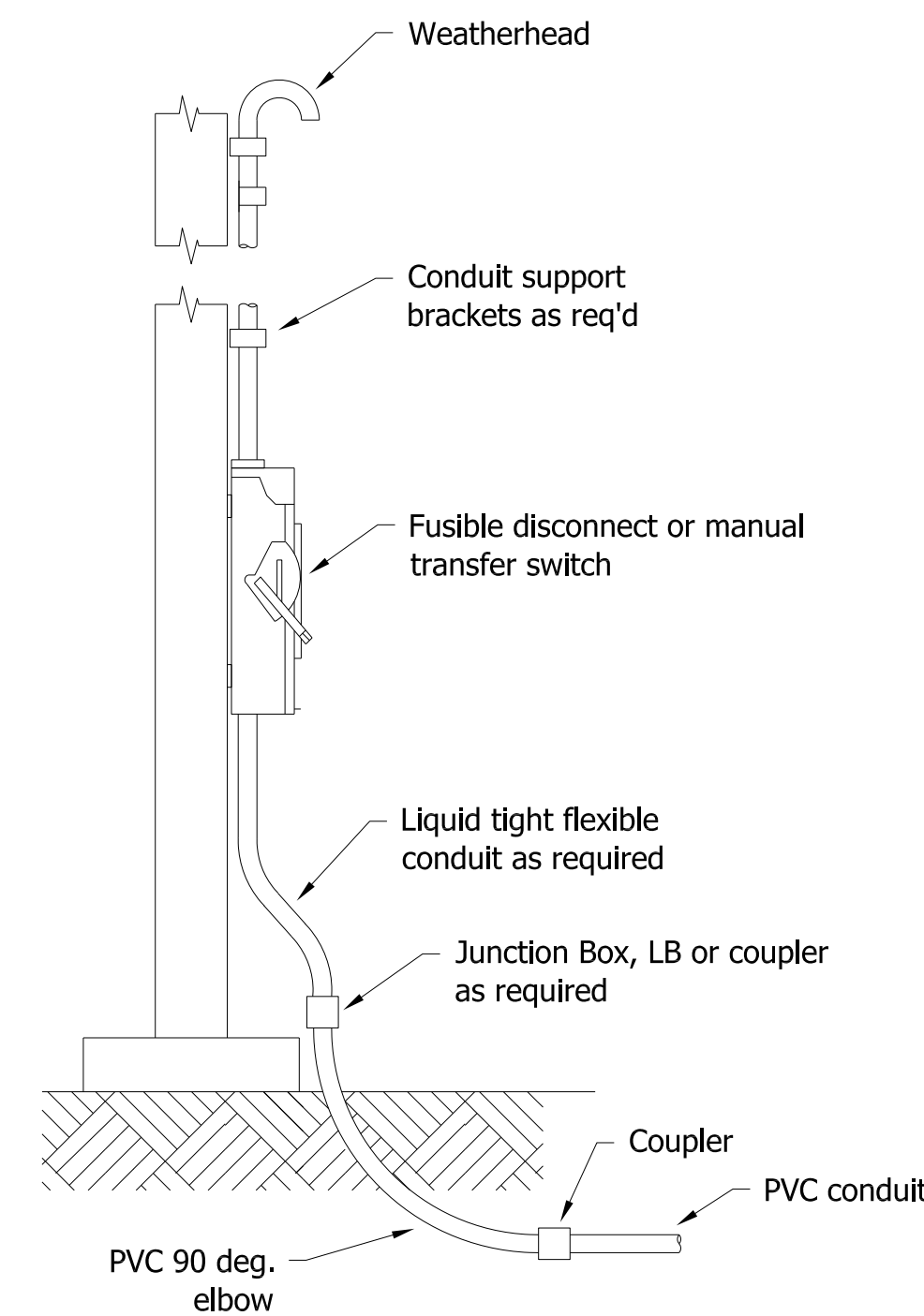
PRELIMINARY NOT FOR CONSTRUCTION



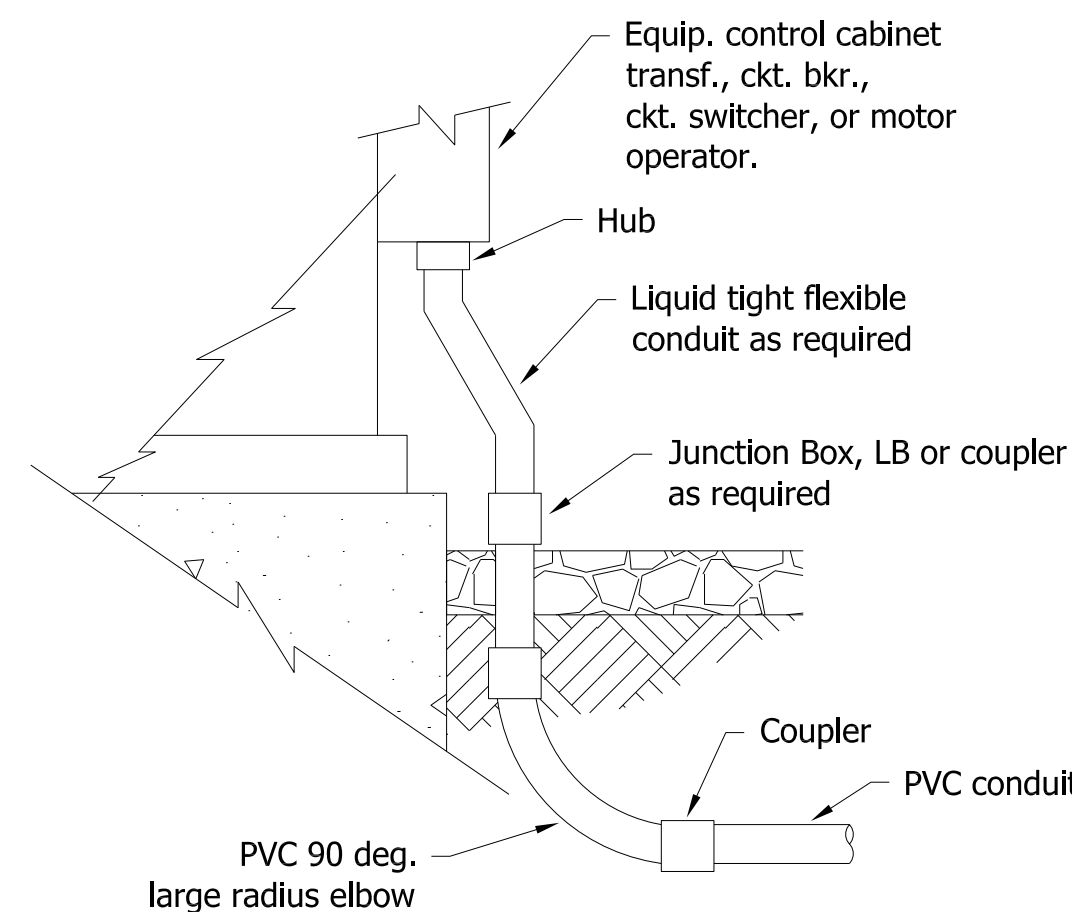
DIRECT BURIED JUNCTION BOX/CABLE TRENCH DETAIL
Not to Scale



TYPICAL CONDUIT DETAIL FOR RISER STANDS
Not to Scale

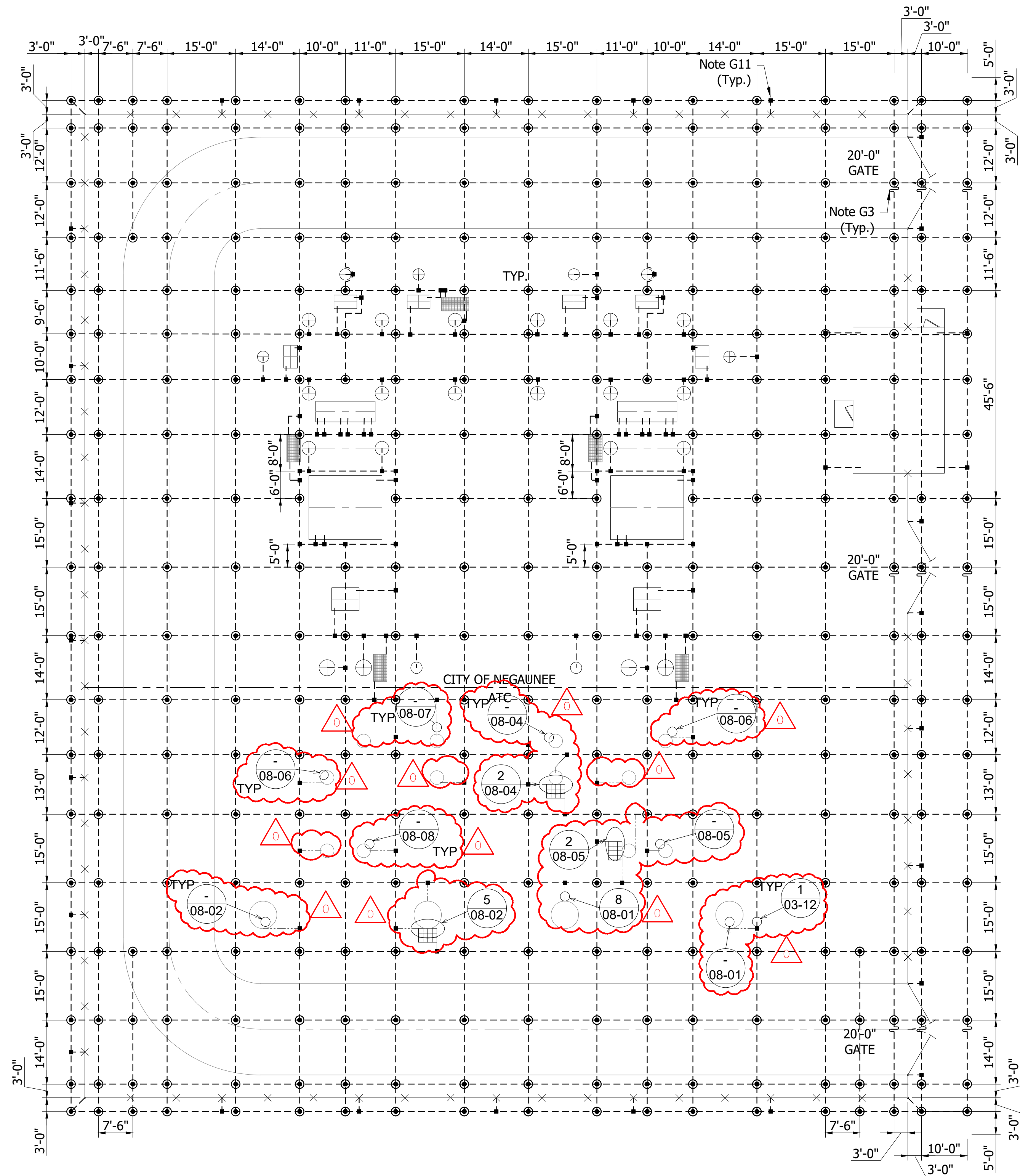


TYPICAL RISER TO STATION SERVICE TRANSFORMERS



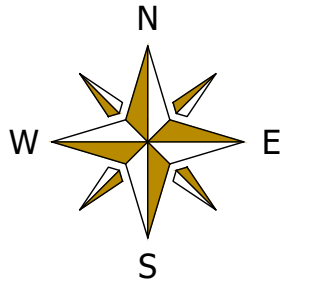
TYPICAL CONDUIT TO EQUIPMENT CABINET

						2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		CONDUIT DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI						
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHK'D	---	SCALE	N.T.S.	PROJECT NO.	MI0592107	DRAWING NO.	03-11
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DATE	2/2/2023	FILE	IRT-03-11				



GROUNDING NOTES:

- G1. Ground grid to be buried 18" below final grade.
- G2. The ground wire shall not be in tension after it is installed.
- G3. Allow for 2'-0" of slack under roadway at gate.
- G4. See Bill of Material for description of items.
- G5. Ground grid resistance to be less than 2Ω. Contractor to inform engineer when grid is installed for testing purposes. Engineer shall test substation ground grid resistance to remote earth using three probe fall of potential method after installation. If resistance is above required level, additional grounding may be required before stone surfacing is installed.
- G6. #2 Solid tinned cu. wire (S10T) to be interlaced with fence mesh as shown in grounding details.
- G7. The ground grid shall extend beyond the open gates as shown.
- G8. Attach ground conductor to transformer tank grounding pads.
- G9. Ground conductor shall be cross connected through ground rod. See detail on drawing 03-21.
- G10. Ground conductor shall be brought up at each structure foundation and attached to the structure using a two conductor ground clamp.
- G11. Attach the ground grid conductor to the fence at each corner & gate post and to the fence line posts at about every 30'
- G12. See drawing 03-21 for grounding details.
- G13. All below grade grounding connections shall be exothermic welded connections per the specification.
- G14. All above grade connectors shall be bolted type connectors for easy removal.
- G15. Verify ground mat locations with substation supplier and equipment drawings before installation. Install clear stone to elevate ground mats as needed to level the ground mat in areas conflicting with the oil containment berms.
- G16. Modifications of ground grid locations to avoid conflicts with foundations and equipment may be required and shall be considered part of the work required in this contract.
- G17. Grounds that penetrate the oil containment system shall be sealed to maintain the integrity of the oil containment system. Seals shall be installed as recommended by the manufacturer of the oil containment materials.
- G18. Equipment and structure grounds or "stingers" consisting of bare conductors must connect each piece of substation equipment and steel structure to the ground grid.



ATC NOTES:

- 1. All grounding shall be in accordance with the ATC Construction Specification Section 33 79 00, latest edition.

LEGEND

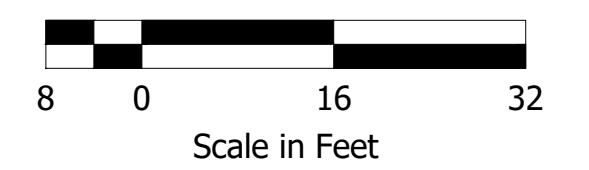
- Ground Grid Connection
- Ground Rod, 2-10'x 5/8" Copper Rod (20' total depth)
- #4/0 AWG, 19 Strand, Soft Drawn Copper
- × Substation Fence
- Ground Mat
- 19 - #9 CCS
- ATC 4' X 3' Switch Ground Mat

DRAWING APPROVAL
PLEASE CIRCULATE DRAWING(S)
IN ORDER SHOWN BELOW:
Comments are needed by : BV, 04/17/23

Name	Initial	Code	Date
PLN			
OPS			
PROT			
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OTHER			

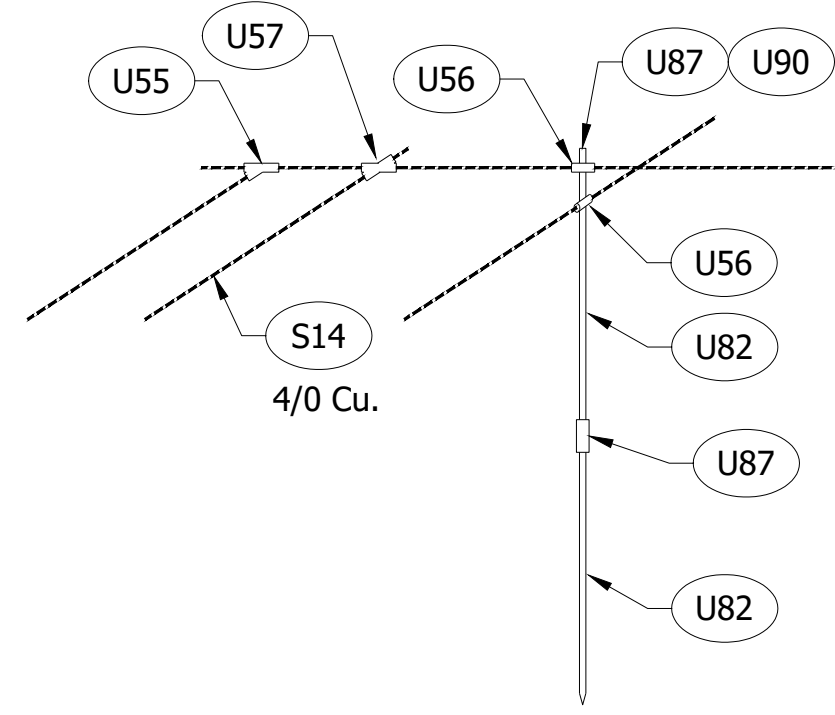
Codes: A = Approved for final
B = Approved with comments
C = Revise and resubmit

**PRELIMINARY
NOT FOR
CONSTRUCTION**

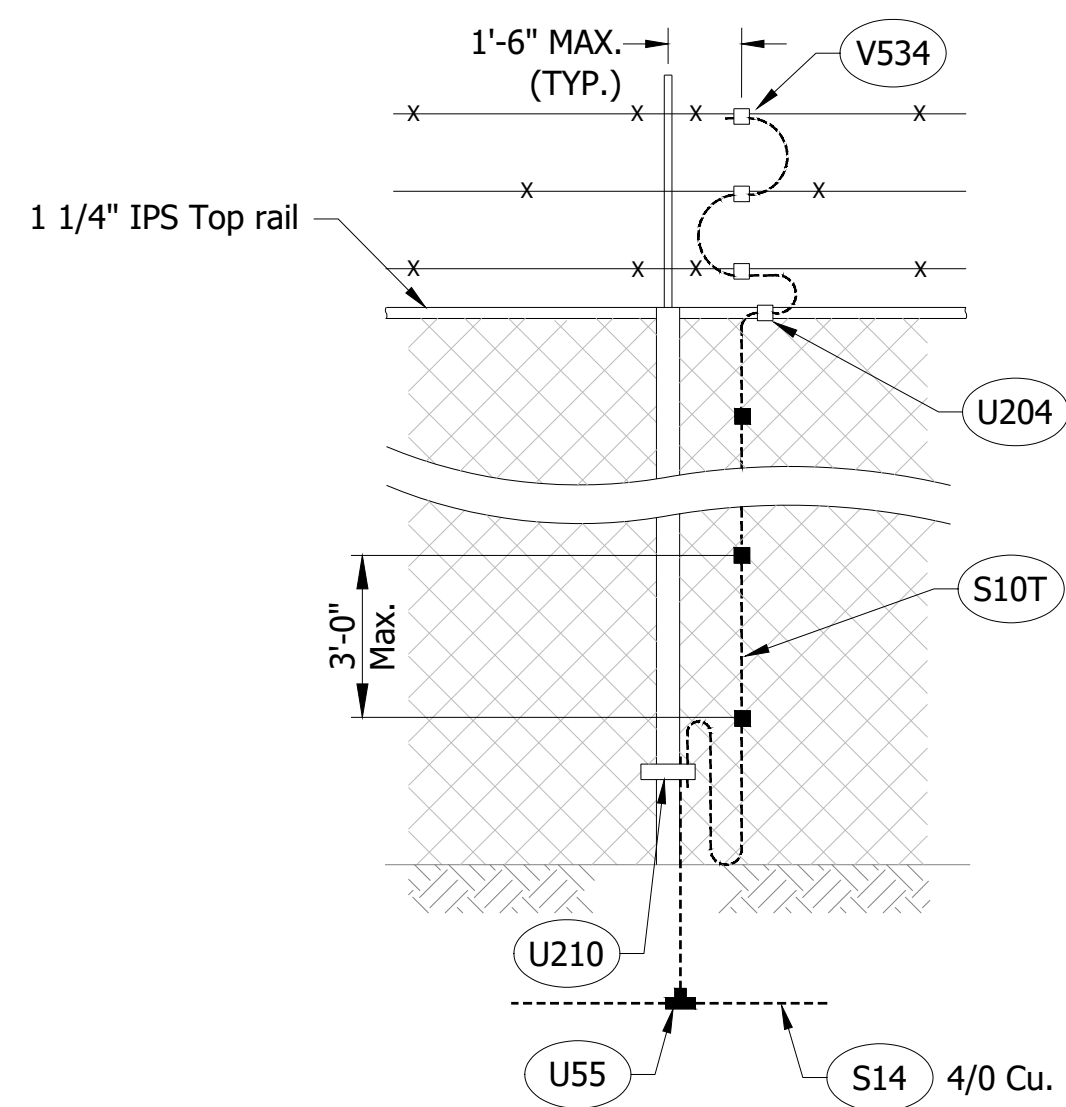


REV CLOUD LEGEND
= REVISION CLOUD FOR ATC W.O. #605015

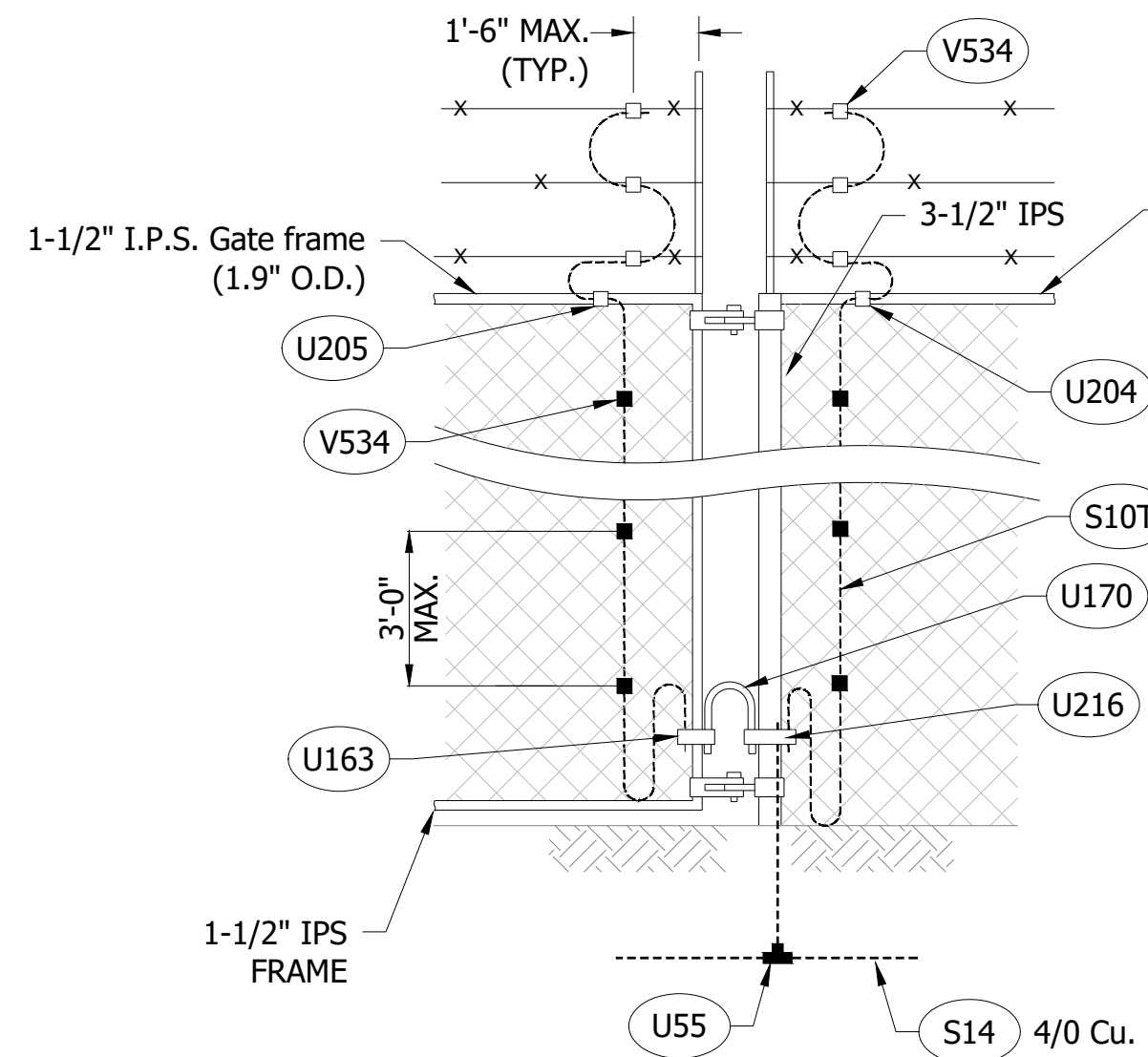
				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		GROUNDING PLAN IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI							
1	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHKD	S. PACKWOOD	SCALE	1/16" = 1'-0"	PROJECT NO.	M10592107	DRAWING NO.	03-20	
0	ISSUED FOR REVIEW - ATC W.O. #605015	KAW	JWS	03-22-23	DWN	G. BODENSTEIN	DATE	7/27/2022	FILE NAME	IRT-03-20					
NO. REVISION AND RECORD OF ISSUE													BY	ENGR.	DATE



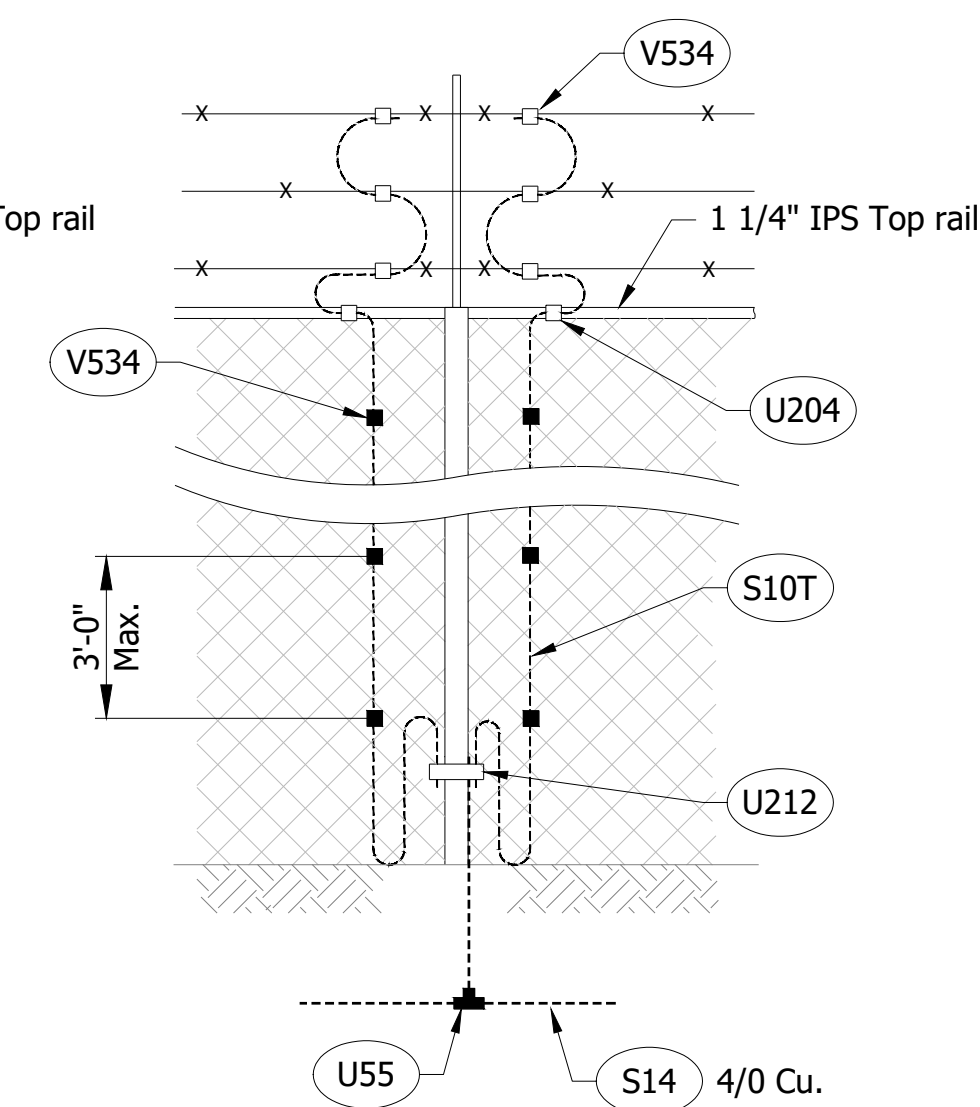
DETAIL 1
(Ground rod & ground conductor connection)



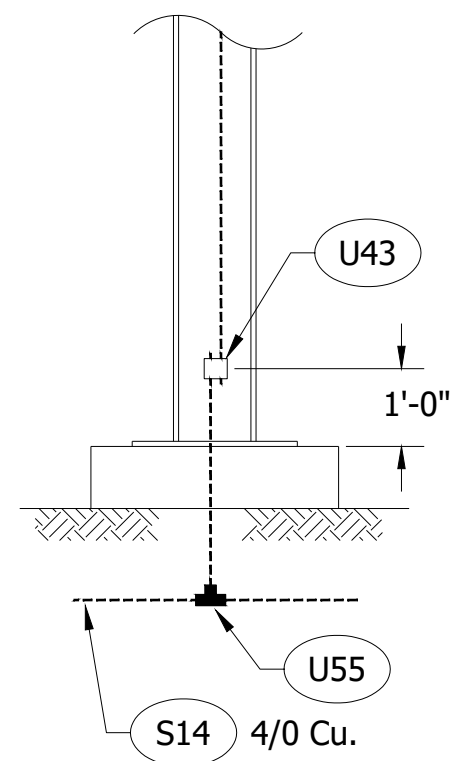
DETAIL 2
(Running fence grounding)
(2" IPS, 2.375" O.D.)



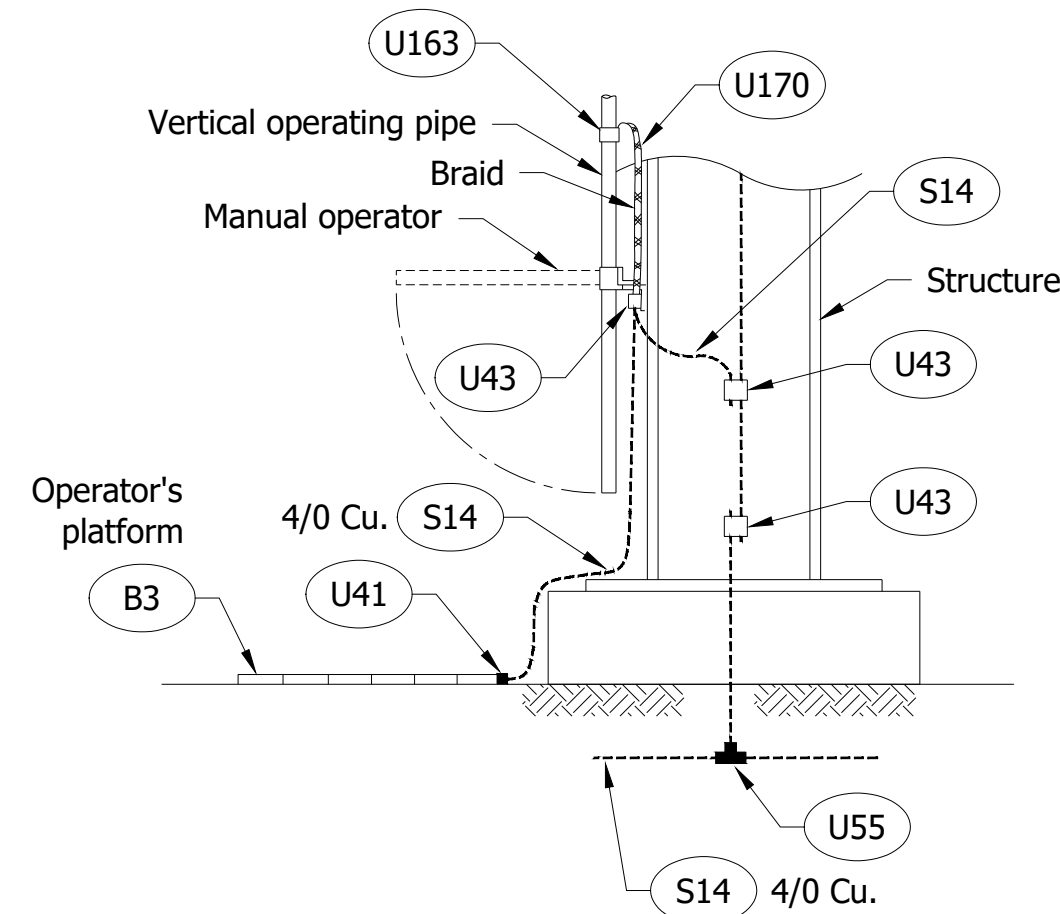
DETAIL 3
(Gate grounding)
(3-1/2" IPS, 4" O.D.)



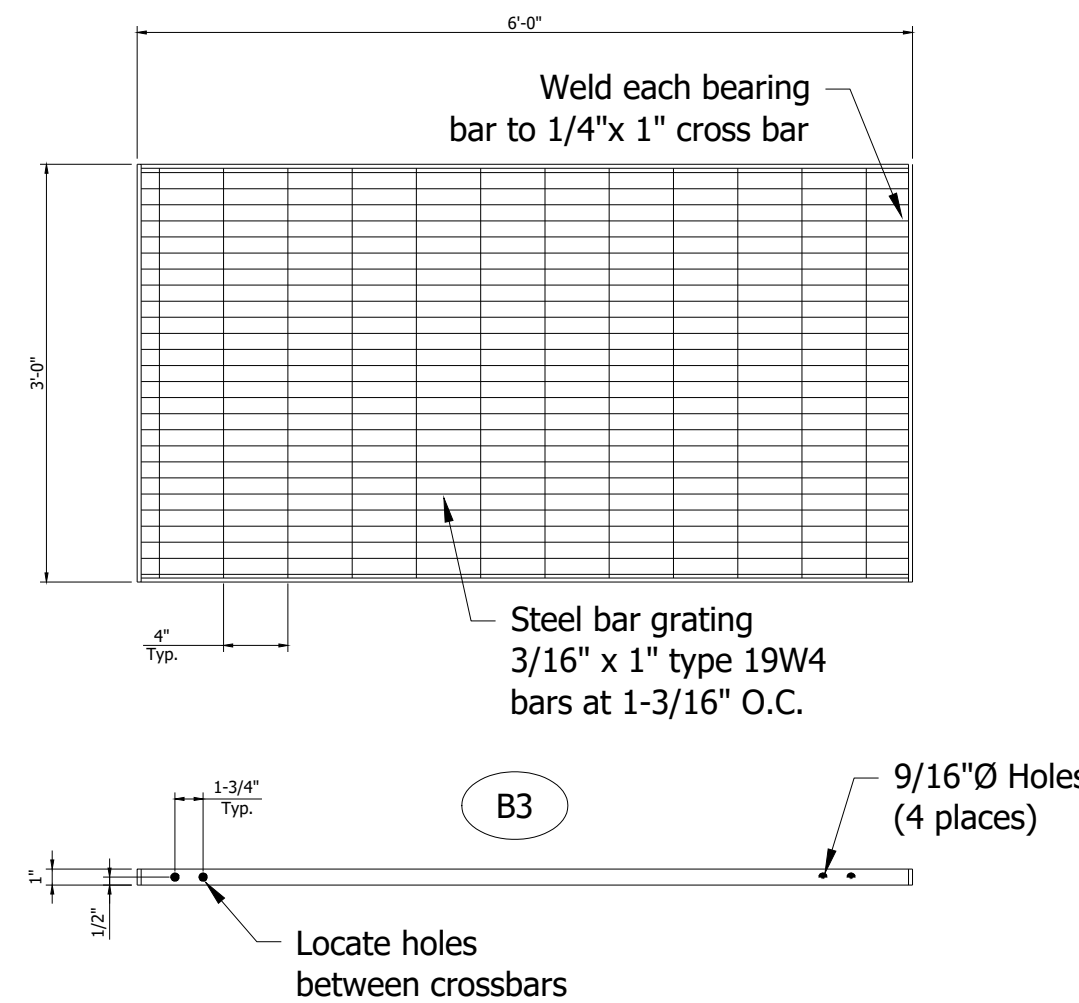
DETAIL 4
(Corner grounding)
(2-1/2" IPS, 2.875" O.D.)



