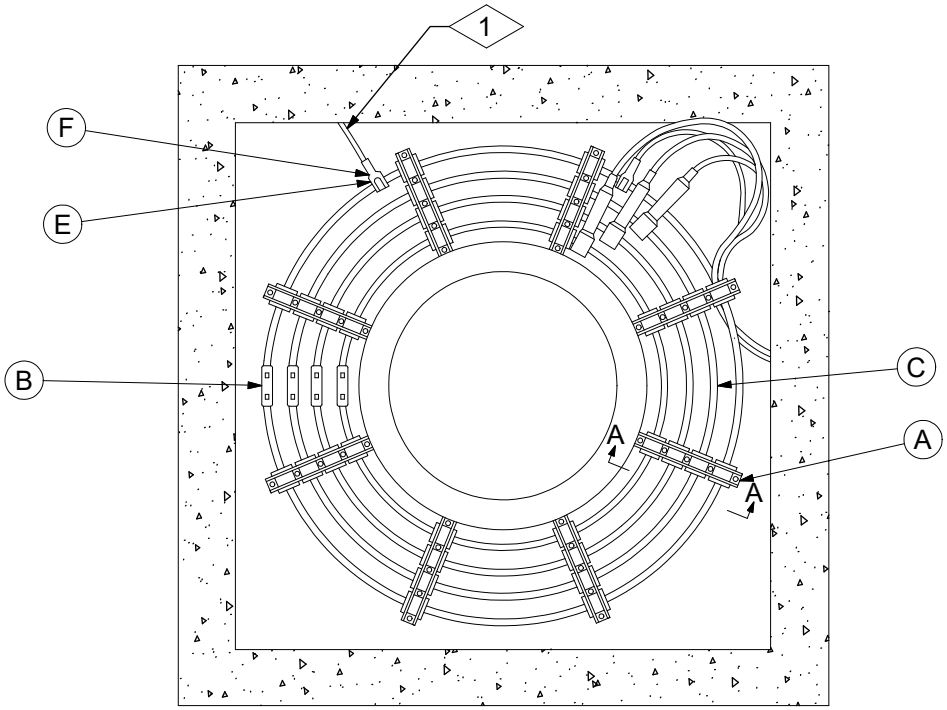
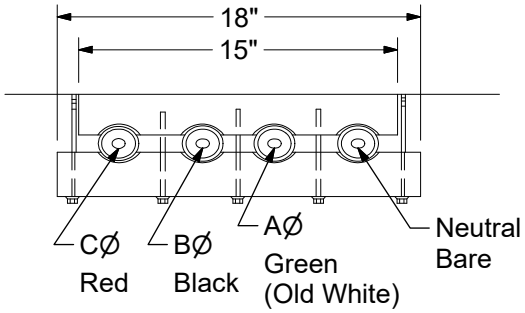
UNDERGROUND NETWORK SYSTEM 43



Ring Bus - Viewed From Manhole Floor



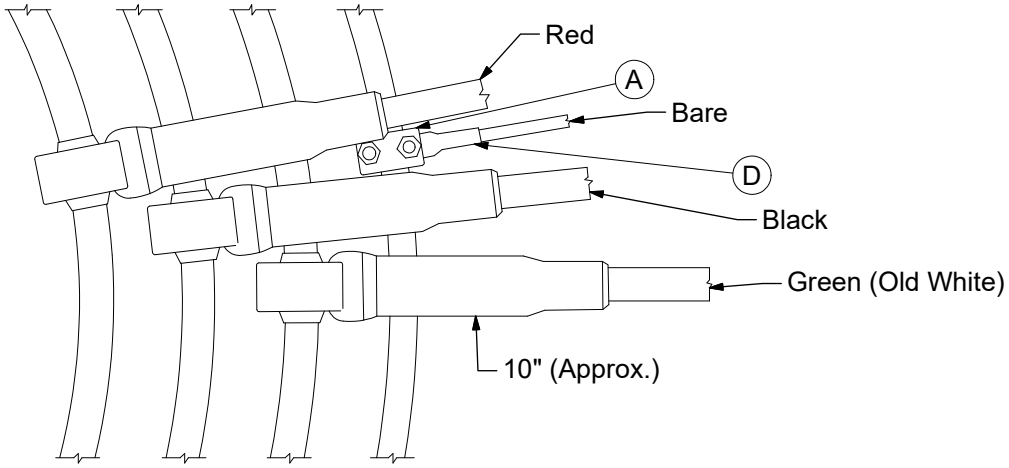
Length of Cable Required	
Phase	Length (ft)
A	18
B	16
C	14

Section A-A - Ring Bus Insulator Clamp

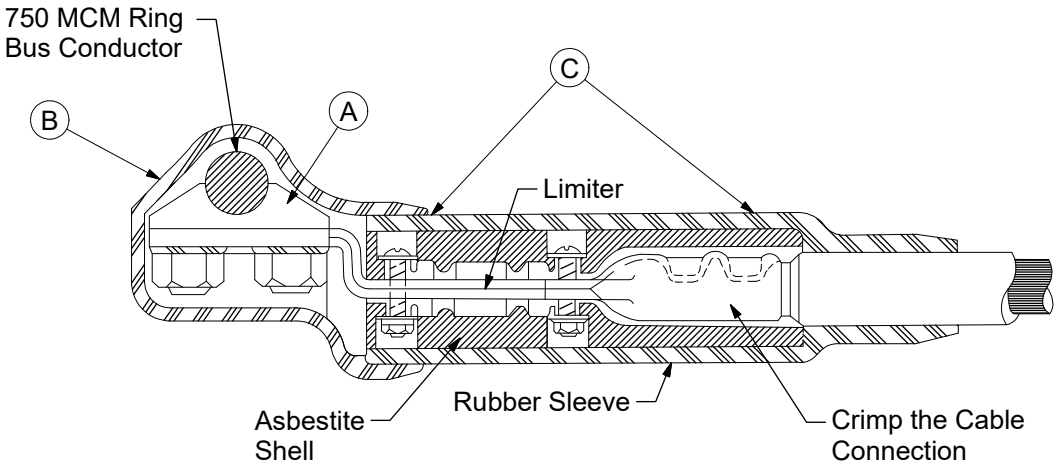
CONSTRUCTION NOTE(s):

1. Connect bonding wire, (Stock #18 52 030), to Bonding System with "T" connector, (Stock #17 54 022)

ITEM	STK / DCS #	DESCRIPTION 43 16 01 **	00
A	25 07 061	Insulator − Ring Bus 4 Cond.	8
B	17 60 360	Sleeve − Compression, 750 kcmil, Cu	4
C	18 07 011	Cable − NW 750 kcmil (ft)	48 (See Table)
D	18 52 022	Wire − 750 kcmil Bare (ft)	20
E	17 52 005	Connector − Cable to Lug	1
F	17 05 194	Lug − Hypress 4/0	1
G	17 54 022	Connector − T−4/0	1
H	18 52 030	Wire − 4/0 Tinned Copper (ft)	10
	753	Op Code Ring Bus	1



Ring Bus - Connections Viewed From Manhole Floor



Limiter Lug and Connection to Ring Bus

CONSTRUCTION NOTE(s):

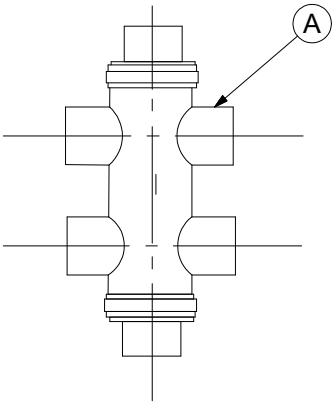
1. Limiter lug consists of limiter, asbestite shell, and rubber sleeve.

2. Use 500 kcmil hypress lug (Stock #17 05 195) on direct runs from transformer to ring bus.

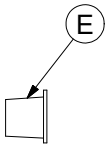
	ITEM	STK / DCS #	DESCRIPTION 43 16 02 **	00
	A	17 52 005	Connector − Cable to Lug	4
	B	17 53 015	Hood − Rubber Insulating	3
1	C	17 05 193	Lug − Limiter	3
2	D	17 05 194	Lug − Hypress 4/0	1

REV	DATE	ENG	DESCRIPTION
2	04/01/2023	EJB	Converted to new format
1	07/06/2011	EJB	

