UNDERGROUND DISTRIBUTION STANDARDS

PURPOSE

Purpose

The purpose of this Distribution Standards manual is to provide the basis for standardized, uniform, and consistent engineering, construction and maintenance practices for the Nashville Electric Service (NES) system. The contents of this manual contain minimum requirements used in designing and building a reliable, cost-effective, operable and maintainable distribution system that is to be used in combination with existing facilities.

Scope

The construction standards in this Manual are intended for new installations of electric distribution equipment. Existing overhead and underground facilities are not required to be modified or replaced based on the contents of this manual. However, any additions, alterations, or replacements to existing facilities must comply with both (1) the National Electrical Safety Code (NESC) rules and (2) the construction standards outlined in this Manual.

For situations not covered by this Manual, construction personnel should consult with NES Operating/Engineering Authorities to ensure compliance with NESC Rules and industry best practices.

Intent

Requirements in this manual are mandatory unless otherwise noted. Where a requirement is stated preferred is to be followed insofar as practical. Material and equipment depicted may be somewhat different, but shall have the same function, as provided using the stock numbers and compatible units in this manual.

Requirements in this manual are regarded as mandatory, unless otherwise noted. When a requirement is stated as “preferred”, it shall be followed insofar as practical. Material and equipment depicted may be somewhat different due to material availability or field conditions but shall have the same function.

Authorization

This manual was prepared under the direction of the NES Engineering Department for utilization in the design, construction, operation, and maintenance of the electric distribution facilities of the operating NES system. It is based upon the latest edition of the National Electrical Safety Code (NESC). And is to be used in conjunction with the applicable edition of the NESC and other codes and standards established. The requirements of the applicable codes and standards established by regulatory authority may supersede requirements in this manual or may establish additional requirements not contained herein.

This manual is provided for the exclusive use of the construction of NES facilities by their employees, contractors or other approved parties and is not to be copied or distributed to others without expressed written approval. NES accepts no responsibility for the unauthorized use of the content of this manual.

UNDERGROUND OVERVIEW & COMPATIBLE UNITS

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

TABLE OF CONTENTS

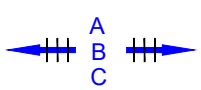
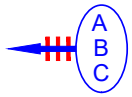
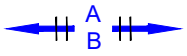
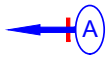
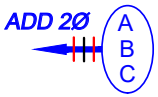
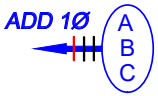
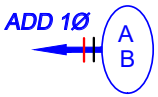
EXISITING BLACK	NEW RED	REMOVE GREEN	TEMP BLUE	FUTURE MAGENTA	EXAMPLE NOTATIONS	DESCRIPTIONS
SPB	SPB	SPB R	SPB	SPB		SECONDARY PULL BOX
PPB	PPB	PPB R	PPB	PPB		PRIMARY PULL BOX
TC	TC	TC R	TC	TC	UDP 1 1PHASE–4POLE 000–00–000	1PH TERM CABINET
TC	TC	TC R	TC	TC	UDP 1 3PHASE–4POLE 000–00–000	2PH OR 3PH TERM CABINET
S	S	S R	S	S	UDP 1 PMH–6 000–00–000 USE PAD DETAIL UGS–0008 REV A	UG DISTRIBUTION SWITCH
MH	MH	R MH	MH	MH	MH-1	MANHOLE LARGE RECTANGULAR WITH NUMBER
MH	MH	MH	MH	MH	MH-2	MANHOLE LARGE OCTAGONAL WITH NUMBER
		R			UDP 1 75 000–00–000	1Ø UGRD TRANS- FORMER 14.4/24.9kV to 120/240V PAD # & kVA SIZE
		R			UDP 1 150 kVA 23.9kV 125/216V 000–00–000 FUSE 50 AMPS USE PAD DETAIL UGS–005	3Ø UGRD TRANSFORMER PAD #, kVA SIZE PRMI./SEC. VOLTAGES AS NOTED
			COLOR BLUE			TEMPORARY SERVICE PEDESTAL FOR TEMPORARY UNDERGROUND SERVICES.
					1-3 50'	CONDUIT STUB-OUT FOR FUTURE EXTENSIONS WITH QUANTITY, DIAMETER AND LENGTH
		R			#1AL 200' 1–2.5"	UNDERGROUND PRIMARY CABLE. STATE CABLE SIZE, LENGTH, NUMBER OF CONDUITS AND THE DIAMETER.
					FEED-THRU	FEED THROUGH BUSHING TO BE INSTALLED ON PAD MOUNTED TRANSFORMERS TO PROVIDE Y SPLICE.
6	6					SECONDARY TO A MULTIPLE METER POINT. INDICATE BUILDING NUMBER, WIRE SIZE, CONDUIT SIZE AND LENGTH AND NUMBER OF METERS.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

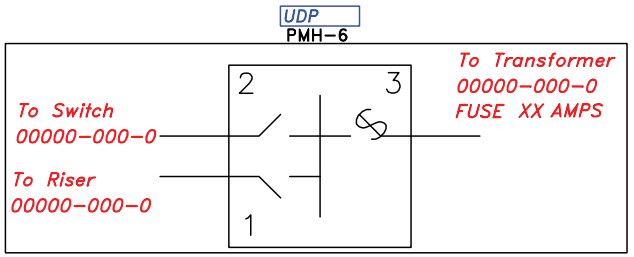
NES

UNDERGROUND DRAWING SYMBOLS

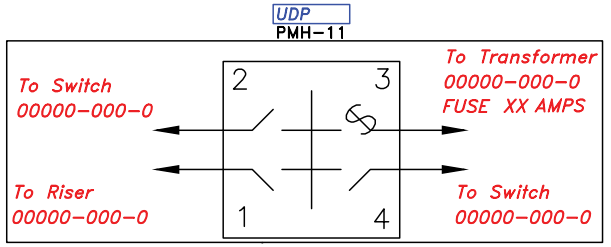
UNDERGROUND OVERVIEW & COMPATIBLE UNITS

EXISTING	NEW	DESCRIPTIONS
		3 PHASE CABLE INSTALLATION
		2 PHASE CABLE INSTALLATION
		1 PHASE CABLE INSTALLATION
		ADD 2PHASES
		ADD ONE PHASE TO A TWO PHASE SYSTEM
		ADD ONE PHASE TO A SINGLE PHASE SYSTEM
		TRANSFORMER PHASING WHEN MORE THAN ONE PHASE IS PRESENT AT TRANSFORMER
		13.8KV TRANSFORMER PHASING WHEN MORE THAN TWO PHASES ARE PRESENT AT TRANSFORMER

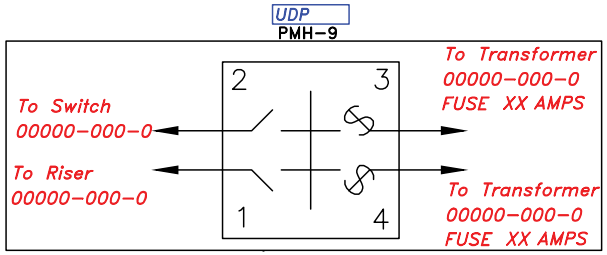
PMH–6 ONE–LINE NOTES



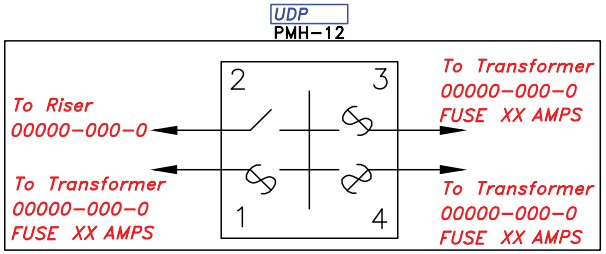
PMH–11 ONE–LINE NOTES



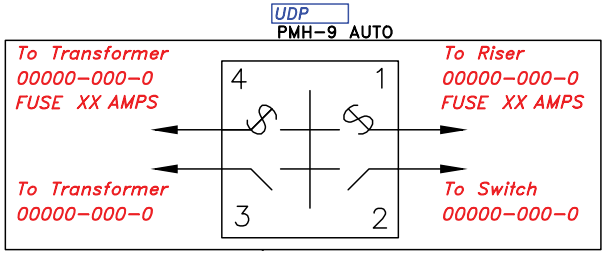
PMH–9 ONE–LINE NOTES



PMH–12 ONE–LINE NOTES



PMH–9 AUTO ONE–LINE NOTES



UDP 1
PMH–6
000–00–000
USE PAD DETAIL
UGS–0008 REV A

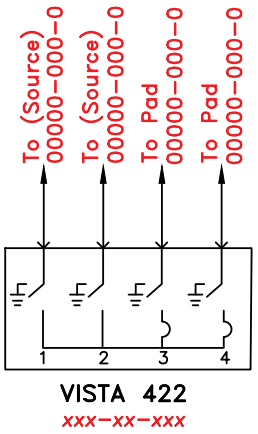
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