DETAIL 6
(Structural grounding)

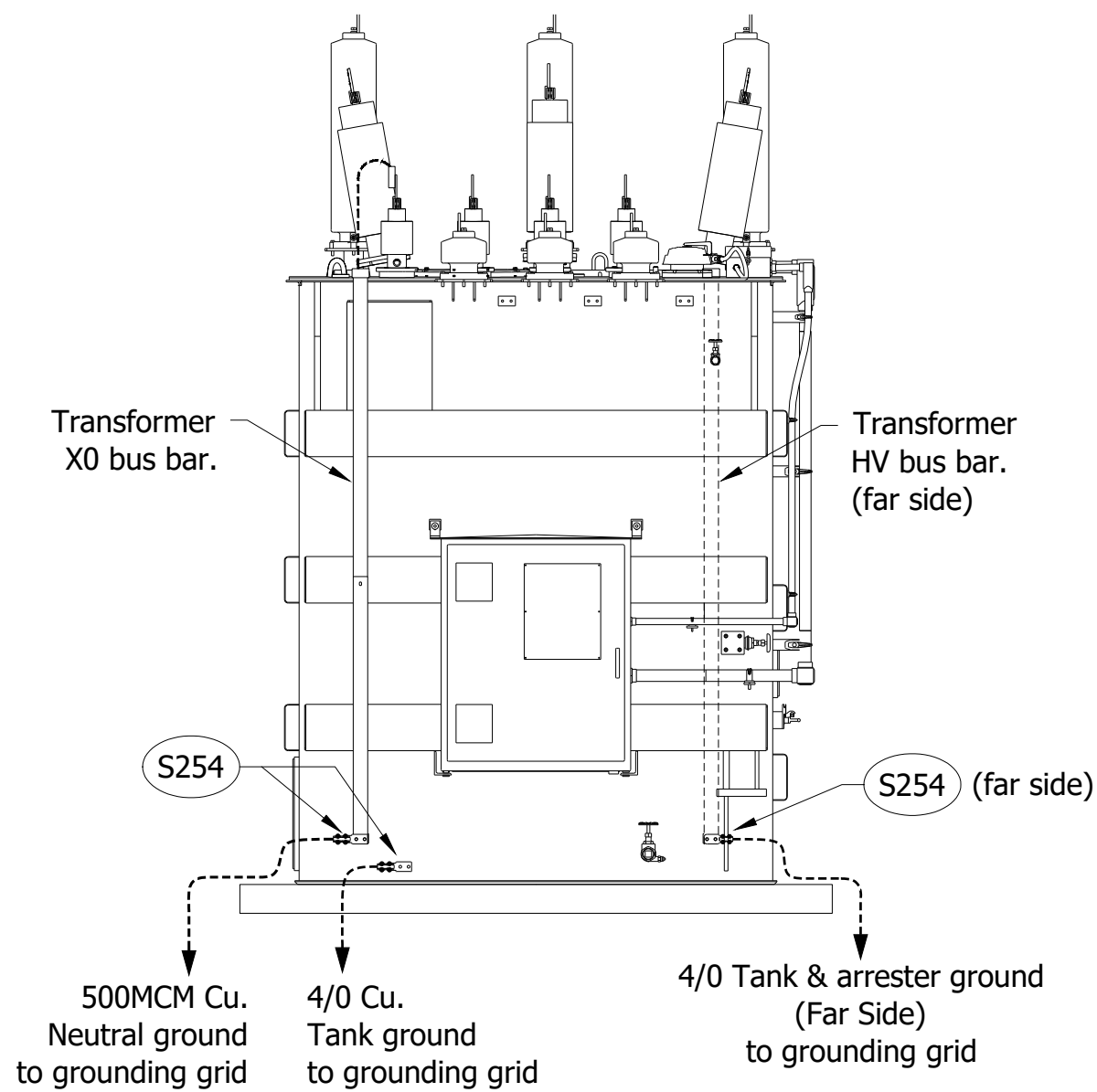


DETAIL 7
(Disconnect switch operator)
(Hand operated)

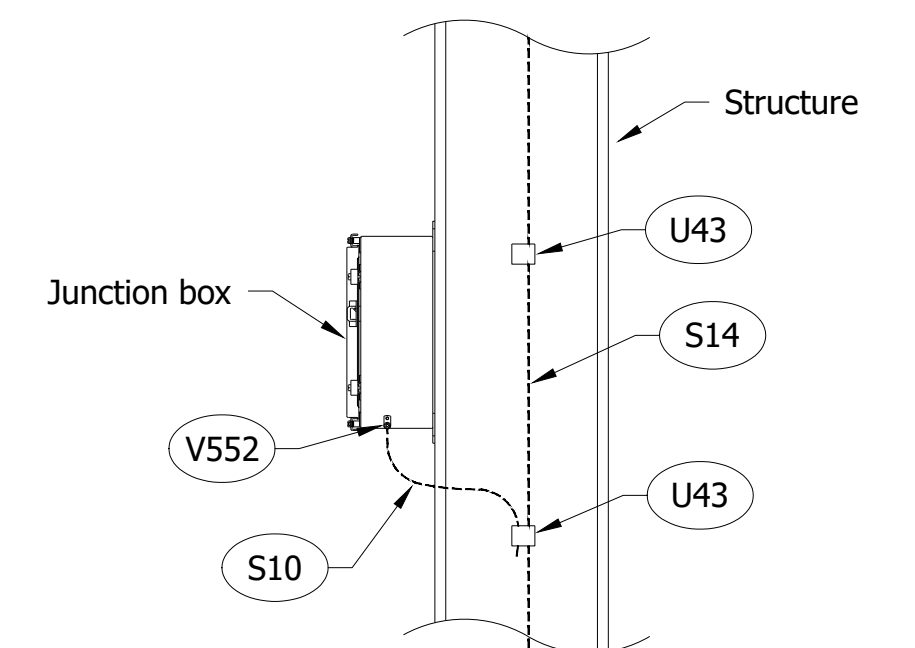


DETAIL 8
Operators platform detail

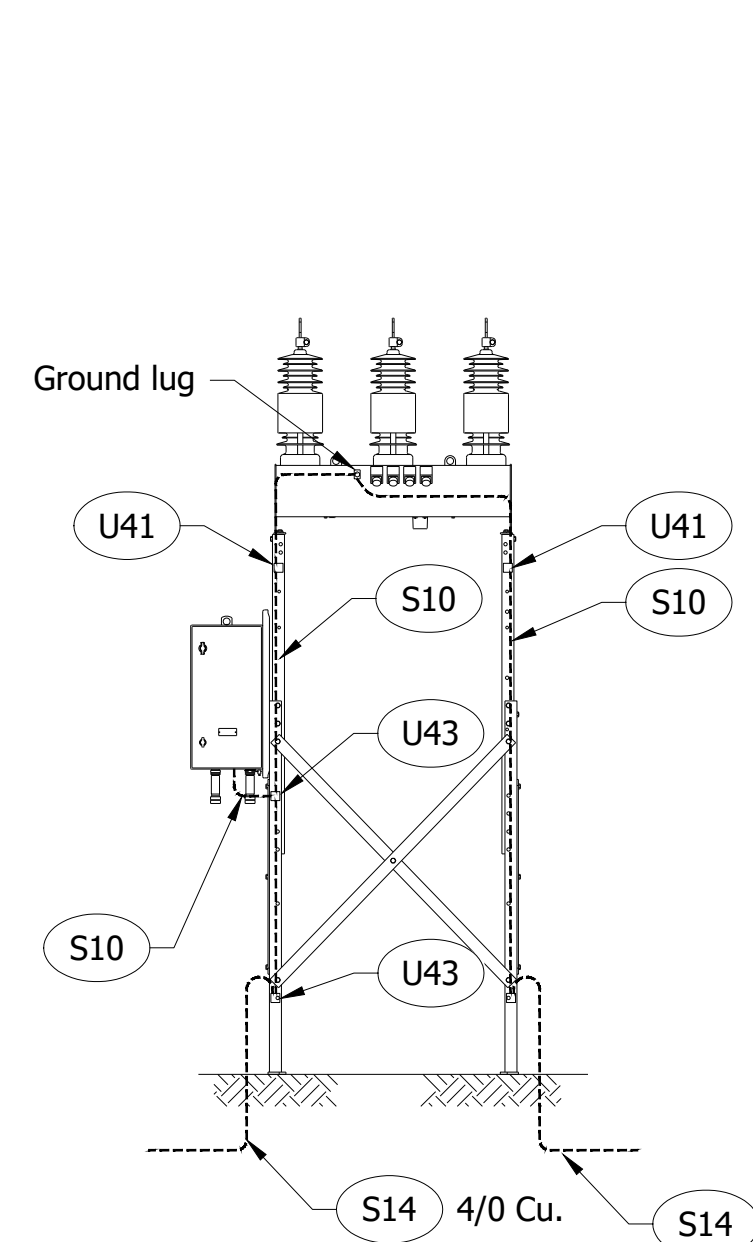
NOTE:
HOT DIP GALVANIZE AFTER WELDING PER ASTM A-123.
WEIGHT: 126 LBS.
SIMILAR COMMERCIALY AVAILABLE GROUNDING PLATFORMS ARE ACCEPTABLE - ENGINEER TO APPROVE



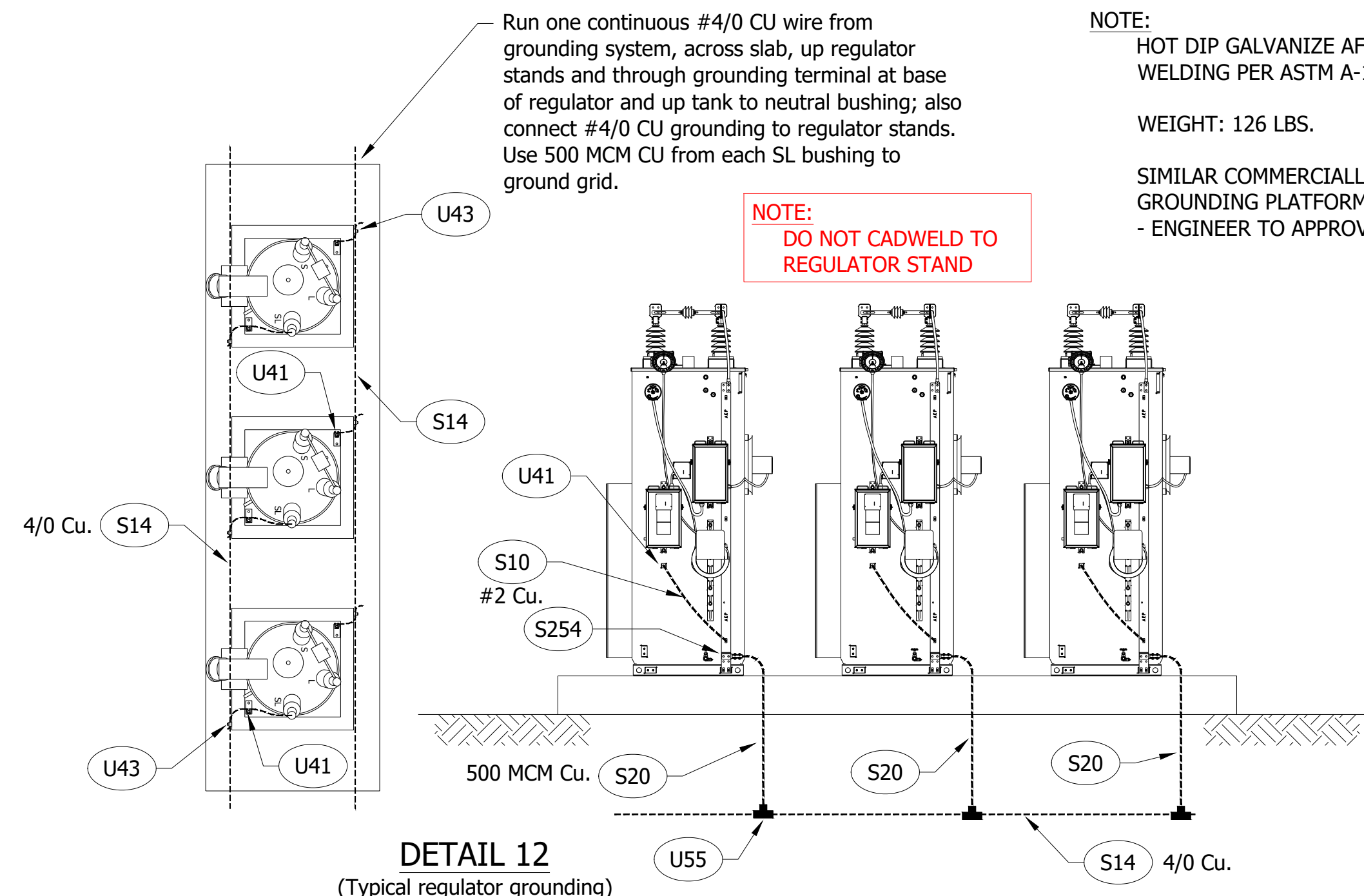
DETAIL 9
Transformer grounding (Typical)
(View of low voltage side)
(Run ground for High voltage side similarly)



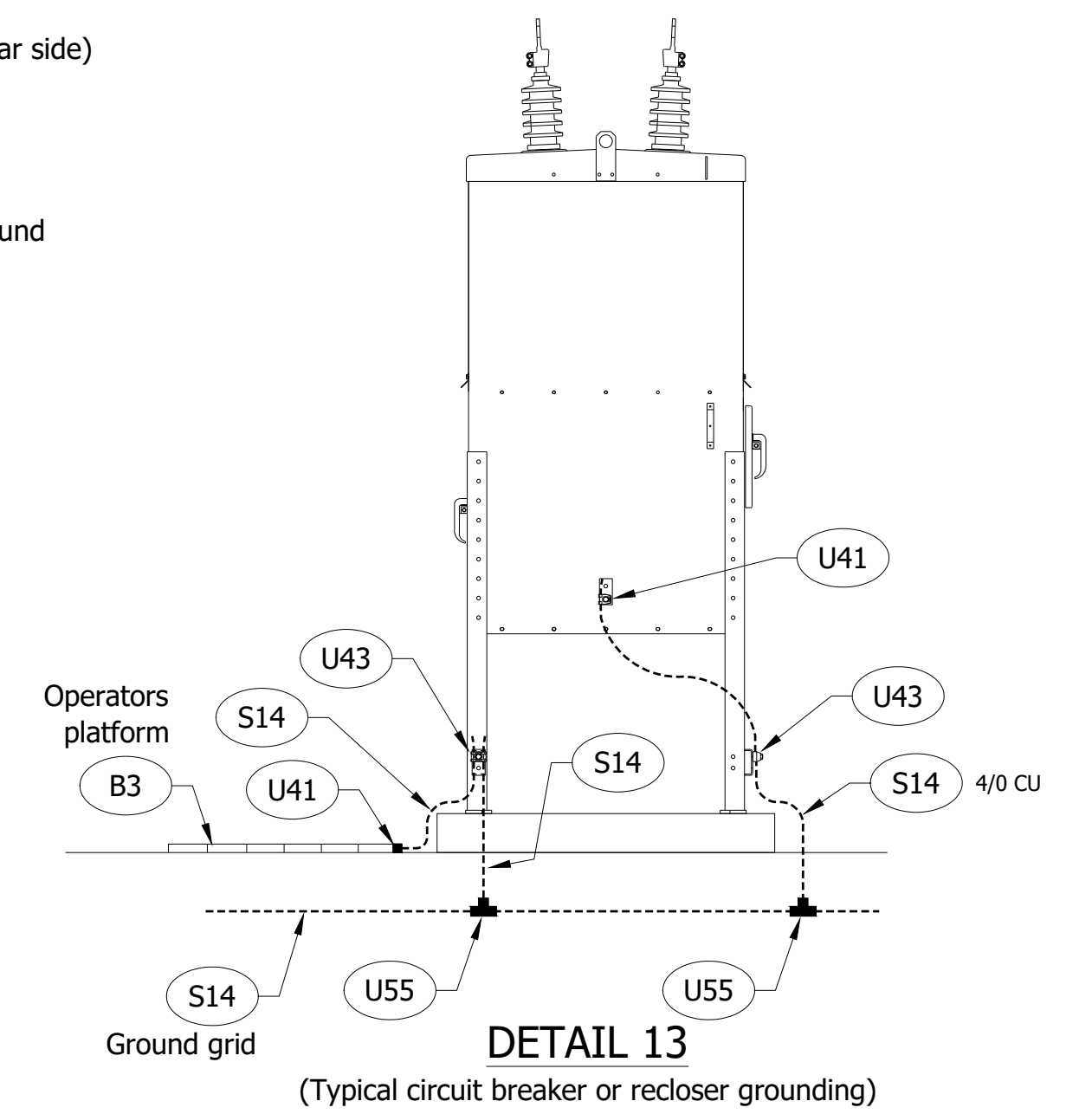
DETAIL 10
(Equipment cabinet or junction box grounding)



DETAIL 11
(Typical recloser grounding)



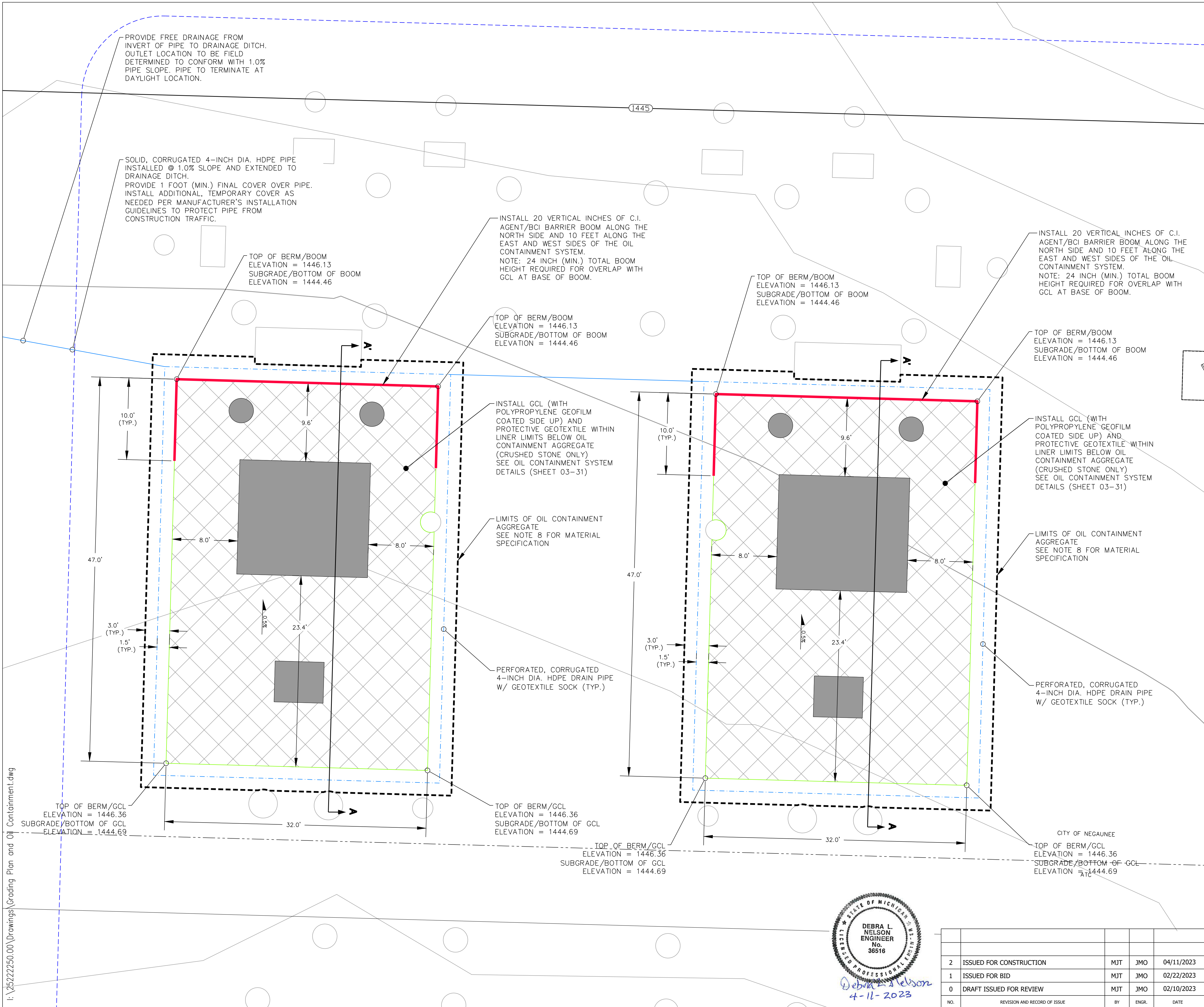
DETAIL 12
(Typical regulator grounding)



DETAIL 13
(Typical circuit breaker or recloser grounding)

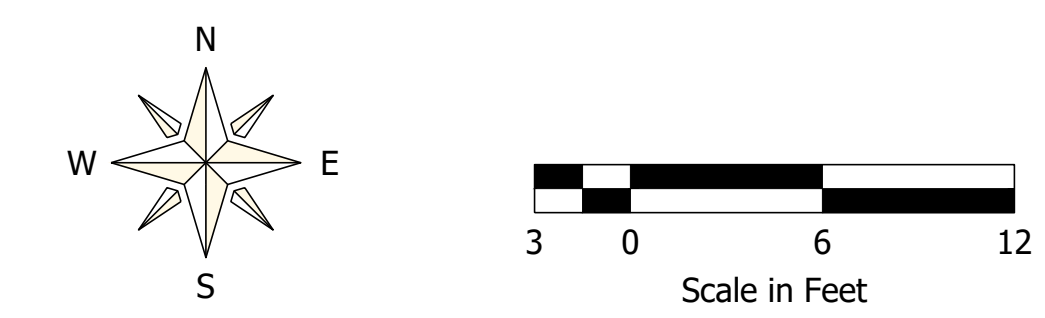
**PRELIMINARY
NOT FOR
CONSTRUCTION**

				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		GROUNDING DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL	CHK'D BY S. PACKWOOD	SCALE N.T.S.	PROJECT NO. MI0592107	DRAWING NO. 03-21
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 2/2/2023	FILE NAME IRT-03-21		



- LEGEND**
- 1425 — EXISTING GRADE (5' CONTOUR)
 - — EXISTING GRADE (1' CONTOUR)
 - (1440) — PROPOSED GRADE (5' CONTOUR)
 - — PROPOSED GRADE (1' CONTOUR)
 - PROPOSED LIMITS OF OIL CONTAINMENT AGGREGATE
 - ▨ PROPOSED OIL CONTAINMENT SYSTEM LINER/ LIMITS OF GEOSYNTHETIC CLAY LINER (GCL)
 - PROPOSED PERFORATED SUPPLEMENTAL OIL CONTAINMENT DRAIN PIPE
 - PROPOSED NON-PERFORATED SUPPLEMENTAL OIL CONTAINMENT DRAIN PIPE
 - 0.5% PROPOSED OIL CONTAINMENT SUBGRADE SLOPE
 - ▬ PROPOSED C.I. AGENT/BCI BARRIER BOOM
 - FOUNDATION WITHIN CONTAINMENT
 - FOUNDATION OUTSIDE OF CONTAINMENT

- NOTES:**
1. PROVIDE AND INSTALL SOLMAX BENTOLINER CNSL (OR APPROVED EQUIVALENT) GEOSYNTHETIC CLAY LINER (GCL) AND PROTECTIVE NONWOVEN GEOTEXTILE (10 OZ./SQ. YARD MIN.).
 2. CURRENT GCL MANUFACTURER INSTALLATION GUIDELINES ARE AVAILABLE FROM SOLMAX (800.435.2008). CONTRACTOR TO PROVIDE ALTERNATE LINER MANUFACTURER'S INSTALLATION SPECIFICATIONS, HANDLING, DELIVERY AND INSTALLATION GUIDELINES/RECOMMENDATIONS WITH REQUEST FOR USE OF AN ALTERNATE LINER PRODUCT.
 3. SHIP, HANDLE, STORE, PLACE, SEAM, AND REPAIR GCL ACCORDING TO THE GCL MANUFACTURER'S INSTALLATION GUIDELINES.
 4. PREPARE SUBGRADE ACCORDING TO GCL MANUFACTURER'S INSTALLATION GUIDELINES PRIOR TO GCL INSTALLATION.
 5. SEE DETAILS AND MANUFACTURER'S INSTALLATION GUIDELINES FOR GCL DETAILING (I.E., SEALING OF GCL AT PENETRATIONS AND TO FOUNDATIONS).
 6. PLACE OIL CONTAINMENT AGGREGATE (CRUSHED STONE ONLY) OVER GCL/PROTECTIVE GEOTEXTILE ACCORDING TO GCL MANUFACTURER'S INSTALLATION GUIDELINES.
 7. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF THE OIL CONTAINMENT LINER THROUGH FINAL ACCEPTANCE OF THE PROJECT.
 8. OIL CONTAINMENT AGGREGATE SHALL CONFORM TO MDOT STANDARD SPECIFICATIONS SECTION 902, COARSE AGGREGATE, CLASS 17A, AND HAVE A MINIMUM VOID RATIO OF 0.43. ONLY CRUSHED STONE MATERIALS WILL BE ACCEPTED. OTHER CRUSHED MATERIALS SHALL ONLY BE ALLOWED WITH PRIOR WRITTEN APPROVAL OF THE ENGINEER.
 9. OIL CONTAINMENT SYSTEM LAYOUT AND ELEVATIONS BASED ON ISSUED FOR BID FOUNDATION PLAN, DRAWING 03-01 BY PSE DATED 04/04/2023 AND THE TOPOGRAPHIC SURVEY BY COLEMAN ENGINEERING COMPANY DATED 07/25/2022.
 10. FIELD VERIFY ALL DIMENSIONS.



NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE
2	ISSUED FOR CONSTRUCTION	MJT	JMO	04/11/2023
1	ISSUED FOR BID	MJT	JMO	02/22/2023
0	DRAFT ISSUED FOR REVIEW	MJT	JMO	02/10/2023

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

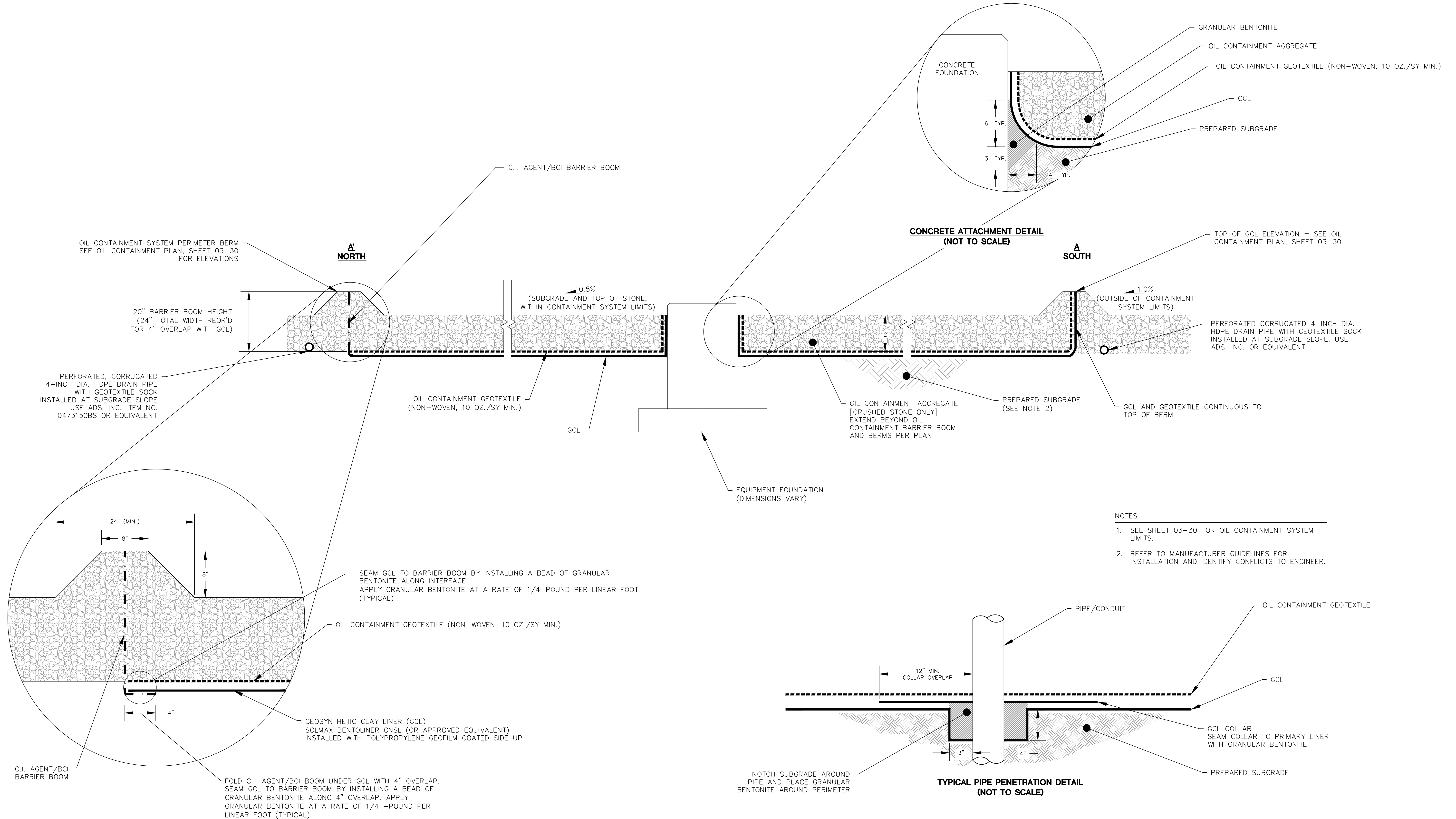
PSE Power System Engineering, Inc.
www.powersystem.org 2424 Rimrock Rd, Suite 300
Madison, WI 53713
Tel: 866.825.8995

**OIL CONTAINMENT PLAN
IRONTOWN SUBSTATION
CITY OF NEGAUNEE, MI**

ENGR. J. OMERNIK	CHIEF APPR. D. NELSON	SCALE 1" = 10'	PROJECT NO. MI0592107	DRAWING NO. 03-30
OWN BY M. THOMPSON	DATE 04/11/2023	FILE NAME IRT-03-30		

I:\25222250.00\Drawings\Grading\Oil Containment.dwg

I:\25222250\Drawings\Grading\Oil Containment.dwg



- NOTES
- SEE SHEET 03-30 FOR OIL CONTAINMENT SYSTEM LIMITS.
 - REFER TO MANUFACTURER GUIDELINES FOR INSTALLATION AND IDENTIFY CONFLICTS TO ENGINEER.