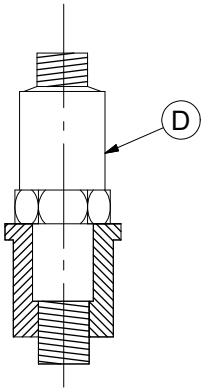
ILLINOIS ONLY



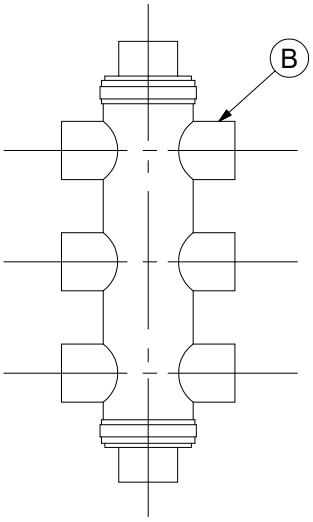
43 16 03 01
6 Way



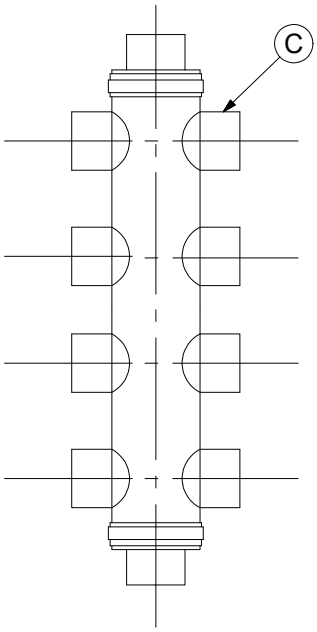
43 06 03 05
Outlet Plug



43 16 03 04
Mole Coupler



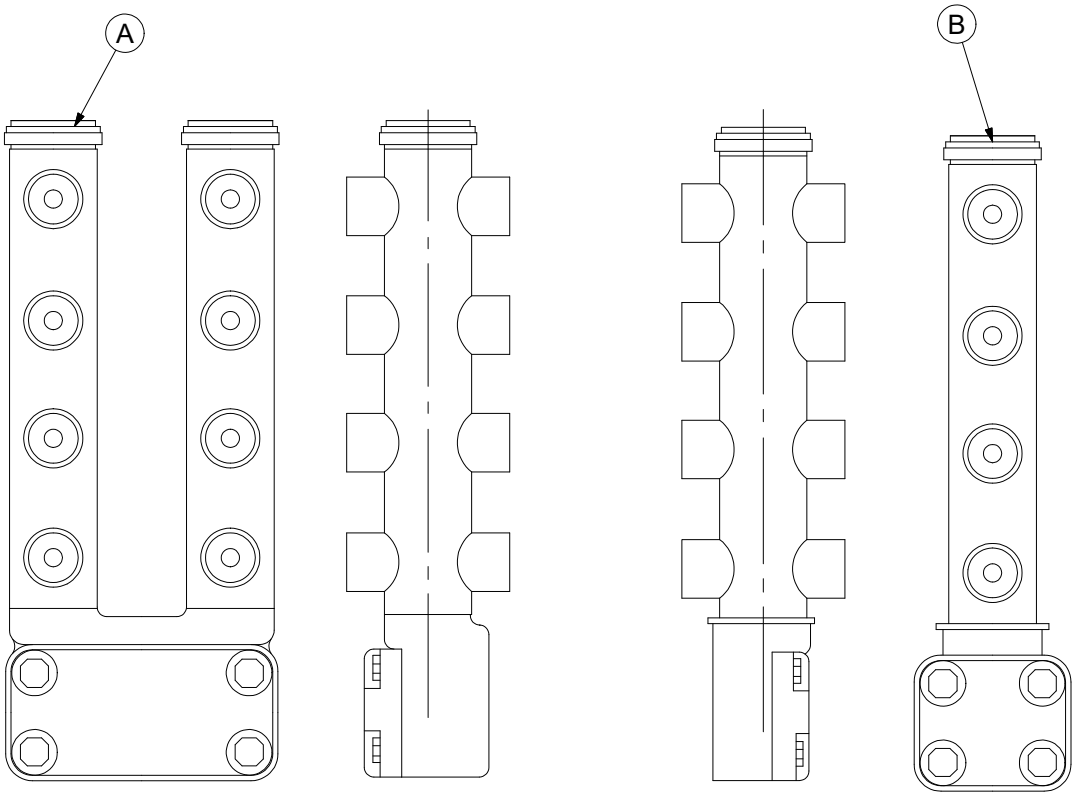
43 16 03 02
8 Way



43 16 03 03
10 Way

ITEM	STK / DCS #	DESCRIPTION 43 16 03 **	01	02	03	04	05
A	17 62 207	Connector − Mole, 6 Way, 1500A	1	-	-	-	-
B	17 62 208	Connector − Mole, 8 Way, 1500A	-	1	-	-	-
C	17 62 209	Connector − Mole, 10 Way, 1500A	-	-	1	-	-
D	17 62 213	Coupler − Mole	-	-	-	1	-
E	17 62 182	Plug − Mole, Diatex	-	-	-	-	1

ILLINOIS ONLY

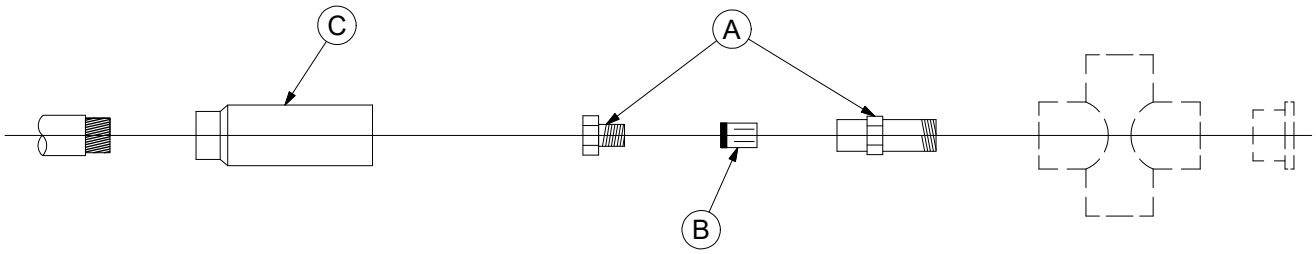


43 16 04 01
16 Way

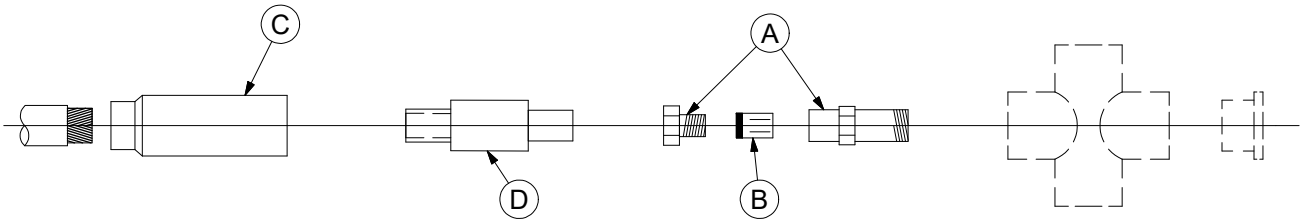
43 16 04 (02 & 03)
8 Way

ITEM	STK / DCS #	DESCRIPTION 43 16 04 **	01	02	03
A	17 62 212	Connector − Mole, Stud, 16 Way, 3000A	1	-	-
B	17 62 210	Connector − Mole, Stud, 8 Way, 2500A	-	1	-
C	17 62 211	Connector − Mole, Stud, 8 Way, 3000A	-	-	1

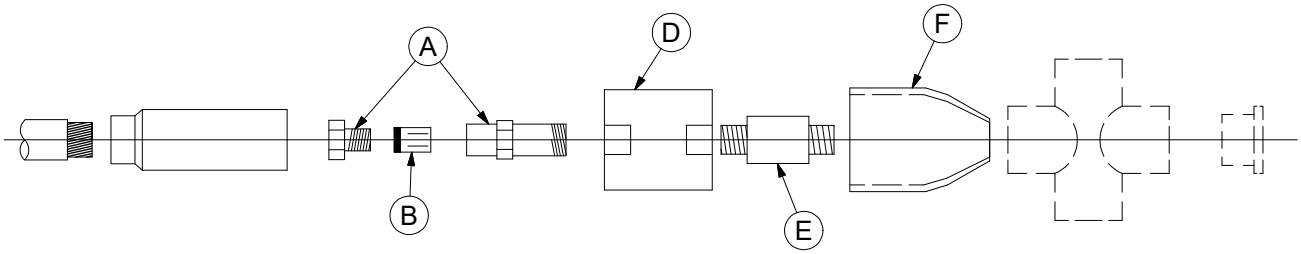
ILLINOIS ONLY



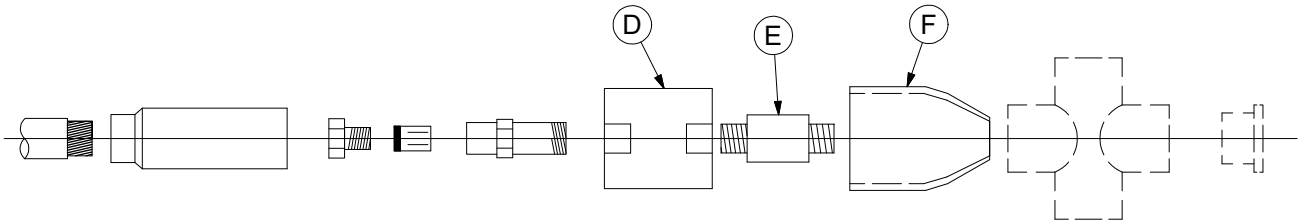
DCS #	DESCRIPTION
43 16 05 01	1/0 Cable/Mole Conn.
43 16 05 02	4/0 Cable/Mole Conn.
43 16 05 03	300 kcmil Cable/Mole Conn.
43 16 05 04	350 kcmil Cable/Mole Conn.
43 16 05 05	500 kcmil Cable/Mole Conn.



DCS #	DESCRIPTION
43 16 05 06	4/0 Cable/Mole Conn. With Limiter
43 16 05 09	500 kcmil Cable/Mole Conn. With Limiter No Threads



DCS #	DESCRIPTION
43 16 05 07	500 kcmil Cable/Mole Conn. With Limiter



DCS #	DESCRIPTION
43 16 05 08	500 kcmil Limiter Added to Cable

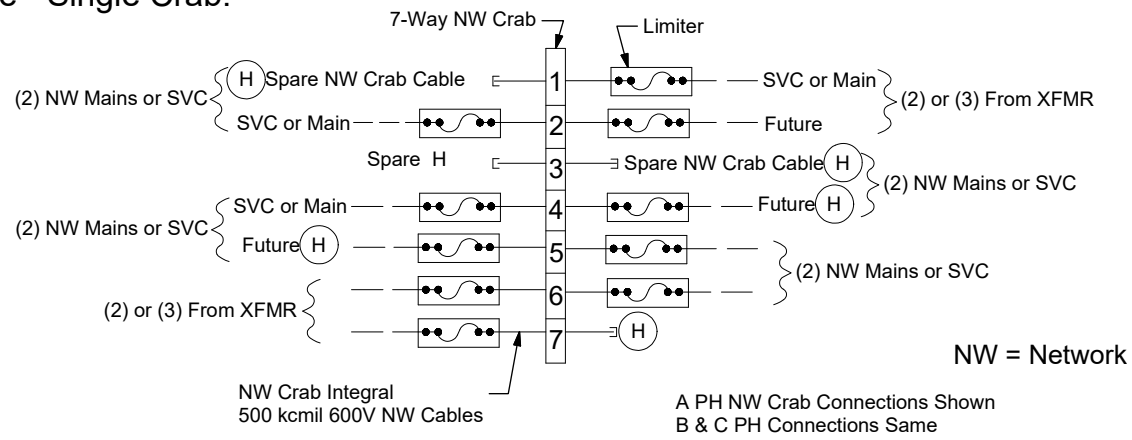
ILLINOIS ONLY

CONSTRUCTION NOTE(s):