UNDERGROUND OVERVIEW & COMPATIBLE UNITS

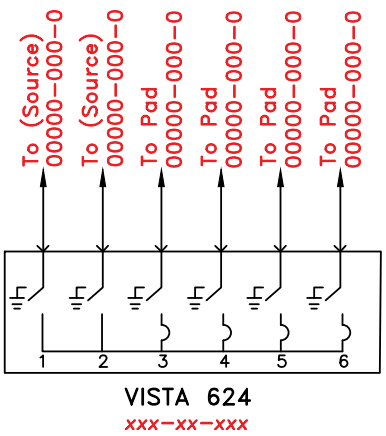
NES

DRAWING ONE-LINE DIAGRAMS
UG PMH SWITCHES

VISTA 422
ONE–LINE
NOTES

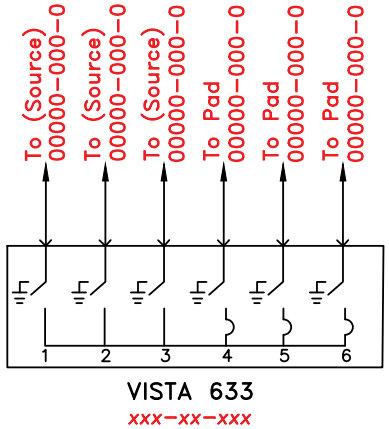


VISTA 624
ONE–LINE
NOTES



UDP 1
VISTA 422
086–31–957
USE PAD DETAIL
UGS–00032B

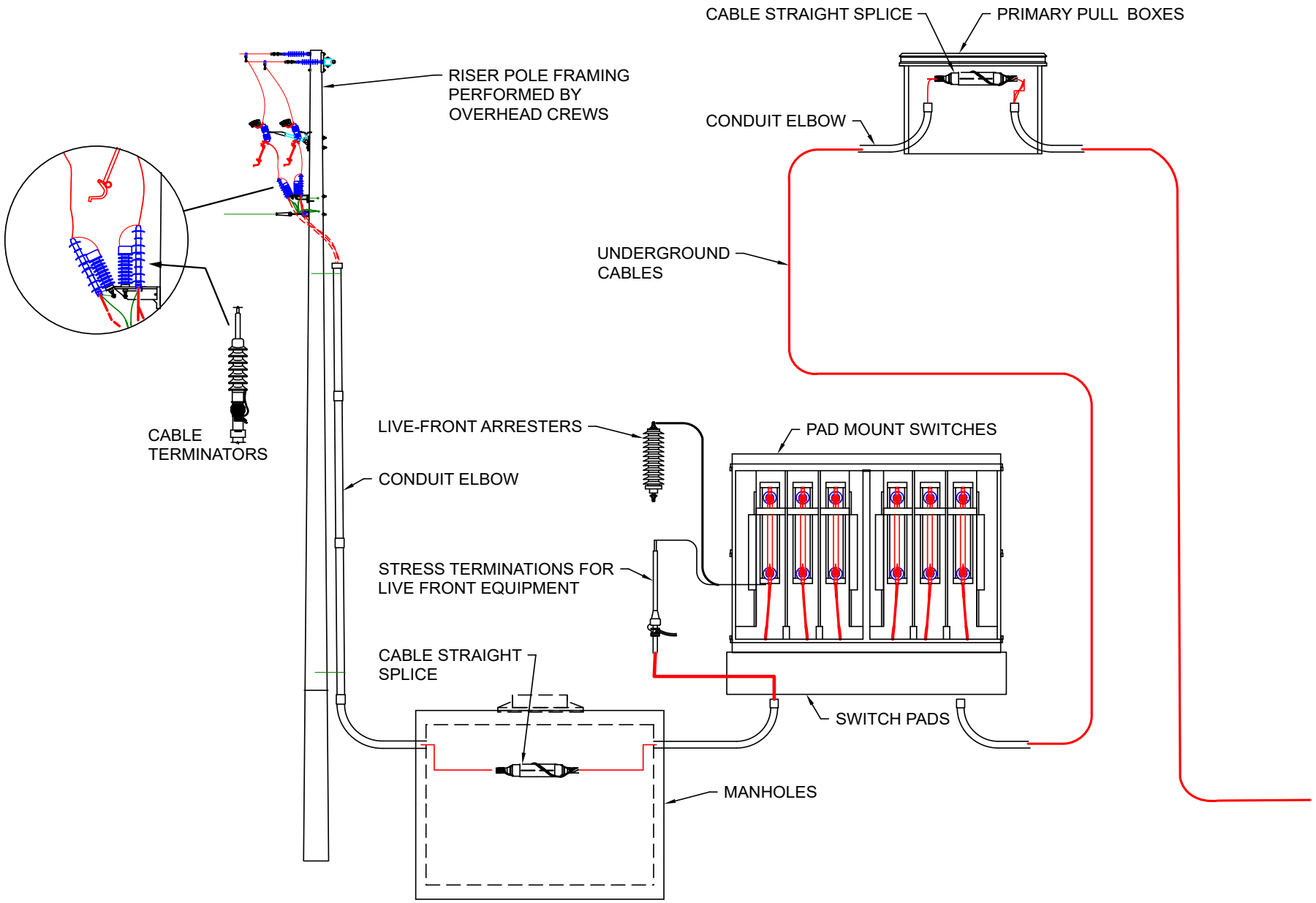
VISTA 633
ONE–LINE
NOTES



REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

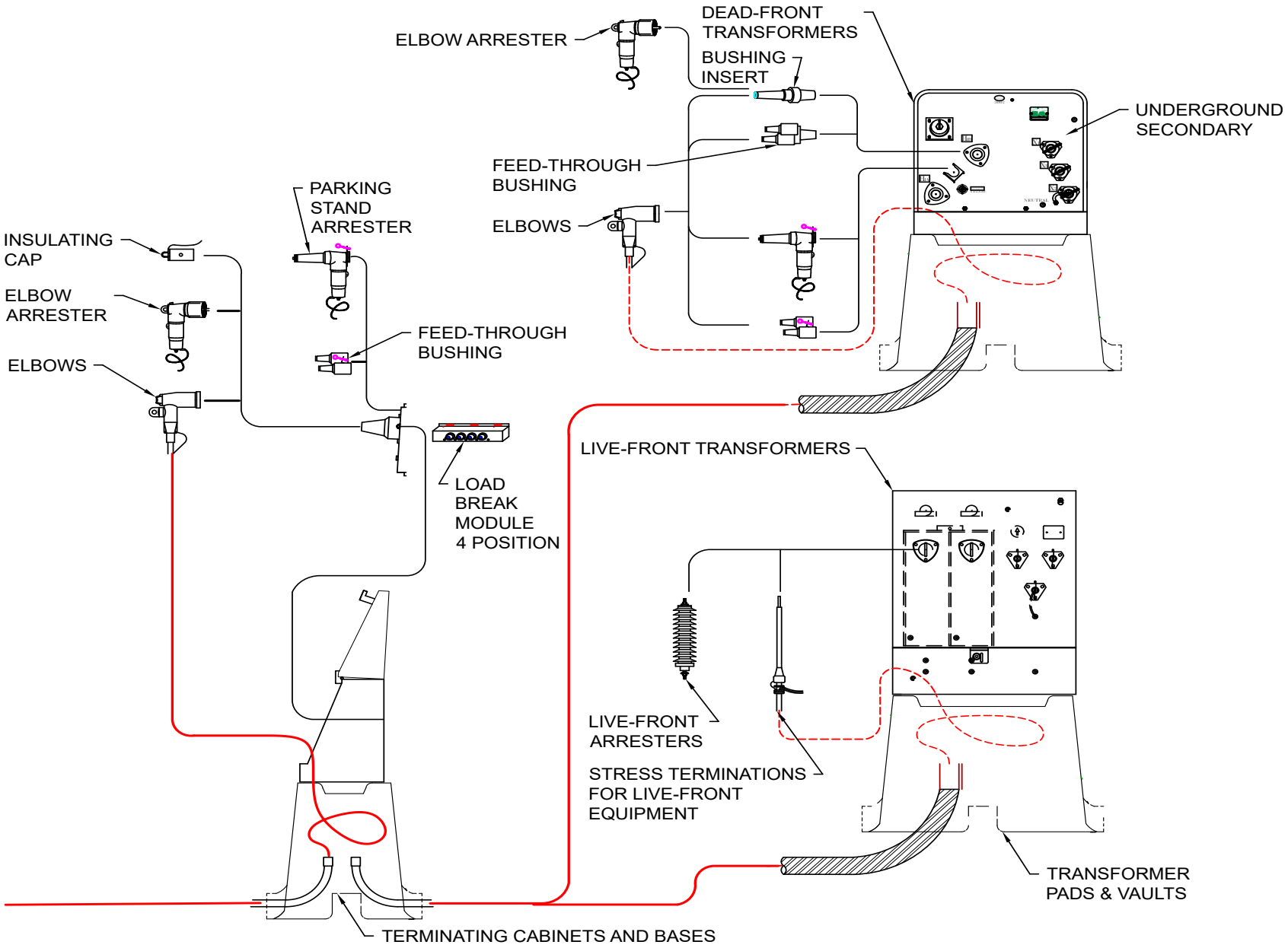
DRAWING ONE-LINE DIAGRAMS
UG VISTA SWITCHES



REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

UNDERGROUND PRIMARY SYSTEM OVERVIEW



REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

UNDERGROUND PRIMARY SYSTEM OVERVIEW (CONT'D)

ARRESTERS		
DESCRIPTION	STOCK CODE	COMP. UNIT
SURGE ARRESTER 12KV, DF,TRANSF OR SWITCH		ULA12DF
SURGE ARRESTER 12KV LIVE FRONT		ULA12LF
SURGE ARRESTER 18KV, DF,TRANSF OR SWITCH		ULA18DF
SURGE ARRESTER 18KV DF PARKING STAND		ULA18DF-PKS
SURGE ARRESTER 18KV LIVE FRONT		ULA18LF
SURGE ARRESTER 18KV LIVE FRONT		ULA18LF-SW
SURGE ARRESTER 3KV, DF,TRANSF OR SWITCH		ULA3DF
SURGE ARRESTER 3KV LIVE FRONT		ULA3LF

RISER SUPPORTS		
DESCRIPTION	STOCK CODE	COMP. UNIT
UG RISER PIPE STRAP, 1/2", 1H		UR-PSTRAP.5
UG RISER PIPE STRAP, 1", 1H		UR-PSTRAP1
UG RISER PIPE STRAP 2.5"		UR-PSTRAP2.5
UG RISER PIPE STRAP 3"		UR-PSTRAP3
UG RISER PIPE STRAP 4"		UR-PSTRAP4
UG RISER PIPE STRAP 5"		UR-PSTRAP5
UG RISER PIPE STRAP 6"		UR-PSTRAP6
RISER CONDUIT STANDOFF BRACKET		UR-STANDOFF
UG RISER CONDUIT SUPPORT 15" OFF SET		UR-SUP15
UG RISER CONDUIT SUPPORT 15" STRAIGHT		UR-SUP15ST
UG RISER CONDUIT SUPPORT 23" OFF SET		UR-SUP23
UG RISER CONDUIT SUPPORT 26" STRAIGHT		UR-SUP26ST

CABLE ACCESSORIES		
DESCRIPTION	STOCK CODE	COMP. UNIT
BUSHING INSERT 200A 25KV		UBINS200A
BUSHING INSERT -FEEDTHRU 200A 25KV		UBINS200A-F
UG BUSHING INSERT INSULATING CAP, 200A		UBINSCAP200A
UG BUSHING INSERT INSULATING CAP, 600A		UBINSCAP600A
UG CONNECTOR, CABLE TERMINATOR, #1		UCN-CTRM1
UG CONNECTOR, CABLE TERMINATOR, 4/0		UCN-CTRM40
UG CONNECTOR, CABLE TERMINATOR, 500MCM		UCN-CTRM500
UG CONNECTOR, CABLE TERMINATOR, 750MCM		UCN-CTRM750
UG CONNECTOR, STRAIGHT SPLICE, #1 AL		UCN-SPL1
UG CONNECTOR, STRAIGHT SPLICE, 4/0AL		UCN-SPL40
UG CONNECTOR, STRAIGHT SPLICE, 500MCM AL		UCN-SPL500
UG CONNECTOR, STRAIGHT SPLICE, 750MCM CU		UCN-SPL750CU
UG, CONNECTOR, STRESS TERMINATOR #1-4/0		UCN-STRM1-40
UG, CONNECTOR, STRESS TERM. 500-750MCM		UCN-STRM750
ELBOW CONN,#1AL/CU 200A 25KV W/SEAL KIT		UELBC-1
ELBOW CONN, #1AL 25KV 600A W/SEAL KT		UELBC-1-6
ELBOW CONN, 4/0 AL/CU 25KV200A W/SEAL KT		UELBC-4/0
ELBOW CONN, 4/0 AL/CU 25KV600A W/SEAL KT		UELBC-4/0-6
ELBOW CONN,4/0 CU 25KV 200A W/SEAL KIT		UELBC-4/0CU
ELBOW CONN, 500 AL/CU 25KV600A W/SEAL KT		UELBC-500-6
ELBOW CONN, 750 AL/CU 25KV600A W/SEAL KT		UELBC-750-6
ELBOW CONNECTOR PLUG 25KV 600A		UELBC-CP
BUSHING STANDOFF FEEDTHRU 200A 25KV		USTAOFF-FDHR
LOADBREAK JUNCTION, 3 POSITION, 200A	401095000	ULBMOD3POLE
LOADBREAK JUNCTION, 4 POSITION, 200A	401090000	ULBMOD4POLE