**BARRIER BOOM/GCL SEAMING DETAIL
(NOT TO SCALE)**

**TYPICAL PIPE PENETRATION DETAIL
(NOT TO SCALE)**



SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

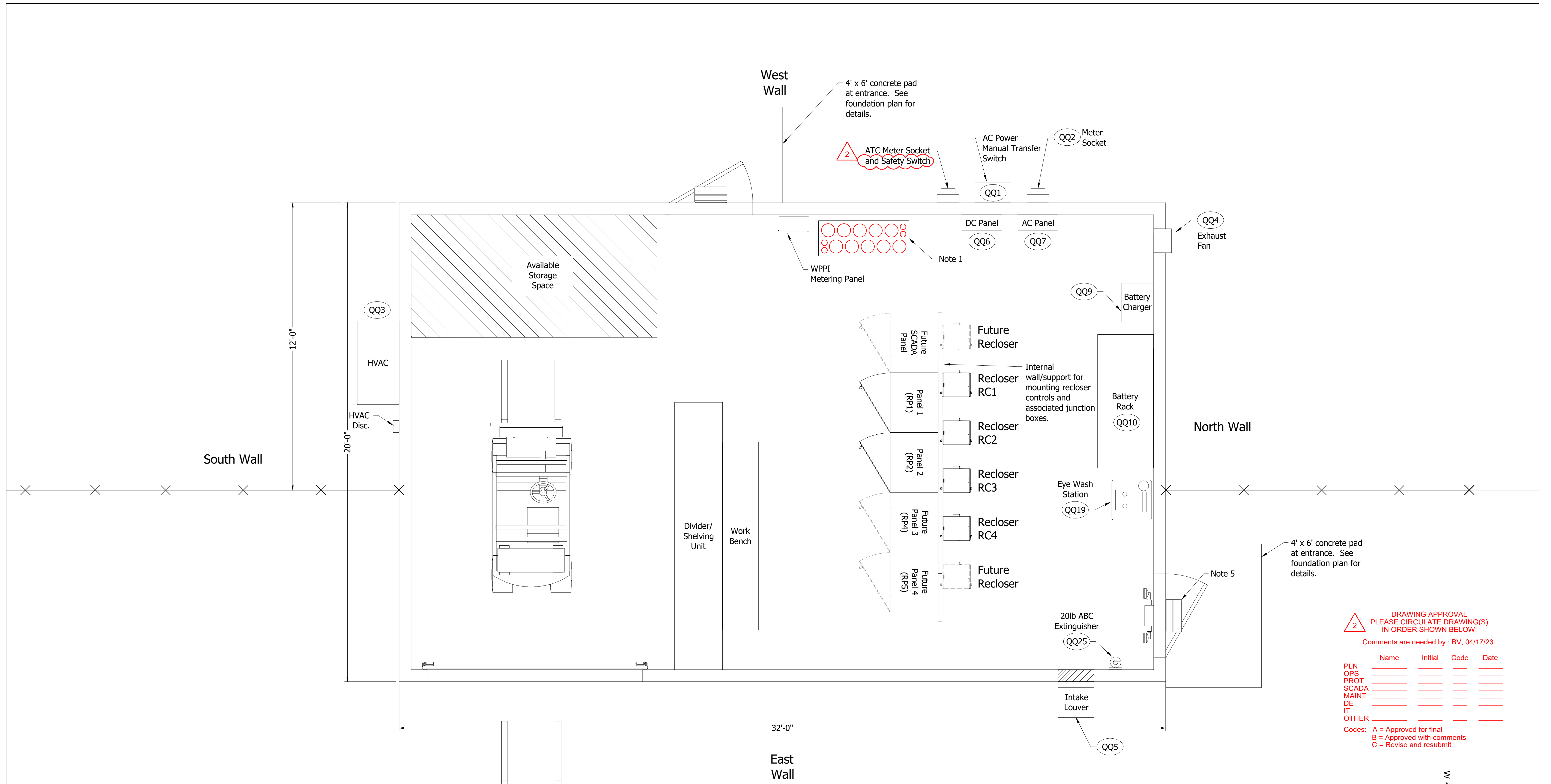
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE
2	ISSUED FOR CONSTRUCTION	MJT	JMO	04/11/2023
1	ISSUED FOR BID	MJT	JMO	02/22/2023
0	DRAFT ISSUED FOR REVIEW	MJT	JMO	02/10/2023

PSE Power System Engineering, Inc.
www.powersystem.org
2424 Rimrock Rd, Suite 300
Madison, WI 53713
Tel: 866.825.8995

ENGR. J. OMERNIK
DWN BY M. THOMPSON

CHIEF APPR. D. NELSON
DATE 04/11/2023

OIL CONTAINMENT DETAILS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI		SCALE	NOT TO SCALE	PROJECT NO.	MI0592107	DRAWING NO.	03-31
		FILE NAME	IRT-03-31				



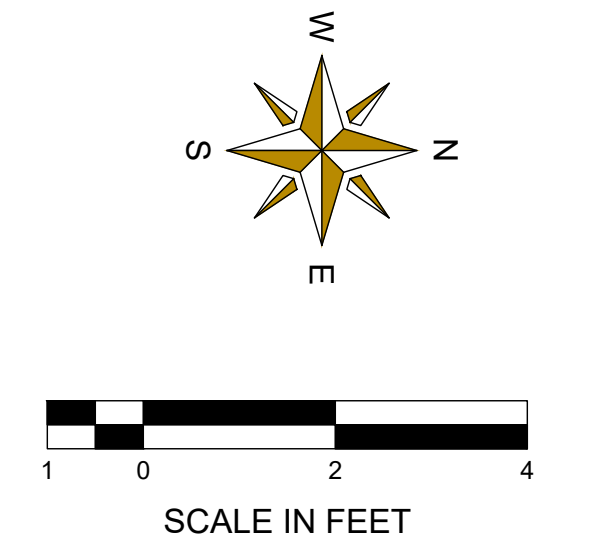
DRAWING APPROVAL
PLEASE CIRCULATE DRAWING(S)
IN ORDER SHOWN BELOW:
Comments are needed by : BV, 04/17/23

Name	Initial	Code	Date
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OPS			
PROT			
SCADA			
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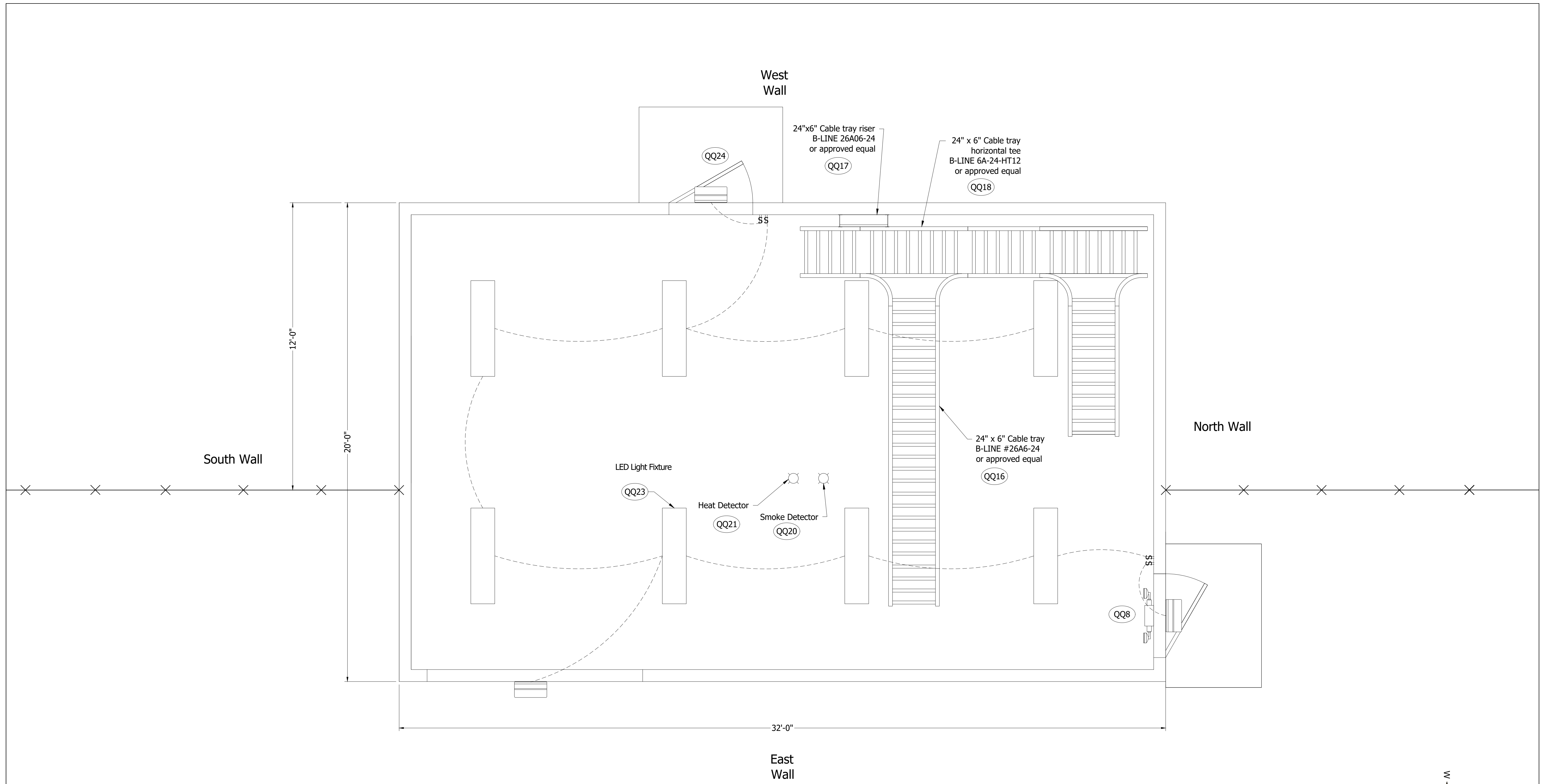
Codes: A = Approved for final
B = Approved with comments
C = Revise and resubmit

- NOTES:**
- 1.) Conduit can be concealed or surface mounted.
 - 2.) Contractor will be responsible for all conduit modifications required to fit equipment.
 - 3.) If metallic conduit is used, grounding bushing will be required at each end of the conduit run.
 - 4.) All electrical equipment and cable trays shall have bonded connections to ground grid using minimum size #6 cu wire or equivalent.
 - 5.) Each corner of the building frame shall be bonded to the ground grid.
 - 6.) Control panels shall be anchored to the floor and connected to the ground grid.
 - 7.) See drawing 05-02 for Ceiling Plan, dwg. 05-03 for Wall Elevations, and dwg. 05-04 for Bill of Materials.
 - 8.) See conduit plan and control building foundation detail for conduit size and location information.
 - 9.) See drawing 08-09 for ATC AC Service Details and Bill of Materials.

REV CLOUD LEGEND
 = REVISION CLOUD FOR ATC W.O. #605015

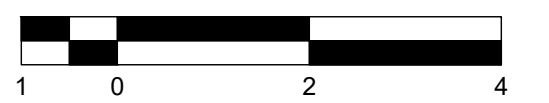
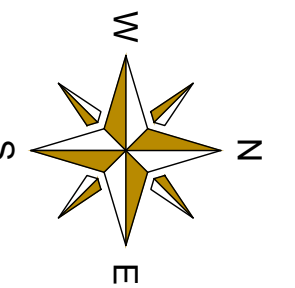


3 ISSUED FOR BID GB NH 5/16/2023				 www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895	CONTROL BUILDING PLAN IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
2 ISSUED FOR REVIEW - ATC W.O. #605015 NJM TAS 03/22/2023						
1 ISSUED FOR REVIEW GB NH 02/21/2023				ENGR. N. HALL DWN BY G. BODENSTEIN	CHG'D/APP'D S. PACKWOOD DATE 5/18/2022	SCALE 1/2" = 1'-0" FILE NAME IRT-05-01
NO. REVISION AND RECORD OF ISSUE BY ENGR. DATE				PROJECT NO. M10592107	DRAWING NO. 05-01	



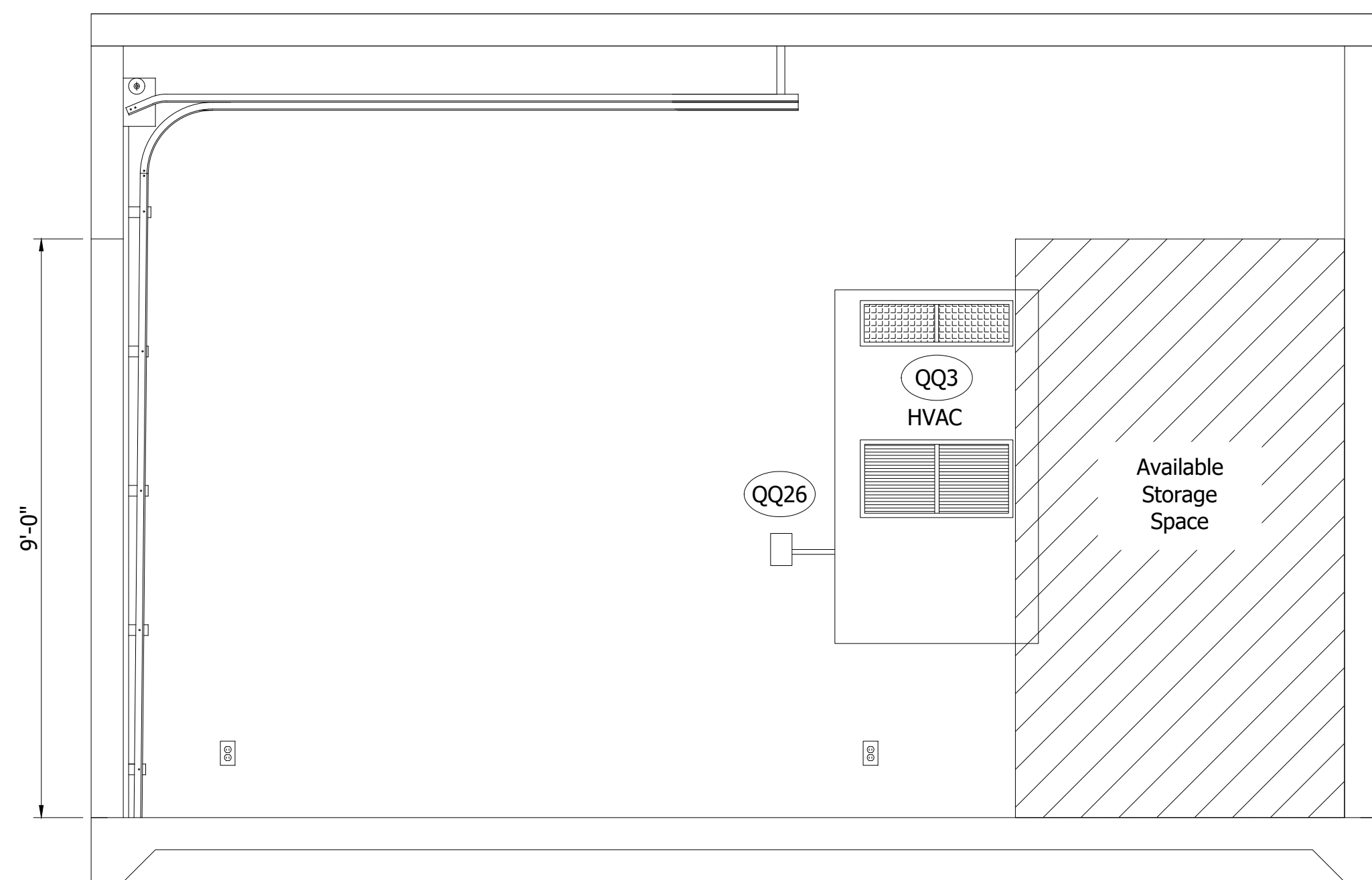
NOTES:

- 1.) Conduit can be concealed or surface mounted.
- 2.) Contractor will be responsible for all conduit modifications required to fit equipment.
- 3.) If metallic conduit is used, grounding bushing will be required at each end of the conduit run.
- 4.) All electrical equipment and cable trays shall have bonded connections to ground grid using minimum size #6 cu wire or equivalent.
- 5.) Each corner of the building frame shall be bonded to the ground grid.
- 6.) Control panels shall be anchored to the floor and connected to the ground grid.
- 7.) See drawing 05-02 for Ceiling Plan, dwg. 05-03 for Wall Elevations, and dwg. 05-04 for Bill of Materials.
- 8.) See conduit plan and control building foundation detail for conduit size and location information.

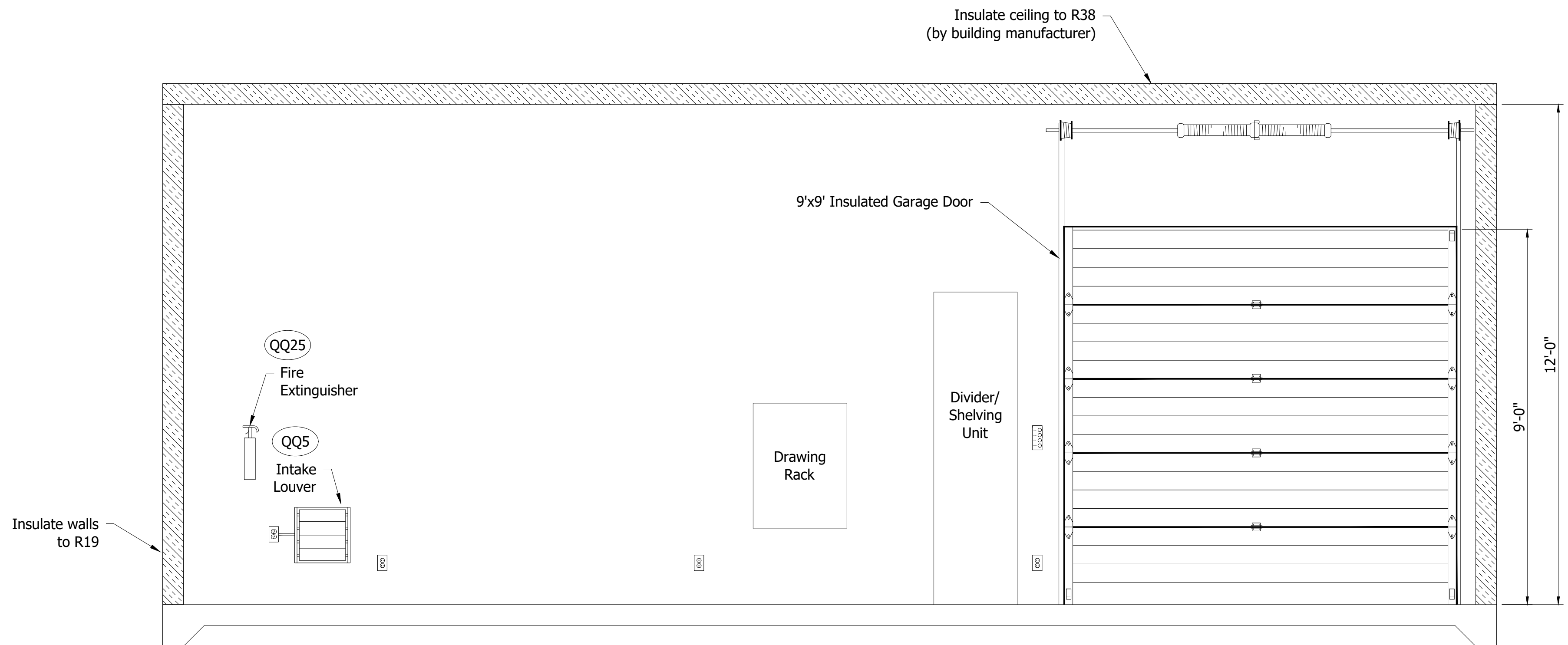


SCALE IN FEET

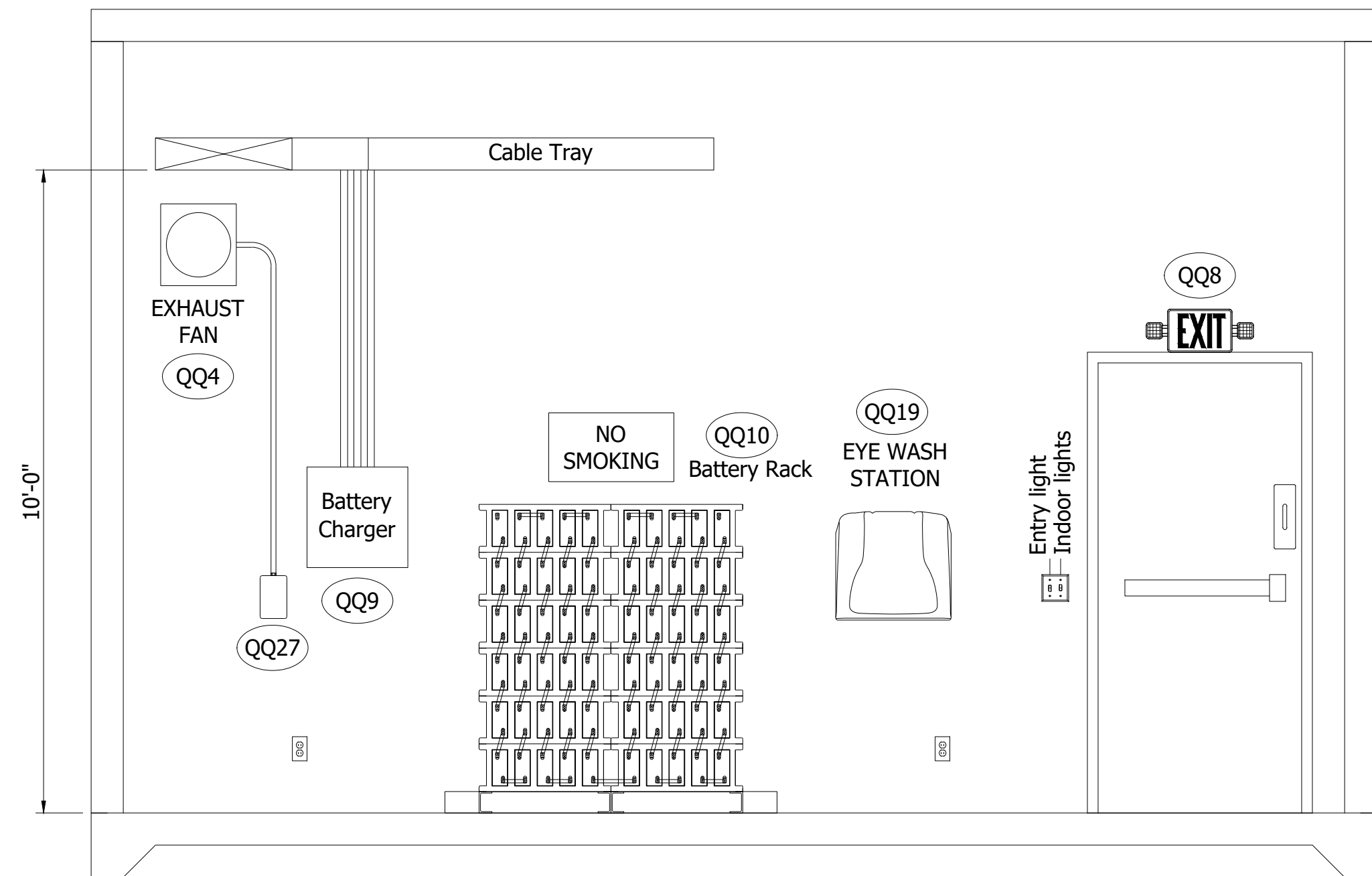
				PSE Power System Engineering, Inc. www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		CONTROL BUILDING CEILING PLAN IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL	CHK'D/APP'D. S. PACKWOOD	SCALE 1/2" = 1'-0"
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 2/9/2023	FILE NAME IRT-05-02
						PROJECT NO. M10592107	DRAWING NO. 05-02



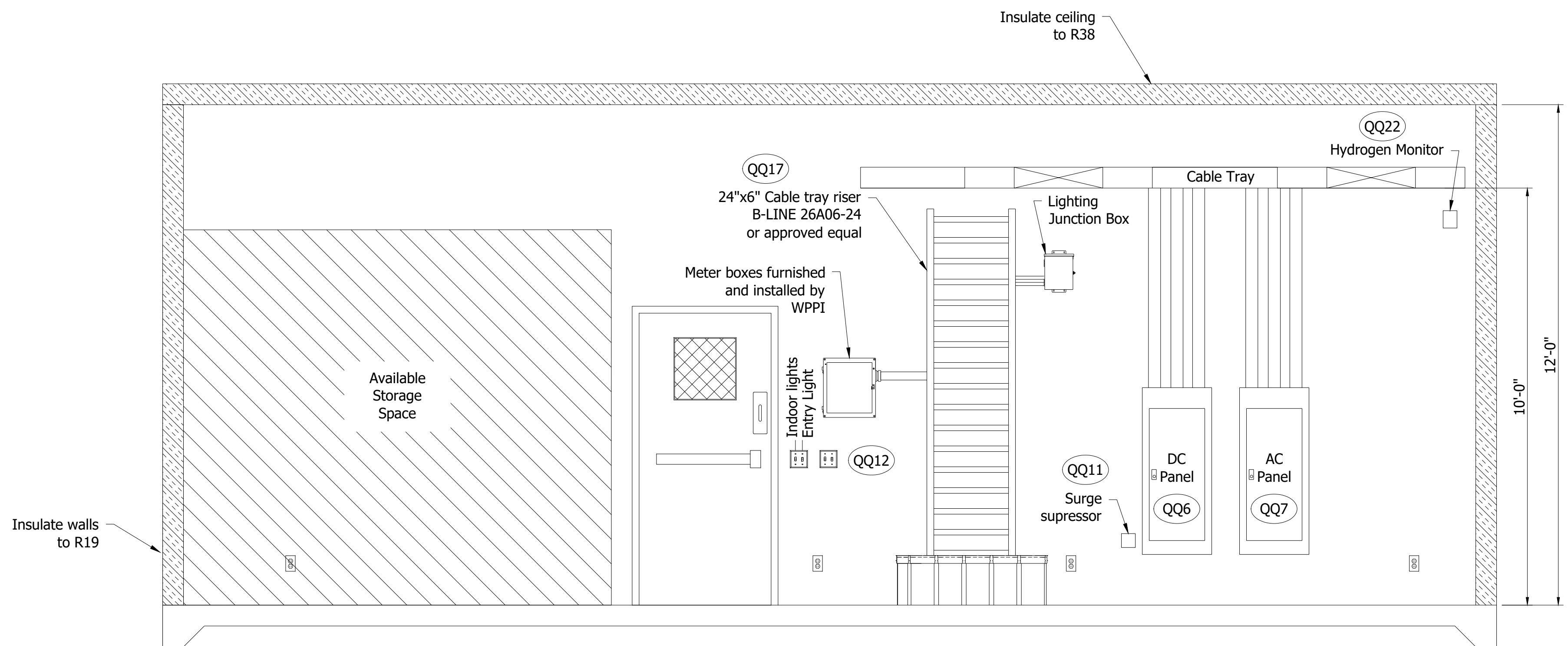
South Wall
Interior Elevation



East Wall
Interior Elevation



North Wall
Interior Elevation



West Wall
Interior Elevation



NOTES:

- 1.) Paint building interior walls and ceiling per specification.

						CONTROL BUILDING ELEVATION IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI		
				www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		SCALE 1/2" = 1'-0" PROJECT NO. M10592107 DRAWING NO. 05-03		
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHK'D	S. PACKWOOD
	NO. REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DATE	2/9/2023
				FILE NAME IRT-05-03				

CONTROL BUILDING


ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CAT./DWG NO.
QQ1	Manual transfer switch, 400A min.	1	Square D	DTU225R
QQ2	Meter socket meeting owner service standard	1	Milbank	--
QQ3	HVAC unit per specification. (See framed opening examples to coordinate unit with framed openings)	1	--	--
QQ4	Exhaust fan per specification	1	--	--
QQ5	Intake louver per specification	1	--	--
QQ6	DC Substation Distribution Panel, 250 VDC with 125 Amp main breaker and branch breakers and spares as shown on the drawings (30 space minimum). Siemens type P1 with BQD branch breakers	1 Lot	Siemens	P2N42NB125FTS
QQ7	AC Station service distribution panel, 120/240 VAC with 225A main breaker and branch breakers and spares as shown on the drawings. wall mounted in substation building. Square D type NQ with type QOB branch breakers or approved equal.	1	Square D	--
QQ8	Emergency exit light, wall mounted, LED. To be approved by owner/engineer.	1	Lithonia	
QQ9	Battery charger, 16 Amp, 125V DC to match station battery, with alarm panel, and equalize aux. contact, as specified	1 Lot	--	--
QQ10	Substation battery, 125VDC, 100AH, valve regulated sealed lead acid cell, 60 cells and accessories as specified, to be located in substation building as shown on the drawings	1 Lot		
QQ11	Surge protector, 50kA, 120/240V, Square D type HWA	1	Square D	TVS1WHA50X
QQ12	Switch, heavy duty 120/240 VAC, 30 Amp, single pole, with appropriate Junction box to be mounted in the substation building for the yard lights.	2	Hubbell	HBL12211
QQ16	Cable tray, 24"x 6"	1 Lot	B-LINE	26A6-24
QQ17	Cable tray riser, 24"x 6"	1 Lot	B-LINE	26A06-24
QQ18	Cable tray, horizontal tee, 24"x6", 12" radius	2	B-LINE	6A-24-HT12
QQ19	Eye wash station, per specification	1 Lot	--	--
QQ20	Smoke detector, per specification	1	--	--
QQ21	Heat detector, per specification	1	--	--
QQ22	Hydrogen monitor, per battery specification	1	--	--
QQ23	Light fixture - LED, surface mounted, 4 foot, 60 W, 120 V. 3500 Kelvin, no controls, white	8	Lithonia	STL4 60L EZ1 LP835
QQ24	Entry light with photocell, LED, to be approved by owner	3	--	--
QQ25	Fire extinguisher, per specification	1	--	--
QQ26	Thermostat, Programmable for HVAC control.	1	--	--
QQ27	Fan timer, mechanical time switch, 24 hour, 15 min. ON/OFF intervals, Type 1 enclosure	1	Intermatic	T1905

* See Note 3

* See Note 3

NOTES:

- See specification 133405 and 260500 for additional material descriptions.
- All items are "or approved equal".
- The building shall have provisions and framed out openings for these items which are for future considerations we are using sealed batteries so additional ventilation is not required at this time.

						CONTROL BUILDING BILL OF MATERIALS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8995			
0	ISSUED FOR BID	GB	NH	05/16/2023	ENGR N. HALL	CHIEF APP'D S. PACKWOOD	SCALE N.T.S.
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 2/9/2022	FILE NAME IRT-05-04
						PROJECT NO. MI0592107	DRAWING NO. 05-04

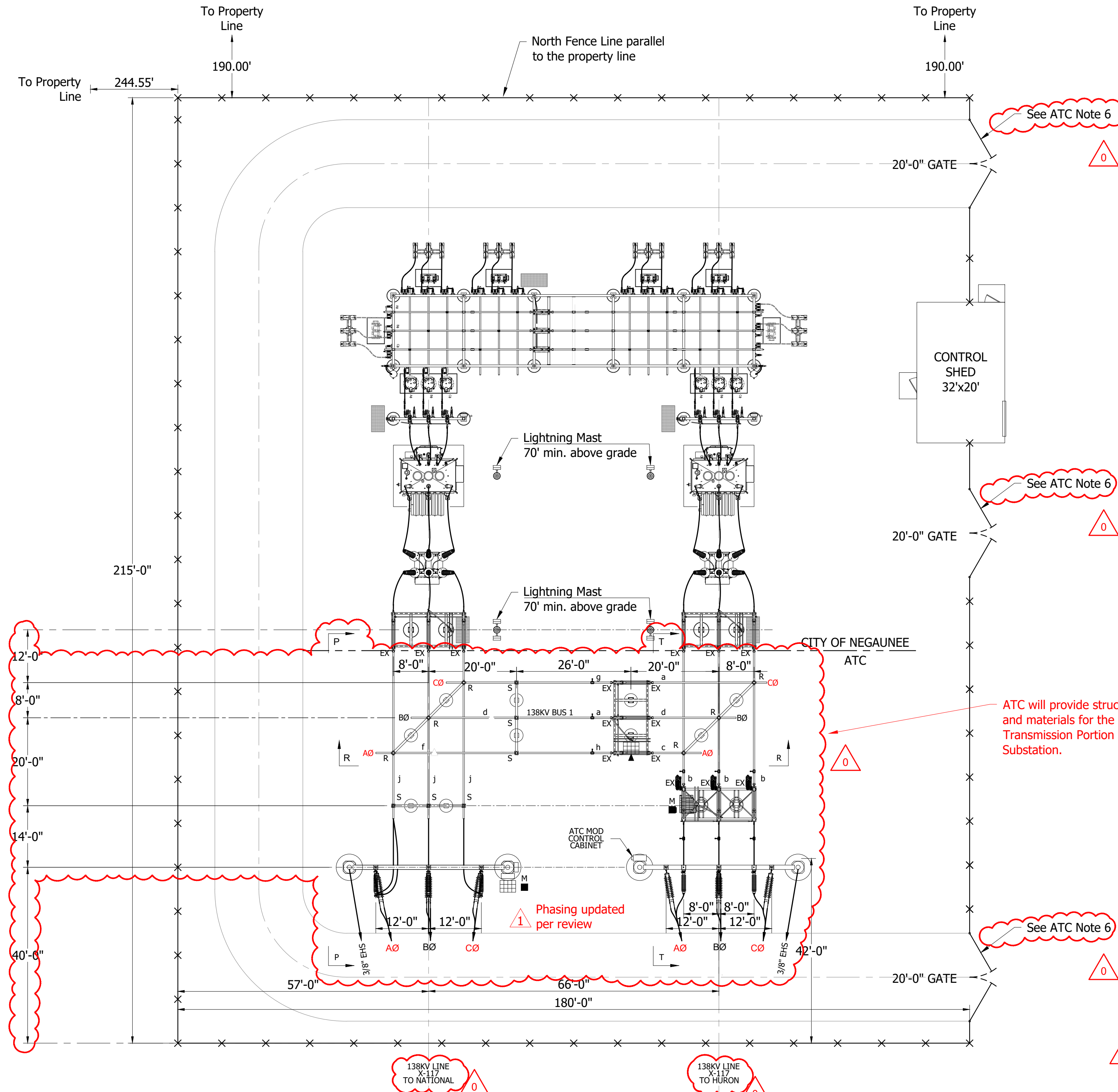
MINIMUM ELECTRICAL CLEARANCES - NEGAUNEE				
PHASE-PHASE VOLTAGE	RIGID CONDUCTORS		HEIGHT ABOVE FOUNDATION	
	TO GROUNDED PARTS	METAL TO METAL	BOTTOM OF INSULATOR OR BUSHING	TO LIVE PARTS
4.16 KV	6"	7"	8'-6"	8'-10"
14.4 KV	7"	12"	8'-6"	9'-0"
23 KV	10"	15"	8'-6"	10'-0"
34.5 KV	13"	18"	8'-6"	10'-0"
46 KV	17"	21"	8'-6"	10'-0"
69 KV	25"	31"	8'-6"	11'-0"
115 KV	42"	53"	8'-6"	12'-0"
138 KV	50"	63"	8'-6"	13'-0"
161 KV	58"	72"	8'-6"	14'-0"

TAKE-OFF STRUCTURE DESIGN LOADS SHALL BE THE MOST STRINGENT OF THE FOLLOWING:

CASE 1:
40 MPH wind load, with phase conductor tensions of 3000 lbs./wire at a ±15° vertical and ±15° horizontal pull off angle, and static wire tensions of 1500 lbs./wire at a ±15° vertical and ±20° horizontal pull off angle. Tensions include a 1/2 inch radial thickness of ice at 0° F. Loading must meet NESC rules 250B, 250C and 250D.

CASE 2:
40 Lbs./sq. ft. of wind load and the line tensions resulting from Case 1 and without ice load.

Contractor is responsible for verifying clearances and informing the engineer of any conflicts.



- NEGAUNEE NOTES:**
- See Dwg. 02-01 for the location of the substation on the property.
 - The Transmission structures and materials will be provided and installed by ATC and their contractor. This includes the expansion connector connecting to Negaunee's 138 kV Switches. See Point of interconnect line on the plan view.
 - The substation package for the Negaunee structures and materials is to provide structure calculations, anchor bolts, anchor bolt plan, steel detail & erection drawings, complete bill of materials, steel structures and electrical components as outlined in drawings 06-10 thru 06-21.
 - The Negaunee substation structure and material package will be installed by the Negaunee Construction contractor.
 - Negaunee is the common facility owner.

ATC LEGEND:

- R - RIGID BUS SUPPORT OR BUS TERMINAL
- S - SLIP BUS SUPPORT
- EX - EXPANSION BUS TERMINAL OR BUS SUPPORT
- △ - BUS COUPLER
- (with arrow) - LOW BUS (3 1/2" TUBULAR AL) 15'-6" BUS HEIGHT
- (with arrow) - HIGH BUS (3 1/2" TUBULAR AL) 23'-6" BUS HEIGHT
- ▲ - SWITCH OPERATOR (MANUAL)
- M ■ - SWITCH OPERATOR (MOTOR)
- (with circle) - GROUND ATTACHMENT POINT
- (dashed) - BASE LINE
- (solid) - MATCHLINE
- × - SECURITY FENCE

ATC GENERAL NOTES:

- CONTRACTOR SHALL FIELD DRILL A 1/4" DRAIN HOLE AT THE LOW POINT OF SAG IN EACH RUN OF TUBULAR BUS. THE LOCATION OF DRAIN HOLES SHALL BE ACCEPTABLE TO THE ENGINEER.
- 336.4 KCMIL ACSR 26/7 VIBRATION DAMPENING CONDUCTOR SHALL BE INSTALLED INSIDE EACH HORIZONTAL RUN OF THE TUBULAR BUS. PRE-STRETCH CONDUCTOR PRIOR TO INSTALLATION.
- MINIMUM ELECTRICAL CLEARANCES:
138KV PHASE TO PHASE = 63 INCHES
PHASE TO GROUND = 50 INCHES
- BUS DESIGN SHORT CIRCUIT RATING: 40KA
- CONTRACTOR SHALL INSTALL ALL COMPRESSION FITTINGS PER MANUFACTURER RECOMMENDATIONS AND INSTRUCTIONS.
- TWO ATC STOCK #136794 FENCE SIGNS TO BE MOUNTED BACK TO BACK ON EACH GATE, 48-60 INCHES ABOVE GROUND SO THAT THE SIGN CAN BE READ WHEN GATE IS OPEN OR CLOSED.