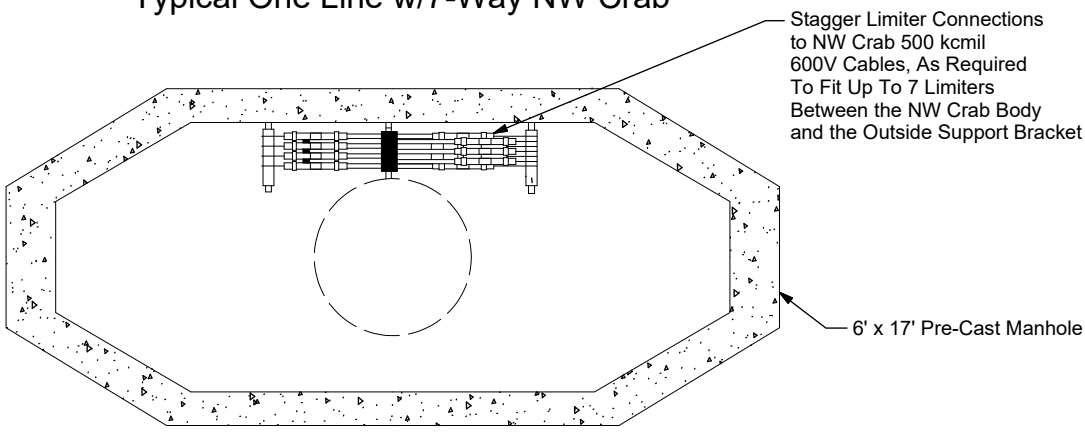
1. For 500 kcmil fuse limiter (Stock# 17 05 328) use the 07 and 08 standards for a fuse with threaded ends and the 09 standard for a fuse with crimped and cable ends.

ITEM	STK / DCS #	DESCRIPTION 43 16 05 **	01	02	03	04	05	06	07	08	09
A	17 62 214	Termination − Socket & Nut, 4/0	1	1	-	-	-	1	-	-	-
	17 62 175	Termination − Socket & Nut, 500 kcmil	-	-	1	1	1	-	1	-	1
B	17 62 205	Connector − Cone, Cmpr., 1/0	1	-	-	-	-	-	-	-	-
	17 62 178	Connector − Cone, Cmpr., 4/0	-	1	-	-	-	1	-	-	-
	17 62 206	Connector − Cone, Cmpr., 300 kcmil	-	-	1	-	-	-	-	-	-
	17 62 202	Connector − Cone, Cmpr., 350 kcmil	-	-	-	1	-	-	-	-	-
	17 62 177	Connector − Cone, Cmpr., 500 kcmil	-	-	-	-	1	-	1	-	1
C	17 60 618	Sleeve − Insulating, 4/0 Limiter	1	1	-	-	-	1	-	-	-
	17 62 181	Sleeve − Insulating, 500 kcmil	-	-	1	1	1	-	-	-	1
D	17 05 327	Fuse − Limiter, 4/0, 480V	-	-	-	-	-	1	-	-	-
	17 05 328	Fuse − Limiter, 500 kcmil, 480V	-	-	-	-	-	-	1	1	1
E	17 63 230	Coupling − Limiter	-	-	-	-	-	-	1	1	-
F	17 60 619	Sleeve − Insulating, for Limiter	-	-	-	-	-	-	1	1	-

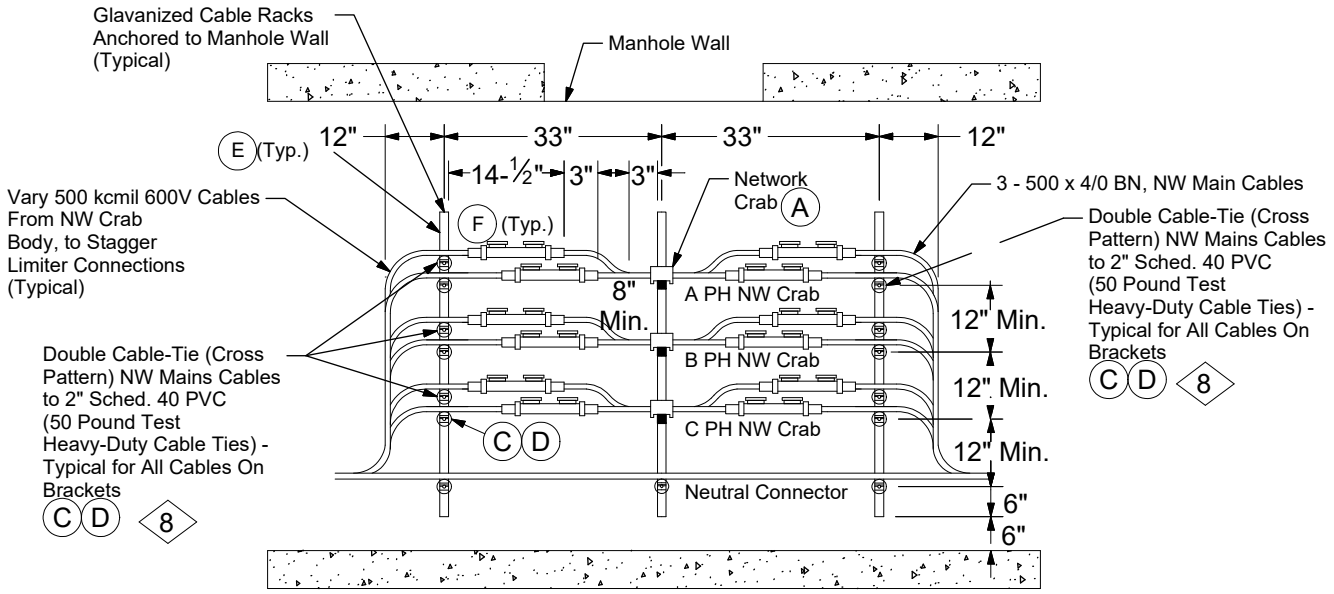
Manhole - Single Crab:



Typical One Line w/7-Way NW Crab



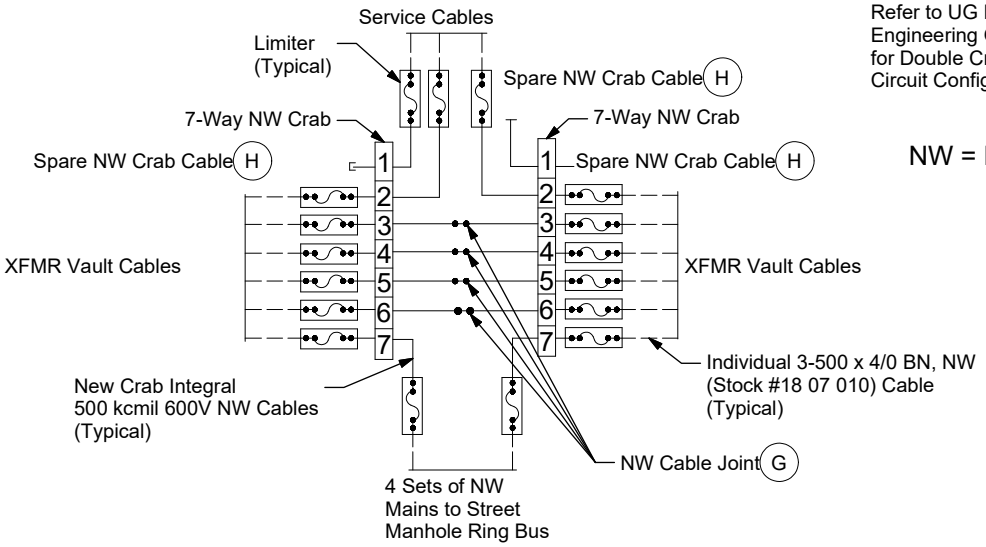
Top View



Side View

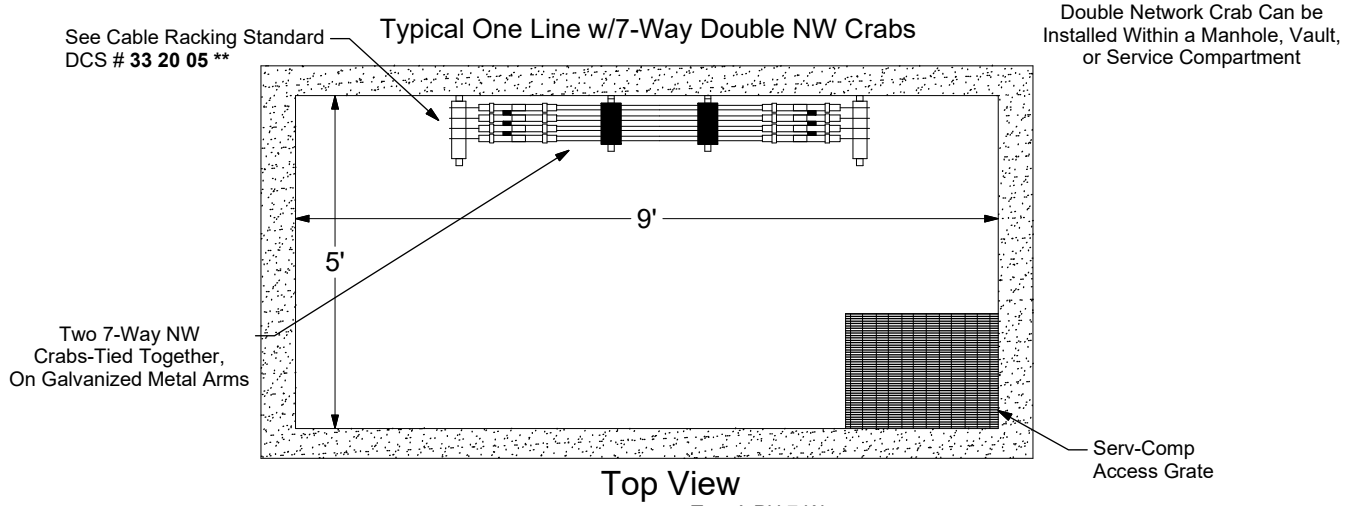
CONSTRUCTION NOTE(s):
1. Consult UG Division Engineering for specific network connection configuration, as required.
2. Single network crab can installed within a manhole, vault, or service compartment.
3. All dimensions are minimum