PRIMARY PULL BOXES		
DESCRIPTION	STOCK CODE	COMP. UNIT
PRI PULLBOX ADJUSTABLE GRADE 30WX48LX36D	060044000	UBOX-3048
PRI PULLBOX ADJUSTABLE GRADE 30WX48LX36D	060044000	UBOX-PRI
PRI PULLBOX TRAFFIC RATED 30WX48LX12D	060045000	UBOX-PRI-TF
PRI PULLBOX COVER TRAFFIC RATED 30WX48L	060045500	UBOX-PRI-TFC
PRI PULLBOX EXTENSION TRF RT 30WX48LX12D	060045200	UBOX-PRI-TFX
TURTLE TRANSFORMER UG BOX 36WX60LX36D	060463600	UBOX-UXFMR

FIBER OPTIC		
DESCRIPTION	STOCK CODE	COMP. UNIT
FO CBL, 1', 144 COUNT UG	024502400	UFIB-144
UNDERGROUND 216 FIBER OPTIC CABLE	024501100	UFIB-216
FO CBL, 1', 24 COUNT UG	024502000	UFIB-24
FO CBL, 1', 96 COUNT UG	024502100	UFIB-96
FO CBL, 1', 96 COUNT UG	024502300	UFIB-96-LT
RISER, FOR 144 CNT FO CABLE, PVC80, 3"	103273000	UFIBRISER-3L
RISER, FOR 24&96 CNT FO CABLE, PVC80, 3"	103273000	UFIBRISER-3S
RISER, FOR 144 CNT FO CABLE, PVC80, 2"	103272000	UFIBRISR-2L
RISER, FOR 24&96 CNT FO CABLE, PVC80, 2"	103272000	UFIBRISR-2S
POLYMER FO TRACER WIRE BOX 9 X 11 X 6		UFTWBX-9X11

GROUNDING		
DESCRIPTION	STOCK CODE	COMP. UNIT
CABLE,1/0,CU,BHD	011060000	UCCH10
CABLE,2,CU,BHD,7S	011000000	UCCH2
CABLE,4/0,CU,BHD,7S	011100000	UCCH40
CABLE,4/0,CU,BSD	011260000	UCCS40
UG MANHOLE GROUND INSERT		UMH-GRDINS

CABLE		
DESCRIPTION	STOCK CODE	COMP. UNIT
CABLE,750,CU,BSD	011300000	UCCS750
CABLE,1000,CU,BSD	011320000	UCCS1000
CABLE,2/0-1N,AL,TPXD,XLP,600V	020350000	UCAT-20
CABLE,2/0-1N,AL,TPXD,XLP,600V, OHT	020350100	UCAT-20-OH
CABLE,2/0-2/0N,CU,TPXD,XLP,600V	020351000	UCCT-20
CABLE,4/0-2/0N,AL,TPXD,XLP,600V, 1000FT	020381000	UCAT-40
CABLE,4/0-2/0N,AL,TPXD,XLP,600V, OHT	020381010	UCAT-40-OH
CABLE,4/0-2/0N,AL,QPXD,XLP,600V	020382000	UCAQ-40
CABLE,350MCM-4/0N,AL,TPXD,XLP,600V	020395000	UCAT-350
CABLE,500MCM-350MCM N,AL,TPXD,XLP,600V	020410000	UCAT-500
CABLE,500MCM-350MCM N,AL,QPXD,XLP,600V	020430000	UCAQ-500
CABLE,1,AL,C/N,EPR,25KV	020542000	UCAL1
CABLE,1,AL,C/N,EPR,25KV, 3CP (3 PH)	020544030	UCAL1-3CP
CABLE,4/0,AL,C/N,EPR,25KV, 3CP	020550030	UCAL40-3CP
CABLE,500MCM,AL,C/N,EPR,25KV	020580000	UCAL500
CABLE,750,CU,1/C,25KV,KERITE INSULATION	024000000	UCCU750-1/C
CABLE,4/0,CU,C/N,EPR,25KV 3CP	024020030	UCCU40-3CP
CABLE,500MCM,CU,C/N,EPR,25KV	024040000	UCCU500
CABLE,750MCM,CU,C/N,EPR,25KV	024050000	UCCU750

CONDUIT & DUCT		
DESCRIPTION	STOCK CODE	COMP. UNIT
DUCT, 3.5" PVC THINWALL	105802000	UDUC3.5
DUCT, 4" PVC THINWALL	105804000	UDUC4
DUCT, 5" PVC THINWALL	105805000	UDUC5
DUCT PLASTIC FEMALE ADAPTER 5" THINWALL		UDUC5-FA
DUCT, 6" PVC THINWALL	105806000	UDUC6
DUCT PLASTIC FEMALE ADAPTER 6" THINWALL		UDUC6-FA
DUCT PLASTIC ELBOW 4" 36R 11.25 ANGLE		UDUCL4-11
DUCT PLASTIC ELBOW 4" 36R 22.5 ANGLE		UDUCL4-22
DUCT PLASTIC ELBOW 4" 36R 45 DEGREE BEND		UDUCL4-45
DUCT PLASTIC ELBOW 4" 90 DEGREE BEND		UDUCL4-90
DUCT PLASTIC ELBOW 5" 90 DEGREE BEND		UDUCL5-90
DUCT, FLEX 2" SCH 40	105770000	UDUFLEX-2
DUCT PLASTIC TERMINATOR ADAPTER 6"		UDUTA6
CONDUIT ELBOW FIBERGLASS 5" 60" RADIUS	101055000	UFIBER5-60R
CONDUIT ELBOW FIBERGLASS 6" 60" RADIUS	101056000	UFIBER6-60R
CONDUIT,GALV 2"	101200000	UGAL2
CONDUIT,GALV 2.5"	101220000	UGAL2.5
CONDUIT,GALV 3"	101240000	UGAL3
CONDUIT,GALV 4"	101280000	UGAL4
CONDUIT,GALV 5"	101300000	UGAL5
CONDUIT,GALV 6"	101310000	UGAL6
CONDUIT ELBOW GALV 2.5" STD RADIUS		UGALL2.5-18R
CONDUIT ELBOW GALV 2" STD RADIUS		UGALL2-STDR
CONDUIT ELBOW GALV 3" 24" RADIUS		UGALL3-24R
CONDUIT ELBOW GALV 3" STD RADIUS		UGALL3-STDR

CONDUIT & DUCT		
DESCRIPTION	STOCK CODE	COMP. UNIT
CONDUIT ELBOW GALV 4" 16" RADIUS		UGALL4-16R
CONDUIT ELBOW GALV 4" 24" RADIUS		UGALL4-24R
CONDUIT ELBOW GALV 4" 36" RADIUS		UGALL4-36R
CONDUIT ELBOW GALV 5" 36" RADIUS		UGALL5-36R
CONDUIT ELBOW GALV 6" 36" RADIUS		UGALL6-36R
CONDUIT COUPLING, GALV 5"		UGCPL5
DUCT PLASTIC COUPLING 5" THINWALL		UPCPL5
DUCT PLASTIC COUPLING 6" THINWALL		UPCPL6
CONDUIT, PVC SCH 40, 2"	103200000	UPVC40-2
CONDUIT, PVC SCH 40, 2.5"	103220000	UPVC40-2.5
CONDUIT, PVC SCH 40, 3"	103230000	UPVC40-3
CONDUIT, PVC SCH 40, 4"	103250000	UPVC40-4
CONDUIT, PVC SCH 40, 5"	103260000	UPVC40-5
CONDUIT, PVC SCH 40, 6"	103264000	UPVC40-6
CONDUIT, PVC SCH 80, 2"	103272000	UPVC80-2
CONDUIT, PVC SCH 80, 3"	103273000	UPVC80-3
CONDUIT, PVC SCH 80, 4"	103274000	UPVC80-4
CONDUIT, ELBOW, PVC, 1 1/4" STD RADIUS		UPVCL1.25
CONDUIT ELBOW,PVC 2.5" 24" RADIUS		UPVCL2.5-24R
CONDUIT ELBOW,PVC 2.5" STD RADIUS		UPVCL2.5-STD
CONDUIT ELBOW,PVC 2" STD RADIUS		UPVCL2-STDR
CONDUIT ELBOW,PVC 3" STD RADIUS		UPVCL3-STDR
CONDUIT ELBOW,PVC 4" 24" RADIUS		UPVCL4-24R
CONDUIT ELBOW,PVC 5" 36" RADIUS		UPVCL5-36R
CONDUIT, PVC SCH 80, 4"	103274000	USPVC80-4

MANHOLES, VAULTS, & PADS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PULLBOX, 17" X 30" L X 18"D, PRECAST	060021000	UGBOX-17X30
UG SWITCH VAULT, VISTA, 6-WAY, PRECAST	060372400	USV-V6WAY-P
UG SWITCH VAULT, VISTA, 4-WAY, PRECAST	060372600	USV-V4WAY-P
PRECAST MANHOLE, LARGE PM-2L	060375000	UMNHOLE-LG
PRECAST MANHOLE, 10'X10',OCTAGON	060377500	UMNHOLE-OCT
CONCRETE PAD, PRECAST, VISTA 4-WAY	060377640	USVPAD-4W
CONCRETE PAD, PRECAST, VISTA 6-WAY	060377650	USVPAD-6W
TRANSFORMER FIBERGLASS PAD 48X37.5	060390000	UTPAD-FG
TERM CAB BASE - 1PHASE 4 POLE 36X22X30		U1P4P-BASE
TERM CAB BASE FOR 2PH OR 3PH 4POLE		U3P4P-BASE
UG MANHOLE, CABLE ARM FIBERGLASS - 13"		UMH-CARM13
UG MANHOLE SUPPORT, CABLE BACK 9 HOLE		UMH-CARM-SUP
UG MANHOLE, THROAT & COVER FOR PRECAST		UMH-THROAT

RISERS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PRIMARY CABLE RISER, SINGLE 2"	101200000	URISERP-2
PRIMARY CABLE RISER, DOUBLE 2.5"	101220000	URISERP-2.5D
PRIMARY CABLE RISER, SINGLE 2.5"	101220000	URISERP-25
PRIMARY CABLE RISER, SINGLE 3"	101240000	URISERP-3
PRIMARY CABLE RISER, SINGLE 4"	103274000	URISERP-4
PRIMARY CABLE RISER, SINGLE 5" 500	103275000	URISERP-5
PRIMARY CABLE RISER, SINGLE 5" 4/0	103275000	URISERP-5 40
PRIMARY CABLE RISER, DOUBLE 5"	103275000	URISERP-5D
PRIMARY CABLE RISER, SINGLE 6"	103276000	URISERP-6
PRIMARY CABLE RISER, DOUBLE 6"	103276000	URISERP-6D