REFERENCE DRAWINGS:

ATC 138KV SECTION - P-P	IRT-06-02
ATC 138KV SECTION - R-R	IRT-06-03
ATC 138KV SECTION - T-T	IRT-06-04
ATC 138KV BUS DETAILS	IRT-06-05
ATC MASTER BILL OF MATERIAL	IRT-09-01
FOUNDATION PLAN	IRT-03-01

ATC will provide structures and materials for the Transmission Portion of the Substation.

Phasing updated per review

ATC BUS CUTTING SCHEDULE
3 1/2" SCH. 40 ALUM. TUBING

QTY.	DESCRIPTION	LENGTH
1	a	26'-0"
3	b	31'-0"
1	d	19'-0"
1	a	27'-0"
1	g	38'-0"
1	h	40'-0"
3	j	39'-0"
3*	e	9'-0"

e - 138KV A-FRAME LEGS
* THE THIRD RIGID BUS ONLY NEEDS 1 CUT

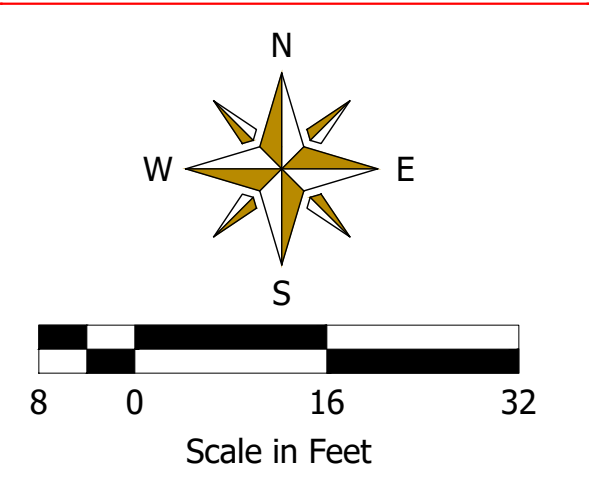
REV CLOUD LEGEND
[Red cloud symbol] = REVISION CLOUD FOR ATC W.O. #605015

DRAWING APPROVAL
PLEASE CIRCULATE DRAWING(S) IN ORDER SHOWN BELOW:
Comments are needed by: BV, 04/17/23

Name	Initial	Code	Date
PLN			
OPS			
PROT			
SCADA			
MAINT			
DE			
IT			
OTHER			

Codes: A = Approved for final
B = Approved with comments
C = Revise and resubmit

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		OVERALL PLAN VIEW IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		SCALE 1/16" = 1'-0" FILE NAME IRT-06-01	PROJECT NO. MI0592107 DRAWING NO. 06-01
1 ISSUED FOR BID GB NH 5/16/2023 0 ISSUED FOR REVIEW - ATC W.O. #605015 MB KAW 03-22-23	ENGR N. HALL DWN BY G. BODENSTEIN	CHKD/APP'D --- DATE 3/11/2022	SCALE 1/16" = 1'-0" PROJECT NO. MI0592107 DRAWING NO. 06-01

MINIMUM ELECTRICAL CLEARANCES - NEGAUNEE

PHASE-PHASE VOLTAGE	RIGID CONDUCTORS		HEIGHT ABOVE FOUNDATION	
	TO GROUNDED PARTS	METAL TO METAL	BOTTOM OF INSULATOR OR BUSHING	TO LIVE PARTS
4.16 KV	6"	7"	8'-6"	8'-10"
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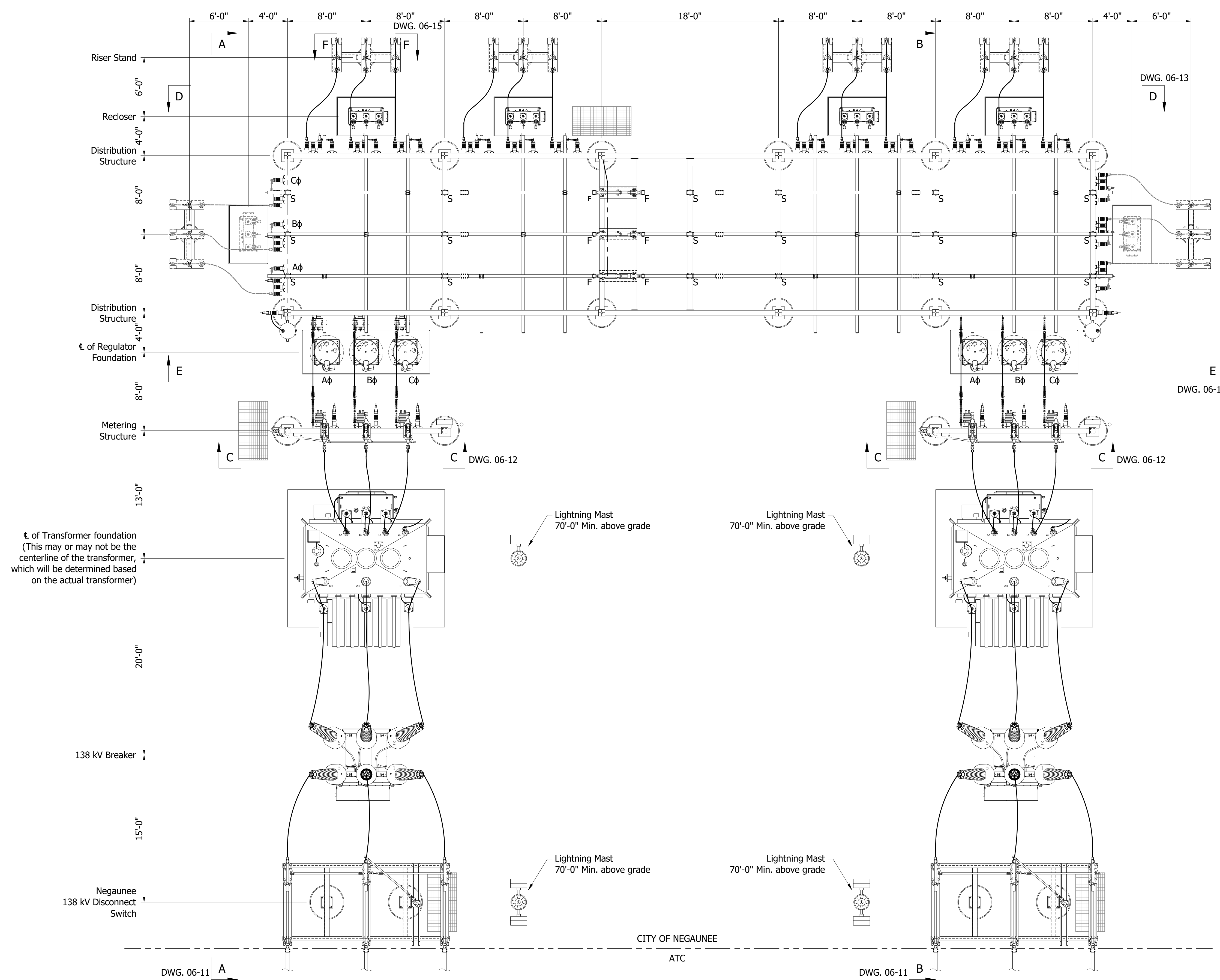
TAKE-OFF STRUCTURE DESIGN LOADS SHALL BE THE MOST STRINGENT OF THE FOLLOWING:

- CASE 1:**
40 MPH wind load, with phase conductor tensions of 3000 lbs./wire at a ±15° vertical and ±15° horizontal pull off angle, and static wire tensions of 1500 lbs./wire at a ±15° vertical and ±20° horizontal pull off angle. Tensions include a 1/2 inch radial thickness of ice at 0° F. Loading must meet NESC rules 250B, 250C and 250D.
- CASE 2:**
40 Lbs./sq. ft. of wind load and the line tensions resulting from Case 1 and without ice load.

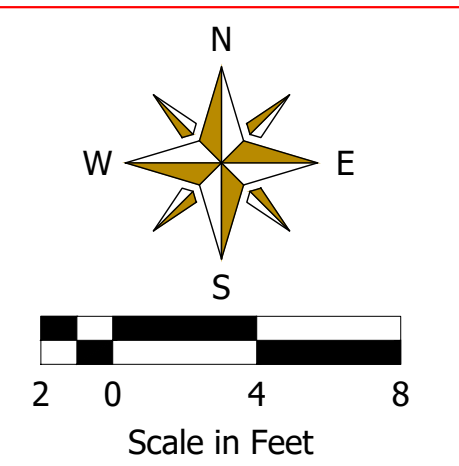
Contractor is responsible for verifying clearances and informing the engineer of any conflicts.

NOTES:

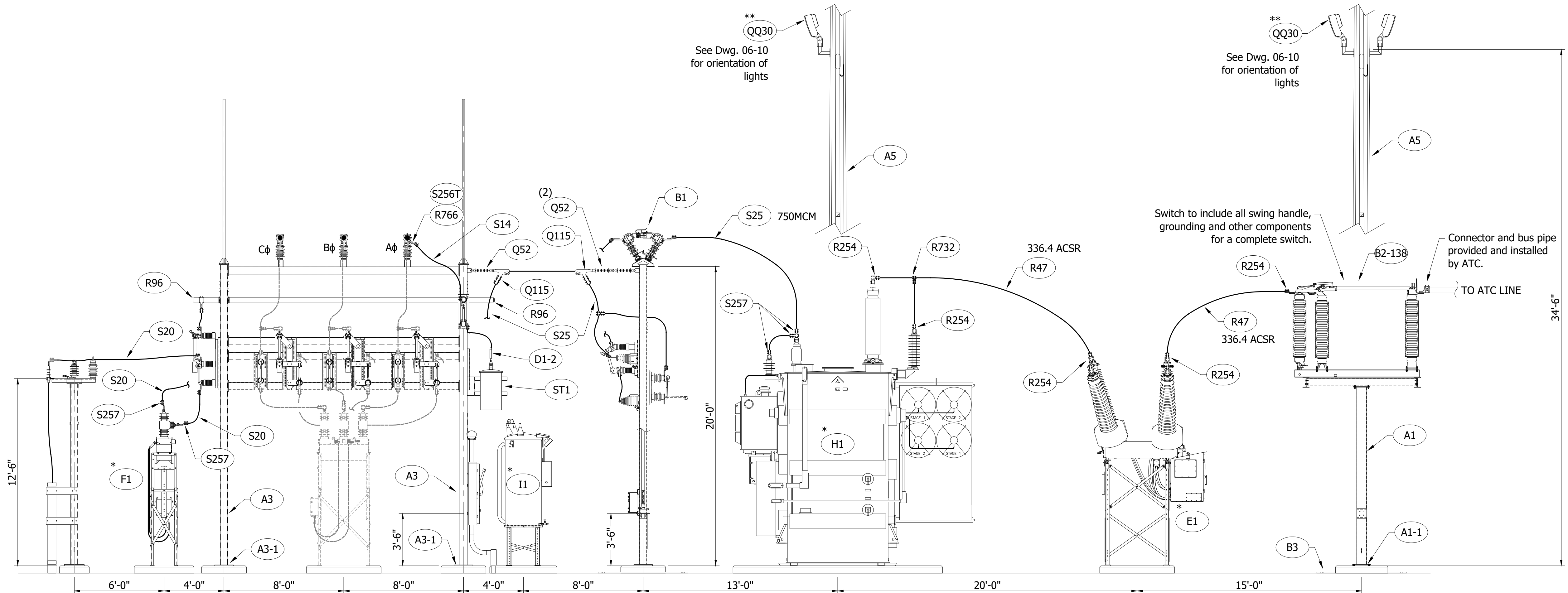
- See drawing 02-01 for the complete site plan and drawing 06-01 for the overall plan view.
- See drawing 03-01 for the foundation plan.
- Directly embedded lightning masts are to be provided by the packager as part of the substation structure & material package bid. Installation will be by the construction contractor.
- Lighting on the lightning masts will be provided and installed by the substation installation contractor.



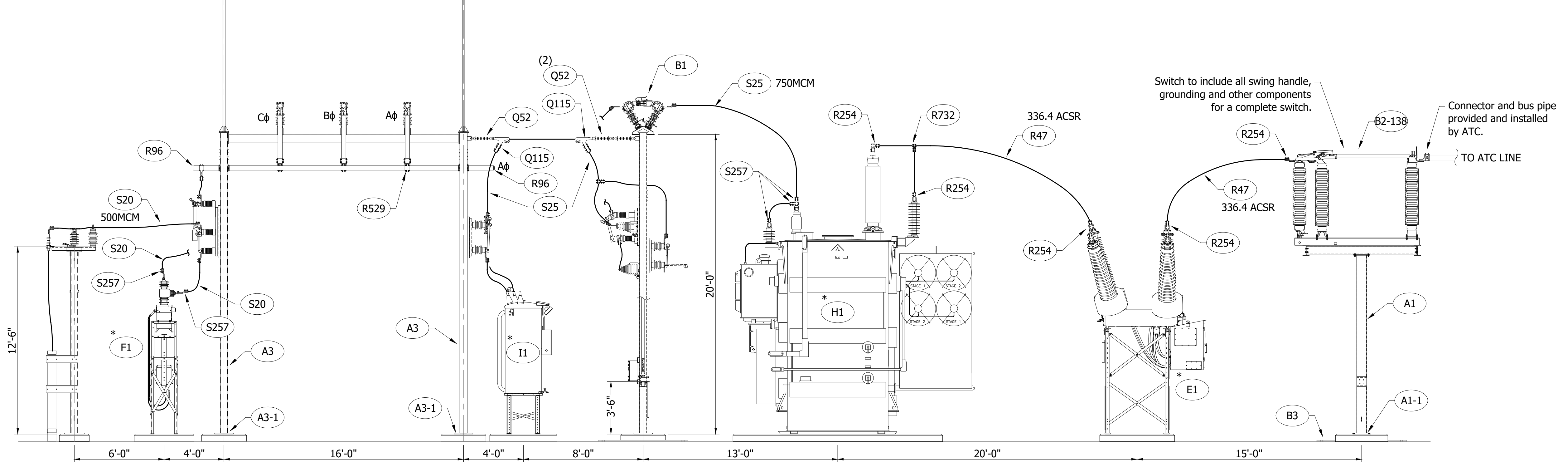
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				2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		PLAN VIEW IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
2	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL	CHG'D/APP'D. S. PACKWOOD	SCALE 3/16" = 1'-0"
1	ISSUED FOR REVIEW	GB	NH	02/21/2023	DWN BY G. BODENSTEIN	DATE 3/11/2022	PROJECT NO. MI0592107
NO. REVISION AND RECORD OF ISSUE				BY	ENGR.	DATE	FILE NAME IRT-06-10
							DRAWING NO. 06-10



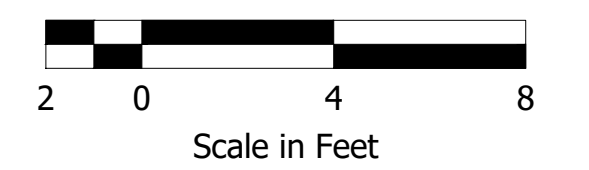
PROFILE A-A
BUS 1 WEST BAY



PROFILE B-B
BUS 2 EAST BAY

- NOTES:
- * Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
 - ** Provided and installed by installation contractor.
1. See drawing 06-10 for structure design loading and clearance requirements.
 2. All tubular steel structures are to accommodate grounding connections. The substation packager shall verify the grounding connector coordinates with the structure.
 3. The 138 kV Switch structure is intended to match height and strength of the ATC switch stands. See reference copy of ATC switch stands.
 4. All dimensions are approximate and the substation packager shall design the steel as necessary to accommodate the materials and equipment.
 5. All structures shall be grounded with 4/0 Awg. bare copper cable (Typical).

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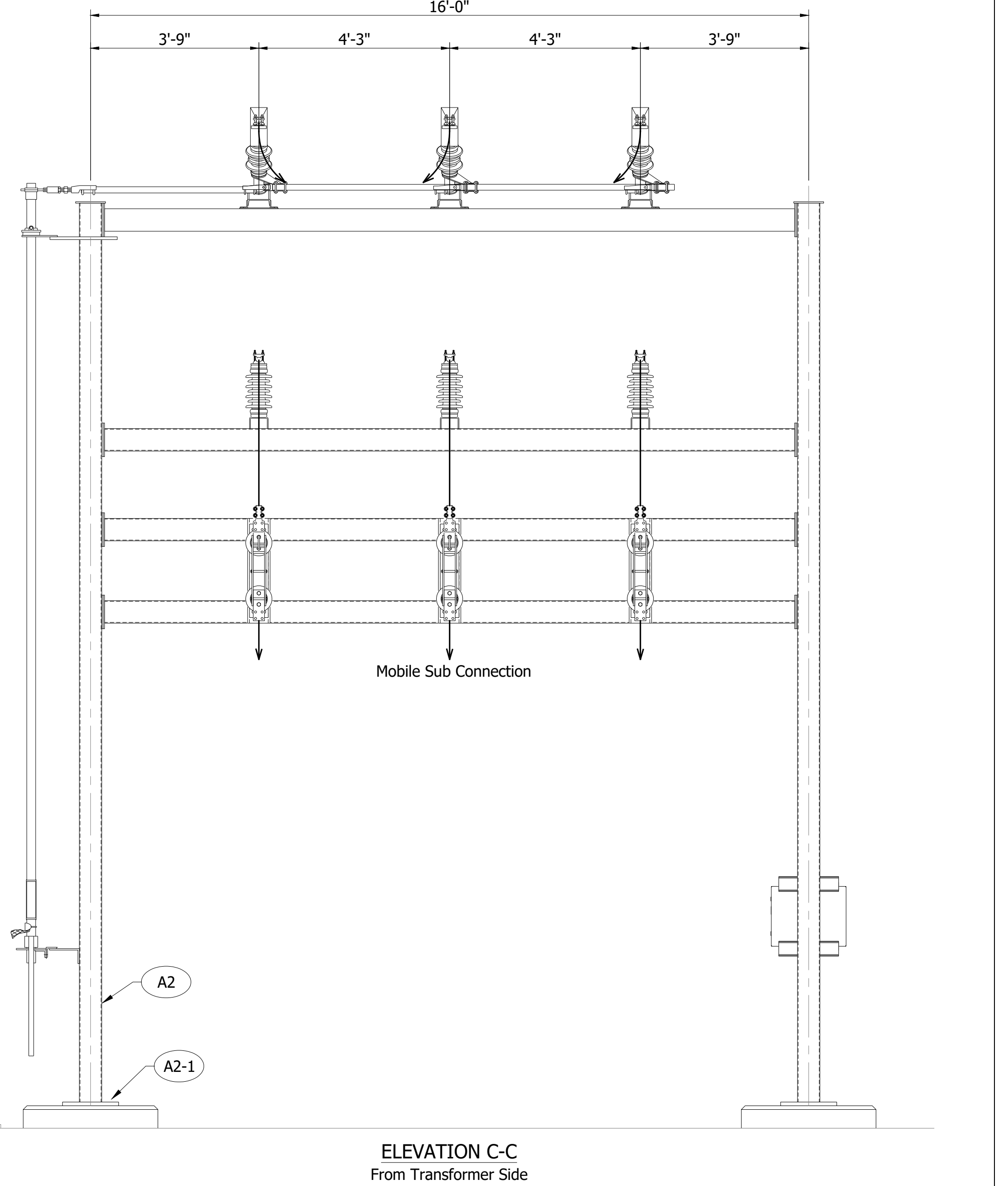
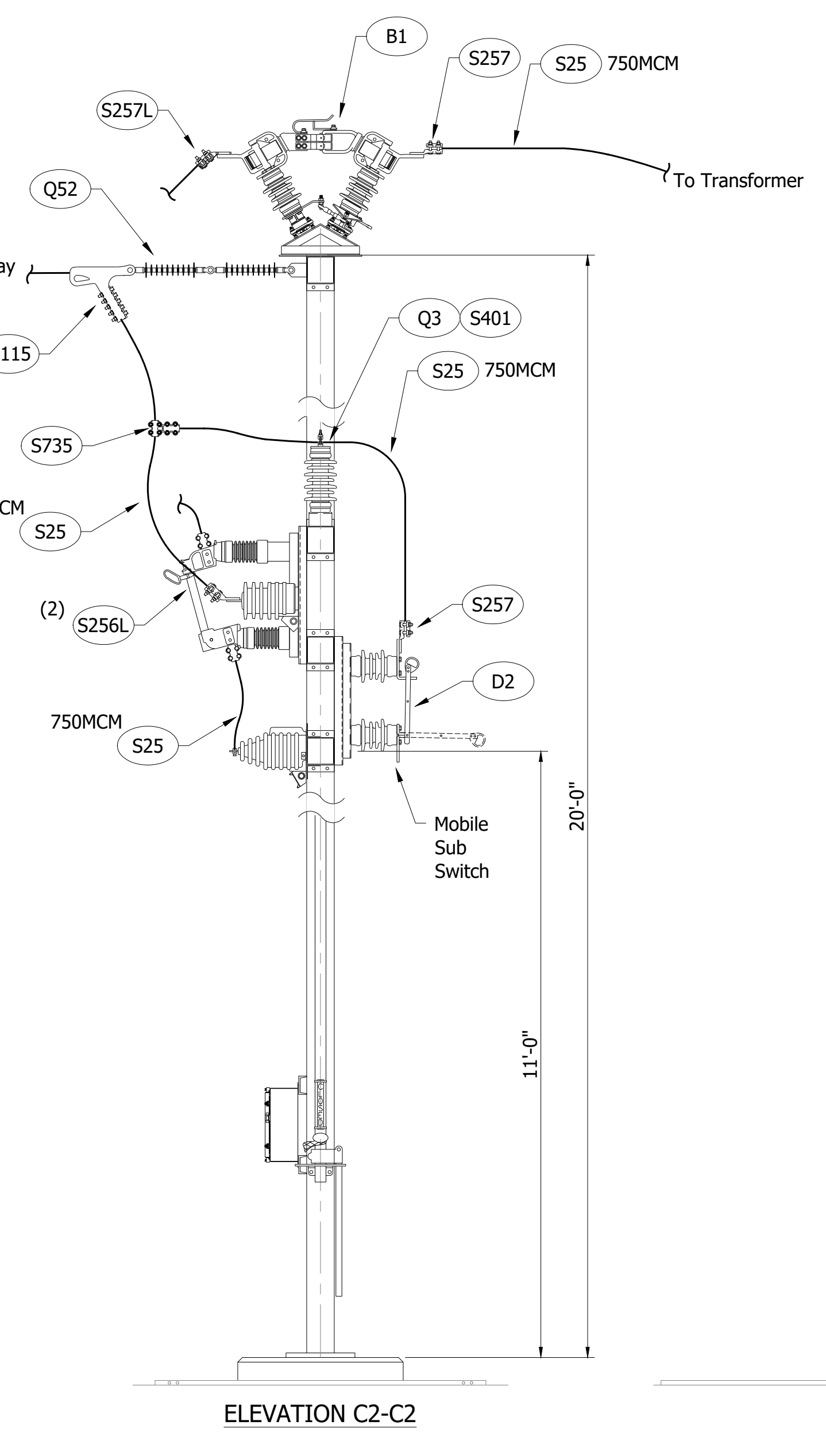
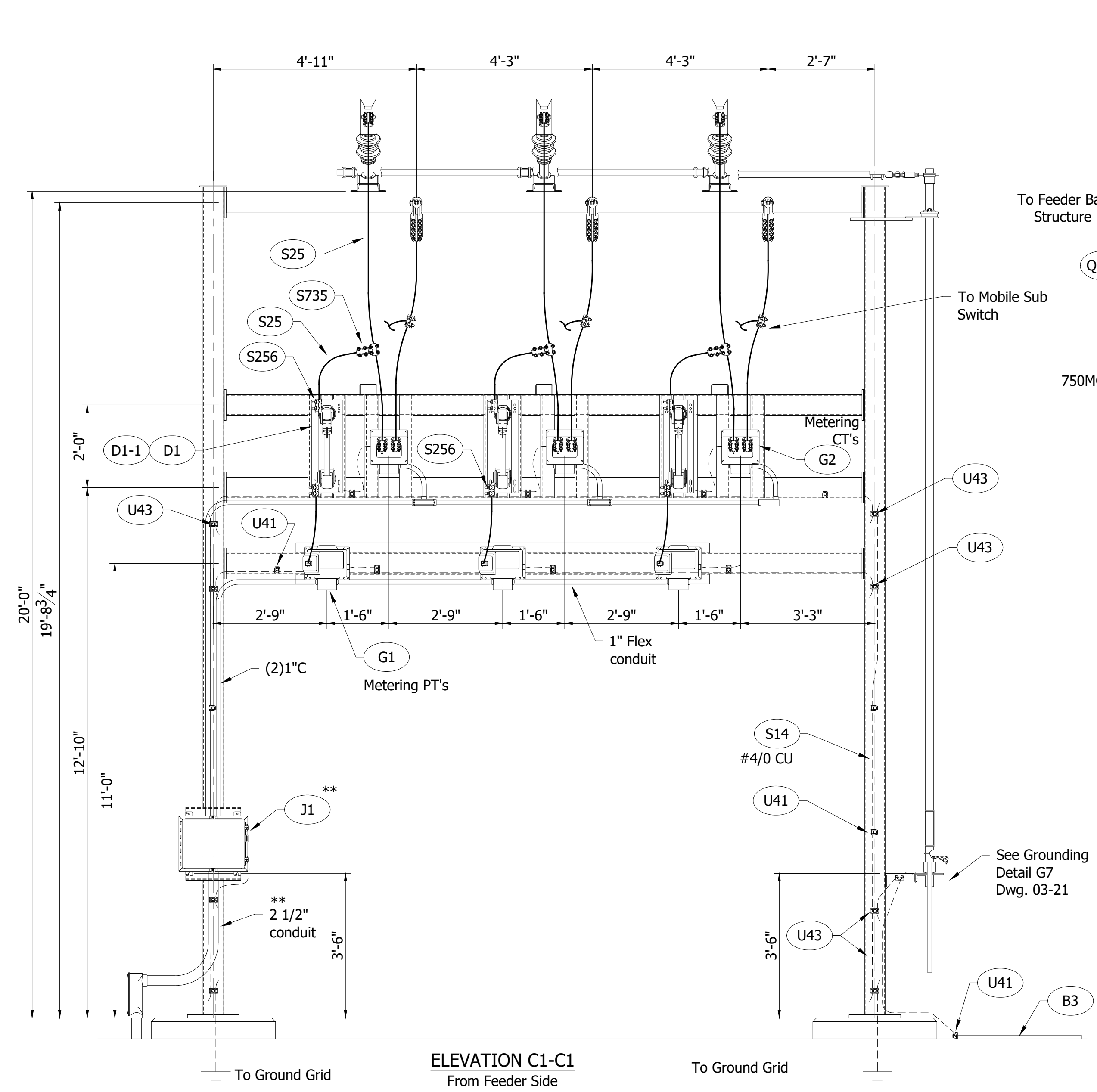
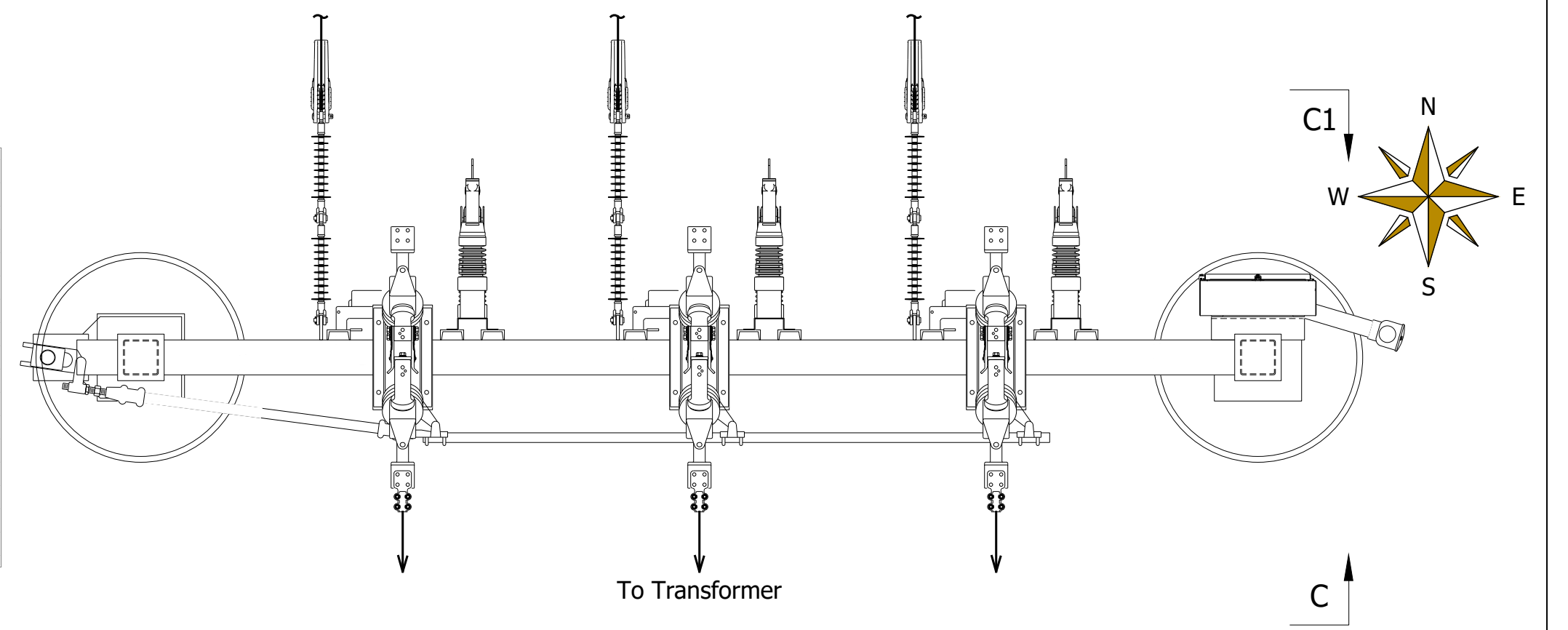
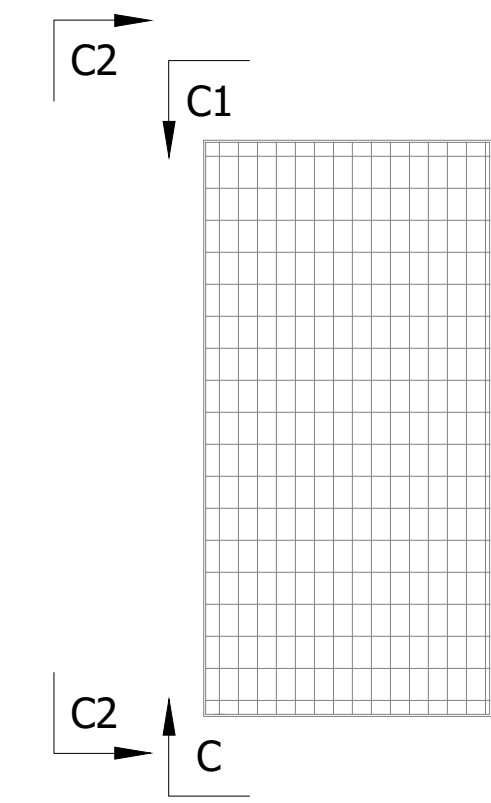


				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895	
				www.powersystem.org		SCALE 1/4" = 1'-0"	
				ENGR. N. HALL		DATE 5/16/2023	
				DWN BY G. BODENSTEIN		DATE 3/11/2022	
				PROJECT NO. MI0592107		DRAWING NO. 06-11	

* Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
 ** Provided and installed by installation contractor.

NOTES:

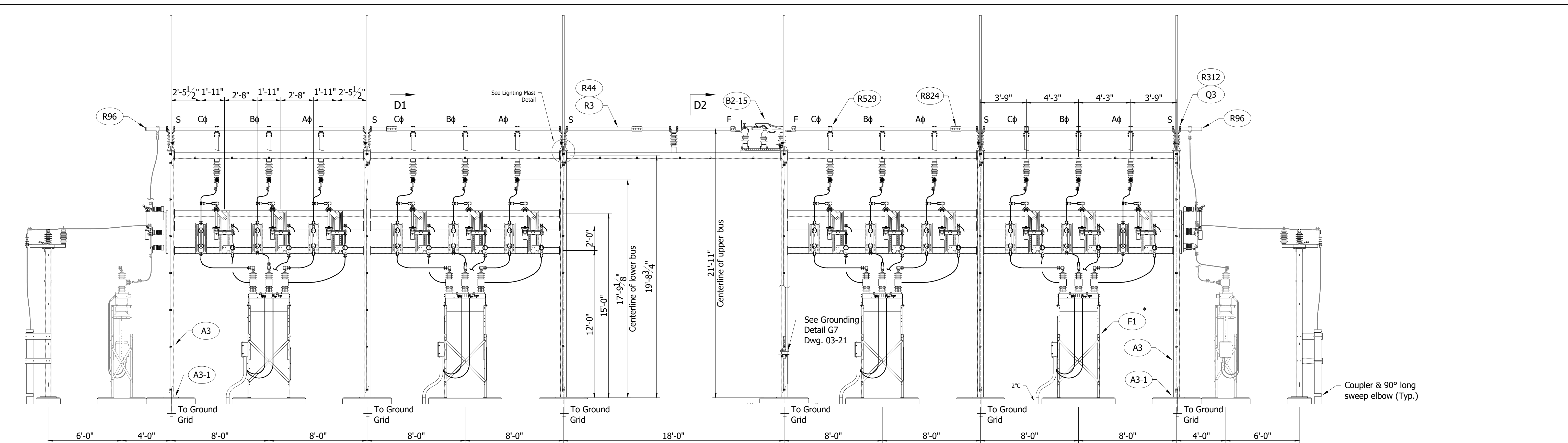
1. 4/0 CU ground wire to be continuous across top of structure & down each leg for CT and VT case grounding.
2. See drawing 06-10 for structure design loading and clearance requirements.