Service Compartment - Double Crab:



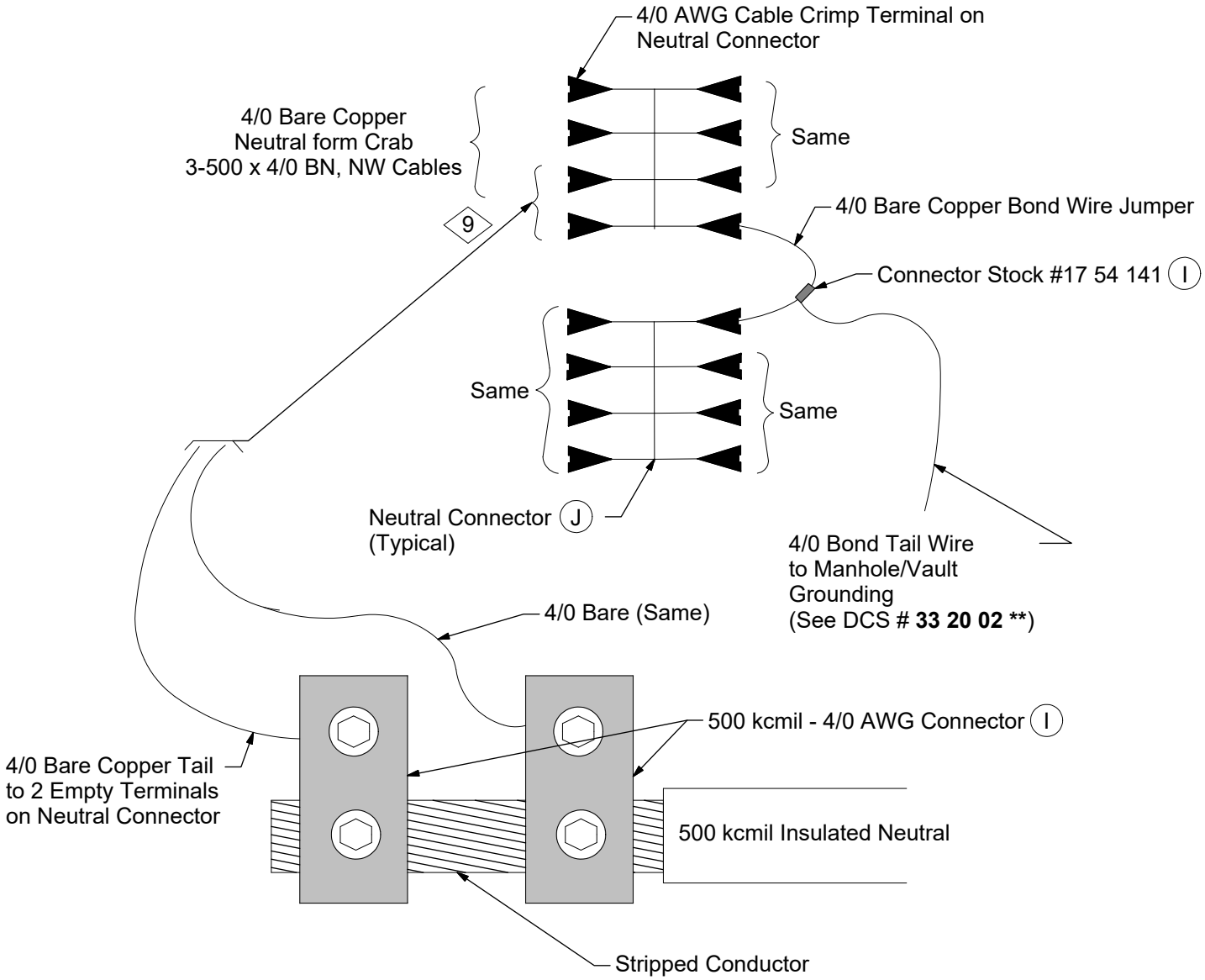
Refer to UG Division Engineering One-Line for Double Crab Circuit Circuit Configuration

NW = Network



REV	DATE	ENG	DESCRIPTION
4	04/01/2023	EJB	Converted to new format
3	03/30/2015	EJB	

Neutral Connector:



500 kcmil Detail

CONSTRUCTION NOTE(s):

4. Add limiters as directed by one-line or UG engineering to network main or service to crab connector.

5. Utilize 600V-500 kcmil cable straight splice to join crab connectors.

6. Cable mounting rack is included in new precast manholes. Add rack as necessary to existing network installations.

◇7. Neutral connections can be made using either the neutral connector or crab (see item J) based on field conditions. The neutral connector is the preferred connection method as it saves space for cable training.

◇8. For cable mount arm (14” or “16), when using 2” dia. PVC sleeve, the PVC sleeve shall be anchored to the arm by 50 pound test cable tie-strap prior to installing crabs. The cables shall be cross tie-strapped to the 2” PVC sleeve - to prevent movement.

◇9. If a 7-500 NW Cable is used or exists, the 500 kcmil Neutral shall be connected as shown in the 500 kcmil Detail.

10. Add approved 600V cable cap to the ends of any spare crab connector cables.

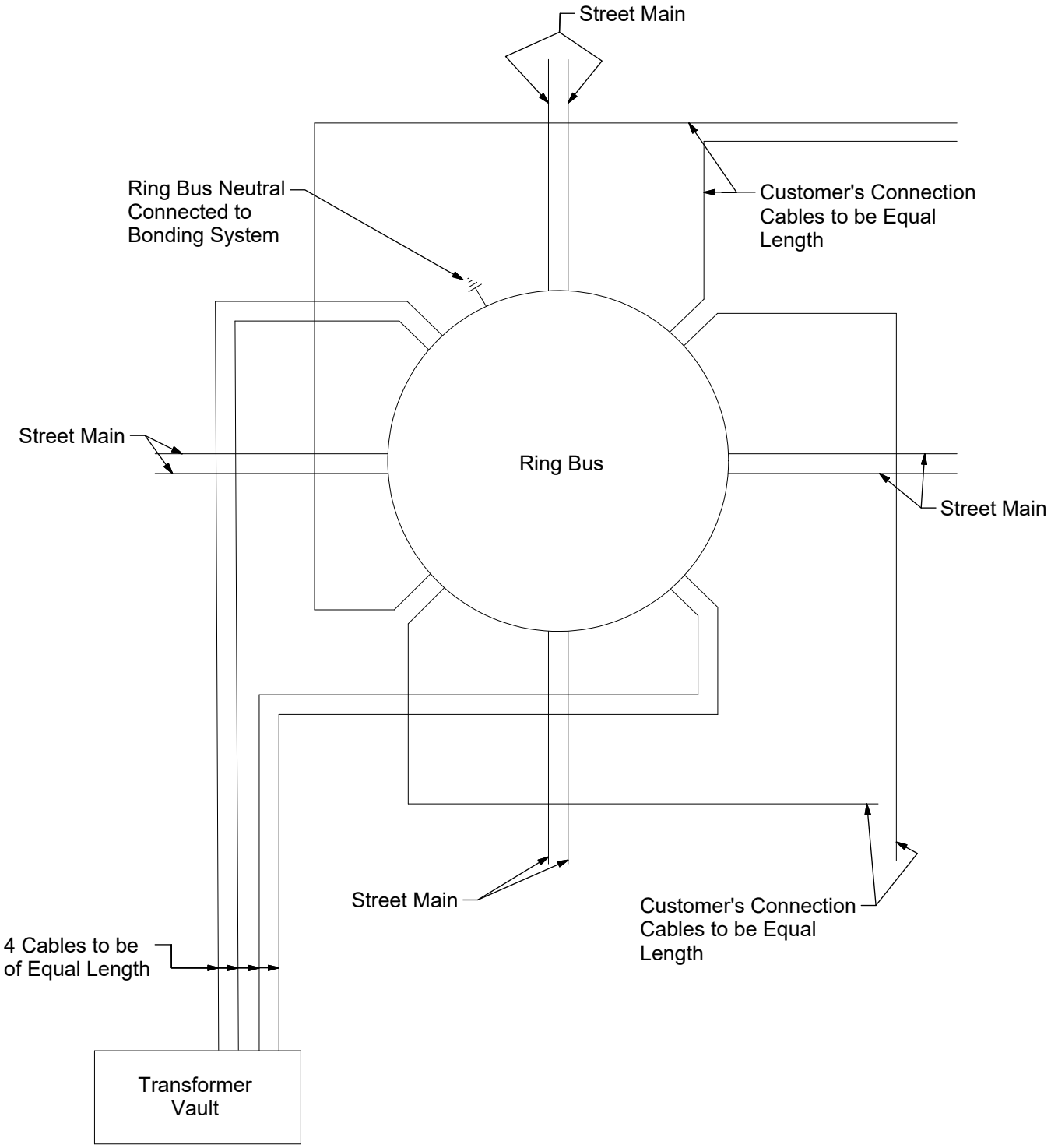
11. Add connectors as necessary to connect neutrals/bond wire to crab connector.

12. For all 4/0 neutrals use the 4/0 bare crab connection. For 500 kcmil neutrals, use 500 kcmil crab reducing sleeves (I) as needed for 4/0 neutrals. See neutral detail or connector.