SWITCHES & TERMINATING CABINETS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PAD MTD SWITCH DF PME10	965890110	USW-PME10
SW PAD RVAC-3 125BIL 25KV MOTOR-OP	965900000	US-PM3-25MO
PAD MTD SWITCH LF PMH-6 600A	965912000	USW-PMH6
PAD MTD SWITCH LF PMU-6M 600A	965913000	USW-PMU6M
PAD MTD SWITCH LF PMH9 14.4KV AUTO TRANS	965914000	USW-PMH913.8
PAD MTD SWITCH LF PMH-9 600A	965916000	USW-PMH9
PAD MTD SWITCH LF PMH-9 25KV AUTO TRANSF	965916100	USW-PMH9AUT
PAD MTD SWITCH LF PMH-11 600A	965919000	USW-PMH11
PAD MTD SWITCH LF PMH-12 600A	965924000	USW-PMH12
SW PAD PMU-9 95KV BIL 600A 15KV LB	965925700	USW-PMU9
SW UG VISTA 6WAY CABINET ONLY	965931000	USVB6-CAB
SW UG VISTA 624 25KV 12.5kA 125BIL RS	965936000	USVB6-2642X
SW UG VISTA 633 25KV 12.5 KA 125BIL RS	965937000	USVB6-3632X
SW UG VISTA 422 25KV 12.5KA 125BIL RS	965938000	USVB4-2622X
SW UG VISTA 624 15KV 25kA 125BIL RS	965940000	USVB6-2642Y
SW UG VISTA 633 15KV 25KA 125BIL RS	965941000	USVB6-3632Y
SW UG VISTA 422 15KV 25KA 125BIL RS	965942000	USVB4-2622Y
PAD MTD SWITCH DF MOST6B 200A	965950000	USW-MOST6B
PAD MTD SWITCH DF MOST9B 200A	965954000	USW-MOST9B
PAD MTD SWITCH DF RVAC9 200A	965955000	USW-RVAC9
PAD MTD SWITCH DF MOST15 200A	965960000	USW-MOST15
SW UG VISTA 4WAY CABINET ONLY	965974400	USVB4-CAB
UGRD TERMINATING CABINET	965975000	U-TERMCAB
PAD MTD TERMINATING CABINET 1PH-4POLE	965978000	U1P4P
PAD MTD TERMINATING CABINET 2PH-4POLE	965982000	U2P4P
PAD MTD TERMINATING CABINET 3PH-4POLE	966005000	U3P4P
FUSE HOLDER S&C SM-4 200A 25KV		UFUSEHLD-SM4
FUSE MOUNTING S&C SM-4 200A 25KV		UFUSEMNT-SM4

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SERVICES		
DESCRIPTION	STOCK CODE	COMP. UNIT
CAB, 350MCM-4/0N,AL,XLP,600V,TPXD, LR	020395010	UCAT-350LR
URD CONNECTOR 3 HOLE		UCN-3H
URD CONNECTOR 4 HOLE		UCN-4H
URD CONNECTOR 5 HOLE		UCN-5H
URD CONNECTOR 6 HOLE		UCN-6H
URD CONNECTOR 7 HOLE		UCN-7H
FIBERGLASS STUBOUT MARKER		USTUBMARKER
CABLE, SERVICE, 4/0-2/0NAL QPXD XLP 600V	020382000	UVAQ-40
CABLE, SERVICE, 500-350NAL QPXD XLP 600V	020430000	UVAQ-500
CABLE,2/0-1N,AL,TPXD,XLP,600V	020350000	UVAT-20
CABLE,2/0-1N,AL,TPXD,XLP,600V,OHT	020350100	UVAT-20-OH
UPR2, 1 FT. 350MCM-4/0N,AL,XLP,600V,TPXD	020395000	UVAT-350
CAB, 350MCM-4/0N,AL,XLP,600V,TPXD, LR	020395010	UVAT-350LR
UPR2, 1 FT. 4/0-2/0N,AL,XLP,600V,TPXD	020381000	UVAT-40
UPR2,1 FT. 4/0-2/0N,AL,XLP,600V,TPXD,OHT	020381010	UVAT-40-OH
UPR2, 1 FT. 500MCM-350MCM,AL,XLP,600V,TP	020410000	UVAT-500
PRECAST PULLBOX, LT. TRAFFIC, 13" X 24"	060020000	UVBOX-13X24
PRECAST PULLBOX, LT. TRAFFIC, 17" X 30"	060021000	UVBOX-17X30
URD SERVICE BOX 18WX32LX20D	060034000	UVBOX-18X32
ARRESTER, SURGE, SECONDARY, 120/240V		UVLA-240
ARRESTER, SURGE, SECONDARY, 650V		UVLA-650
URD SERVICE PEDESTAL 31X31	060395500	UVPED-31X31
CONDUIT, PVC SCH 40, 2"	103200000	UVPVC40-2
CONDUIT, PVC SCH 40, 2.5"	103220000	UVPVC40-2.5
CONDUIT, PVC SCH 40, 3"	103230000	UVPVC40-3

SERVICES		
DESCRIPTION	STOCK CODE	COMP. UNIT
CONDUIT, PVC SCH 40, 4"	103250000	UVPVC40-4
CONDUIT, PVC SCH 80, 2"	103272000	UVPVC80-2
CONDUIT, PVC SCH 80, 3"	103273000	UVPVC80-3
CONDUIT, PVC SCH 80, 4"	103274000	UVPVC80-4
CONDUIT ELBOW,PVC 2" STD RADIUS		UVPVC-L2
CONDUIT ELBOW,PVC 2.5" STD RADIUS		UVPVC-L2.5
CONDUIT ELBOW,PVC 2.5" 24" RADIUS		UVPVC-L-24R
CONDUIT ELBOW,PVC 3" STD RADIUS		UVPVC-L3
CONDUIT ELBOW,PVC 4" 24" RADIUS		UVPVC-L4
RISER, SERVICE, PVC80, 2"	103272000	UVRISER-2
RISER, SERVICE, PVC80, 3"	103273000	UVRISER-3
RISER, SERVICE, PVC80, 4"	103274000	UVRISER-4
FIBERGLASS TEMPORARY SERVICE PEDESTAL		UVTEMP-PED
TERMINATIONS, SERV, UGRD, 2" COND, 2/0AT		UVTERM2-20T
TERMINATIONS, SERV, UGRD, 3" COND, 2/0AT		UVTERM3-20T
TERMINATIONS, SERV, UGRD, 3" COND, 350AT		UVTERM3-350T
TERMINATIONS, SERV, UGRD, 3" COND, 4/0AT		UVTERM3-40T
TERMINATIONS, SERV, UGRD, 3" COND, 500AT		UVTERM3-500T
TERMINATIONS, SERV, UGRD, 4" COND, 4/0AQ		UVTERM4-40Q
TERMINATIONS, SERV, UGRD, 4" COND, 500AQ		UVTERM4-500Q

SINGLE PHASE TRANSFORMERS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PAD MTD 1PH LF 25KVA 4160/2400-240/120	920216000	UT0216
PAD MTD 1PH LF 50KVA 4160/2400-240/120	920224000	UT0224
PAD MTD 1PH LF 100KVA 4160/2400-240/120	920228000	UT0228
PAD MTD 1PH DF 50KVA 2.4/4.16-120/240	920324000	UT0324
PAD MTD 1PH DF 75KVA 2.4/4.16-120/240	920326000	UT0326
PAD MTD 1PH DF 100KVA 2.4/4.16-120/240	920328000	UT0328
PAD MTD 1PH LF 167KVA 7200/4160-240/120	922134000	UT2134
PAD MTD 1PH DF 50KVA 13.2/7.62-120/240	922324000	UT2324
PAD MTD 1PH DF 75KVA 13.2/7.62-120/240	922326000	UT2326
PAD MTD 1PH DF 100KVA 13.2/7.62-120/240	922328000	UT2328
PAD MTD 1PH DF 167KVA 13.2/7.62-120/240	922334000	UT2334
PAD MTD 1PH DF 250KVA 13.2/7.62-120/240	922340000	UT2340
TURTLE - SI DF 1P 25KVA 13.8 120/240	964616000	UT4616
TURTLE - SI DF 1P 25KVA 13.8 240/480	964617000	UT4617
TURTLE - SI DF 1P 50KVA 13.8 120/240	964624000	UT4624
TURTLE - SI DF 1P 75KVA 13.8 120/240	964626000	UT4626
TURTLE - SI DF 1P 100KVA 13.8 120/240	964628000	UT4628
PAD MTD 1PH DF 25KVA 13.8/7.97 480/240	925611600	UT5611
PAD MTD 1PH DF 25KVA 13.8/7.97 480/240	926716000	UT6716
PAD MTD 1PH DF 100KVA 13.8/7.97 480/240	926728000	UT6728

SINGLE PHASE TRANSFORMERS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PAD MTD 1PH LF 75KVA 14.4-120/240	927026000	UT7026
PAD MTD 1PH LF 167KVA 14.4-120/240	927034000	UT7034
PAD MTD 1PH LF 250KVA 14.4-120/240	927040000	UT7040
PAD MTD 1PH LF 50KVA 14.4/24.9-120/240LF	927924000	UT7924
PAD MTD 1PH LF 75KVA 14.4/24.9-120/240LF	927926000	UT7926
PAD MTD 1PH LF 100KVA 14.4/24.9-120/240L	927928000	UT7928
PAD MTD 1PH LF 167KVA 14.4/24.9-120/240L	927934000	UT7934
PAD MTD 1PH LF 250KVA 14.4/24.9-120/240L	927940000	UT7940
PAD MTD 1PH DF 25KVA 14.4/24.9-120/240	928116000	UT8116
PAD MTD 1PH DF 50KVA 14.4/24.9-120/240	928124000	UT8124
PAD MTD 1PH DF 75KVA 14.4/24.9-120/240	928126000	UT8126
PAD MTD 1PH DF 100KVA 14.4/24.9-120/240	928128000	UT8128
PAD MTD 1PH DF 167KVA 14.4/24.9-120/240	928134000	UT8134
PAD MTD 1PH DF 250KVA 14.4/24.9-120/240	928140000	UT8140
PAD MTD 1PH DF 25KVA 23.9/13.8 480/240	928660000	UT8660
PAD MTD 1PH DF 25KVA 23.9/13.8 480/240	928716000	UT8716
PAD MTD 1PH DF 100KVA 23.9/13.8 480/240	928728000	UT8728

THREE PHASE TRANSFORMERS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PAD MTD 3PH LF 225KVA 4160-208Y/120	941138000	UT1138
PAD MTD 3PH LF 45KVA 4160-216Y/125	941522000	UT1522
PAD MTD 3PH LF 75KVA 4160-216Y/125	941526000	UT1526
PAD MTD 3PH LF 150KVA 4160-216Y/125	941532000	UT1532
PAD MTD 3PH LF 300KVA 4160-216Y/125	941540000	UT1540
PAD MTD 3PH DF 75KVA 13.8/7.96-216Y/125	945626000	UT5626
PAD MTD 3PH DF 150KVA 13.8/7.96-216Y/125	945632000	UT5632
PAD MTD 3P LF 2500KVA 23.9/13.8-216Y/125	948779000	UT8779
PAD MTD 3PH LF 15MVA 23.9/13.8-13.8/7.9	948996000	UT8996
DRY VAULT 3PH 500KVA 14.4/24.9-216Y/125	949152000	UT9152
DRY VAULT 3PH 1000KVA 14.4/24.9-216Y/125	949164000	UT9164
DRY VAULT 3PH 1500KVA 14.4/24.9-216Y/125	949170000	UT9170
DRY VAULT 3PH 2500KVA 24.9/14.4-216Y/125	949179000	UT9179
PAD MTD 3PH DF 75KVA 14.4/24.9-125/216	949326000	UT9326
PAD MTD 3PH DF 150KVA 14.4/24.9-125/216	949332000	UT9332
PAD MTD 3PH DF 225KVA 14.4/24.9-125/216	949338000	UT9338
PAD MTD 3PH DF 300KVA 14.4/24.9-125/216	949343000	UT9343
PAD MTD 3PH DF 500KVA 14.4/24.9-125/216	949352000	UT9352
PAD MTD 3PH DF 750KVA 14.4/24.9-125/216	949358000	UT9358
PAD MTD 3PH DF 1000KVA 14.4/24.9-125/216	949364000	UT9364
PAD MTD 3PH DF 1500KVA 14.4/24.9-125/216	949370000	UT9370
PAD MTD 3PH LF 75KVA 24.9/14.4-216Y/125	949426000	UT9426
PAD MTD 3PH LF 150KVA 24.9/14.4-216Y/125	949432000	UT9432
PAD MTD 3PH LF 225KVA 24.9/14.4-216Y/125	949438000	UT9438
PAD MTD 3PH LF 300KVA 24.9/14.4-216Y/125	949443000	UT9443
PAD MTD 3PH LF 500KVA 24.9/14.4-216Y/125	949452000	UT9452
PAD MTD 3PH LF 750KVA 14.4/24.9-125/216	949458000	UT9458
PAD MTD 3PH LF 1000KVA 14.4/24.9-125/216	949464000	UT9464