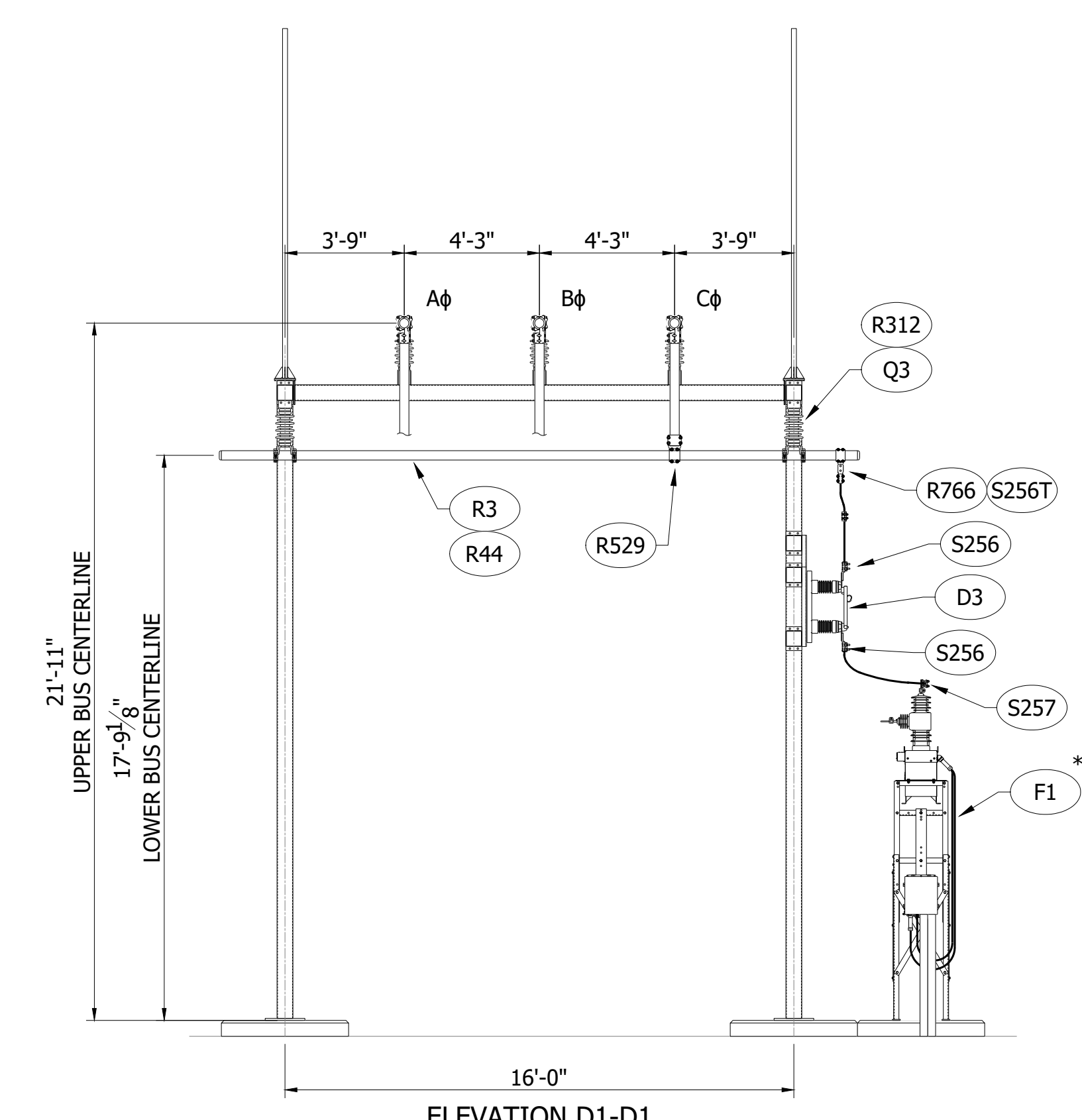
**PRELIMINARY
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CONSTRUCTION**



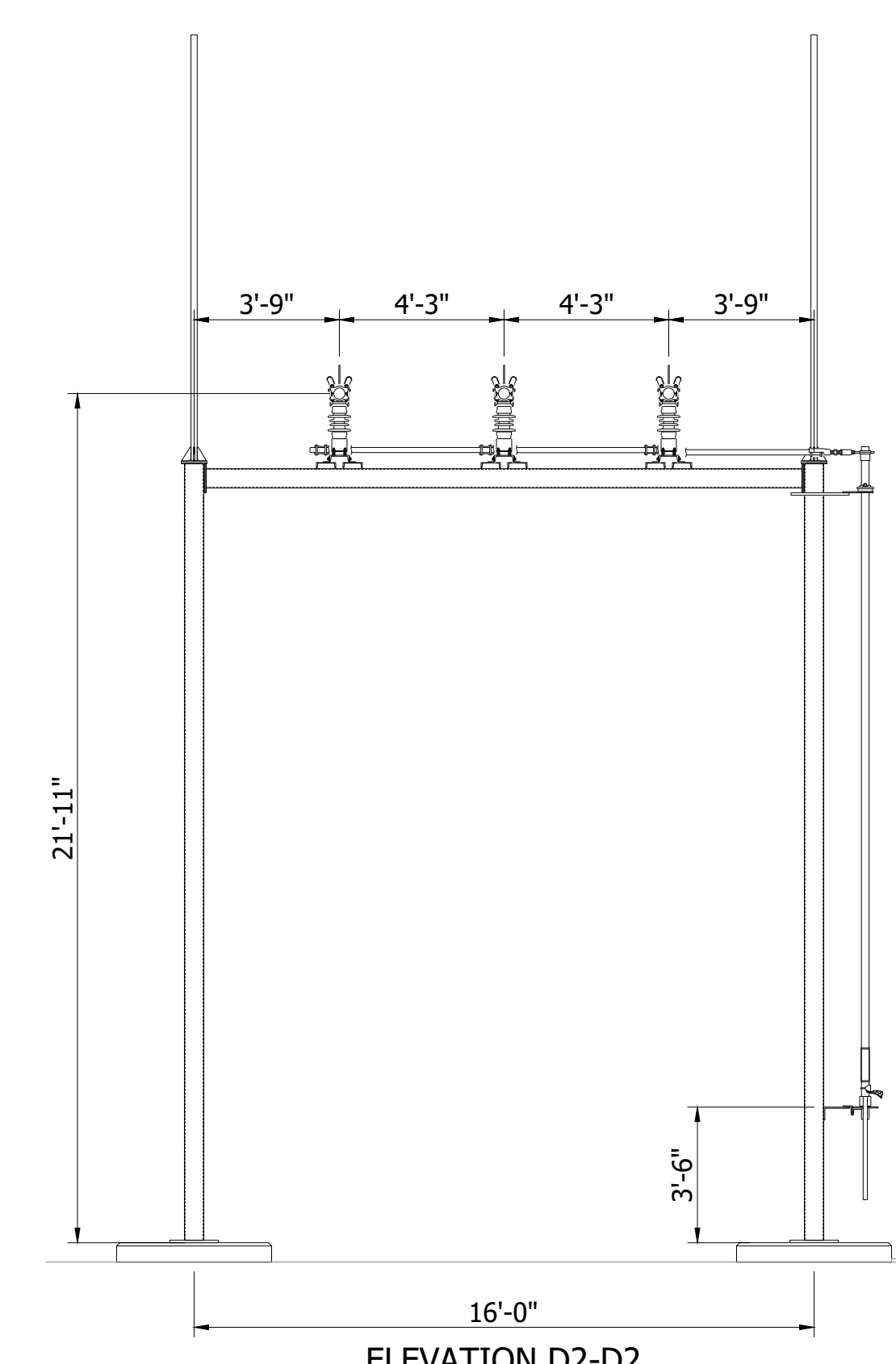
						15KV METERING STRUCTURE ELEVATIONS C-C IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				<small>www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895</small>			
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR N. HALL	CHK'D APPR'D S. PACKWOOD	SCALE 1/2" = 1'-0"
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 3/11/2022	FILE NAME IRT-06-12
						PROJECT NO. MI0592107	DRAWING NO. 06-12



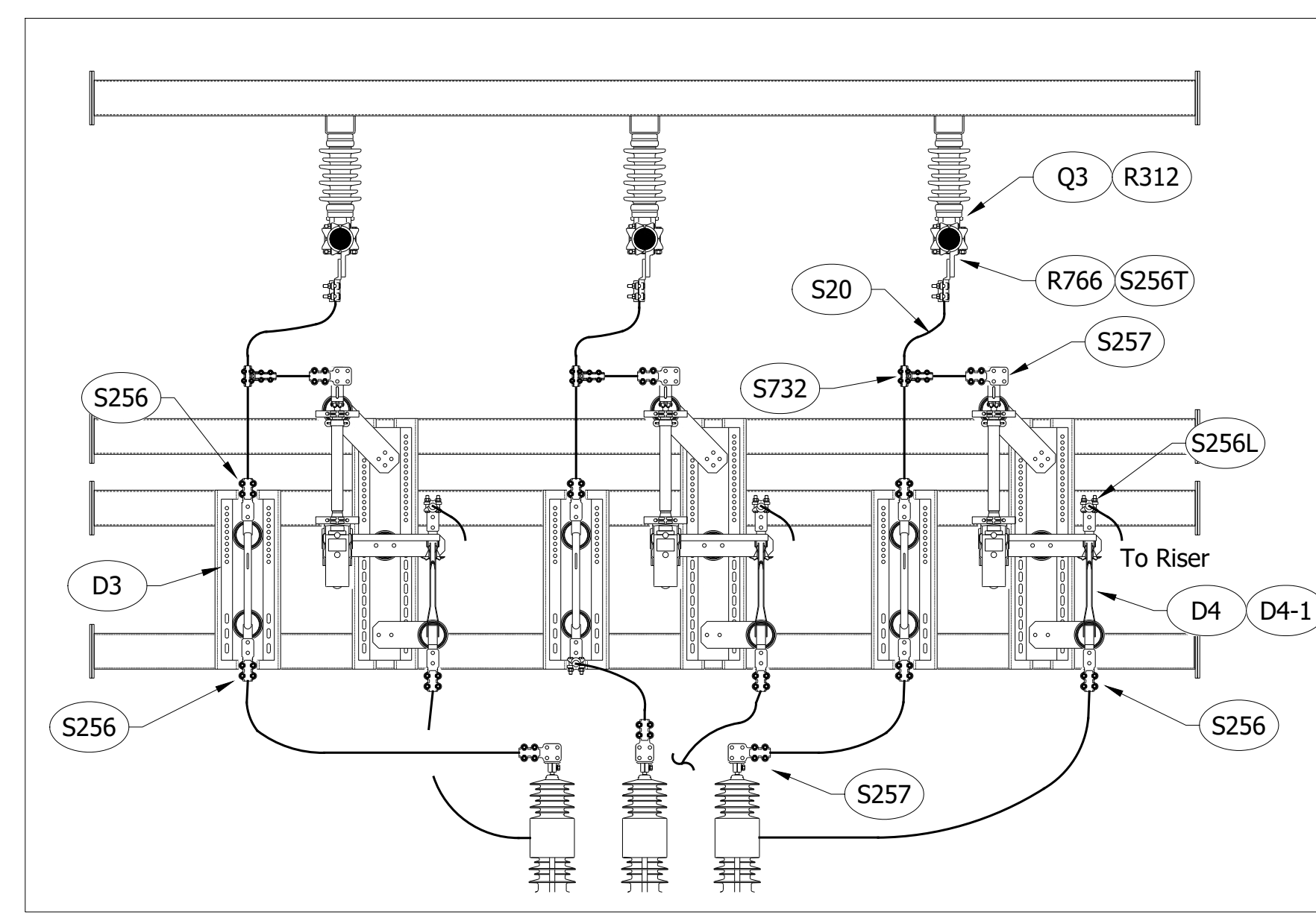
ELEVATION D-D



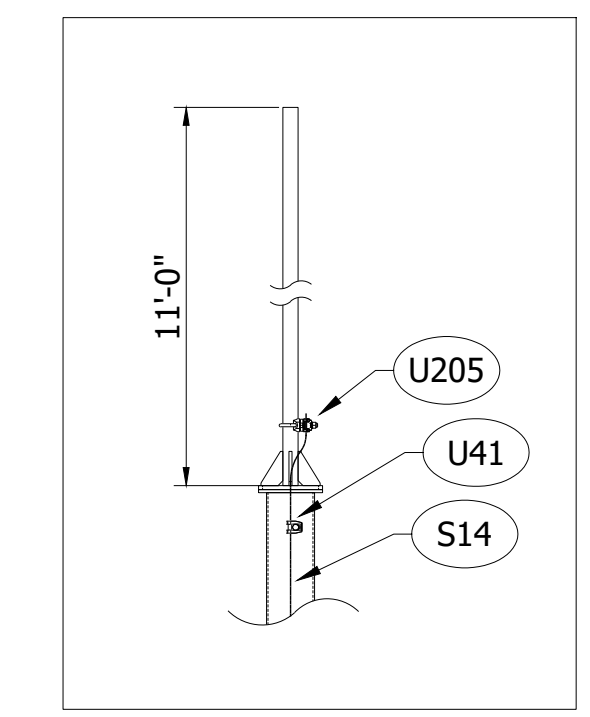
ELEVATION D1-D1



ELEVATION D2-D2



FEEDER CIRCUIT DETAIL



LIGHTNING MAST DETAIL

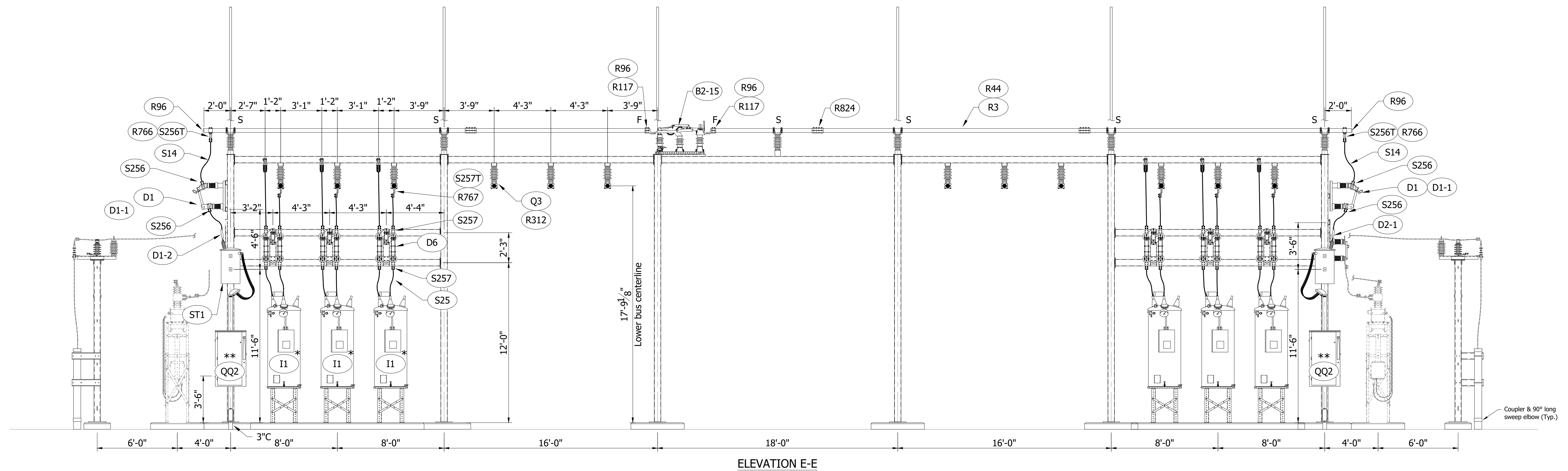
NOTES:

- Bus support clamping arrangement
F= Fixed bus position
S= Sliding bus position
- #4/0 Cu ground wire to be continuous across top of structure & down each leg.
- See drawing 06-10 for structure design loading and clearance requirements.
- * Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
- ** Provided and installed by installation contractor.



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CONSTRUCTION

				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895	
				www.powersystem.org		SCALE 1/4" = 1'-0"	
				PROJECT NO. MIO592107		DRAWING NO. 06-13	
				DATE 3/11/2022		FILE NAME IRT-06-13	
				ENGR. N. HALL		CHK'D. S. PACKWOOD	
				DATE 5/16/2023		DATE 3/11/2022	
				DWN BY G. BODENSTEIN		DATE 3/11/2022	
				BY GB NH		DATE 5/16/2023	
				REVISION AND RECORD OF ISSUE		NO.	



ELEVATION E-E

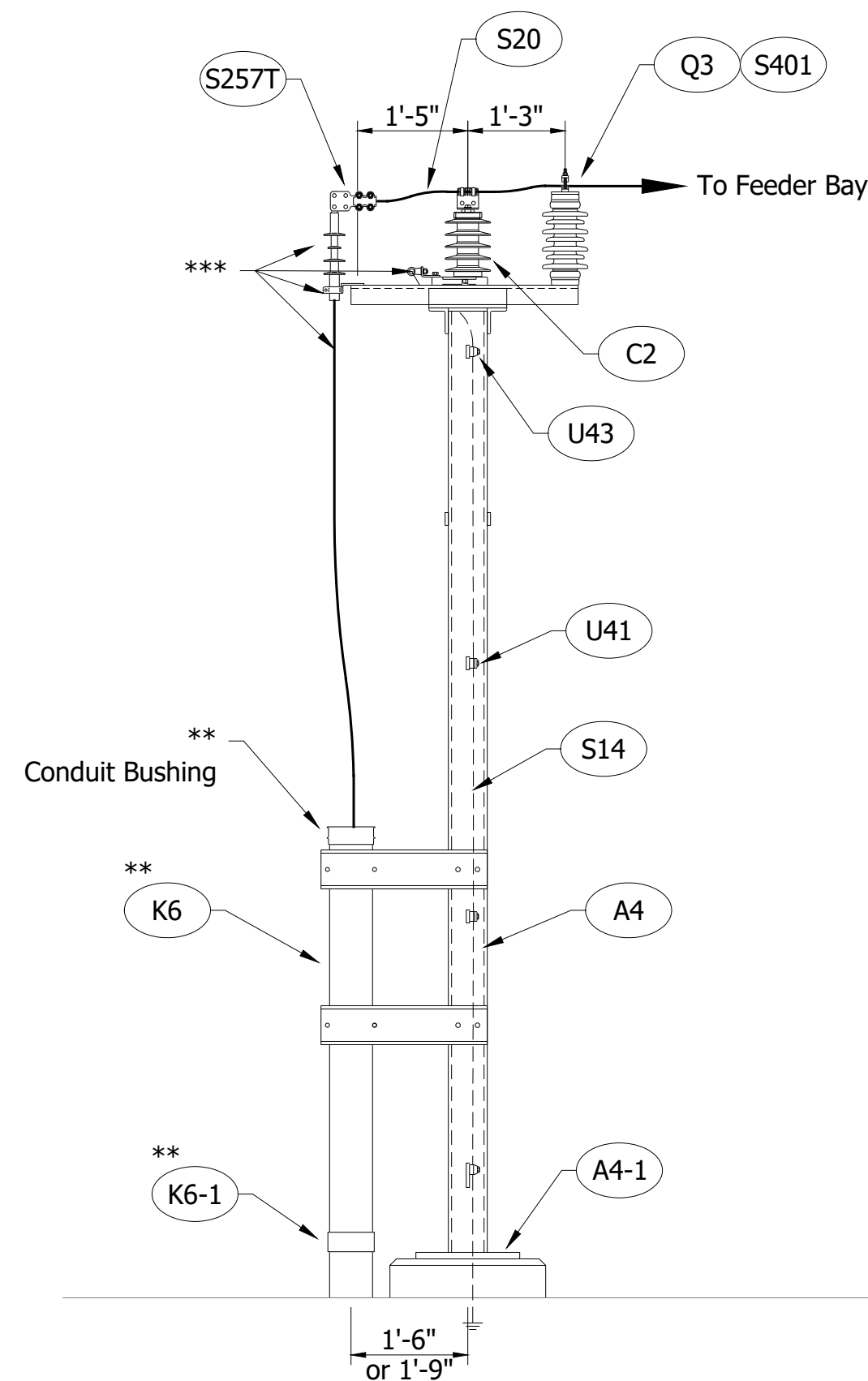
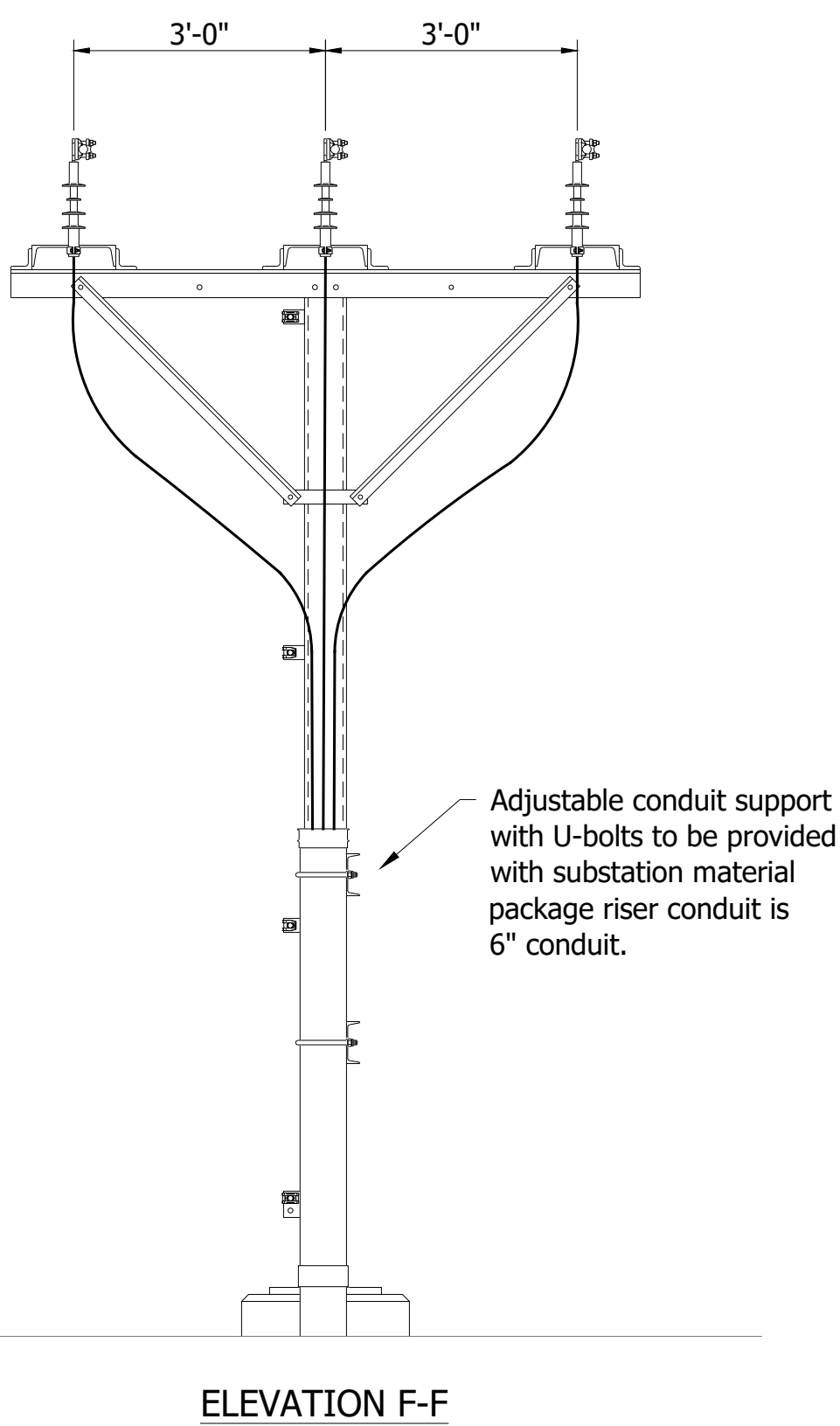
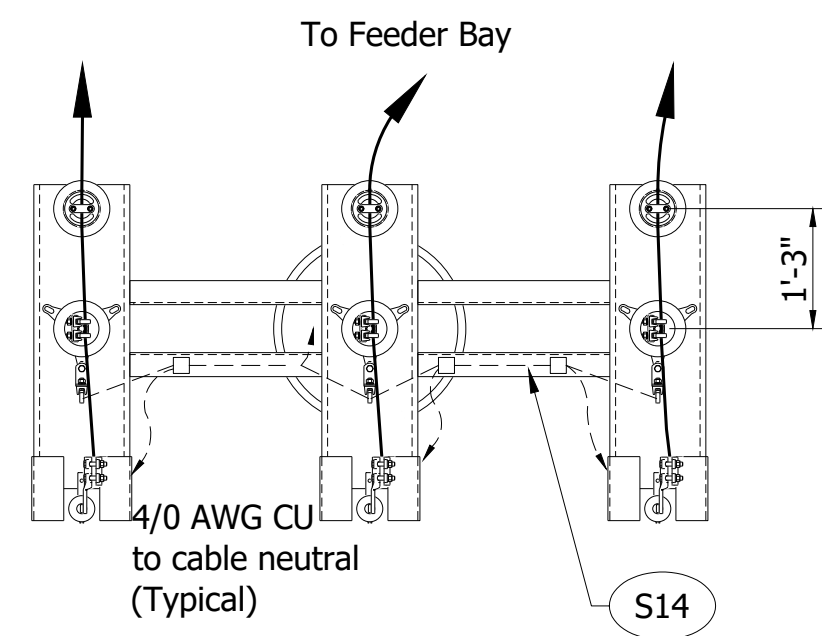
NOTES:

1. Bus support clamping arrangement
F= Fixed bus position
S= Sliding bus position
 2. #4/0 Cu ground wire to be continuous across top of structure & down each leg.
 3. See drawing 06-10 for structure design loading and clearance requirements.
- * Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
** Provided and installed by installation contractor.

PRELIMINARY
NOT FOR
CONSTRUCTION



				PSE Power System Engineering, Inc.		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895	
				www.powersystem.org		SCALE 1/4" = 1'-0"	
				ENGR. N. HALL		PROJECT NO. MI0592107	
				DWN BY G. BODENSTEIN		DRAWING NO. 06-14	
				DATE 5/16/2023		DATE 3/11/2022	
				DATE 3/11/2022		FILE NAME IRT-06-14	



- * Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
- ** Provided and installed by installation contractor.
- *** Installed by distribution line contractor.

PRELIMINARY
NOT FOR
CONSTRUCTION



				PSE Power System Engineering, Inc. www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		TYPICAL RISER STRUCTURE IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI		
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL	CHK'D BY S. PACKWOOD	SCALE 1/2" = 1'-0"	
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 3/11/2022	FILE NAME IRT-06-15	
							PROJECT NO. MI0592107	DRAWING NO. 06-15

138kV STRUCTURES (BUS 1 & BUS 2)

ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
A1	138 kV Switch Structure	2 Lot		
A1-1	Anchor bolt with two(2) galvanized hex nuts and washers	16 As Req'd		
B2-138	Group operated switch, three pole, vertical break, horizontal mount 138kV, 1200 amp, 650kV BIL, with quick break arching horns	2	Southern States, Mindcore, or approved equal	EV-2
* E1	Circuit breaker, 138kV, 1200A continuous	2	TBD	XXX
* H1	Transformer, 138kVA-12.47Y/7.2kV x 4.16Y/2.4kV 7.5/10.5 MVA	2	TBD	XXX
R47	Conductor, #336.4 AWG ACSR, 26/7, Linnet	140' As req'd		
R254	Terminal, aluminum, #4/0-397 MCM ACSR to 4-hole NEMA pad	30	Sefcor	AFNC-20-4A
R732	Tee, aluminum, #4/0 - 397 MCM ACSR main to #4/0 - 397 MCM ACSR tap	6	Sefcor	ACRCT-2020
S25	Conductor, 750 kcmil copper, 61 strand, S.D. bare	70' As req'd		
S257	Bronze terminal, #4/0 STR. - 1000 MCM copper to 4-hole NEMA pad	18	Sefcor	FNCT-34-4A
U41	Bronze ground connector, one #4 AWG - 300 MCM wire to a flat surface	As req'd	Sefcor	GTC-14B
U43	Bronze ground connector, two #4 AWG - 300 MCM wires of unequal size to a flat surface	As req'd	Sefcor	GTC2-14B
U163	Grounding clamp, bronze, flexible strap to a 1-1/2" IPS pipe	2	Sefcor	GBR-54
U170	Flexible copper braid (24" long), 200 Amp	2 As Req'd	Sefcor	XBG146-B-24

* Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
 ** Provided and installed by installation contractor.
 *** Installed by distribution line contractor.

NOTES:

- All quantities are preliminary and are to be verified by the contractor. Contractor is responsible for providing correct materials and quantities for a functioning installation.
- Anchor bolts, bolts, nuts, and washers shall be galvanized unless noted otherwise.
- All bolted pad connections shall be made up with stainless steel (SS) 1/2"-13unc hex head machine bolt, 2 round flat washers (0.1" thick minimum), 1 bellville washer (0.089" thick minimum) and 1/2" nut. Nut shall be SS for aluminum connections and silicon bronze for copper connections.
- The packager shall provide one fuse plus a spare for each fuse assembly required, unless otherwise noted.
- All anchor bolt patterns are to be square to reduce installation errors.
- Substation packager to provide structure loading calculations for foundation design by others. Packager to provide anchor bolt plan/details for installation by others.

METERING STRUCTURE (BUS 1 & BUS 2)

ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
A2	15 kV Metering Structure	2 Lot		
A2-1	Anchor bolt with two(2) galvanized hex nuts and washers	16 As Req'd		
B1	Group operated switch, 2000 A, 110BIL, 80KA momentary, center break	2 Lot	USCO	AGCH5V-01520
D1	SMD-20 Power fuse, Station-vertical offset, excluding fuse unit, 14.4 kV, 110 kV BIL, 200 A, cypoxy station post insulators	6	S&C	192222R2-E
D1-1	Fuse unit (Include 1 spare) 14.4 kV, 3K, S&C "K" TCC 165-2	6	S&C	702003
D2	Disconnect switch, Type LCO-C, copper, hookstick operated, 15kV, 2000A, 100kA momentary, 110kV BIL, porcelain insulators, 4-hole tinned terminal pad	6	Cleveland/Price	C102A230G06
G1	Potential transformer, ratio 20:1, 2400:120V, type JVV-4, Single Bushing	6	GE	764x030016
G2	15kV current transformer, 1000:5, type JKW-5	6	GE	755x050119
J1	PT Junction box, NEMA 4 weather tight with hinged pad lockable door and fast opening clamp assembly, back panel, three phase fuse holder, 30 A, type RK-5, 3-10A 250v cartridge fuses, (with 3 spares) and terminal blocks	2 Each	Hoffman Enclosure Panel Fast clamp GE Terminal block Shorting block Bussmann Fuse block	A16H20ALP A20P16 AFC412SS EB25B06 EB27B06 H25030-3
Q3	Station post insulator, TR-208, rated 23kV, 150kV BIL, ANSI-70 light gray glaze	6	Lapp	315208-70
Q52	Dead End insulator, polymer, 15kV	12	Hubbell	4010150215
Q115	Aluminum Dead-end strain clamp, 30,000 LBS.	6	Hubbell	SD-112-N
S14	Conductor, #4/0 AWG copper, 19 strand, S.D. bare	160' As req'd		
S25	Conductor, 750 kcmil copper, 61 strand, S.D. bare	200' As req'd		
S256	Bronze terminal, #4/0 STR. - 1000 MCM copper to 2-hole NEMA pad	12	Sefcor	FNCT-34-2B
S256L	Bronze terminal, #4/0 STR. - 1000 MCM copper to 2-hole NEMA pad, 45 Degree angle	12	Sefcor	FNCT45-34-2B
S257	Bronze terminal, #4/0 STR. - 1000 MCM copper to 4-hole NEMA pad	12	Sefcor	FNCT-34-4A
S257L	Bronze terminal, #4/0 STR. - 1000 MCM copper to 4-hole NEMA pad, 45 Degree angle	6	Sefcor	FNCT45-34-4A
S401	Bronze bus support, #2 - 2000 MCM to insulator with 3" bolt circle	6	Sefcor	CJ-3
S735	Bronze tee, #4/0 - 1000 MCM copper to #4/0 - 1000 MCM copper	6	Sefcor	TCRCT-3434
U41	Bronze ground connector, one #4 AWG - 300 MCM wire to a flat surface	As req'd	Sefcor	GTC-14B
U43	Bronze ground connector, two #4 AWG - 300 MCM wires of unequal size to a flat surface	As req'd	Sefcor	GTC2-14B
U163	Grounding clamp, bronze, flexible strap to a 1-1/2" IPS pipe	4	Sefcor	GBR-54
U170	Flexible copper braid (24" long), 200 Amp	4 As Req'd	Sefcor	XBG146-B-24

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0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL	CRK'D BY S. PACKWOOD	SCALE NONE
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 3/14/2023	FILE NAME IRT-06-20
						PROJECT NO. M10592107	DRAWING NO. 06-20

FEEDER BAY STRUCTURE (BUS 1 & BUS 2)

ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
A3	15 kV Feeder Bay Structure	1 Lot		
A3-1	Anchor bolt with two(2) galvanized hex nuts and washers	48 As Req'd		
B2-15	Group operated switch, three pole, vertical break, horizontal mount 15kV, 2000 amp, 110kV BIL, with quick break arching horns	1 Lot	USCO	AVR-01520
D1	SMD-20 Power fuse, Station-vertical offset, excluding fuse unit, 14.4 kV, 110 kV BIL, 200 A, cypoxy station post insulators	2	S&C	192222R2-E
D1-1	Fuse unit (Include 1 spare) 14.4 kV, 6K, S&C "K" TCC 165-2	3	S&C	702006
D1-2	Current limiting fuse 8.3kV, 40K, 50,000 A.I.C. with parallel groove & spline stud (include 1 spare)	2	Cooper Power	FAH8KV40KCG-R1
D3	Disconnect switch, single pole, single throw, hookstick operated, rated 14.4kV, 110kV BIL, 600 Amps continuous, 40,000 Amp momentary, tin plated terminals, cypoxy insulators	18	S&C	14722-E
D4	Recloser bypass disconnect rated 14.4 kV, 600A continuous with SMD-40 fuse on left rated 400E max, 110 kV BIL, cypoxy station post insulators	18	S&C	192812-E
D4-1	Fuse unit, SMU-40, 14.4 kV 400E, slow speed (TCC 119-2)	18	S&C	832400
D6	Voltage regulator bypass switch, type RBI, non-sequenced, hook stick operated, 14.4kV, 110 kV BIL, 2000 amps continuous, 100,000 amps momentary, tinned terminal pads.	6	Cleveland/Price	C13A002G06
* F1	15kV Recloser, 800A	4	TBD	
* I1	Single phase voltage regulator, 416kVA, 2.5Kv, 1665A	6	TBD	
Q3	Station post insulator, TR-208, rated 23kV, 150kV BIL, ANSI-70 light gray glaze	42	Lapp	315208-70
Q52	Dead End insulator, polymer, 15kV	6	Hubbell	4010150215
Q115	Aluminum Dead-end strain clamp, 30,000 LBS.	6	Hubbell	SD-112-N
R3	3" IPS Schedule 40 Aluminum bus, 6063-T6, 20 foot lengths	500' As req'd		
R44	Conductor, #4/0 AWG ACSR, 6/1 strand, Penguin	500' As req'd		
R96	Aluminum end plug, drive-in type, 3" IPS	36	Sefcor	DP-62-AL
R117	Terminal, aluminum, 3" IPS Aluminum tube to 4-hole NEMA pad	6	Sefcor	AFNT-62-4B
R312	Bus support, aluminum, 3" IPS, 3" B.C.	42	Sefcor	ASTI-62-3
R529	Tee, aluminum, 3" IPS main to 3" IPS tap	24	Sefcor	ATTT-6262
R766	Tee, aluminum, 3" IPS aluminum tube to 2-hole NEMA pad	14	Sefcor	ATF-62-2B
R767	Tee, aluminum, 3" IPS aluminum tube to 4-hole NEMA pad	6	Sefcor	ATF-62-4A
R824	Coupler, aluminum, 3" IPS Aluminum tube main to 3" IPS Aluminum tube tap	9	Sefcor	ASCT-6262
S14	Conductor, #4/0 AWG copper, 19 strand, S.D. bare	50' As req'd		
S20	Hendrix 15kV, 500 kcmil copper, Tree Wire	200' As req'd	Hendrix	

FEEDER BAY STRUCTURE (BUS 1 & BUS 2)

ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
S25	Conductor, 750 kcmil copper, 61 strand, S.D. bare	100' As req'd		
S256	Bronze terminal, #4/0 STR. - 1000 MCM copper to 2-hole NEMA pad	40	Sefcor	FNCT-34-2B
S256L	Bronze terminal, #4/0 STR. - 1000 MCM copper to 2-hole NEMA pad, right angle	12	Sefcor	FNCT90-34-2B
S256T	Bronze terminal, #4/0 STR. - 1000 MCM copper to 2-hole NEMA pad, tin plated	14	Sefcor	FNCT-34-2B-TP
S257	Bronze terminal, #4/0 STR. - 1000 MCM copper to 4-hole NEMA pad	60	Sefcor	FNCT-34-4A
S257T	Bronze terminal, #4/0 STR. - 1000 MCM copper to 4-hole NEMA pad, tin plated	6	Sefcor	FNCT-34-4A-TP
S732	Tee, bronze, #1/0 - 500 MCM copper to #1/0 - 500 MCM copper	12	Sefcor	TCRCT-2020
U41	Bronze ground connector, one #4 AWG - 300 MCM wire to a flat surface	As req'd	Sefcor	GTC-14B
U43	Bronze ground connector, two #4 AWG - 300 MCM wires of unequal size to a flat surface	As req'd	Sefcor	GTC2-14B
U163	Grounding clamp, bronze, flexible strap to a 1-1/2" IPS pipe	2	Sefcor	GBR-54
U170	Flexible copper braid (24" long), 200 Amp	2 As Req'd	Sefcor	XBG146-B-24
U205	Grounding clamp, bronze, #4 AWG STR.-2/0 STR. ground wire to a 1-1/2" IPS pipe	12 As req'd	Sefcor	GU1-5409
QQ2	Fused disconnect switch, 400A min.	2	Square D	H225NR
ST1	Station Service Transformer, 50kVA	2		

NOTES:

- All quantities are preliminary and are to be verified by the contractor. Contractor is responsible for providing correct materials and quantities for a functioning installation.
- Anchor bolts, bolts, nuts, and washers shall be galvanized unless noted otherwise.
- All bolted pad connections shall be made up with stainless steel (SS) 1/2"-13unc hex head machine bolt, 2 round flat washers (0.1" thick minimum), 1 bellville washer (0.089" thick minimum) and 1/2" nut. Nut shall be SS for aluminum connections and silicon bronze for copper connections.
- The packager shall provide one fuse plus a spare for each fuse assembly required, unless otherwise noted.
- All anchor bolt patterns are to be square to reduce installation errors.
- Substation packager to provide structure loading calculations for foundation design by others. Packager to provide anchor bolt plan/details for installation by others.