DCS #	DESCRIPTION
43 16 06 01	3-Way Single NW Crab
43 16 06 02	5-Way Single NW Crab
43 16 06 03	7-Way Single NW Crab
43 16 06 04	3-Way Single NW Crab
43 16 06 05	5-Way Single NW Crab
43 16 06 06	7-Way Single NW Crab

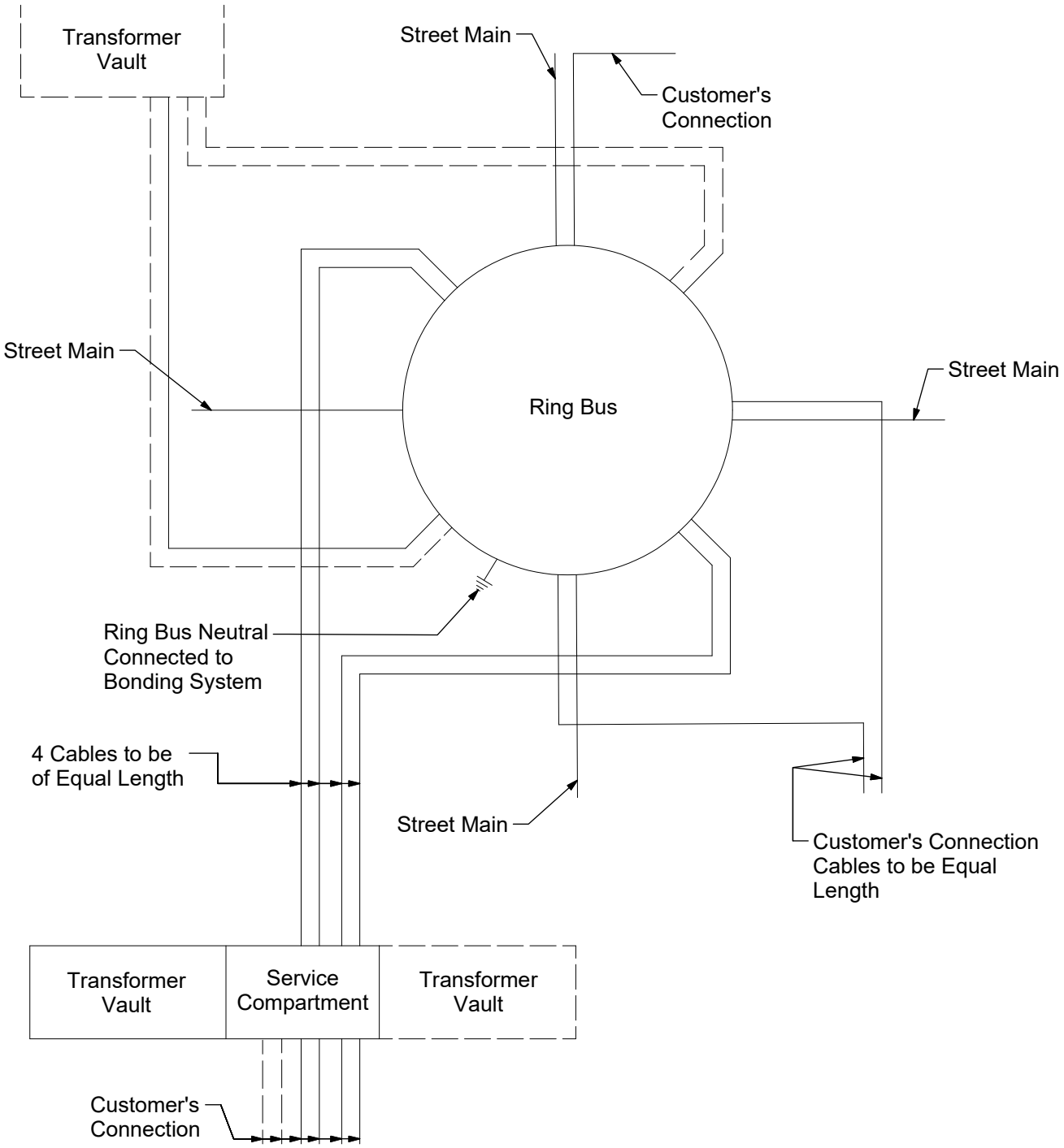
	ITEM	STK / DCS #	DESCRIPTION 43 16 06 **	01	02	03	04	05	06
	A	17 05 488	Crab – 500 kcmil, 600 V, NW, 3-Way	3	-	-	6	-	-
		17 05 485	Crab – 500 kcmil, 600 V, NW, 5-Way	-	3	-	-	6	-
		17 05 484	Crab – 500 kcmil, 600 V, NW, 7-Way	-	-	3	-	-	6
	B	18 52 024	Wire – 4/0 AWG, Cu, Bare Soft Drawn (ft.)	10	10	10	10	10	10
	C	40 59 715	Tie – Cable, Black, 10" Dia.	48	80	112	64	112	160
	D	12 56 112	Arm – Cable Mounting, 14"	9	-	-	12	-	-
		12 56 113	Arm – Cable Mounting, 18"	-	9	9	-	12	12
3@	E	12 56 116	Rack – Cable Mounting, 55", 37 Holes	3	3	3	4	4	4
		12 56 115	Rack – Cable Mounting, 30", 18 Holes	3	3	3	4	4	4
1@	F	17 05 548	Limiter – 500 kcmil, 120 V, Fused	#	#	#	#	#	#
2@	G	41 14 36 11	Splice – 600 V, 500 kcmil, Str.	-	-	-	6	9	12
4@	H	40 59 166	Cap – Cable End – 500 kcmil NW. (600 V)	#	#	#	#	#	#
5@	I	17 54 141	Connector – Wire, 2 - 500 kcmil, Cu (Neut.)	#	#	#	#	#	#
6@	J	17 05 501	Neutral Connection – 4/0 AWG, 600 V, NW, 4-Way, Bare Crimp (Neut.) (8 total connections – 4 per side)	1	2	2	3	3	3
		17 05 485	Crab – 500 kcmil, 600 V, NW, 5-Way (Neut.)	1	1	1	1	1	1

REV	DATE	ENG	DESCRIPTION
4	04/01/2023	EJB	Converted to new format
3	03/30/2015	EJB	



DESIGN NOTE(s):

1. Connections to ring bus shall be arranged to maintain balanced loading of the ring bus under various operating conditions. Variations in this arrangement of connections may be made as required to meet specific conditions. The number of street mains and customers' connections depends on requirements at each location.



DESIGN NOTE(s):

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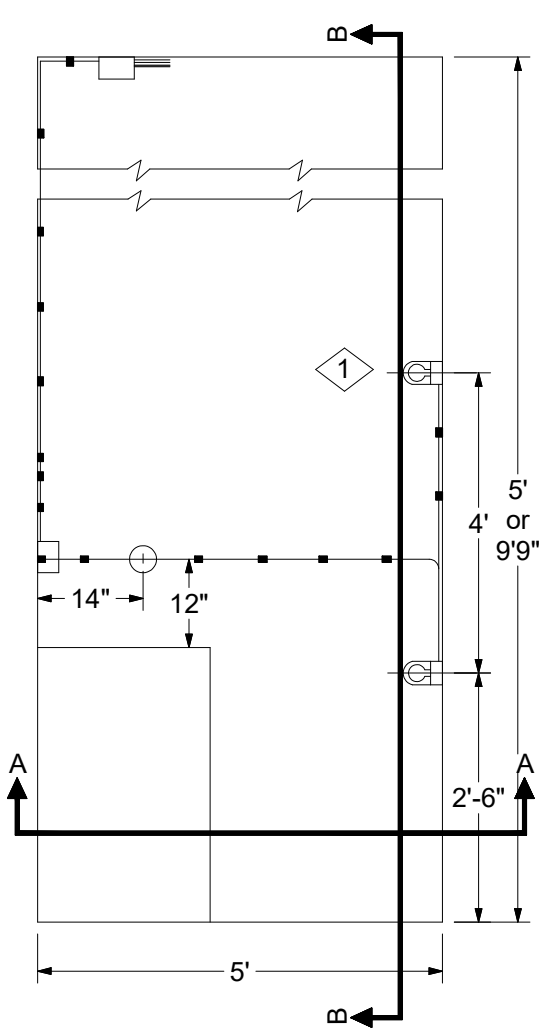
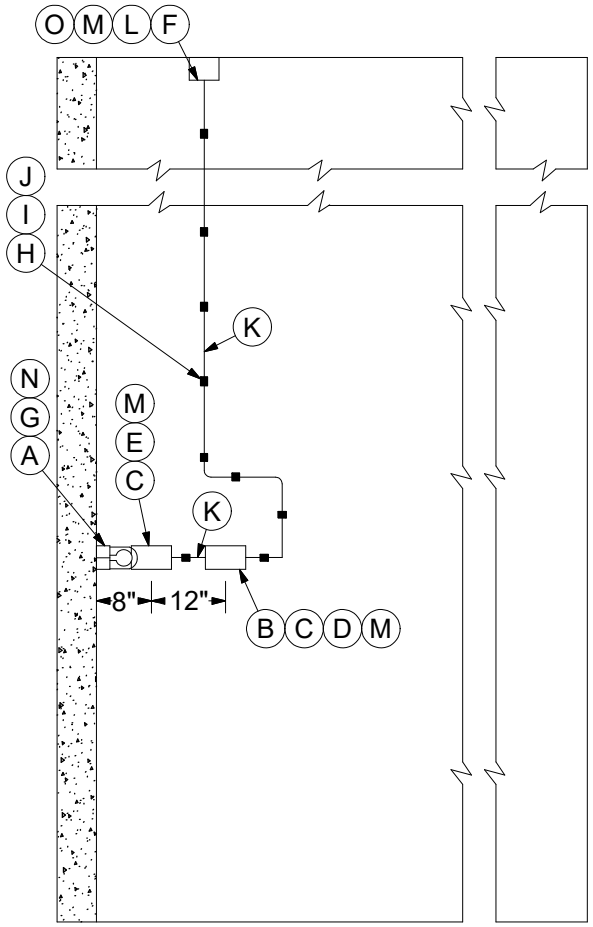
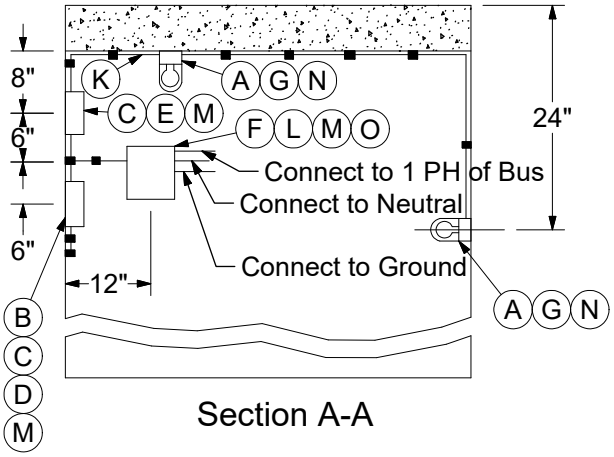