THREE PHASE TRANSFORMERS		
DESCRIPTION	STOCK CODE	COMP. UNIT
PAD MTD 3PH LF 1500KVA 14.4/24.9-125/216	949470000	UT9470
PAD MTD 3PH DF 75KVA 14.4/24.9-277/480	949526000	UT9526
PAD MTD 3PH DF 150KVA 14.4/24.9-277/480	949532000	UT9532
PAD MTD 3PH DF 225KVA 14.4/24.9-277/480	949538000	UT9538
PAD MTD 3PH DF 300KVA 14.4/24.9-277/480	949543000	UT9543
PAD MTD 3PH DF 500KVA 14.4/24.9-277/480	949552000	UT9552
PAD MTD 3PH DF 750KVA 14.4/24.9-277/480	949558000	UT9558
PAD MTD 3PH DF 1000KVA 14.4/24.9-277/480	949564000	UT9564
PAD MTD 3PH DF 1500KVA 14.4/24.9-277/480	949570000	UT9570
PAD MTD 3PH DF 2000KVA 14.4/24.9-277/480	949574000	UT9574
PAD MTD 3PH DF 2500KVA 14.4/24.9-277/480	949579000	UT9579
PAD MTD 3PH LF 225KVA 14.4/24.9-277/480	949638000	UT9638
PAD MTD 3PH LF 300KVA 14.4/24.9-277/480	949643000	UT9643
PAD MTD 3PH LF 750KVA 14.4/24.9-277/480	949658000	UT9658
PAD MTD 3PH LF 1000KVA 14.4/24.9-277/480	949664000	UT9664
PAD MTD 3PH LF 1500KVA 14.4/24.9-277/480	949670000	UT9670
PAD MTD 3PH LF 2000KVA 14.4/24.9-277/480	949676000	UT9676
PAD MTD 3PH LF 2500KVA 14.4/24.9-277/480	949679000	UT9679
PAD MTD 3PH LF 3750KVA 14.4/24.9-277/480	949682000	UT9682
PAD MTD 3PH LF 1000KVA 14.4/24.9-2.4/4.1	949764000	UT9764
PAD MTD 3HP LF 2500KVA 14.4/24.9-2.4/4.1	949779000	UT9779
PAD MTD 3PH LF 3750KVA 14.4/24.9-2.4/4.1	949782000	UT9782
PAD MTD 3PH LF 5000KVA 14.4/24.9-2.4/4.1	949784000	UT9784
PAD MTD 3PH LF 10MVA 14.4/24.9-2.4/4.1	949792000	UT9792
PAD MTD 3P DF 1500KVA 14.4/24.9-4.16/2.4	949870000	UT9870
DRY VAULT 3PH 1000KVA 14.4/24.9-277/480	949964000	UT9964
DRY VAULT 3PH 1500KVA 14.4/24.9-277/480	949970000	UT9970
DRY VAULT 3PH 2500KVA 14.4/24.9-277/480	949979000	UT9979
DRY VAULT 3PH 3000KVA 14.4/24.9-277/480	949980000	UT9980

PRIMARY CABLE

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

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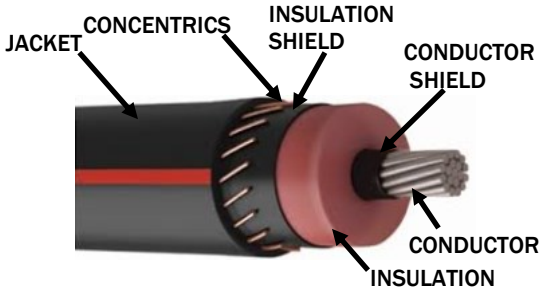
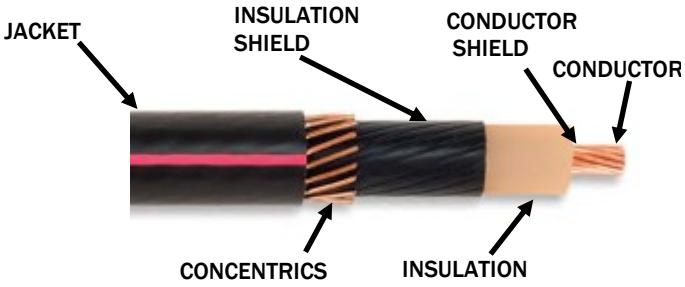
UNDERGROUND DISTRIBUTION CABLE (URD,UD) CONCENTRIC NEUTRAL
25kV ALUMINUM - 90°C Rating (UL)
CONDUCTOR - Solid or Class "B" Strand
CONDUCTOR SHIELD - Semiconducting layer
INSULATION - EPR rubber insulation
INSULATION SHIELD - Semiconducting Layer
CONCENTRICS - Neutrals as Specified Below
JACKET - 50 mil Over Concentric Wire, Insulating LLDPE W/3 Red Stripes



ALUMINUM CABLE PROPERTIES											
SINGLE PHASE CABLE WITH FULL NEUTRAL (25 KV) 260 MIL INSULATION THICKNESS									AMPACITY		
NES STOCK NUMBER	NES COMPATIBLE UNIT	SIZE (AWG/ KCMIL)	NO. OF STRANDS	COPPER NEUTRAL WIRES (NO. - AWG)	O.D. OVER INSULATION (INCHES)	O.D. OVER JACKET (INCHES)	CABLE WEIGHT (LBS./KFT)	FT / FULL REEL	DIRECT BURIAL (AMPS)	PVC CONDUIT (AMPS)	MIN. BENDING RADIUS
020542000	UCAL1	1	19	13-#14	0.93	1.23	775	4,000	200	145	15"
THREE PHASE INSTALLATIONS - SINGLE CABLE WITH 1/3 NEUTRAL (25 KV) 260 MIL INSULATION THICKNESS									AMPACITY		
020544030	UCAL1-3CP	1	19	13-#14	0.93	1.23	775	3-1,500	200	145	15"
020550030	UCAL40-3CP	4/0	19	11-#14	1.12	1.44	1,034	3-1,000	255	245	18"
020580000	UCAL500	500	37	25-#14	1.41	1.73	1,690	1,500	400	395	21"

UNDERGROUND DISTRIBUTION CABLE (URD,UD) CONCENTRIC NEUTRAL
25kV COPPER - 90°C Rating (UL)
CONDUCTOR - Solid or Class "B" Strand
CONDUCTOR SHIELD - Semiconducting layer
INSULATION - EPR rubber insulation
INSULATION SHIELD - Semiconducting Layer
CONCENTRICS - Neutrals as Specified Below
CABLE INFORMATION TABLE



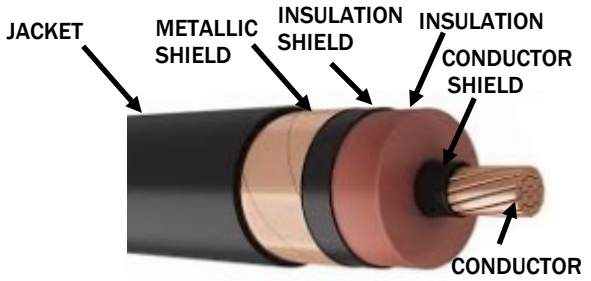
COPPER CABLE PROPERTIES											
THREE PHASE INSTALLATIONS - SINGLE CABLE WITH 1/3 NEUTRAL (25 KV) 260 MIL INSULATION THICKNESS									AMPACITY		
NES STOCK NUMBER	NES COMPATIBLE UNIT	SIZE (AWG/ KCMIL)	NO. OF STRANDS	COPPER NEUTRAL WIRES (NO. - AWG)	O.D. OVER INSULATION (INCHES)	O.D. OVER JACKET (INCHES)	CABLE WEIGHT (LBS./KFT)	FT / FULL REEL	DIRECT BURIAL (AMPS)	PVC CONDUIT (AMPS)	MIN. BENDING RADIUS
024020030	UCCU40-3CP	4/0	19	18-#14	1.12	1.45	1,582	3-1,000	325	310	18"
024040000	UCCU500	500	37	26-#12	1.41	1.77	3,014	1,500	490	485	22"
024050000	UCCU750	750	61	25-#10	1.60	2.02	4,288	1,200	575	565	25"

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

CABLE SPECIFICATIONS JACKETED CONCENTRIC NEUTRAL

POWER CABLE - TYPE MV-105 25kV SHIELDED SPS
CONDUCTOR - Class “B” Copper Strand
CONDUCTOR SHIELD - Semiconducting layer
INSULATION - EPR rubber insulation
INSULATION SHIELD - Semiconducting Layer
METALLIC SHIELD - 5 mil Copper Tape, 20% Overlap JACKET - PVC



COPPER CABLE PROPERTIES										
THREE PHASE INSTALLATIONS - SINGLE CABLE WITH TAPE SHIELD - NO NEUTRAL (25 KV) 260 MIL INSULATION THICKNESS								AMPACITY		
NES STOCK NUMBER	NES COMPATIBLE UNIT	SIZE (AWG/ KCMIL)	NO. OF STRANDS	O.D. OVER INSULATION (INCHES)	O.D. OVER JACKET (INCHES)	CABLE WEIGHT (LBS./KFT)	FT / FULL REEL	DIRECT BURIAL (AMPS)	PVC CONDUIT (AMPS)	MIN. BENDING RADIUS
024000000	UCCU750-1/C	750	61	1.61	1.99	4,288	1,000	575	565	24”

NOTE: A 500MCM CU neutral must be pulled into the same conduit with these cables when used on a grounded wye system. The copper tape shield is not rated for any sustained neutral current.

MINIMUM CABLE BENDING RADIUS TABLE				
FOR ALL PRIMARY CABLES THE MINIMUM BENDING RADIUS IS THE GREATER OF: 12 X SINGLE CONDUCTOR OUTSIDE DIAMETER 7 X MULTI-CONDUCTOR ASSEMBLED OUTSIDE DIAMETER				
NON-SHIELDED CABLE SEE TABLE BELOW SINGLE AND MULTIPLE CONDUCTOR-ALL VOLTAGES				
	600V	2KV	5KV	8 KV AND LARGER
THROUGH 500 KCMIL	3	3	4	6 X OUTSIDE DIAMETER
600-1750 KCMIL	4	4	5	7 X OUTSIDE DIAMETER
2000 KCMIL AND ABOVE	5	5	6	8 X OUTSIDE DIAMETER

During Installation
Cable should not be pulled with a radius less than that determined for the installed cable. Due to limitation of side bearing pressure, it is recommended that larger radius bends be used.