15KV RISER STRUCTURE


ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
A4	15kV Riser Structure	6		
A4-1	Anchor bolt with two(2) galvanized hex nuts and washers	24 As req'd		
C2	Arrester, 3kV, Polymer, Station class, 2.55kV MCOV, Type EVP, ANSI NO. 70 Sky gray with NEMA 4-Hole pad	18	Ohio Brass	EVPO00300-3001
K6	Conduit, 6" PVC, schedule 40, with bushing	6 As req'd		
K6-1	Conduit, 6", 48"-90° sweep, PVC	6		
*** K17	15kV UG Cable for feeders	As req'd	By owner	
*** K17-1	Cable support / Mounting bracket for Item K17	18 As req'd	By owner	
*** K27	15kV Cable terminator and connector for Item K17	18 As req'd	By owner	
Q3	Station post insulator, TR-208, rated 23kV, 150kV BIL, ANSI-70 light gray glaze	18	Lapp	315208-70
S14	Conductor, #4/0 AWG copper, 19 strand, S.D. bare	200' As req'd		
S20	Hendrix 15kV, 500 kcmil copper, Tree Wire	50' As req'd	Hendrix	
S257T	Bronze terminal, #4/0 STR. - 1000 MCM copper to 4-hole NEMA pad, tin plated	18	Sefcor	FNCT-34-4A-TP
S401	Bronze bus support, #2 - 2000 MCM to insulator with 3" bolt circle	18	Sefcor	CJ-3
U41	Bronze ground connector, one #4 AWG-300 MCM wire to a flat surface	As req'd	Sefcor	GTC-14B
U43	Bronze ground connector, two #4 AWG-300 MCM wires of unequal size to a flat surface	As req'd	Sefcor	GTC2-14B
	Bolt assemblies for electrical connections (See Note 3)	As req'd		

STATIC POLE

ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
A5	Lightning mast, 80', direct buried	4 EA.		
** QQ30	Small utility floodlight, 5900 Nominal Lumens, 120VAC, non-dimming, trunnion mounting, gray color, 4000K color temp, w/mounting arm (or approved equal)	6	Eaton/Streetworks	UFLD-S-C15-E-U-66-T-AP
S14	Conductor, #4/0 AWG copper, 19 strand, S.D. bare	400' As req'd		
U41	Bronze ground connector, one #4 AWG - 300 MCM wire to a flat surface	As req'd	Sefcor	GTC-14B
U43	Bronze ground connector, two #4 AWG - 300 MCM wires of unequal size to a flat surface	As req'd	Sefcor	GTC2-14B

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- * Provided by equipment manufacturer under separate contract with Negaunee, installed by installation contractor.
- ** Provided and installed by installation contractor.
- *** Installed by distribution line contractor.

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0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CRKD/APP'D	S. PACKWOOD	SCALE	NONE	PROJECT NO.	DRAWING NO.	
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	BY	G. BODENSTEIN	DATE	3/14/2023	FILE NAME	IRT-06-21	MIO592107	06-21


GROUNDING MATERIALS - FENCE & GROUND GRID

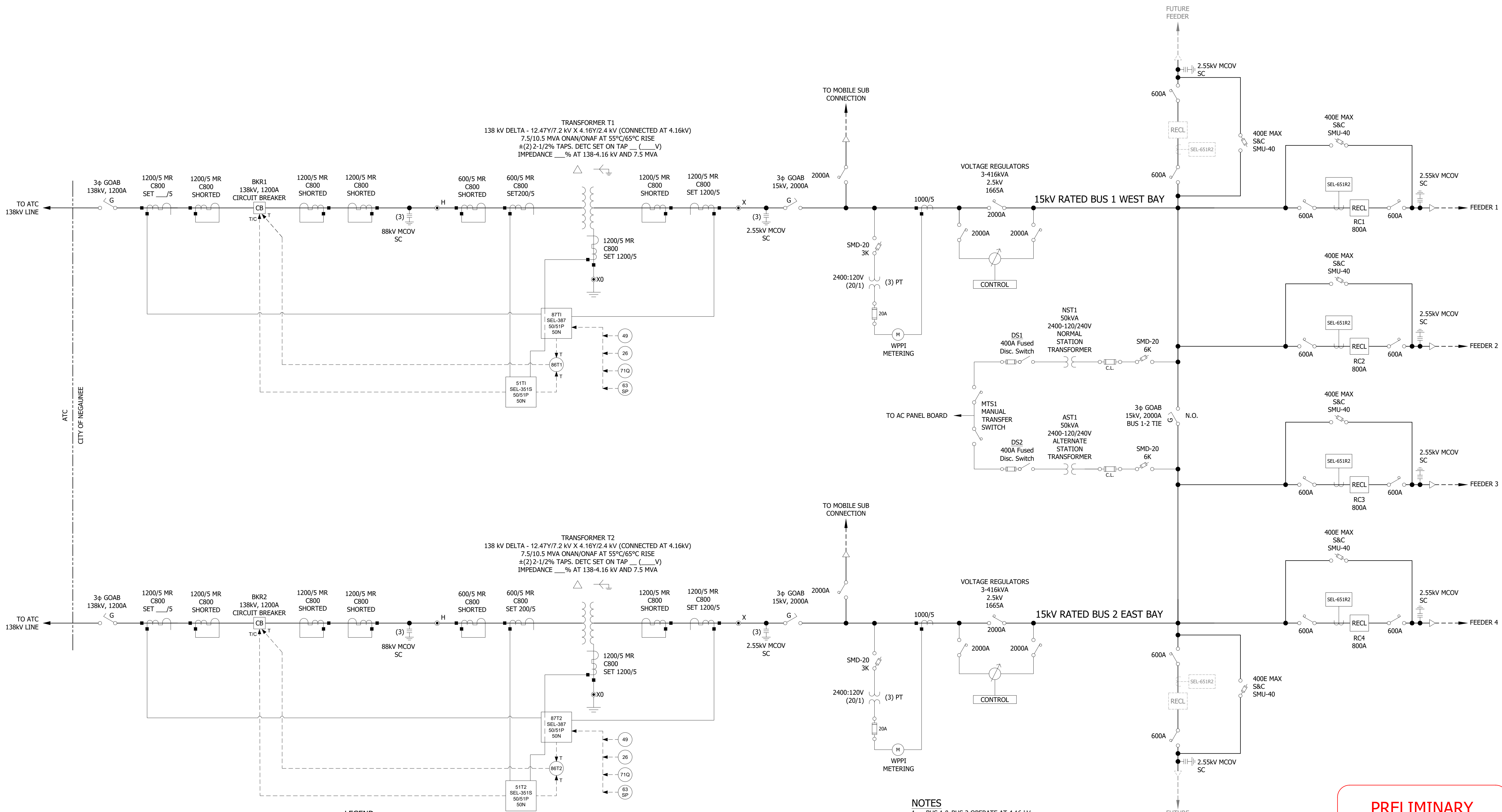
ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG NO.
B3	Switch operator platform, 3'-0" X 6'-0"	5		Detail 8 Dwg. 03-21
S10	Conductor, #2 copper, 7 strand, S.D., bare	As Req'd		
S10T	Conductor, #2 tin plated copper, 7 strand, S.D., bare	As Req'd		
S14	Conductor, 4/0 copper, 19 strand, S.D. bare	As req'd		
S20	Conductor, 500MCM copper, 19 strand, S.D. bare	As req'd		
U41	Bronze ground connector, one #4 AWG-300 MCM wire to a flat surface	As req'd	Sefcor	GTC-14B
U43	Bronze ground connector, two #4 AWG-300 MCM wires of unequal size to a flat surface	As req'd	Sefcor	GTC2-14B
U55	Cadweld powder cartridge, size #150, type TA #4/0 AWG tee	As req'd	Erico	
U56	Cadweld powder cartridge, size #150, type GY #4/0 AWG cable to 5/8" rod	As req'd	Erico	
U57	Cadweld powder cartridge, size #250, type XB #4/0 AWG cross	As req'd	Erico	
U82	Ground rod, threaded, 5/8" diameter x 10', 13 mil copper clad steel	As req'd	Erico	635803
U87	Ground rod coupler, for 5/8" diameter rod, threaded	As req'd	Erico	CR58
U90	Ground rod driving stud, for 5/8" diameter ground rod, threaded (use with threaded coupler)	As req'd	Erico	DS58
U163	Grounding clamp, bronze, flexible strap to a 1-1/2" IPS pipe	As req'd	Sefcor	GBR-54
U170	Flexible copper braid (24" long), 200 Amp	As req'd	Sefcor	XBG146-B-24
U204	Grounding clamp, bronze, #2 AWG Str. - 250 MCM ground wire to a 1-1/4" IPS pipe	As req'd	Sefcor	GU1-4912
U205	Grounding clamp, bronze, #4 AWG STR.-2/0 STR. ground wire to a 1-1/2" IPS pipe	As req'd	Sefcor	GU1-5409
U210	Grounding clamp, bronze, 2/0 AWG Str. - 250 MCM ground wire to a 2" IPS pipe	As req'd	Sefcor	GU1-5812
U212	Grounding clamp, bronze, #2 AWG STR. - 250 MCM ground wire to a 2-1/2" IPS pipe	As req'd	Sefcor	GU1-6012
U216	Grounding clamp, bronze, #4 AWG STR. - 250 MCM ground wire to a 3-1/2" IPS pipe	As req'd	Sefcor	GU1-6312
V534	Connector, tin plated split bolt with spacer, #2 AWG copper ground conductor to barbed wire or fence	As req'd	Homac	E3-GP
V552	Connector (lug), copper, #8 - 1/0 AWG copper to pad with 5/16" dia. bolt hole	As req'd	Homac	ML-1/0
	Bolt assemblies for electrical connections (See Note 3)	As req'd		

NOTES:

- All quantities are preliminary and are to be verified by the contractor. Contractor is responsible for providing correct materials and quantities for a functioning installation.
- All bolted pad connections shall be made up with stainless steel (SS) 1/2"-13unc hex head machine bolt, 2 round flat washers (0.1" thick minimum), 1 bellville washer (0.089" thick minimum) and 1/2" nut. Nut shall be SS for aluminum connections and silicon bronze for copper connections.

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						2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		BILL OF MATERIALS IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI				
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHK'D	S. PACKWOOD	SCALE	NONE	PROJECT NO.	DRAWING NO.
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DATE	3/14/2023	FILE	IRT-06-22	MI0592107	06-22



LEGEND

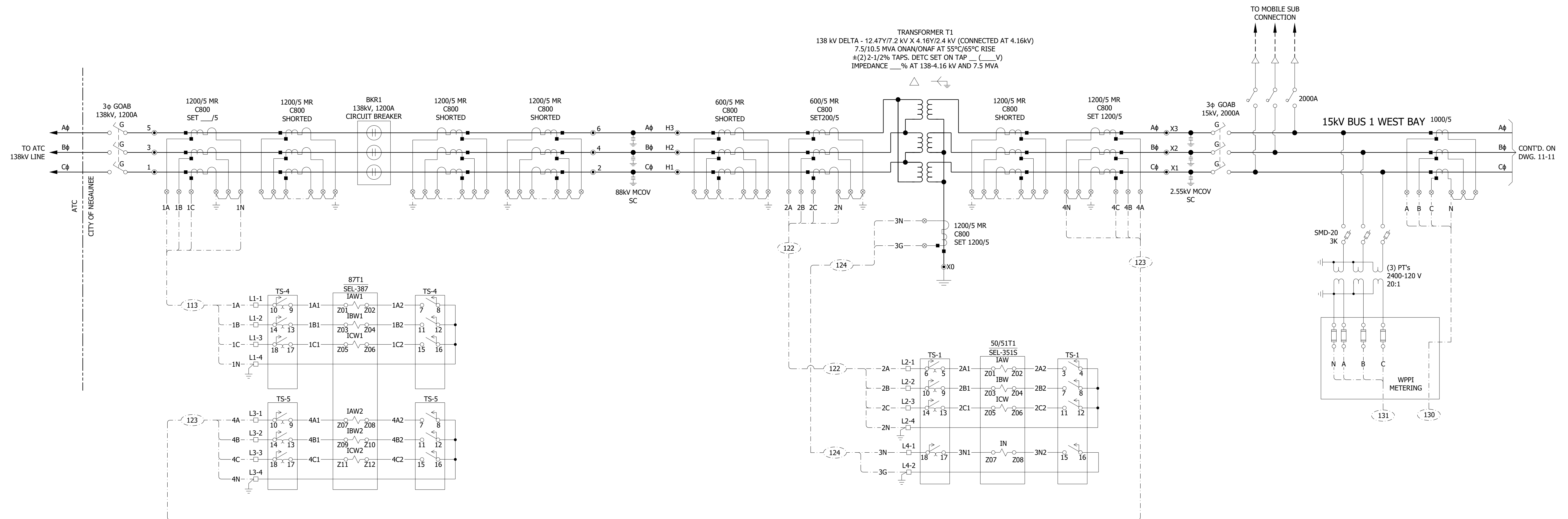
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	GANG OPERATED AIR BREAK SWITCH		METER		OVER CURRENT RELAY		RECLUSER
	HOOK STICK SWITCH		VOLTAGE REGULATOR		DIFFERENTIAL RELAY		POTENTIAL TRANSFORMER
	BUSHING CURRENT TRANSFORMER		U.G. CABLE		TRIP CIRCUIT		
	CURRENT TRANSFORMER		OVERHEAD TO UNDERGROUND TERMINATOR		CURRENT LIMITING		

NOTES

- BUS 1 & BUS 2 OPERATE AT 4.16 kV, RATED 15 kV.

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2	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	CHKD	S. PACKWOOD
1	ISSUED FOR REVIEW	GB	NH	02/21/2023	ENGR	G. BODENSTEIN	DATE	3/10/2022
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	FILE NAME	IRT-10-02	SCALE	NONE
							PROJECT NO.	MI0592107
							DRAWING NO.	10-02



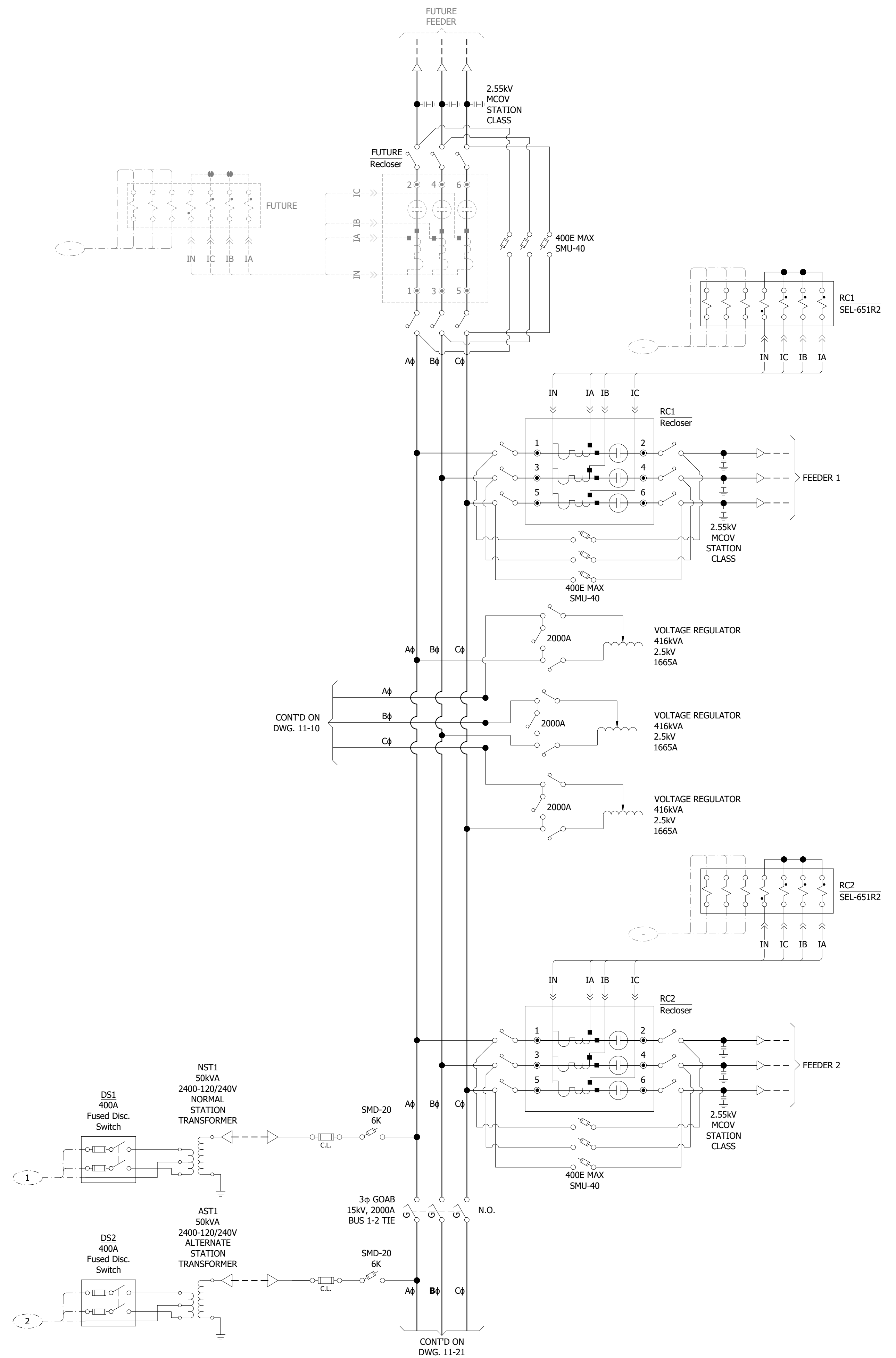
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	FUSED DISCONNECT SWITCH		LIGHTNING ARRESTER		FUSE		EXTERNAL EQUIPMENT SHORTING TERMINAL
	GANG OPERATED AIR BREAK SWITCH		METER		POTENTIAL TRANSFORMER		RELAY PANEL SHORTING TERMINAL BLOCK
	HOOK STICK SWITCH		VOLTAGE REGULATOR		CURRENT LIMITING		EQUIPMENT BUSHING
	BUSHING CURRENT TRANSFORMER		U.G. CABLE				
	CURRENT TRANSFORMER		OVERHEAD TO UNDERGROUND TERMINATOR				

NOTES
 1. BUS 1 OPERATES AT 4.16 kV, RATED 15 kV.

**PRELIMINARY
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 CONSTRUCTION**

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2	ISSUED FOR BID	GB	NH	05/16/2023	ENGR	N. HALL	SCALE NONE
1	ISSUED FOR REVIEW	GB	NH	02/21/2023	CHK'D	S. PACKWOOD	PROJECT NO. MI0592107
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DRAWING NO. 11-10
					DATE	5/11/2022	FILE NAME IRT-11-10

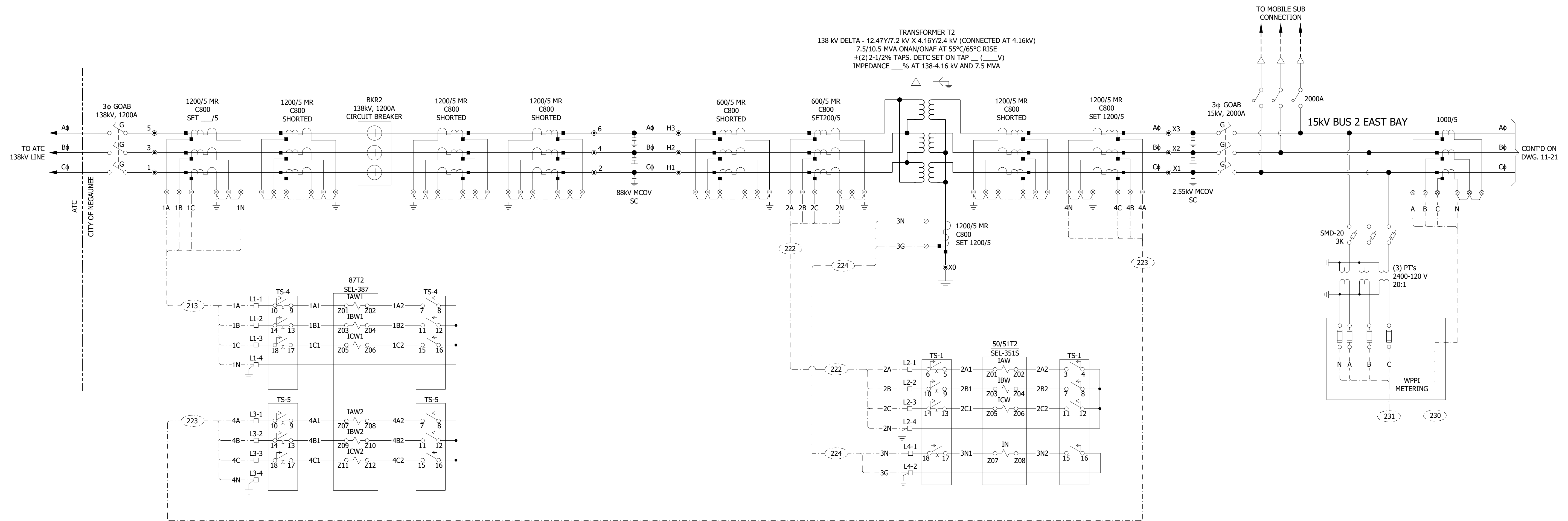


LEGEND

	FUSED DISCONNECT SWITCH		LIGHTNING ARRESTER		FUSE		EXTERNAL EQUIPMENT SHORTING TERMINAL
	GANG OPERATED AIR BREAK SWITCH		METER		POTENTIAL TRANSFORMER		RELAY PANEL SHORTING TERMINAL BLOCK
	HOOK STICK SWITCH		VOLTAGE REGULATOR		CURRENT LIMITING		EQUIPMENT BUSHING
	BUSHING CURRENT TRANSFORMER		U.G. CABLE				
	CURRENT TRANSFORMER		OVERHEAD TO UNDERGROUND TERMINATOR				

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2	ISSUED FOR BID	GB	NH	05/16/2023	ENGR. N. HALL	CHK'D APP'D. S. PACKWOOD	SCALE NONE
1	ISSUED FOR REVIEW	GB	NH	02/21/2023	DWN BY G. BODENSTEIN	DATE 5/11/2022	FILE NAME IRT-11-01
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	PROJECT NO. M10592107	DRAWING NO. 11-11	

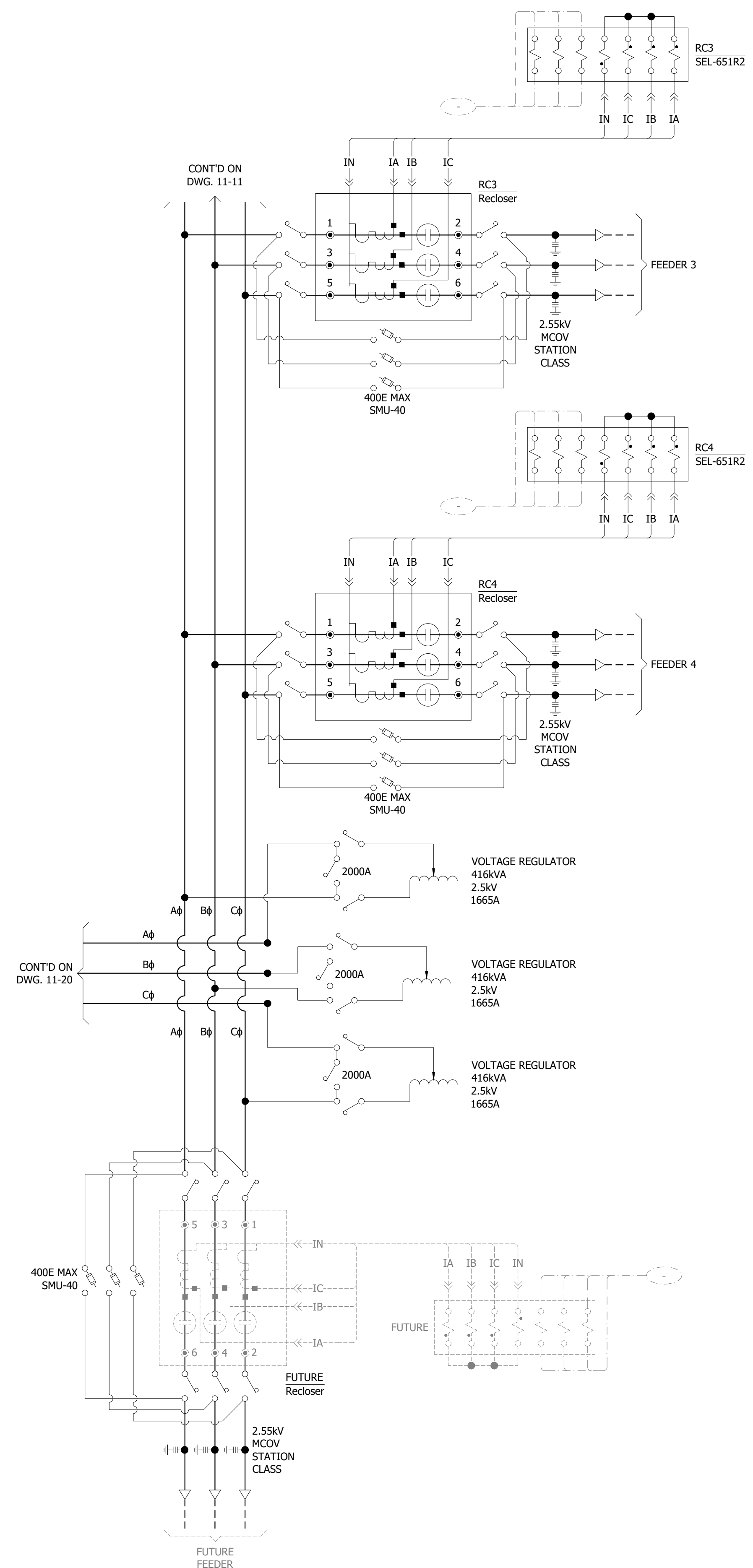


LEGEND			
	FUSED DISCONNECT SWITCH		LIGHTNING ARRESTER
	GANG OPERATED AIR BREAK SWITCH		METER
	HOOK STICK SWITCH		VOLTAGE REGULATOR
	BUSHING CURRENT TRANSFORMER		U.G. CABLE
	CURRENT TRANSFORMER		OVERHEAD TO UNDERGROUND TERMINATOR
	FUSE		POTENTIAL TRANSFORMER
	EXTERNAL EQUIPMENT SHORTING TERMINAL		CURRENT LIMITING
	RELAY PANEL SHORTING TERMINAL BLOCK		EQUIPMENT BUSHING

NOTES
 1. BUS 2 OPERATES AT 4.16 kV, RATED 15 kV.

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				PROJECT NO. MI0592107		DRAWING NO. 11-20	
				DWN BY G. BODENSTEIN		DATE 5/11/2022	
				ENGR N. HALL		DATE 02/21/2023	
				BY GB		ENGR. NH	
				DATE 05/16/2023		FILE NAME IRT-11-20	

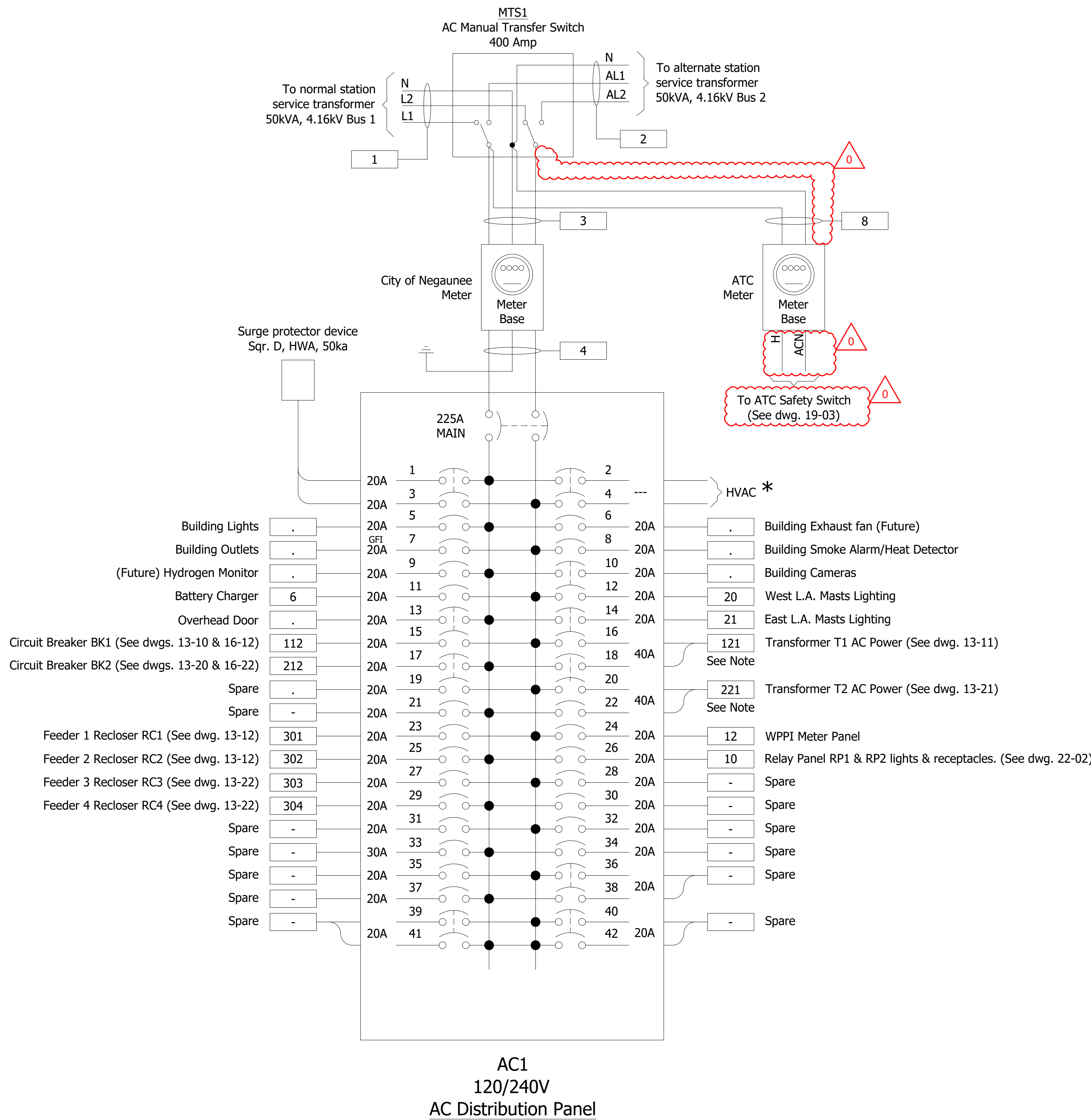


LEGEND

	FUSED DISCONNECT SWITCH		LIGHTNING ARRESTER		FUSE		EXTERNAL EQUIPMENT SHORTING TERMINAL
	GANG OPERATED AIR BREAK SWITCH		METER		POTENTIAL TRANSFORMER		RELAY PANEL SHORTING TERMINAL BLOCK
	HOOK STICK SWITCH		VOLTAGE REGULATOR		CURRENT LIMITING		EQUIPMENT BUSHING
	BUSHING CURRENT TRANSFORMER		U.G. CABLE		OVERHEAD TO UNDERGROUND TERMINATOR		
	CURRENT TRANSFORMER						

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2	ISSUED FOR BID	GB	NH	05/16/2023	ENGR	N. HALL	CHK'D APP'D	S. PACKWOOD	SCALE	NONE	PROJECT NO.	DRAWING NO.
1	ISSUED FOR REVIEW	GB	NH	02/21/2023	DWN	G. BODENSTEIN	DATE	5/11/2022	FILE NAME	IRT-11-21	MI0592107	11-21
NO.	REVISION AND RECORD OF ISSUE			BY	ENGR.	DATE						



- NOTES:**
- The final breaker/circuit layout is dependent on the building manufacturer design.
 - AC wiring is anticipated to be E1(K1) color scheme of B,R,W,G.