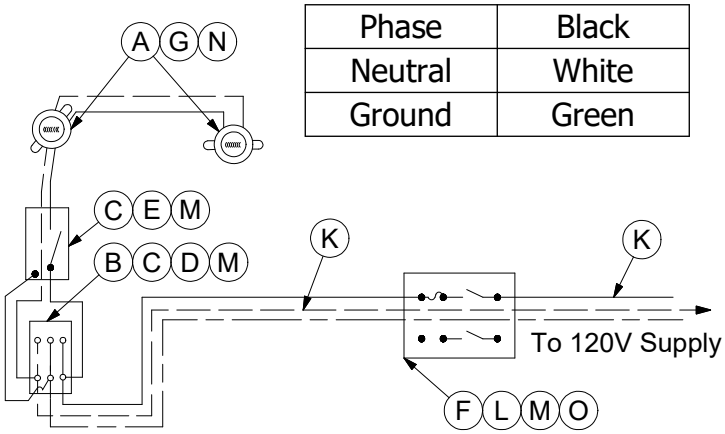
Plan View



Section B-B



Section A-A



Phase	Black
Neutral	White
Ground	Green

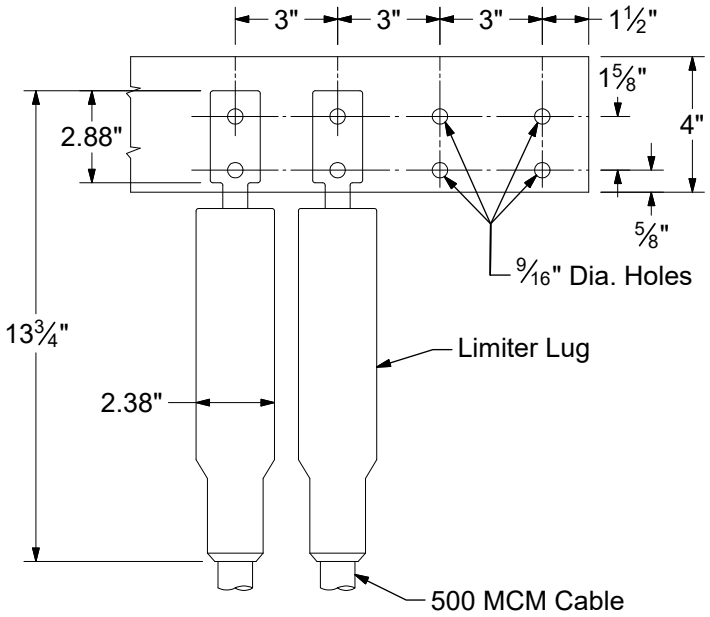
Wiring Diagram

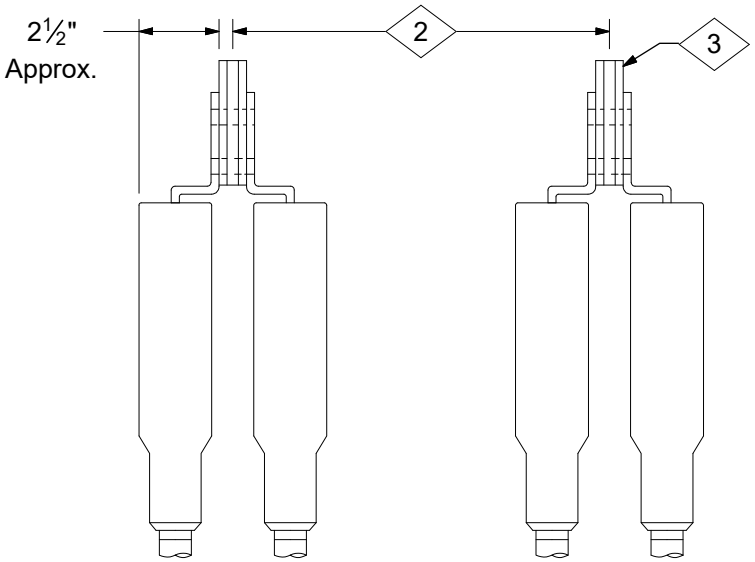
REV	DATE	ENG	DESCRIPTION
5	04/01/2023	EJB	Converted to new format
4	06/13/2011	EJB	

ITEM	STK / DCS #	DESCRIPTION 43 17 01 **	00
A	40 55 925	Fixture − Incandescent Lighting 150W with Globe	2
B	40 56 505	Receptacle − Duplex,GFI, 15A	1
C	40 01 105	Box − Surface Wiring, Outdoor	2
D	40 56 506	Plate Receptacle Cover, Outdoor	1
E	40 58 509	Switch − Toggle Outdoor, 10A, with Cover	1
F	20 52 041	Fuse − 15A., Cartridge, Type FRN	1
G	26 03 012	Lamp − General Purpose, 60 W Med. Screw Base	2
H	21 51 001	Anchor − Expansion 8−32	24
I	21 68 036	Screw − Rd. Hd. Brass 8−32 3/4” Long	24
J	23 67 128	Cleat − Cable, Plastic	24
K	18 61 113	Cord − Electrical, 600V, #14−3, Wet Rated (ft)	55
L	40 08 226	Switch − Safety, 30A Fusible, Outdoor	1
M	40 52 053	Connector − Cord, 3/4” Hub	6
N	40 52 065	Connector − Cord, 1/2” Hub	2
O	40 53 189	Nut − Conduit Lock, 3/4”	2
P	21 51 005	Anchor − Expansion 1/4”−20	12
Q	21 68 034	Screw − Rd. Hd. Brass 1/4”−20 1” Long	12
	1399	Op Code Lighting, Vault & Ser. Comp.	2

DESIGN NOTE(s):

1. For extra lamp required on 9'-9” service compartment vault, requisition one receptacle Stock #40 55 925 and one lamp Stock #26 03 012. Lamp not required on 5' vault.





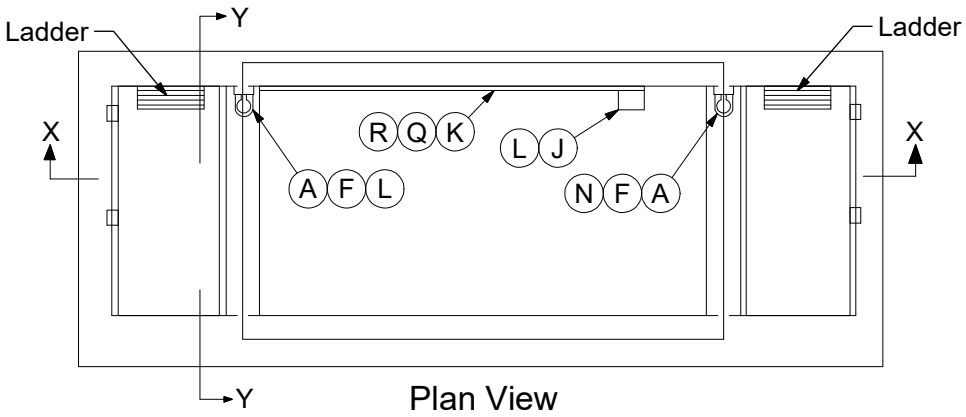
End View Showing Spacing

Drilling Plan for Cable Limiter Lugs	
2000 Amp Bus	4 Lugs Per Phase
3000 Amp Bus	6 Lugs Per Phase
4000 Amp Bus	8 Lugs Per Phase

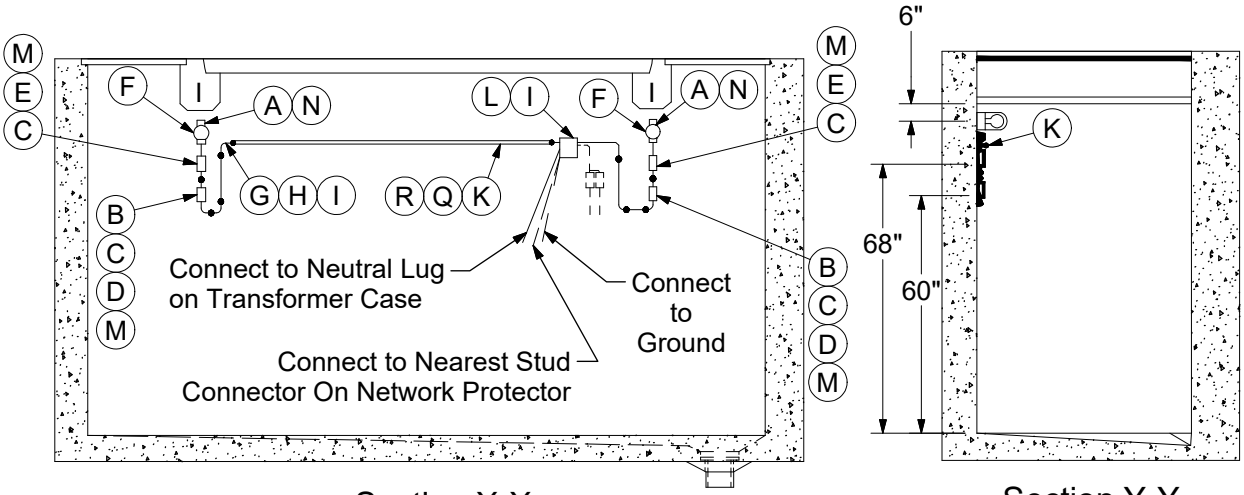
CONSTRUCTION NOTE(s):

1. Arrangement shown is for cables connecting from bottom of bus. Bus drilling must be reversed if cables connect from the top.
2. 12" Phase to Phase Spacing Where Space Permits. Otherwise, 10" Minimum Phase to Phase Spacing.
3. Number of bars as required by bus rating.