CABLE MAXIMUM PULLING TENSIONS

METHOD 1:

Maximum allowable tension when cable is installed by pulling directly on the conductors.

Tmax = 0.008 x N x CM
Where: n= number of cables
CM= conductor circular mils

CABLE SIZE	CM	N	Tmax (LBS)
#1 AL/CU	83,693	1	670
4/0 AL/CU	211,600	1	1,693
500 AL/CU	500,000	1	4,000
750 AL/CU	750,000	1	6,000

METHOD 2:

Pulling by attaching a Kellems grip over the jacketed and shielded cable the maximum tension allowable is 1000lbs.*

* Do not exceed the maximum cable tension listed above.

METHOD 3:

Maximum allowable tension due to side wall pressure when pulling through a radius.
TRmax = 675 x D1 x R
Where: D1= Diameter of one cable in inches
R= Radius of bend in feet

CABLE SIZE	D1 (IN)	R (FT)	TRmax (LBS)
#1AL/CU	1.23	2	1,661**
4/0 AL/CU	1.44	2	1,944**
500 AL/CU	1.77	3	3,584
750 CU[NOTE 1]	1.99	3	4,030
750 CU[NOTE 2]	2.02	3	4,091

**Do not exceed the maximum cable tensions from method one or two.

STANDARD CONDUIT DIAMETER PER CABLE

CABLE SIZE	QTY.	SINGLE CABLE DIA.	CALCULATED DIAMETER	MINIMUM CONDUIT	NES STANDARD
ALUMINUM			(IN)		
#1AL	1	1.23	1.73	2	2.5
#1AL	2	1.23	2.96	3	3
#1AL	3	1.23	3.15	4	4
4/0AL	3	1.44	3.60	4	5
500AL	3	1.73	4.23	5	5
COPPER			(IN)		
4/0CU	3	1.45	3.62	4	5
500CU	3	1.77	4.31	5	6
750 CU[NOTE 1]	3	2.02	4.85	6	6
750 CU[NOTE 2]	3	1.99	4.78	5	6

NOTES

1. Table values are for 25 kV cable with concentric neutral jacketed cables except as noted.
2. Indicates 25 kV power cable with tape shield used in high fault current applications with separate neutral conductor.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

CABLE IN DUCT PULLING METHODS

STANDARD CABLE INSTALLATION LENGTHS

SINGLE PHASE INSTALLATION PER DUCT

Installation conditions used to determine the maximum pull distance:

1. Single phase run from a pad to a riser pole.
2. Pull rope is attached to the cable or a Kellems grip.
3. Two large radius 90˚ bends, no sweeps and no change in elevation from riser to pad.
4. Pay-off reel is located at the pad and applies 100 lbs of tension to the cable.
5. Conduit is in average condition with moderate contamination and the cable is well lubricated.

CABLE SIZE	RISER HT. (FT)	TENSION (LBS)	MAXIMUM PULL / CONDUIT LENGTH	CABLE / REEL	FEET / REEL
#1AL	30	665	500	1	4,000

TWO PHASE INSTALLATION PER DUCT

Installation conditions used to determine the maximum pull distance:

1. Two phase run from a pad to a riser pole.
2. Pull rope is attached to each cable. NO KELLEMS GRIPS.
3. Two large radius 90˚ bends, no sweeps and no change in elevation from riser to pad.
4. Pay-off reel is located at the pad and applies 100 lbs of tension to the cable.
5. Conduit is in average condition with moderate contamination and the cable is well lubricated.

CABLE SIZE	RISER HT. (FT)	TENSION (LBS)	MAXIMUM PULL / CONDUIT LENGTH	CABLE / REEL	FEET / REEL
#1AL	30	1,330	800	2	4,000

Installation conditions used to determine the maximum pull distance:

1. Three phase run from a pad to a riser pole.
2. Pull rope is attached to each cable. NO KELLEMS GRIPS.
3. Two large radius 90˚ bends, no sweeps and no change in elevation from riser to pad.
4. Pay-off reel is located at the pad and applies 100 lbs. of tension to the cable.
5. Conduit is in average condition with moderate contamination and the cable is well lubricated.

THREE PHASE INSTALLATION PER DUCT

CABLE SIZE	RISER HT. (FT)	TENSION (LBS)	MAXIMUM PULL / CONDUIT LENGTH	CABLE / REEL	FEET / REEL
#1AL	30	1,995	900	1	1,500
4/0AL	30	4,970	1,800	1	1,000
500AL	30	10,300	2,500	3	1,500
4/0CU	30	4,750	1,100	1	1,000
500CU	30	10,400	1,400	3	1,500
750CU	30	11,670	1,100	3	1,200

NOTES

1. Pulling distance limits are based on conditions anticipated at the time of cable replacement. Cables installed in new ducts may be pulled much farther. I**t is critical to establish limits that anticipate the conditions expected to be encountered during future maintenance.**
2. Severe conduit contamination will significantly increase the pulling tensions. It is necessary therefore to remove the sections of conduit contaminated by dirt when repairing damage from a dig-in.
3. Unecessary sweeps and abrupt elevation changes in conduits should be avoided. Keep conduit layouts as straight as possible to avoid increase cable tension. See Appendix A - Cable Pulling section to determine increased tension impact for sweeps per conductors.
4. Distances may be limited by pull rope strength and the amount of cable on a reel.
5. Large radius = 24” for conduits up to 4” in diameter and 36” for 5” and 6” conduits.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

CABLE IN DUCT
STANDARD PULLING DISTANCE

One Single Conductor Cable per Conduit (in Ducts)

Fig. 1

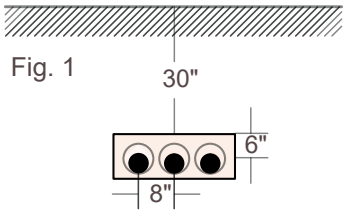


Fig. 2

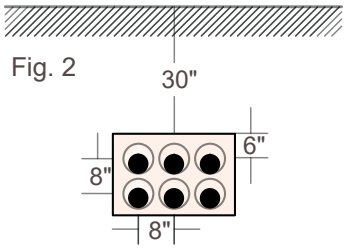
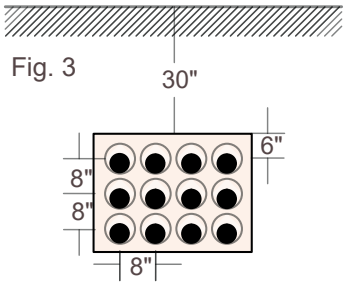
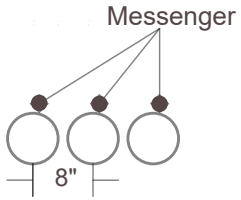


Fig. 3



Single Conductor Installations in Air

Fig. 11



ALUMINUM CONDUCTORS											
SINGLE CABLE IN DUCT PER LOAD FACTOR										IN AIR	
CONDUCTOR SIZE (AWG/ KCMIL)	1 CIRCUIT FIG. 1 LOAD FACTOR			2 CIRCUITS FIG. 2 LOAD FACTOR			4 CIRCUITS FIG. 3 LOAD FACTOR			FIG. 11 INDOOR	FIG. 11 OUTDOOR
	50	75	100	50	75	100	50	75	100		
1	185	173	161	173	156	141	155	134	115	184	228
4/0	317	295	272	294	262	233	260	220	188	324	403
500	527	484	442	483	424	372	419	350	296	558	687

COPPER CONDUCTORS											
SINGLE CABLE IN DUCT PER LOAD FACTOR										IN AIR	
CONDUCTOR SIZE (AWG/ KCMIL)	1 CIRCUIT FIG. 1 LOAD FACTOR			2 CIRCUITS FIG. 2 LOAD FACTOR			4 CIRCUITS FIG. 3 LOAD FACTOR			FIG. 11 INDOOR	FIG. 11 OUTDOOR
	50	75	100	50	75	100	50	75	100		
4/0	409	380	350	379	338	300	335	284	243	417	509
500	676	621	566	619	543	477	538	448	380	712	863
750	849	775	703	773	674	588	667	552	464	907	1,082

Assumptions:
Ambient Temperature 20°C
Conductor Temperature 90°C
Earth RHO 90°C - cm/watt
Concrete RHO 85°C - cm/watt
Duct RHO 600°C - cm/watt
No Sheath Losses (Single point grounding)
5 Inch Duct
* NOTE: Cable surface temperature limit may reduce conductor operating temperature No Sheath Losses (Single point grounding)

NOTES

1. Tables are based on Non-metallic conduit(s).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

CABLE AMPACITY SINGLE CONDUCTOR PER DUCT

Three Single Conductor Cables Paralleled/Triplexed per Conduit (in Ducts)

Fig. 4

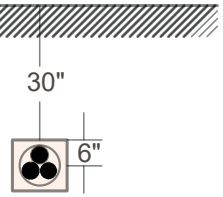


Fig. 5

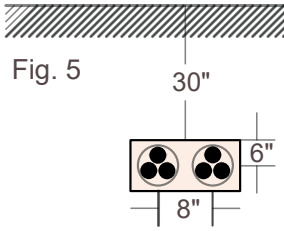
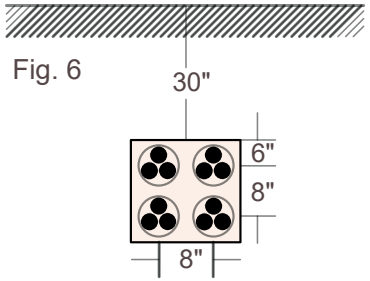
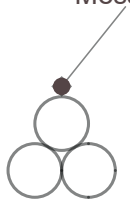


Fig. 6



Three Conductor Installations in Air

Fig. 12 Messenger



ALUMINUM CONDUCTORS											
CONDUCTOR SIZE (AWG/ KCMIL)	SINGLE CABLE IN DUCT PER LOAD FACTOR									IN AIR	
	1 CIRCUIT FIG. 4 LOAD FACTOR			2 CIRCUITS FIG. 5 LOAD FACTOR			4 CIRCUITS FIG. 6 LOAD FACTOR				
	50	75	100	50	75	100	50	75	100	FIG. 12 INDOOR	FIG. 12 OUTDOOR
1	153	145	137	146	135	123	134	119	105	157	197
4/0	260	245	229	246	225	204	224	196	171	276	344
500	428	400	371	402	363	326	361	311	269	472	581

COPPER CONDUCTORS											
CONDUCTOR SIZE (AWG/ KCMIL)	SINGLE CABLE IN DUCT PER LOAD FACTOR									IN AIR	
	1 CIRCUIT FIG. 4 LOAD FACTOR			2 CIRCUITS FIG. 5 LOAD FACTOR			4 CIRCUITS FIG. 6 LOAD FACTOR				
	50	75	100	50	75	100	50	75	100	FIG. 12 INDOOR	FIG. 12 OUTDOOR
4/0	337	317	297	319	291	264	290	253	221	358	439
500	549	513	475	516	465	417	463	398	344	605	735
750	680	633	584	636	571	510	568	485	418	760	905

NOTES

1. Load Factor is the percentage of time, per 24 hour period, that the cable experiences load.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

PRIMARY CABLE

NES

CABLE AMPACITY THREE CONDUCTOR PER DUCT

MAXIMUM LOADING PER SYSTEM VOLTAGE (KVA)									
THREE PHASE INSTALLATIONS kVA= 1.73 * I * kV									
VOLTAGE (KV) 23.9 13.8 4	23.9			13.8			4.16		
LOAD FACTOR									
WIRE SIZE	50%	75%	100%	50%	75%	100%	50%	75%	100%
1AL	6,326	5,995	5,665	3,653	3,462	3,271	1,059	1,003	948
4/0AL	10,750	10,130	9,468	6,207	5,849	5,467	1,799	1,695	1,585
500AL	17,697	16,539	15,340	10,218	9,550	8,857	2,962	2,768	2,567
4/0CU	13,934	3,107	12,280	8,046	7,568	7,091	2,332	2,194	2,055
500CU	22,700	21,211	19,640	13,107	12,247	11,340	3,799	3,550	3,287
750CU	28,116	26,173	24,147	16,234	15,112	13,942	4,706	4,380	4,041
SINGLE PHASE INSTALLATIONS kVA = I* kV									
Voltage	13.8kV			7.96kV			2.4kV		
LOAD FACTOR									
Wire Size	50%	75%	100%	50%	75%	100%	50%	75%	100%
1Al	2,553*	2,387*	2,222*	1,473*	1,377*	1,282*	740*	692*	644*

NOTES

This table is based on the following conditions.
1. Three phase kVA is based on the amperages listed on Figure 4 on the previous page.
2. Single phase kVA is based on the amperages listed on Figure 1 on the previous page.