DRAWING APPROVAL
PLEASE CIRCULATE DRAWING(S)
IN ORDER SHOWN BELOW:

Comments are needed by : BV, 04/17/23

	Name	Initial	Code	Date
PLN				
OPS				
PROT				
SCADA				
MAINT				
DE				
IT				
OTHER				

Codes: A = Approved for final
B = Approved with comments
C = Revise and resubmit

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Note:

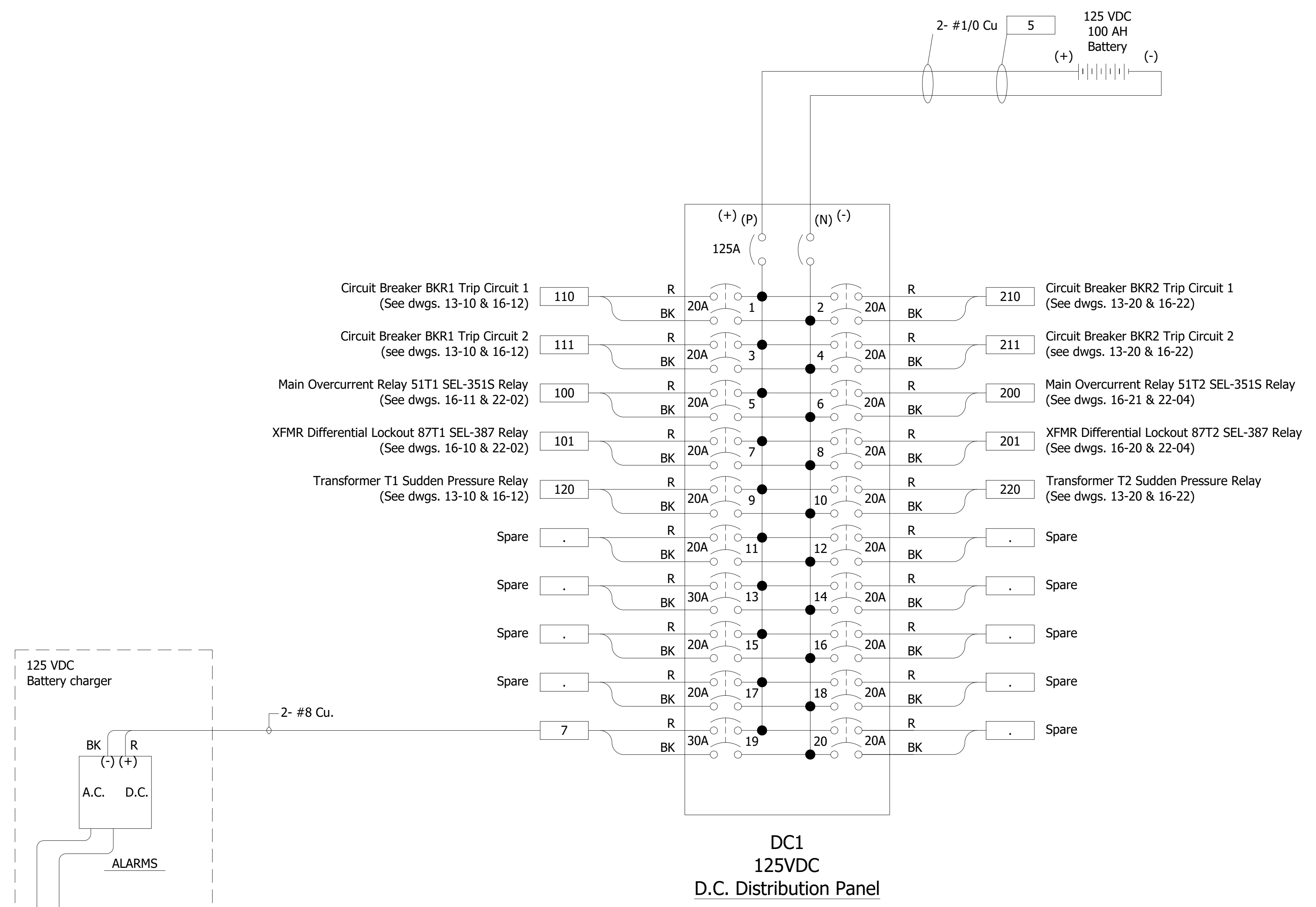
XX BK One
R Two
W Three
G Four

* HVAC Contractor to size breaker for equipment

REV CLOUD LEGEND

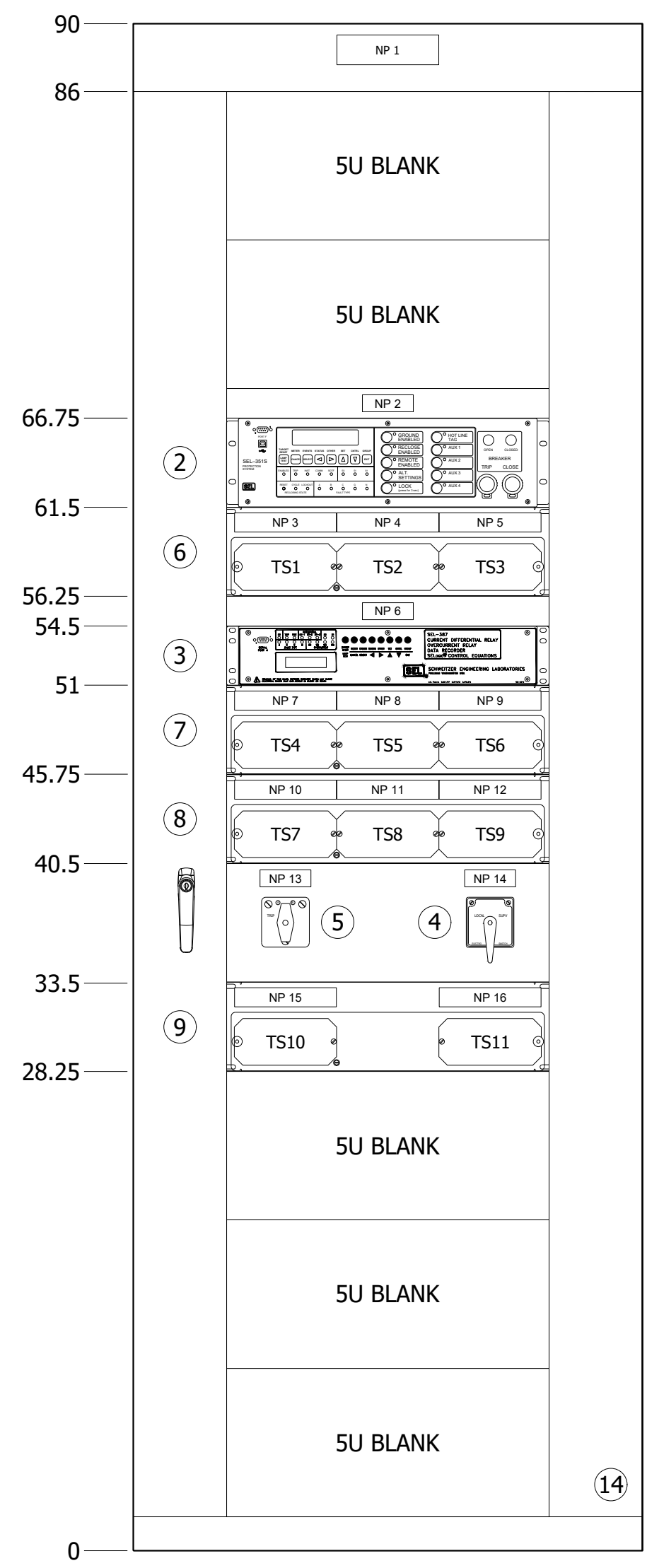
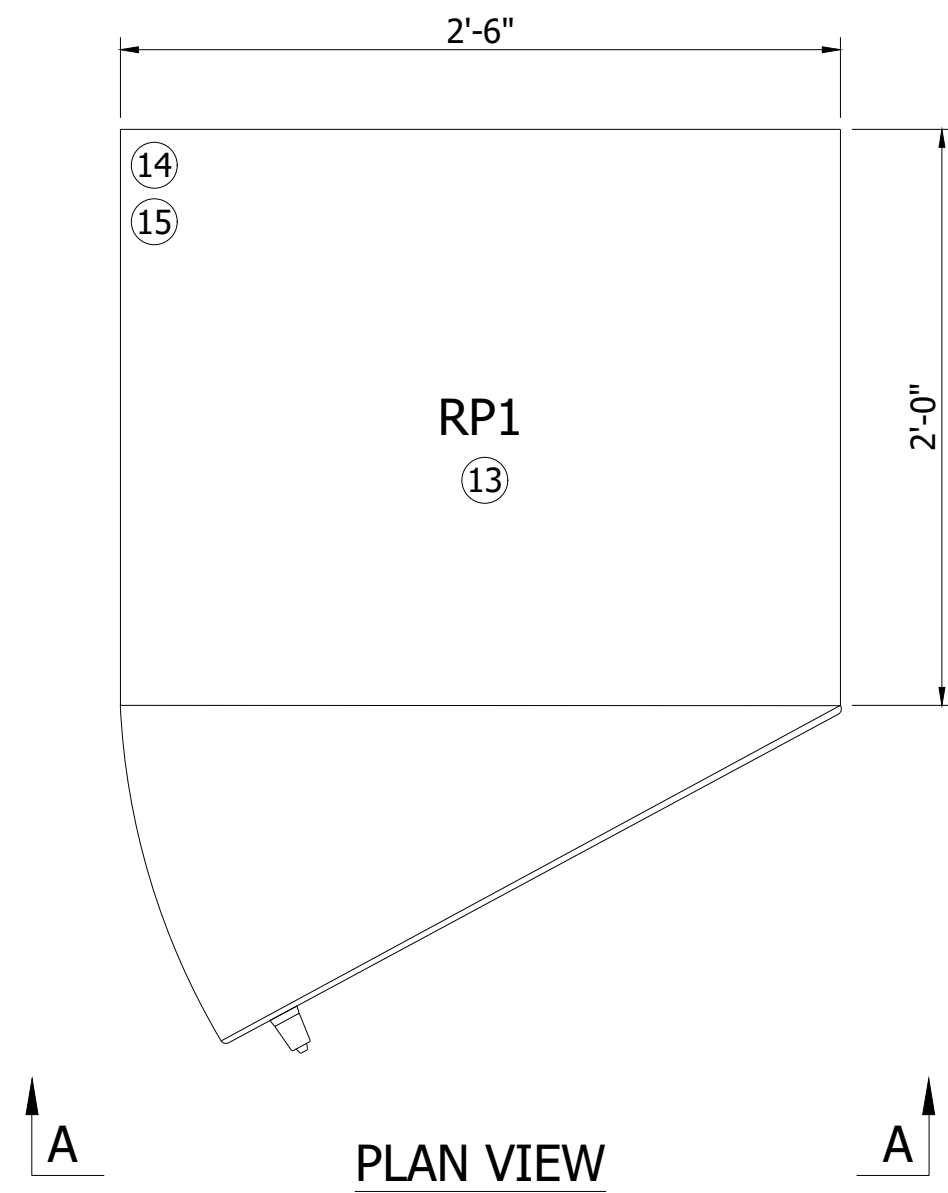
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				PSE Power System Engineering, Inc.		AC PANEL WIRING IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895			
1	ISSUED FOR BID	GB	NH	5/16/2023	ENGR	N. HALL	SCALE NONE
0	ISSUED FOR REVIEW - ATC W.O. #605015	NJM	TAS	03/22/2023	CHKD	S. PACKWOOD	PROJECT NO. MI0592107
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN	G. BODENSTEIN	DRAWING NO. 19-01
					DATE	12/28/2022	FILE NAME IRT-19-01



PRELIMINARY
NOT FOR
CONSTRUCTION

				Power System Engineering, Inc. <small>www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8995</small>		DC PANEL WIRING IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI			
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR N. HALL	CHK'D S. PACKWOOD	SCALE NONE	PROJECT NO. MI0592107	DRAWING NO. 19-02
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	DWN BY G. BODENSTEIN	DATE 12/28/2022	FILE NAME IRT_19-02		



RELAY PANEL RP1
View A-A

ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG #
1	30"W X 90"H X 24"D RELAY RACK PANEL	1		
2	SEL-351S, FEEDER OVER CURRENT PROTECTION AND CONTROL, 3 VOLTAGE INPUTS, HORIZONTAL RACK, STANDARD INTERFACE INCLUDING USB PLUS INDOOR SAFELock TRIP/CLOSE PUSHBUTTONS, 125VDC, (2)10/100 BASE-T, E1A-485 5AMP PHASE/NEUTRAL, STANDARD PROTOCOL	1	SEL	0351S7XHD3E54X1
3	SEL-387, CURRENT DIFFERENTIAL AND OVERCURRENT RELAY, STANDARD FIRMWARE, 125VDC, 5AMP PHASE/NEUTRAL/ HORIZONTAL RACK MOUNT, STANDARD PROTOCOL	1	SEL	0387003X5HXX4XX
4	43L/S LOCAL/SUPERVISORY CONTROL SWITCH -- TWO DECK -- MAINTAINED CONTACTS -- NO OFF POSITION -- WITH PISTOL GRIP HANDLE -- NAMEPLATE ENGRAVING: TITLE "43L/S", POSN #1 "LOCAL", POSN #2 "SUPV" (ENGRAVING CODE 010D-2L14L).	1	ELECTROSWITCH	24202D
5	86LO, MANUAL RESET LOCKOUT RELAY - SERIES 24 - 125 VOLTS DC - COIL STYLE "D" 20 MAIN CONTACTS: 10 NORMALLY OPEN, 10 NORMALLY CLOSED - WITH TARGET. "TRIP" (RED) AND "RESET" (BLACK) - OVAL FIXED HANDLE, 86, WITH LED LIGHTS, AMBER/BLUE, 125 VOLTS DC	1	ELECTROSWITCH	78PB05MU
6	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A" (1)8C,2P, POSITION "B" (1)10P, POSITION "C" (1)10P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH018001001B
7	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A", "B", "C" (3)6C,4P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH014014014B
8	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A", "B", "C" (3)10P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH001001001B
9	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A" (1)10P, POSITION "B" BLANK, POSITION "C" (1)10P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH001000001B
10	TERMINAL BLOCK, 12 POINT, GE TYPE EB-25	AS REQUIRED	GE	12EB25B12
11	SHORTING TERMINAL BLOCK, 4 POINT, GE TYPE EB-27	AS REQUIRED	GE	4EB27B04
12	TWO POLE FUSE BLOCK, 250V WITH NON FUSES. FUSE SIZES AS PER DRAWINGS	AS REQUIRED	BUSSMANN	H25030-2
13	RELAY PANEL 2700K (800 LUMENS) 9 WATT LED A19 LIGHT BULB WITH PORCELAIN FIXTURE AND GUARD. MOUNTED AT TOP.	1		
14	RELAY PANEL 120 VAC, 15AMP SINGLE POLE DOOR LIGHT SWITCH. MOUNTED NEAR TOP OF DOOR PANEL	1		
15	RELAY PANEL 120 VAC, 15AMP GFI DUPLEX RECEPTACLE, MOUNTED NEAR BOTTOM OF PANEL	1		

NOTES:

1. PROVIDE SUFFICIENT TERMINAL BLOCKS FOR THE WIRING OF THE EQUIPMENT BEING INSTALLED AND THEIR ASSOCIATED CABLES, PLUS 10% SPARE.
2. PROVIDE A LIKE AMOUNT OF TERMINAL BLOCKS AND SPARES FOR ANY FUTURE EQUIPMENT.

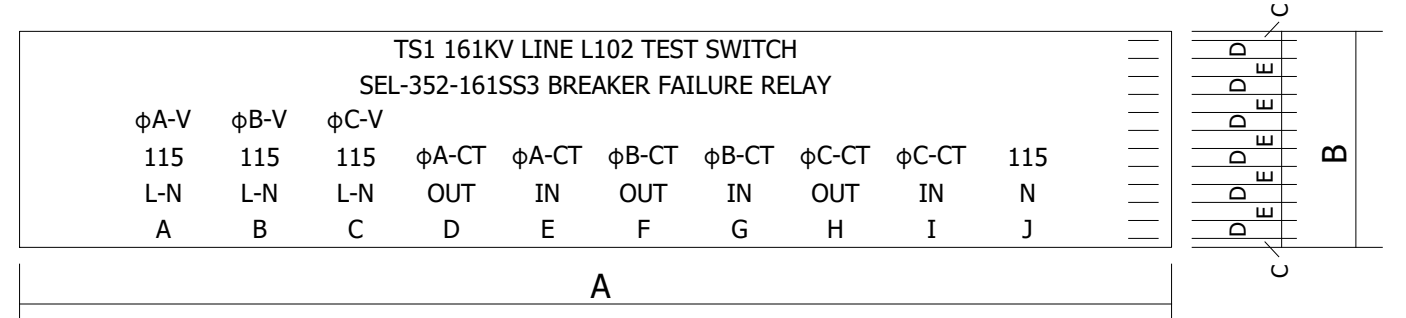
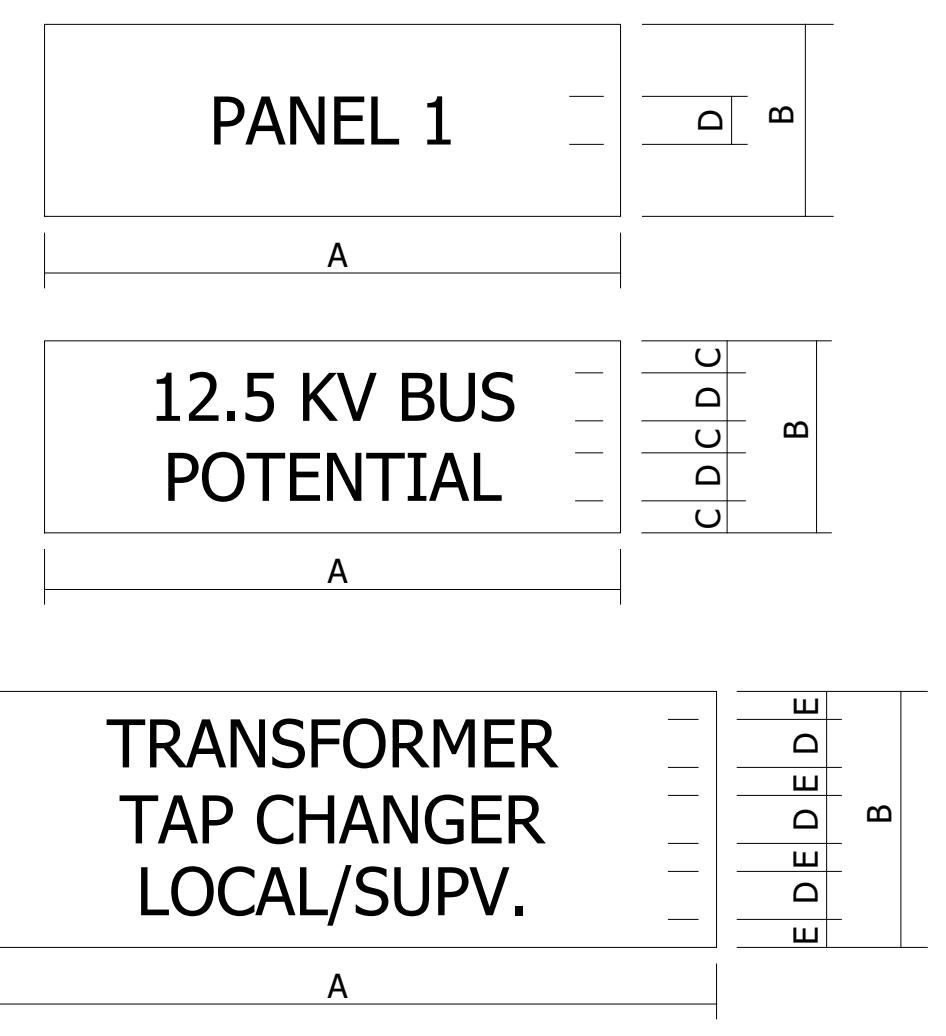
NAMEPLATE SIZE NO.	NAMEPLATE DIMENSIONS				
	A	B	C	D	E
1	1 1/8	7/16	1/16	1/8	-
2	1 1/2	9/16	1/8	3/32	-
3	1 3/4	5/8	1/8	1/8	-
4	2 1/4	3/4	1/8	3/16	-
5	3	1	7/32	3/16	7/64
6	4	1 1/4	1/4	1/4	1/8
7	6	1 3/4	3/8	5/16	13/64
8	6	1 1/8	3/64	3/32	3/32

NAME PLATE NOTES:

1. PROVIDE BLACK NAMEPLATES WITH WHITE ENGRAVED LETTERS.

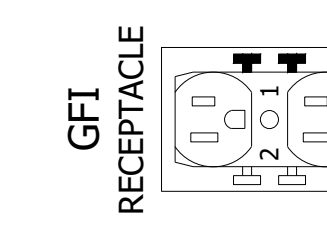
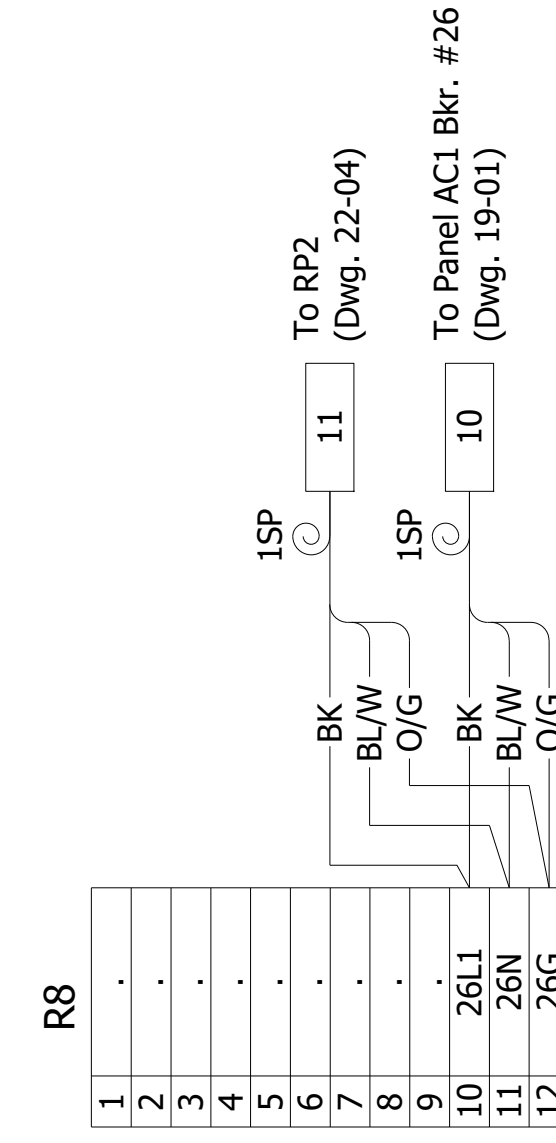
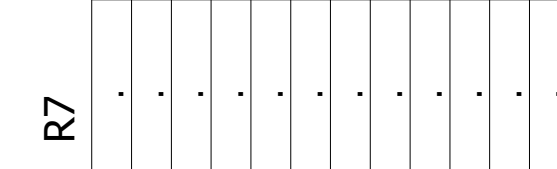
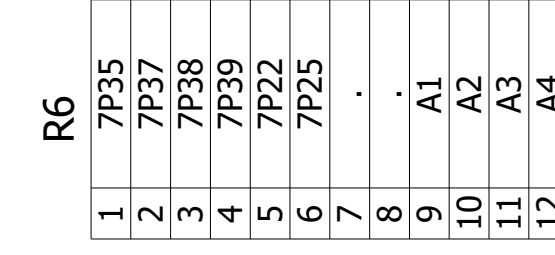
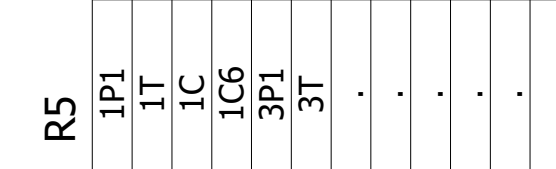
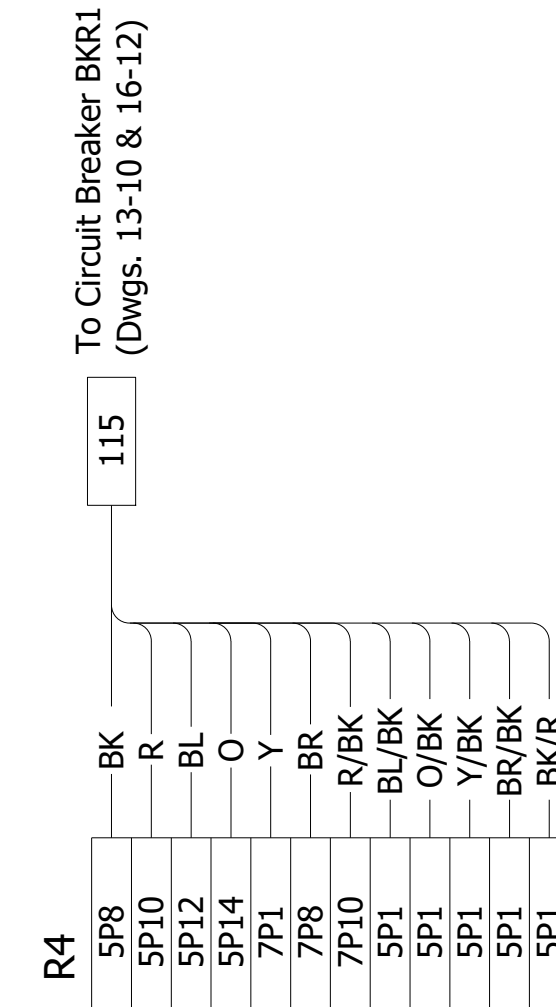
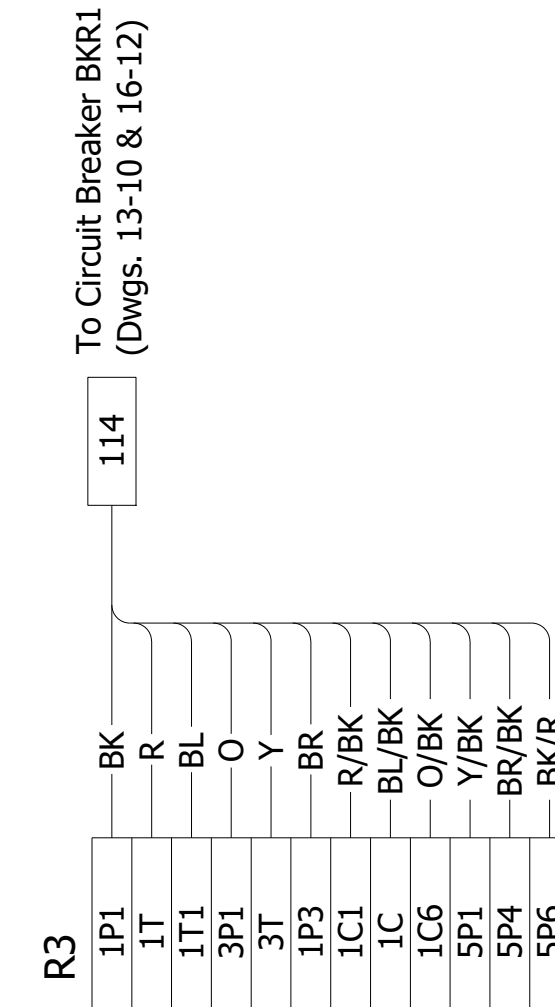
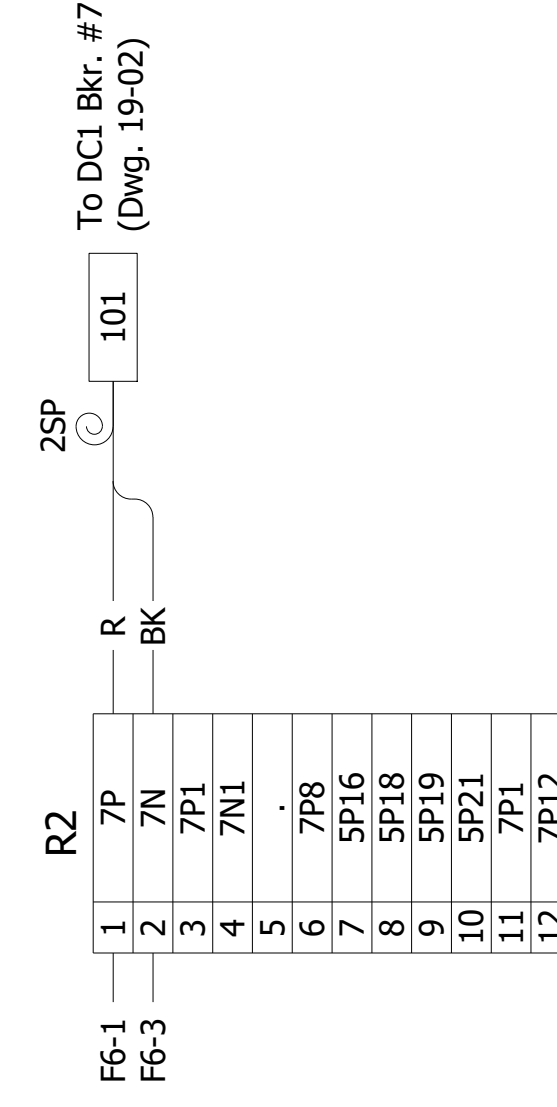
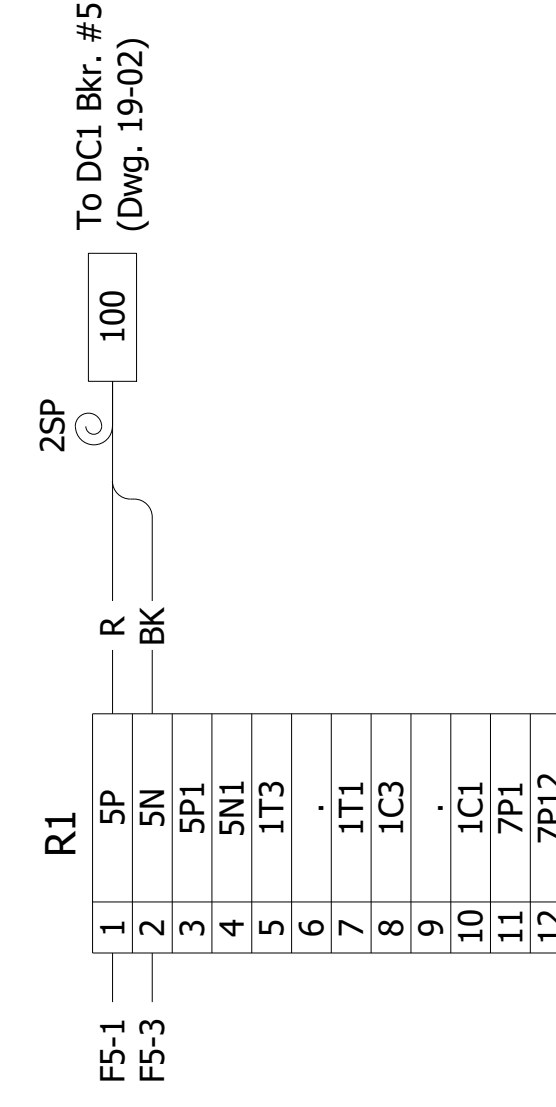
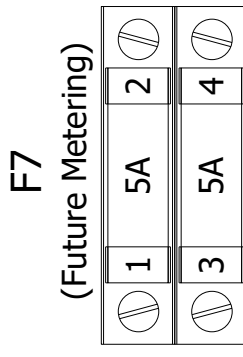
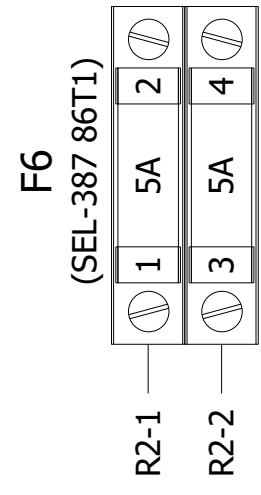
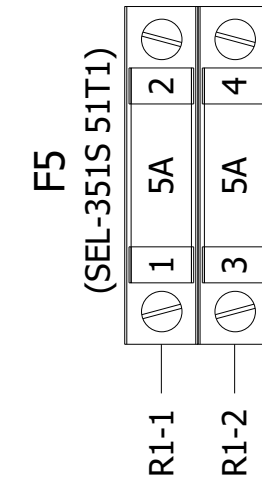
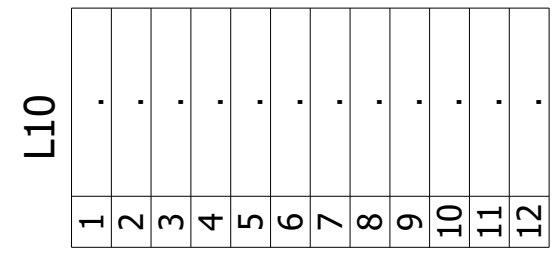
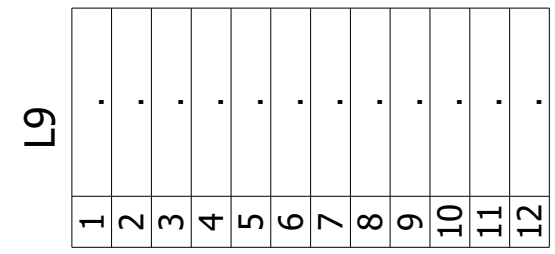
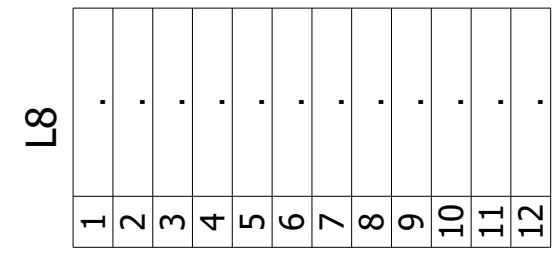
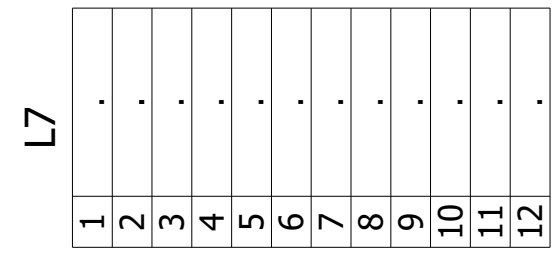
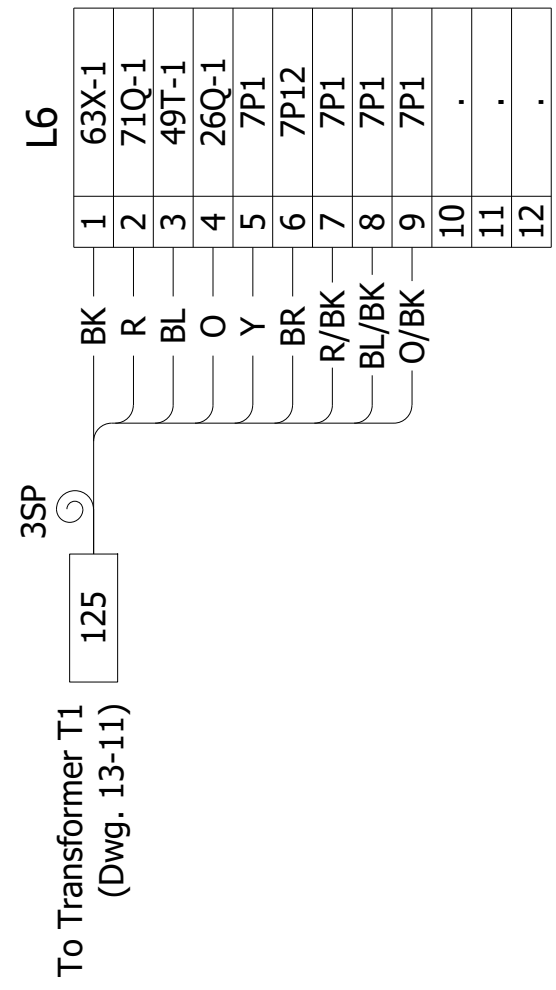
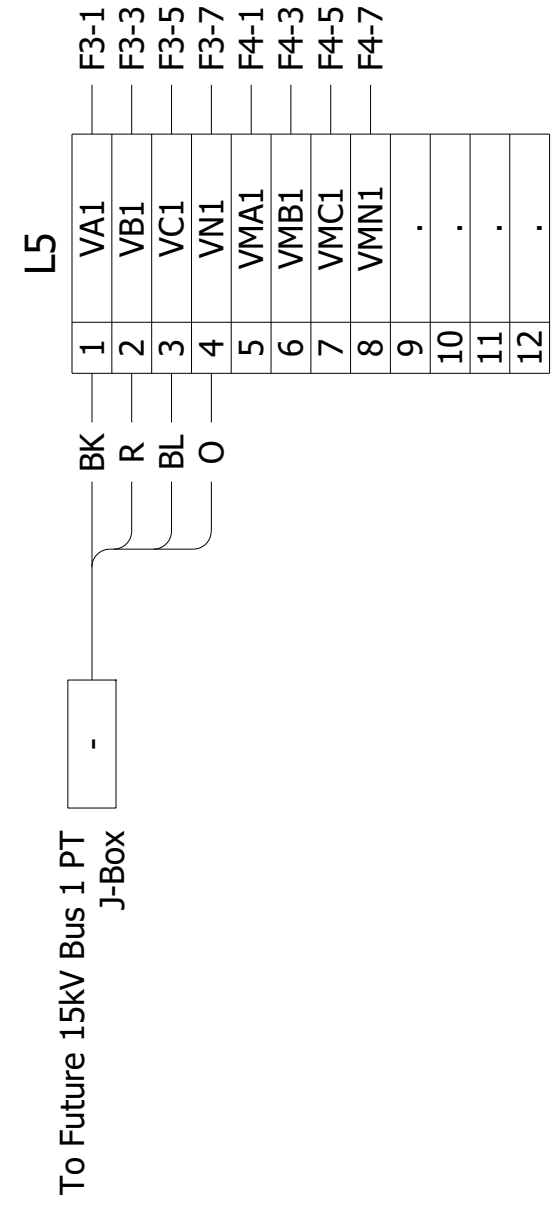
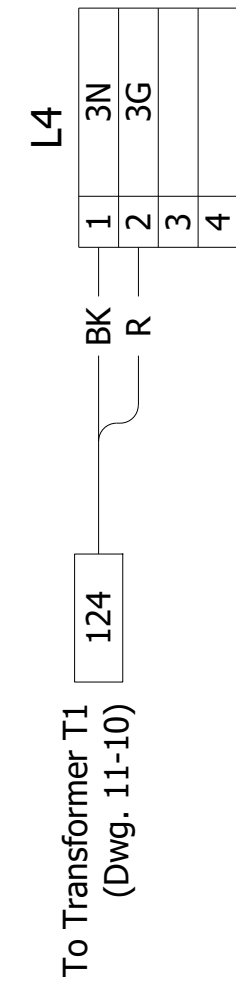
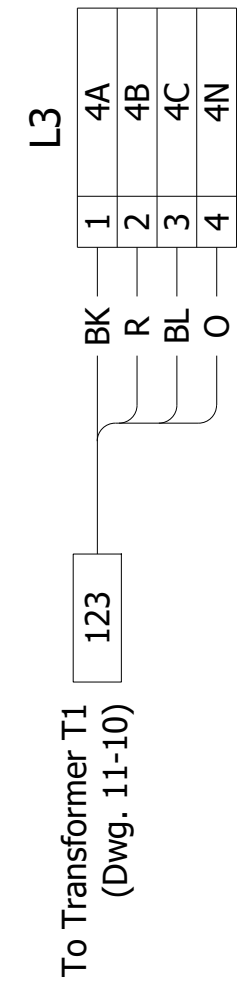
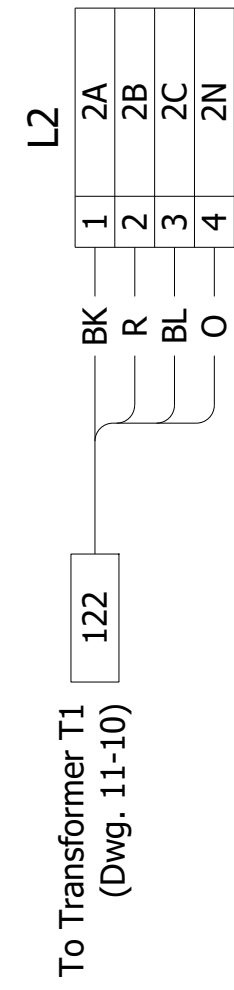
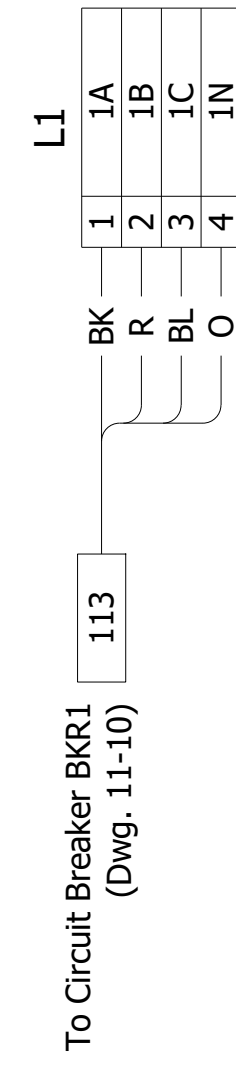
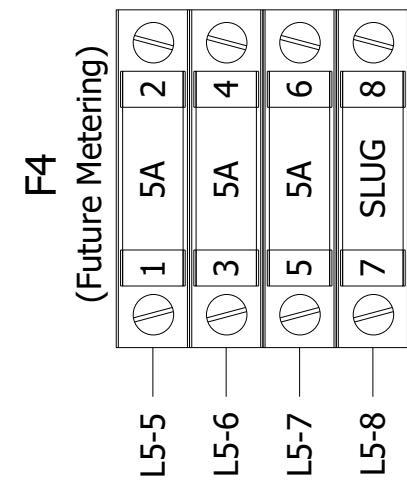
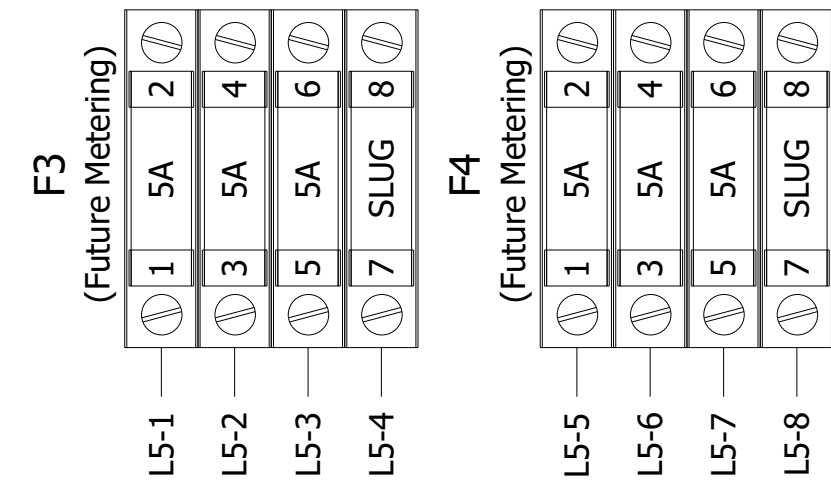
PANEL NAMEPLATES					
NP	SIZE	DESCRIPTION	NP	SIZE	DESCRIPTION
1	7	RP1 Transformer T1 Protection	11	8	TS8 SEL-387 (87T1) Test Switches
2	5	SEL-351S (51T1) Main Overcurrent Relay	12	8	TS9 SEL-387 (87T1) Test Switches
3	8	TS1 SEL-351S (51T1) Main CT's	13	5	86T1 Transformer Lockout Relay
4	8	TS2 SEL-351S (51T1) Main Test Switches	14	5	43L/S Local Supervisory Switch L S
5	8	TS3 SEL-351S (51T1) Main Test Switches	15	8	TS10 86T1 Test Switches
6	5	SEL-387 (87T1) Transformer Differential Relay	16	8	TS11 43L/S T1 Test Switches
7	8	TS4 SEL-387 Breaker BKR1 CT's HV Side			
8	8	TS5 SEL-387 Transformer T1 CT's LV Side			
9	8	TS6 SEL-387 Feeder 1 CT's			
10	8	TS7 SEL-387 (87T1) Test Switches			