REV	DATE	ENG	DESCRIPTION
2	04/01/2023	EJB	Converted to new format
1	07/27/2011	EJB	



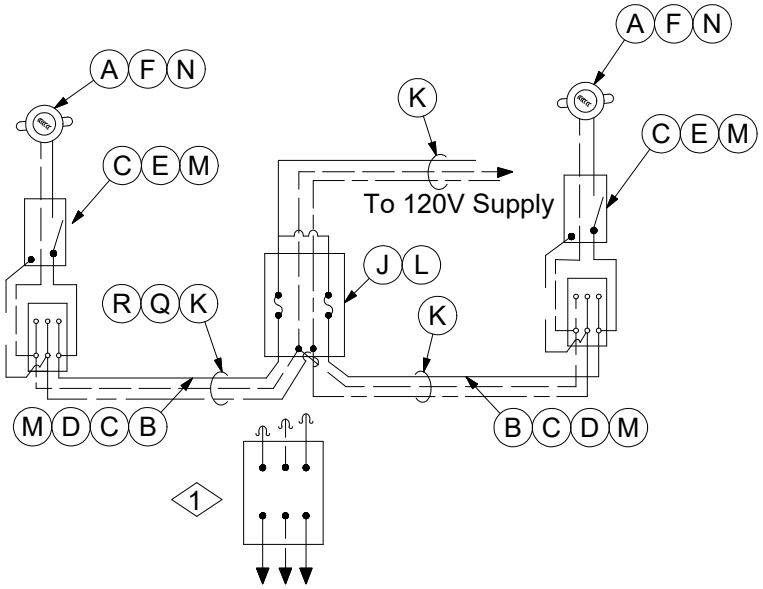
Plan View



Section X-X

Section Y-Y

Phase	Black
Neutral	White
Ground	Green



Wiring Diagram

CONSTRUCTION NOTE(s):

1. Connections for sump pump and automatic water spray system to be Installed only when required.

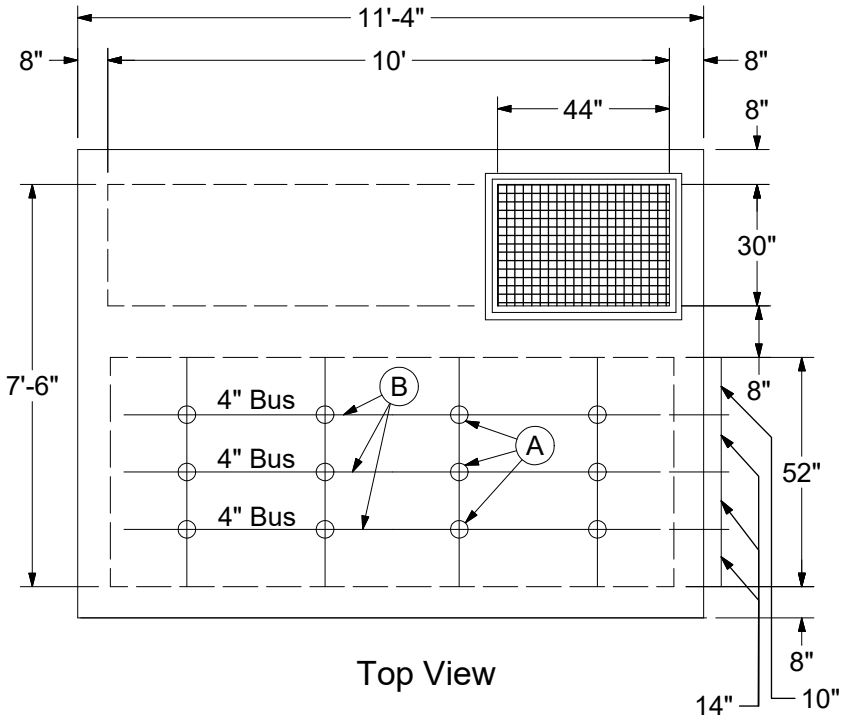
	ITEM	STK / DCS #	DESCRIPTION 43 18 01 **	01	02
	A	40 55 925	Fixture - Lighting, 150W, w/ Globe	2	2
	B	40 56 505	Receptacle - Duplex, GFI, 15A	2	2
	C	40 51 653	Box - Surface Wiring, PVC, Outdoor	4	4
	D	40 56 687	Cover - Receptacle - Outdoor	2	2
	E	40 58 509	Switch - Toggle, Outdoor, 10A, w/ Cover	2	2
	F	26 06 856	Lamp - LED, 120V, 8.5W (60W Eq.), Medium Base	2	2
	G	21 51 001	Anchor - Expansion 8-32	24	24
	H	21 68 036	Screw - Round Head Brass 8-32, ¾" Long	24	24
	I	23 67 128	Cleat - Cable, Plastic	24	24
2	J	20 52 041	Fuse - 15 A, 600V, Cartridge, Type CC	2	2
	K	18 61 130	Cord - Electrical, 600V, #12-3, Wet Rated	55'	55'
3	L	40 51 644	Box - Fuse, 600V, 30A, 10" Wide x 8" High X 4" Deep	1	-
		40 51 652	Box - Fuse, 600V, 30A, 6" Wide x 6" High X 4" Deep	-	1
	M	40 52 053	Connector - Cord, ¾" Hub	8	8
	N	40 52 065	Connector - Cord, ½" Hub	2	2
	O	21 51 005	Anchor - Expansion ¼"-20	24	24
	P	21 68 034	Screw - Round Head, Brass ¼"-20, 1" Long	24	24
	Q	12 51 197	Conduit - PVC, 5ch. 40, 1" x 10'	1	1
	R	40 52 455	Clamp - Conduit, 1", PVC	4	4
		1399	Op Code Lighting, Vault & Service Compartment	2	2

DESIGN NOTE(s):

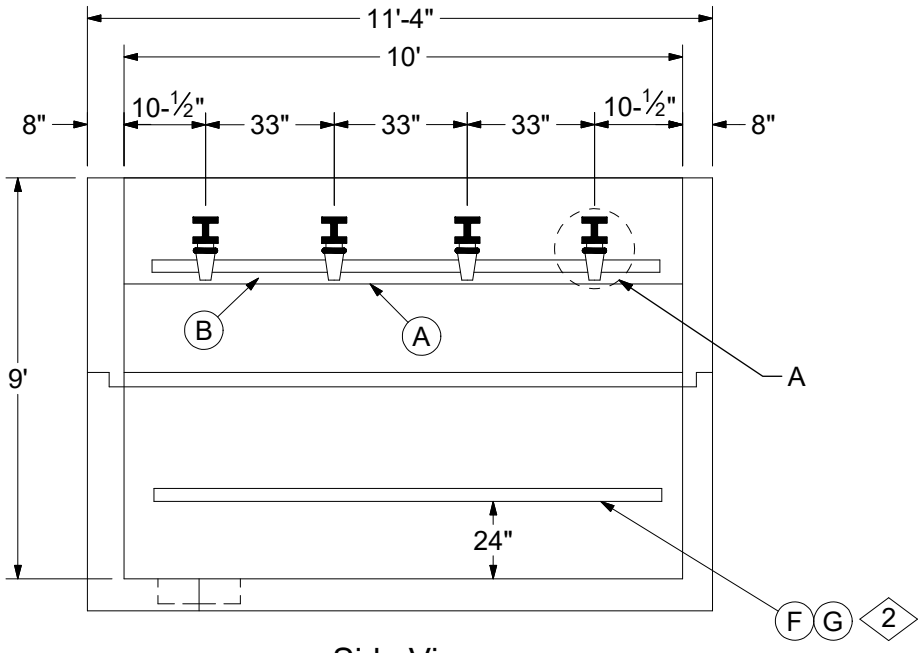
2. A fuse puller tool Stock # 85 29 163 is available to remove the fuse from the carriage.