Do not use this table for any other cable configuration:

Reduce three phase kVA by 50% if phases are separated in metal conduits.

***Single phase sidelines must not exceed 500kVA connected. This is limited by the maximum circuit un-balanced load settings at the substation. The numbers in the table above only reflect the cable's limits based on the conditions listed on the previous page.**

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE LOADING PER SYSTEM VOLTAGE

MOVEMENT, STORAGE AND HANDLING OF CABLE

Movement of Reels of Cable

1. Reels of cable must not be dropped from any height, particularly from trucks or other transporting equipment.
2. Lift reels using following methods:
   a. Crane or boom type equipment—insert shaft (heavy rod or pipe) through reel hubs and lift with slings on shaft, preferably utilizing spreader or yoke to reduce or avoid sling pressure against reel flange
   b. (Fork lift type of equipment may be used to move smaller, narrower width reels. Fork tines should be placed so that lift pressure is on reel flange not on cable, and must reach all the way across reels so lift is against both reel flanges.
3. Reels may be moved short distances by rolling. Reels should be rolled in the direction indicated by arrows painted on reel flanges. Surfaces over which the reels are to be rolled should be firm, clear of debris, and also clear of protruding stones, humps, etc. which might damage the cable if the reel straddled them.

Storage of Reels of Cable

1. Cable ends are sealed prior to shipment. If factory seals are removed or damaged, new tape seals must be applied to prevent moisture entry into cable. Strip cable finishes back 2”, down to insulation for braided or non-jacketed constructions.Then apply four layers of an insulating tape, criss-cross over the cable end and carry back at least 4” onto cable outer finish. Add a containing cover of two layers of vinyl electrical tape completely over the end seal. Cold shrink covers may also be used.
2. Whenever possible, the factory applied lagging (protective cover) should be left in place. Additional covering such as tarpaulin, plastic sheeting, etc., may be used if cable is to be stored for long periods outdoors or in excessively dirty, dusty areas.
3. Store reels of cable on a firm surface, paved if possible, or on planking to prevent settling into soft ground.
4. The storage areas should have good drainage.
5. Use fencing or other barriers to protect cables and reels against damage by vehicles or other equipment moving about in the storage area.

Handling During Installation

1. Cold weather handling and pulling-in of cable can be more difficult, depending on the cable construction and installation location. Cold-induced stiffness of cable must be considered along with radius and number of bends in the proposed installation run.

In general most cables can be safely handled without damage if not subjected to temperature lower than 10°F (-12°C) in the 24 hour period proceeding pulling and bending. If it is anticipated that store temperatures will be below this level during the 24-hour pre-pull period, arrangements should be made to move the reel, avoiding impact, to a warmer area. If no indoor warming area is available, a plastic sheeting-covered shelter may be constructed and heated. The reel should be held in the warm storage area at a tempera-ture of at least 60°F (16°C) for 24 hours to ensure total warmup. Apply pulling eyes or grips while cable is in the warming area, prior to movement outdoors or uncovering. If these instructions cannot be followed, please consult manufacturer regarding the particular situation and cable involved.

2. Always determine the safe maximum pulling tension of the cable and compare this to the tension required for the particular run configuration being considered.
3. Always determine that ducts and conduits are clear of obstructions and properly sized. After swabbing or brushing, a sizing mandrel should be pulled through to ensure the cables will fit without jamming.
4. Attachment to the cable can be accomplished with any of the commercially available devices (Kellems grips, Greenlee wire grip, etc.) or by field or factory-made pulling eyes. The choice may depend on the tension requirements, especially when long runs or runs with several bends are to be made. If the pull is through wet or damp locations, the cable ends must be positively sealed to prevent moisture entry, and resealed after pulling.
5. Cable end seals may be disrupted during the pulling operations and therefore should be checked and replaced if the cables are not going to be spliced or terminated right after pull-in. This is especially important for underground runs where cable ends may be left in manholes which are subject to flooding.

CABLE ATTACHMENT

APPROVALS

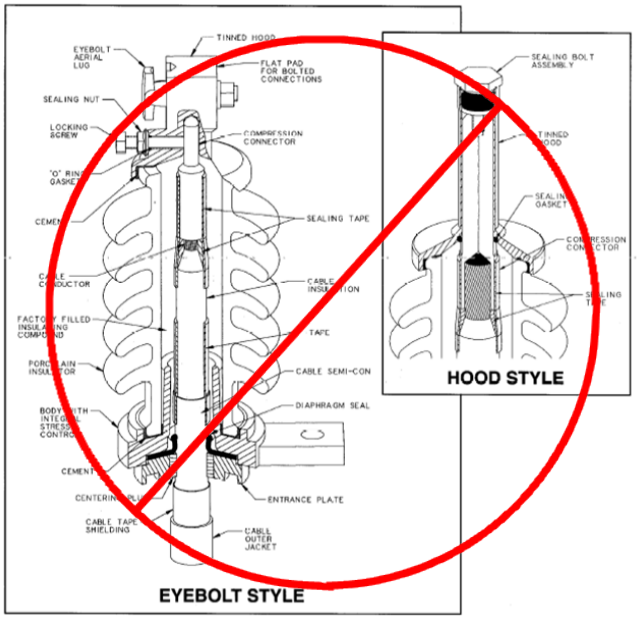
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

TABLE OF CONTENTS

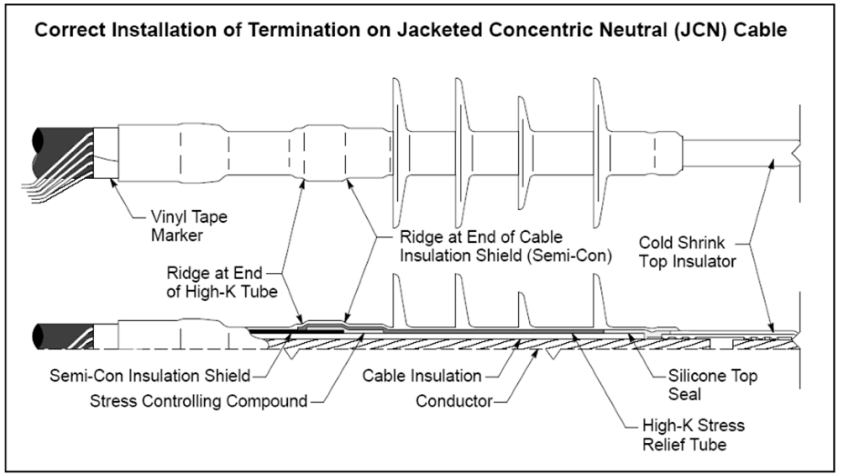
CAUTION NOTE:

THE INSULATING COMPOUND INSIDE OF CERAMIC CABLE TERMINATIONS CAN LEAK OUT OVER TIME. THESE SHOULD BE IMMEDIATELY REPLACED IF THE CABLE BELOW THE TERMINATION APPEARS TO HAVE A BUILDUP OF CONTAMINATION.

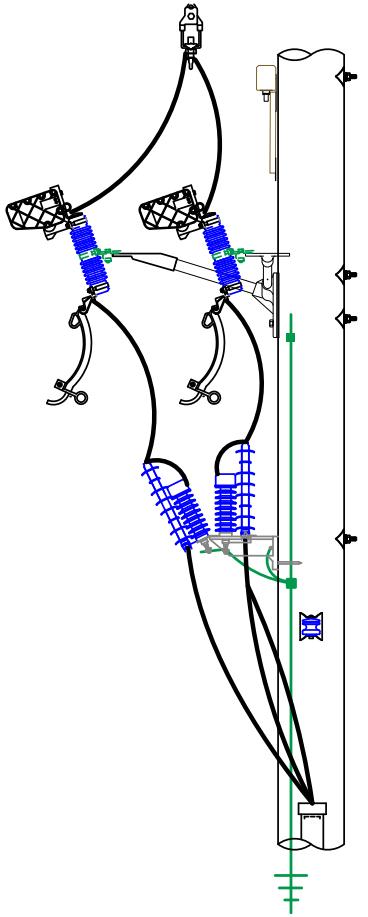
CERAMIC TERMINATORS ARE REPLACEMENT ITEM(S) DURING SCHEDULED OUTAGES.



CERAMIC CABLE TERMINATION
NOTE 4



SILICON RUBBER CABLE TERMINATION



NOTES
1. These devices are referred to as “cable terminators”. They are used at the riser pole to make the transition from a rubber insulated cable to an air insulated wire.
2. These should not be used inside of live front equipment. (See stress terminations on the following page.)
3. Refer to the manufacturers instructions for the proper stripping distances and other installation tips.
4. Ceramic Terminators replacement requires a scheduled outage.