TYPICAL NAMEPLATE DETAIL



PRELIMINARY
NOT FOR
CONSTRUCTION

		2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895		RP1 RELAY PANEL LAYOUT TRANSFORMER T1 IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL
					CRK'D APP'D. S. PACKWOOD
					SCALE NONE
					PROJECT NO. MI0592107
					DRAWING NO. 22-01
					FILE NAME IRT-22-01

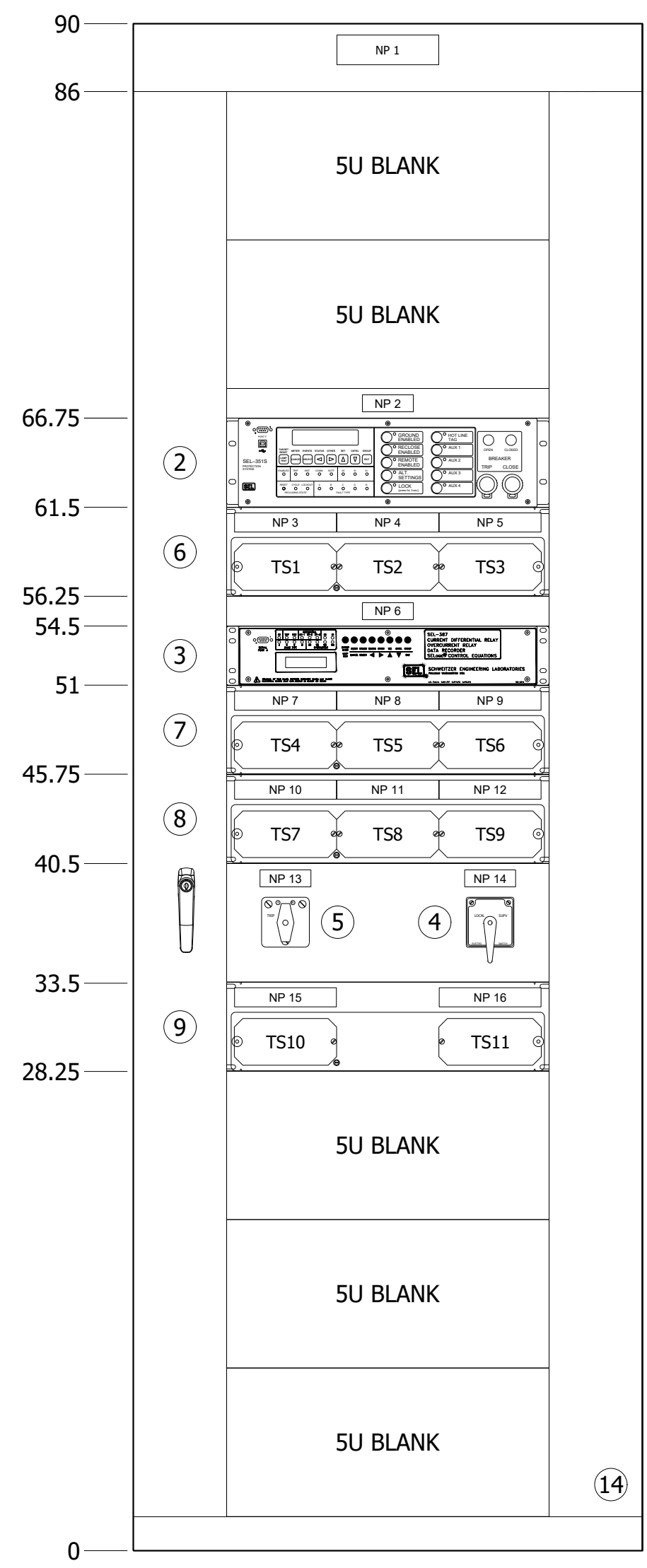
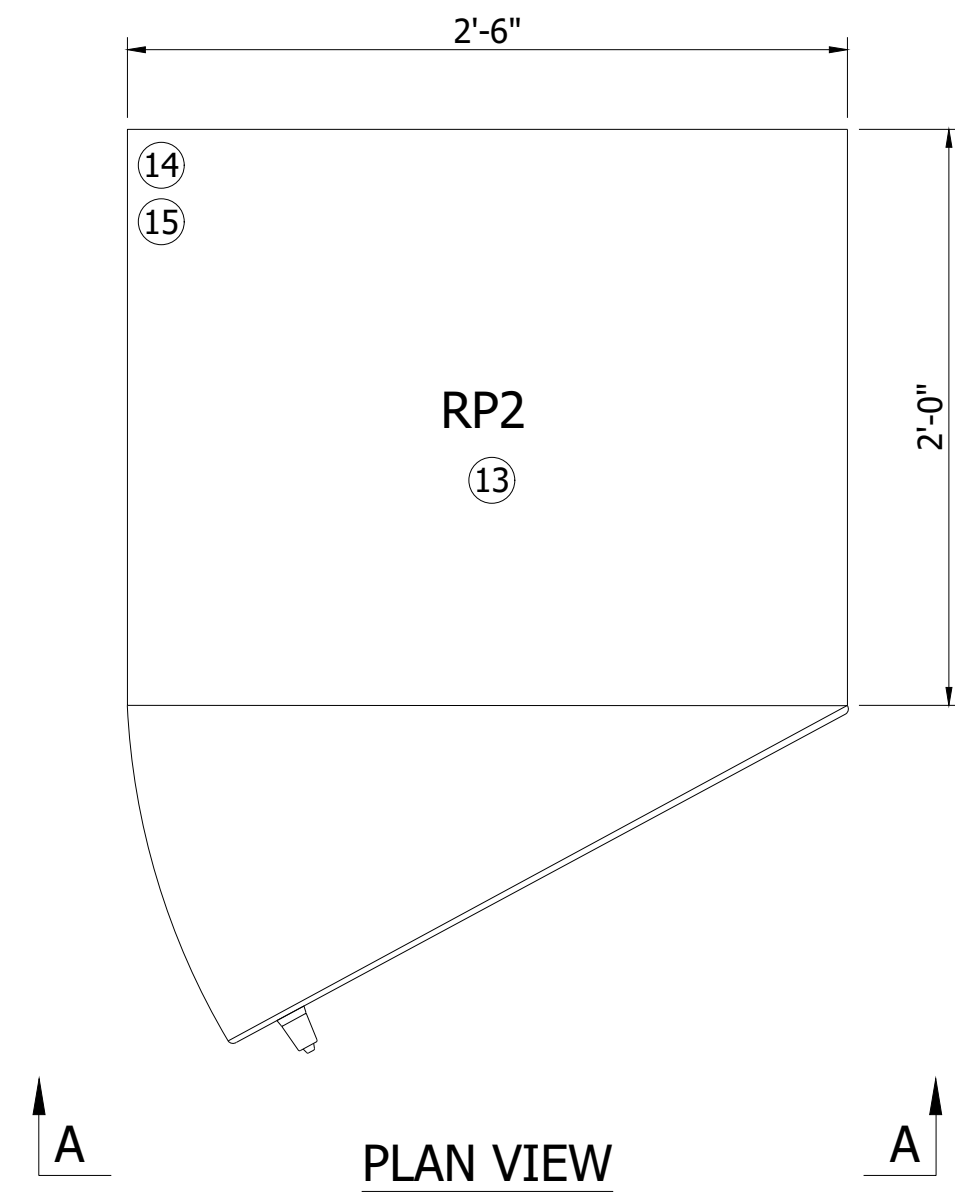


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NOT FOR
CONSTRUCTION**

0 ISSUED FOR BID		GB	NH	5/16/2023	ENGR. N. HALL	CHK'D BY: S. PACKWOOD	SCALE: NONE	PROJECT NO. MI0592107	DRAWING NO. 22-02
NO. REVISION AND RECORD OF ISSUE		BY	ENGR.	DATE	DWN BY: G. BODENSTEIN	DATE: 12/28/2022	FILE NAME: IRT-22-02		

PSE Power System Engineering, Inc.
www.powersystem.org
2424 Rimrock Rd, Suite 300
Madison, WI 53713
Tel: 866.825.8895

RP1 RELAY PANEL WIRING
IRONTOWN SUBSTATION
CITY OF NEGAUNEE, MI



RELAY PANEL RP2
View A-A

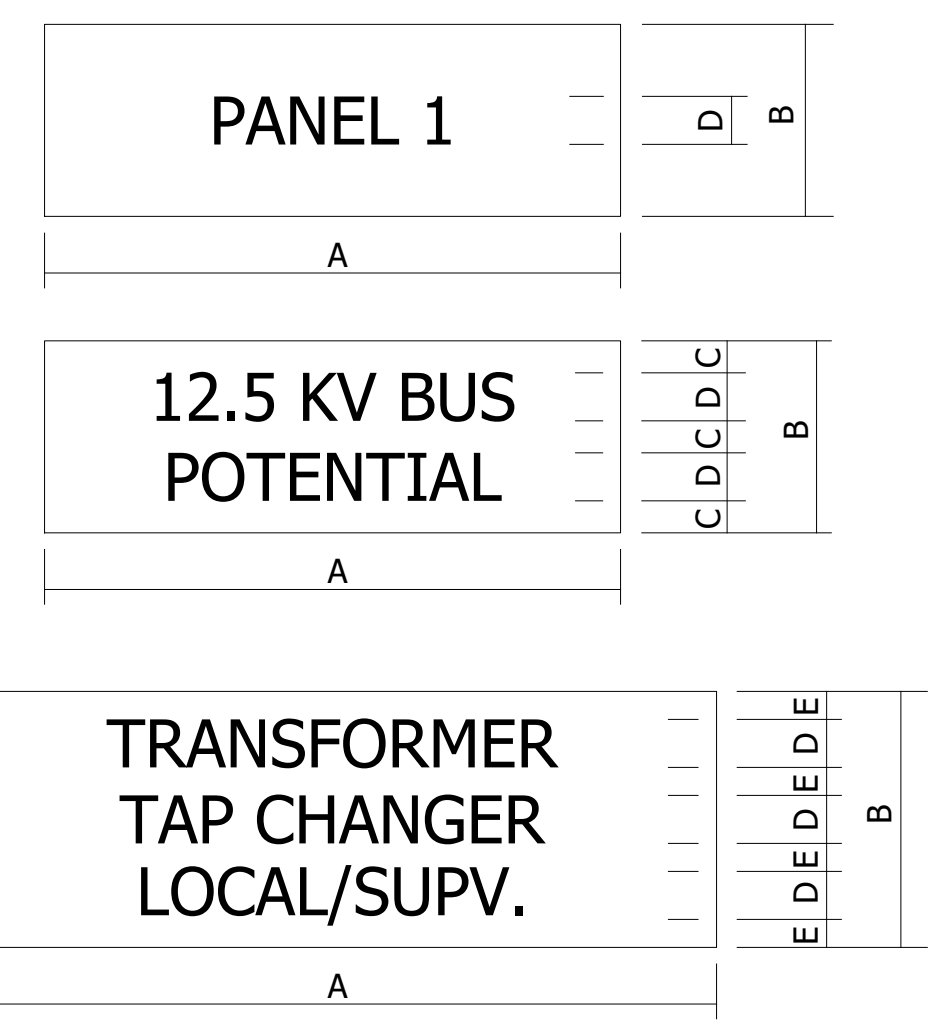
ITEM	DESCRIPTION	QUANTITY	MANUFACTURER	CATALOG #
1	30"W X 90"H X 24"D RELAY RACK PANEL	1		
2	SEL-351S, FEEDER OVER CURRENT PROTECTION AND CONTROL, 3 VOLTAGE INPUTS, HORIZONTAL RACK, STANDARD INTERFACE INCLUDING USB PLUS INDOOR SAFELock TRIP/CLOSE PUSHBUTTONS, 125VDC, (2)10/100 BASE-T, E1A-485 5AMP PHASE/NEUTRAL, STANDARD PROTOCOL	1	SEL	0351S7XHD3E54X1
3	SEL-387, CURRENT DIFFERENTIAL AND OVERCURRENT RELAY, STANDARD FIRMWARE, 125VDC, 5AMP PHASE/NEUTRAL/ HORIZONTAL RACK MOUNT, STANDARD PROTOCOL	1	SEL	0387003X5HXX4XX
4	43L/S LOCAL/SUPERVISORY CONTROL SWITCH -- TWO DECK -- MAINTAINED CONTACTS -- NO OFF POSITION -- WITH PISTOL GRIP HANDLE -- NAMEPLATE ENGRAVING: TITLE "43L/S", POSN #1 "LOCAL", POSN #2 "SUPV" (ENGRAVING CODE 010D-2L14L).	1	ELECTROSWITCH	24202D
5	86LO, MANUAL RESET LOCKOUT RELAY - SERIES 24 - 125 VOLTS DC - COIL STYLE "D" 20 MAIN CONTACTS: 10 NORMALLY OPEN, 10 NORMALLY CLOSED - WITH TARGET. "TRIP" (RED) AND "RESET" (BLACK) - OVAL FIXED HANDLE, 86, WITH LED LIGHTS, AMBER/BLUE, 125 VOLTS DC	1	ELECTROSWITCH	78PB05MU
6	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A" (1)8C,2P, POSITION "B" (1)10P, POSITION "C" (1)10P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH018001001B
7	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A", "B", "C" (3)6C,4P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH014014014B
8	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A", "B", "C" (3)10P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH001001001B
9	TEST SWITCH, RACK MOUNT ASSEMBLY, POSITION "A" (1)10P, POSITION "B" BLANK, POSITION "C" (1)10P WITH 3 RACK UNIT MOUNTING PLATE, SWITCHES IN LOWER POSITION FT19R-3RU	1	ABB	FRXH001000001B
10	TERMINAL BLOCK, 12 POINT, GE TYPE EB-25	AS REQUIRED	GE	12EB25B12
11	SHORTING TERMINAL BLOCK, 4 POINT, GE TYPE EB-27	AS REQUIRED	GE	4EB27B04
12	TWO POLE FUSE BLOCK, 250V WITH NON FUSES. FUSE SIZES AS PER DRAWINGS	AS REQUIRED	BUSSMANN	H25030-2
13	RELAY PANEL 2700K (800 LUMENS) 9 WATT LED A19 LIGHT BULB WITH PORCELAIN FIXTURE AND GUARD. MOUNTED AT TOP.	1		
14	RELAY PANEL 120 VAC, 15AMP SINGLE POLE DOOR LIGHT SWITCH. MOUNTED NEAR TOP OF DOOR PANEL	1		
15	RELAY PANEL 120 VAC, 15AMP GFI DUPLEX RECEPTACLE, MOUNTED NEAR BOTTOM OF PANEL	1		

NOTES:

1. PROVIDE SUFFICIENT TERMINAL BLOCKS FOR THE WIRING OF THE EQUIPMENT BEING INSTALLED AND THEIR ASSOCIATED CABLES, PLUS 10% SPARE.
2. PROVIDE A LIKE AMOUNT OF TERMINAL BLOCKS AND SPARES FOR ANY FUTURE EQUIPMENT.

PANEL NAMEPLATES					
NP	SIZE	DESCRIPTION	NP	SIZE	DESCRIPTION
1	7	RP2 Transformer T2 Protection	11	8	TS8 SEL-387 (87T2) Test Swtches
2	5	SEL-351S (51T2) Main Overcurrent Relay	12	8	TS9 SEL-387 (87T2) Test Swtches
3	8	TS1 SEL-351S (51T2) Main CT's	13	5	86T2 Transformer Lockout Relay
4	8	TS2 SEL-351S (51T2) Main Test Swtches	14	5	43L/S Local Supervisory Switch L S
5	8	TS3 SEL-351S (51T2) Main Test Swtches	15	8	TS10 86T2 Test Swtches
6	5	SEL-387 (87T2) Transformer Differential Relay	16	8	TS11 43L/S T2 Test Swtches
7	8	TS4 SEL-387 Breaker BKR2 CT's HV Side			
8	8	TS5 SEL-387 Transformer T2 CT's LV Side			
9	8	TS6 SEL-387 Feeder 2 CT's			
10	8	TS7 SEL-387 (87T2) Test Swtches			

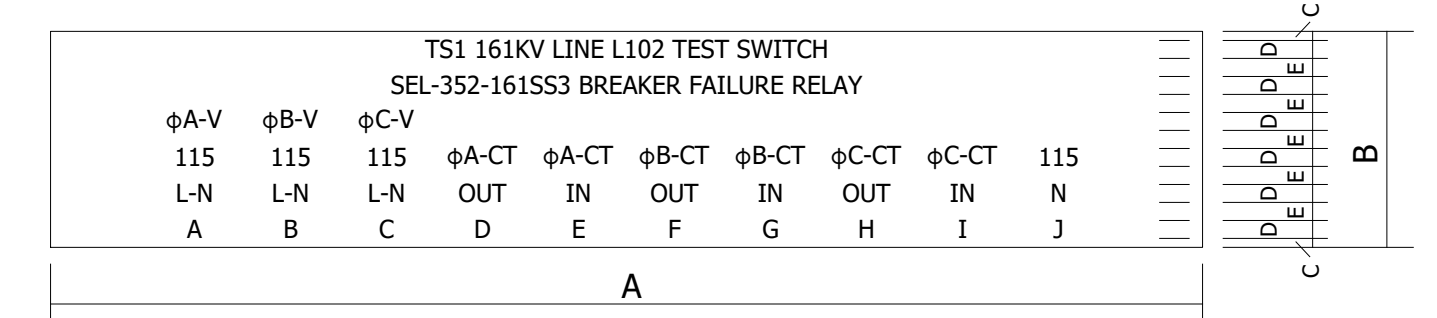
TYPICAL NAMEPLATE DETAIL



NAMEPLATE SIZE NO.	NAMEPLATE DIMENSIONS				
	A	B	C	D	E
1	1 1/8	7/16	1/16	1/8	-
2	1 1/2	9/16	1/8	3/32	-
3	1 3/4	5/8	1/8	1/8	-
4	2 1/4	3/4	1/8	3/16	-
5	3	1	7/32	3/16	7/64
6	4	1 1/4	1/4	1/4	1/8
7	6	1 3/4	3/8	5/16	13/64
8	6	1 1/8	3/64	3/32	3/32

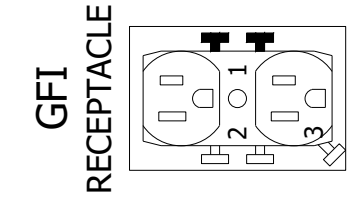
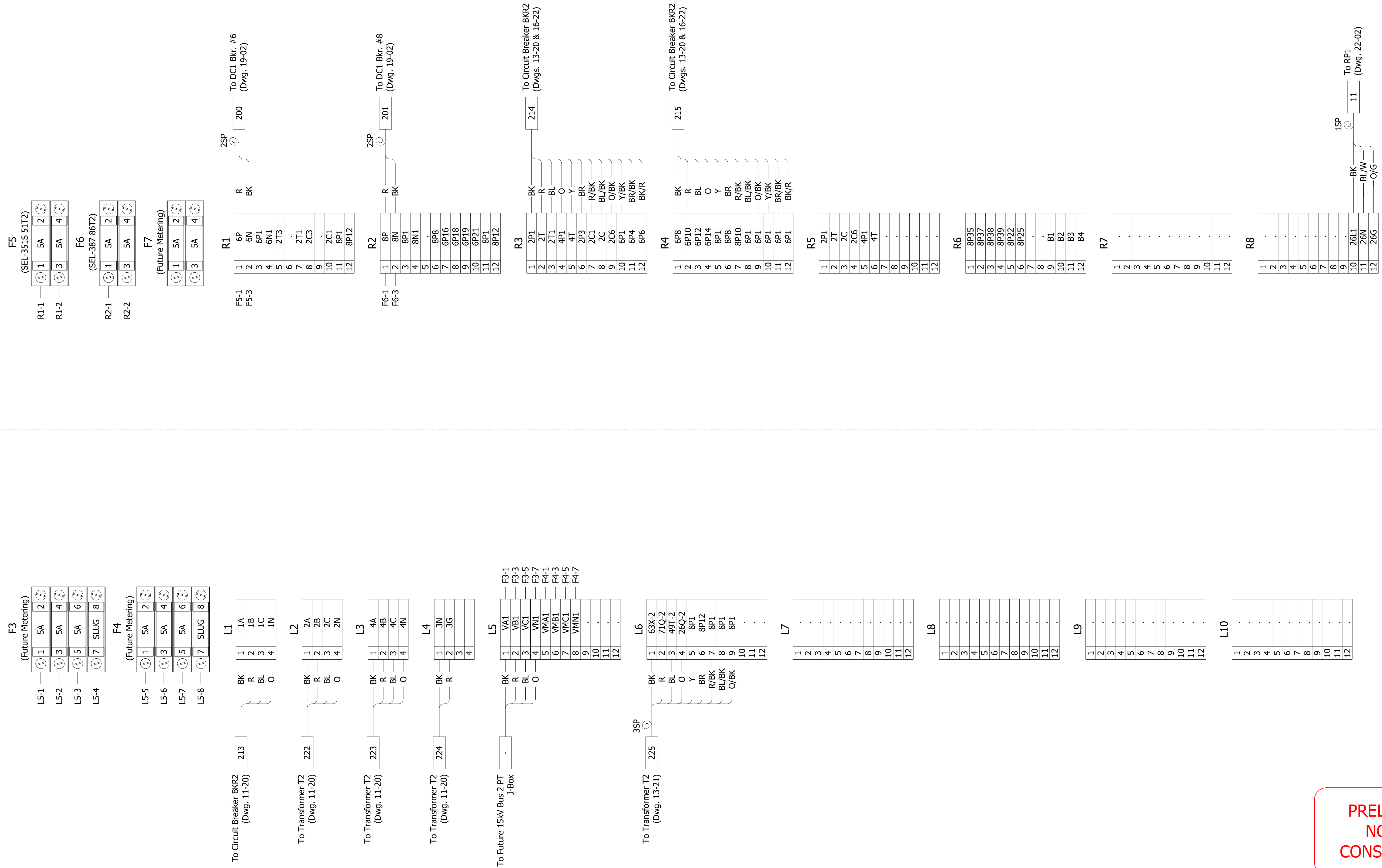
NAME PLATE NOTES:

1. PROVIDE BLACK NAMEPLATES WITH WHITE ENGRAVED LETTERS.



PRELIMINARY
NOT FOR
CONSTRUCTION

						RP2 RELAY PANEL LAYOUT TRANSFORMER T2 IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI	
				www.powersystem.org 2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895			
0	ISSUED FOR BID	GB	NH	5/16/2023	ENGR. N. HALL	CRK/DY APP'D. S. PACKWOOD	SCALE NONE
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	OWN BY G. BODENSTEIN	DATE 12/28/2022	FILE NAME IRT-22-03
						PROJECT NO. MI0592107	DRAWING NO. 22-03



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CONSTRUCTION

GND 1 2 3 4 5 6 7 8 9 10 11 12

						2424 Rimrock Rd, Suite 300 Madison, WI 53713 Tel: 866.825.8895	
				RP2 RELAY PANEL WIRING IRONTOWN SUBSTATION CITY OF NEGAUNEE, MI			
NO.	REVISION AND RECORD OF ISSUE	BY	ENGR.	DATE	SCALE	FILE NAME	PROJECT NO.
0	ISSUED FOR BID	GB	NH	5/16/2023	NONE	IRT-22-04	MI0592107
							DRAWING NO. 22-04