3. Installation of the large fuse box (DCS # **43 18 01 01**) is preferred in vaults where space allows.

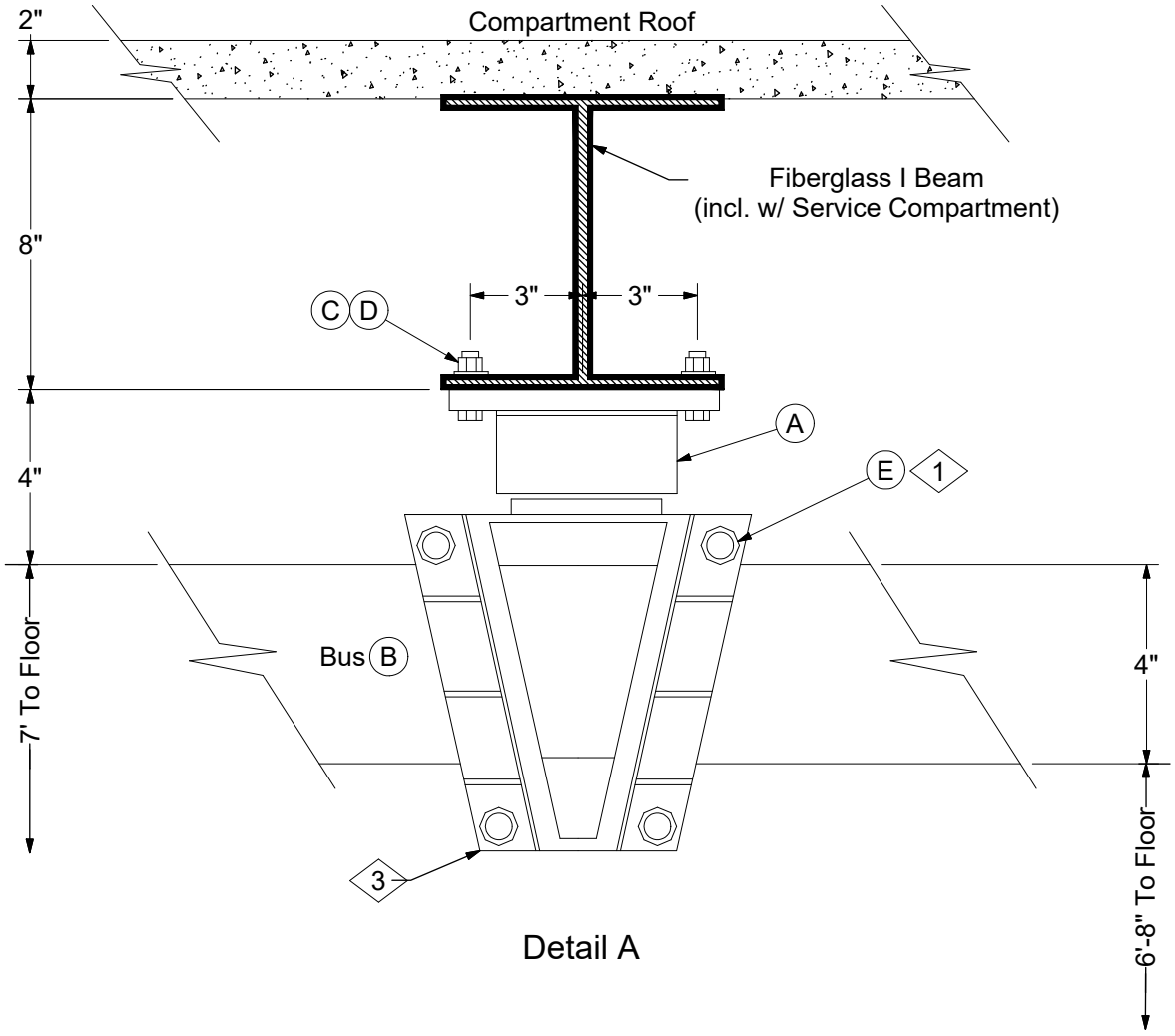
Precast Network Service Compartment



Top View



Side View



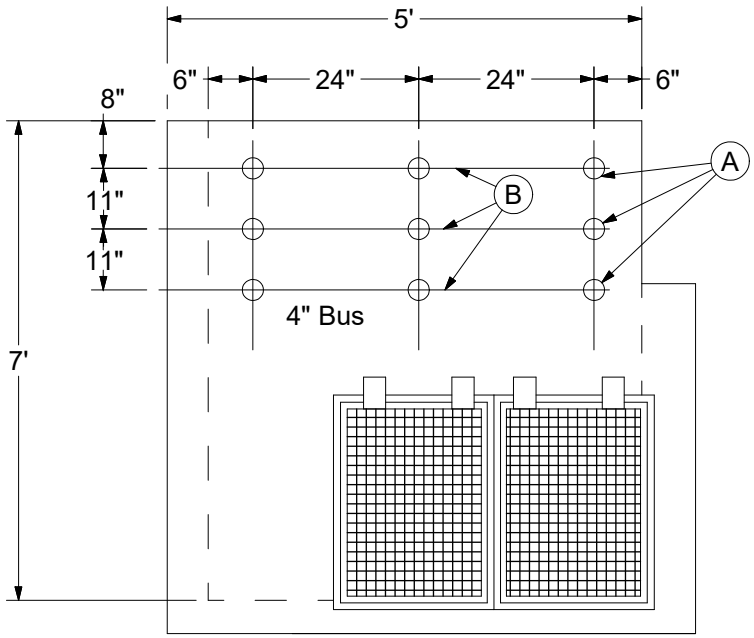
Detail A

BUS AMPACITY	
1000 Amps	43 19 01 01
2000 Amps	43 19 01 02
3000 Amps	43 19 01 03

	ITEM	STK / DCS #	DESCRIPTION 43 19 01 **	01	02	03
	A	25 07 024	Support - Network Bus, Vertical, Heavy Duty	12	12	12
	B	18 12 126	Bar - Bus, Copper, ¼" x 4" x 9', Predrilled	3	6	9
	C	21 56 078	Bolt - Machine, SS, ½" x 2", Hex Head w/Hex Nut	24	24	24
	D	23 66 005	Washer - Lock, Galv. Steel, ½"	24	24	24
1	E	17 55 810	Spacer, Bus Support, ¼" x 4" x 4", Copper	-	12	24
	F	18 12 125	Bar - Bus, Neutral/Ground Kit, ¼" x 4" x 9', w/Mounts	1	1	1
	G	21 53 049	Bolt - Machine, Everdur, ⅜" x 6", Hex Head w/Nut	8	8	8

REV	DATE	ENG	DESCRIPTION
2	04/01/2023	EJB	Converted to new format
1	02/05/2018	EJB	

Small Network Service Compartment



Top View

BUS AMPACITY	
1000 Amps	43 19 01 04
2000 Amps	43 19 01 05
3000 Amps	43 19 01 06

CONSTRUCTION NOTE(s):

1. Insert the copper spacers (E) between the bus bars (A) at each network bus support (B) as necessary.

2. Attach the Neutral/Ground Bus to the bond wire using 4/0 copper wire (Stock #18 52 024) and a two bolt connector (Stock #17 54 132) and a copper lug (Stock #17 05 194).

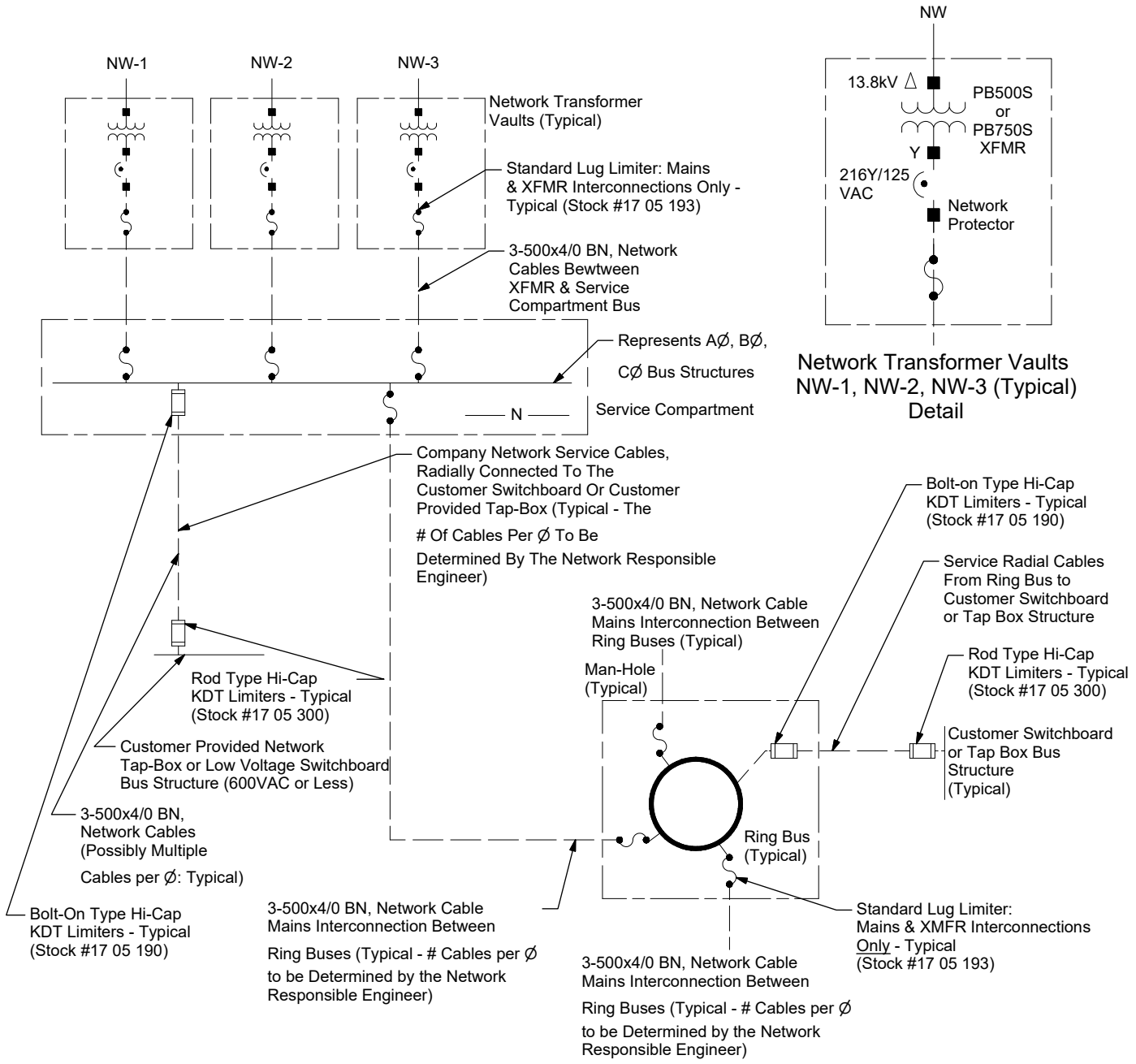
3. For all bus bar connections tighten bolts to a torque value of 20 ft-lbs.

	ITEM	STK / DCS #	DESCRIPTION 43 19 01 **	04	05	06
1	A	25 07 024	Support - Network Bus, Vertical, Heavy Duty	9	9	9
	B	18 12 124	Bar - Bus, Copper, ¼" x 4" x 53", Predrilled	3	6	9
	C	21 56 078	Bolt - Machine, SS, ½" x 2", Hex Head w/Hex Nut	18	18	18
	D	23 66 005	Washer - Lock, Galv. Steel, ½"	18	18	18
	E	17 55 810	Spacer, Bus Support, ¼" x 4" x 4", Copper	-	9	18
	F	18 12 127	Bar - Bus, Neutral/Ground Kit, ¼" x 4" x 4', w/Mounts	1	1	1
	G	21 53 049	Bolt - Machine, Everdur, ⅜" x 6", Hex Head w/Nut	6	6	6

DESIGN NOTE(s):

4. This standard covers new pre-cast network service compartment installations, custom scratch built service compartments, and rebuilt existing service compartments. Consult the project one-line and drawings for additional connection and circuit information. All other standard requirements are contained herein.

REV	DATE	ENG	DESCRIPTION
2	04/01/2023	EJB	Converted to new format
1	02/05/2018	EJB	



CONSTRUCTION NOTE(s):

1. Hi-cap KDT limiters shall be used only on 480Y/277V spot network connections and for 216Y/125V radial secondary network taps to customer equipment from a ring bus or service compartment.

2. The hi-cap KDT limiter's interrupting rating is 200,000 amps, symmetrical, and the standard lug limiter's interrupting rating is 14,000 amperes, symmetrical.

3. Neutral connections not shown on this drawing (limiters not used on neutral conductors).

4. PB500S transformer interconnections: (4) 3-500x4/0 BN,Network Cable PB 750S transformer interconnections: (6) 3-500x4/0 BN,Network Cable

5. Unless otherwise noted, all devices exist in all three phases.

6. This standard is complimentary to DCS **43 16 96 00** & **43 16 97 00**.

NOTES