CABLE TERMINATIONS

MATERIAL LIST

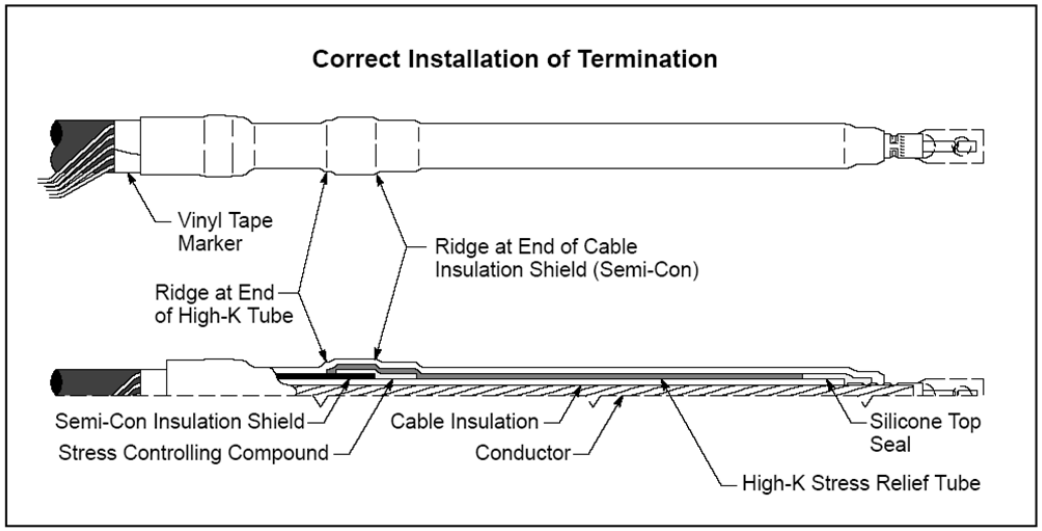
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UCN-CTRM1	402678000	UG CONNECTOR, CABLE TERMINATOR, #1	1	EA
UCN-CTRM40	402680000	UG CONNECTOR, CABLE TERMINATOR, 4/0	1	EA
UCN-CTRM500	402700000	UG CONNECTOR, CABLE TERMINATOR, 500MCM	1	EA
UCN-CTRM750	402700000	UG CONNECTOR, CABLE TERMINATOR, 750MCM	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY RISER POLE
25KV CABLE TERMINATIONS

CABLE ATTACHMENT



SILICON RUBBER CABLE TERMINATION

LIVE-FRONT EQUIPMENT

STRESS TERMINATOR

CABLE TERMINATIONS				
MATERIAL LIST				
CU CODE	**STOCK #**	**DESCRIPTION**	**QUANTITY**	**UNIT**
UCN-STRM1-40	403830000	UG CONNECTOR, STRESS TERMINATOR, #1-4/0	1	EA
UCN-STRM750	403850000	UG CONNECTOR, STRESS TERM. 500-750MCM	1	EA

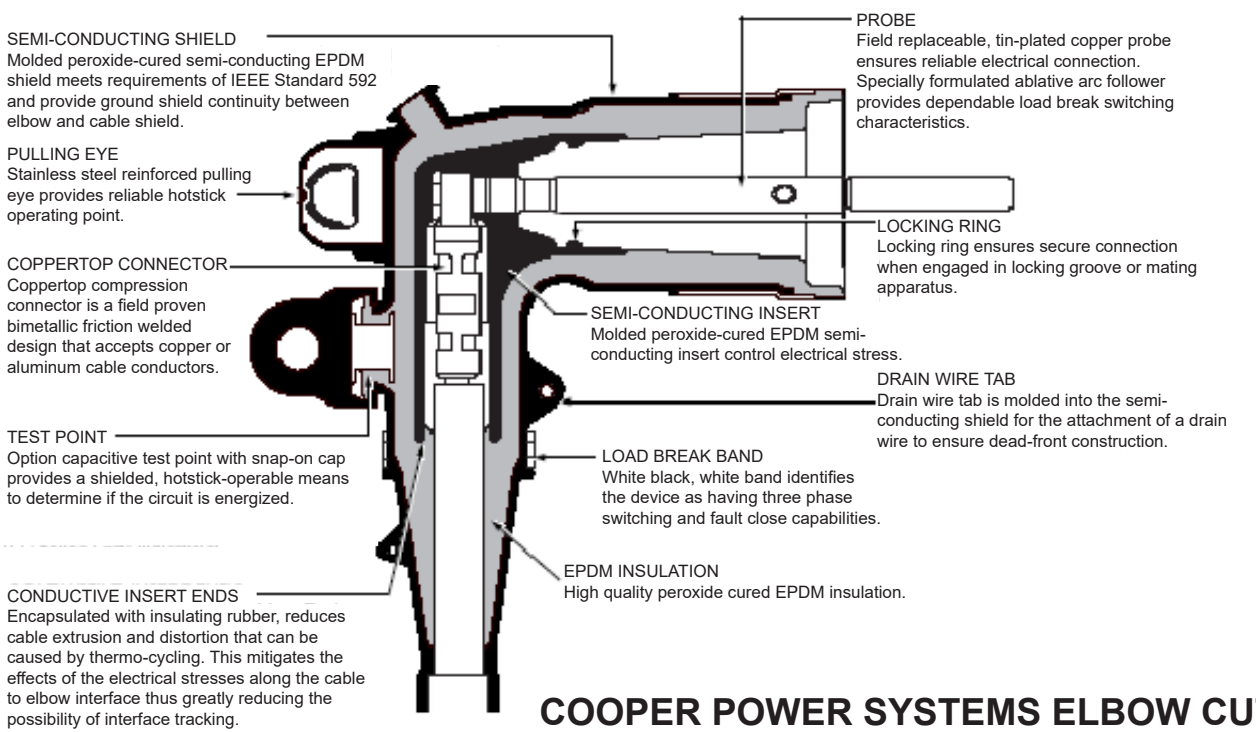
NOTES

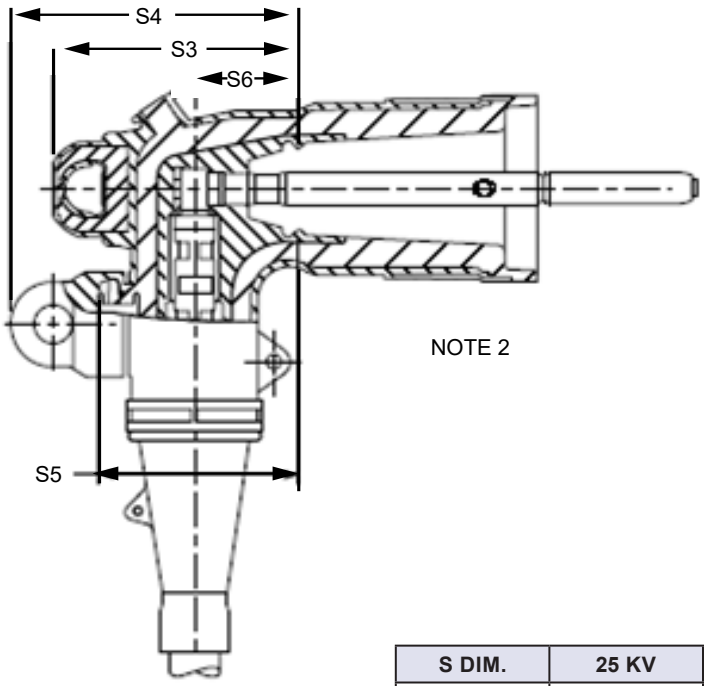
1. This type of cable end is referred to as a “stress terminator”. It is used inside live front equipment.
2. Not to be used on riser poles or outdoor installations
3. Refer to the manufacturers instructions for the proper stripping distances and other installation tips.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY LIVE-FRONT 25KV CABLE TERMINATIONS





S DIM.	25 KV
S3	2.9"
S4	4.6"
55	3.2"
S6	1.7"

COOPER POWER SYSTEMS ELBOW CUTAWAY

CABLE TERMINATIONS				
MATERIAL LIST				
CU CODE	**STOCK #**	**DESCRIPTION**	**QUANTITY**	**UNIT**
UELBC-1	400396000	ELBOW CONN,#1AL/CU 200A 25KV	1	EA
	400318000	CABLE SEALING KIT #1 - 4/0	1	EA
UELBC-4/0	400400000	ELBOW CONN, 4/0 AL/CU 25KV 200A	1	EA
	400318200	CABLE SEALING KIT 1/0 - 750	1	EA
UELBC-4/0CU	400412000	ELBOW CONN,4/0 CU 25KV 200A	1	EA
	400318200	CABLE SEALING KIT 1/0 - 750	1	EA

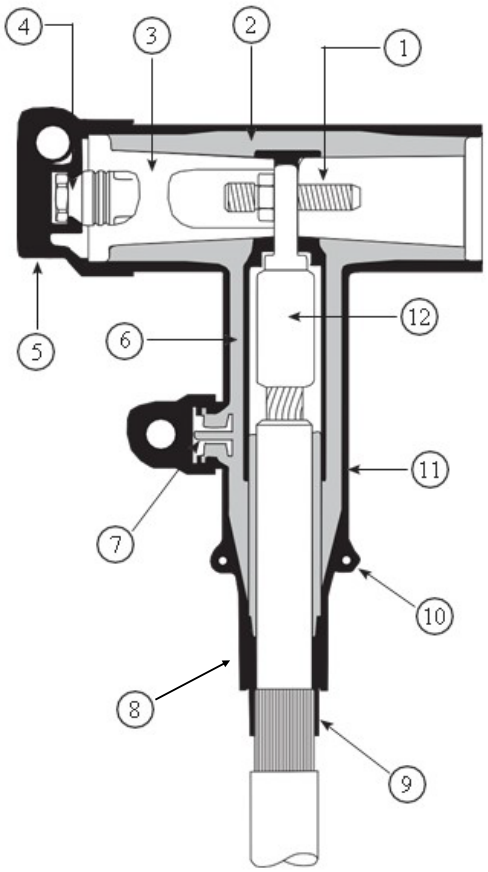
NOTES

1. CAUTION: The cable stripping distances vary slightly between different manufacturer's elbows. Refer to the manufacturer's instructions for the correct installation procedures.
2. Elbow profile and stacking dimensions as referenced in IEEE Standard 386™. Note: Dimesnions given are for reference only.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY DEAD-FRONT ELBOW (200A) LOAD BREAK 25KV CABLE TERMINATIONS



1. Clamping Screw
Tin plated copper screw secures the conductor contact to the bushing.

2. Insulation
Molded EPDM insulating rubber.

3. Basic Insulating Plug
Molded epoxy part has a threaded metal insert to accept the clamping screw.

4. Capacitive Test Point
Capacitive test point provides means to check the circuit status.

5. Rubber Cap
Molded EPDM rubber protects and earths the test point during normal operation.

6. Internal Screen
EPDM conducting rubber screen controls electrical stress.

7. Optional Capacitive Test Point
Provides placement for fault indicators.

8. Stress Relief
The configuration of the outer screen and the cable adapter provide stress relief.

9. Cable Adapter
Maintains a watertight seal and provides the initial cable stress relief.

10. Earthing Eyes
Molded into the external screen for connection of an earthing wire.

11. External Screen
Molded EPDM conducting rubber mates with the cable screen to maintain continuity and ensure that the assembly is at ground potential

12. Conductor Contact
Inertia welded bimetallic compression connector accepts copper or aluminum conductors.

COOPER POWER SYSTEMS 600A, 900A ELBOW

CABLE TERMINATIONS				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UELBC-1-6	400414700	ELBOW CONN, NLB #1 AL/CU 25KV 600A	1	EA
	400318000	CABLE SEALING KIT #1 - 4/0	1	EA
UELBC-4/0-6	400415000	ELBOW CONN, NLB 4/0 AL/CU 25KV 600A	1	EA
	400318000	CABLE SEALING KIT #1 - 4/0	1	EA
UELBC-500-6	400416000	ELBOW CONN, NLB 500 AL/CU 25KV 600A	1	EA
	400318200	CABLE SEALING KIT 1/0 - 750	1	EA
UELBC-750-6	400418000	ELBOW CONN, NLB 750 AL/CU 25KV 600A	1	EA
	400318200	CABLE SEALING KIT 1/0 - 750	1	EA
UELBC-4/0-9	400419400	ELBOW CONN, NLB 4/0 AL/CU 25KV 900A	1	EA
	400318000	CABLE SEALING KIT #1 - 4/0	1	EA
UELBC-500-9	400419500	ELBOW CONN, NLB 500 AL/CU 25KV 900A	1	EA
	400318200	CABLE SEALING KIT 1/0 - 750	1	EA
UELBC-CP	400417000	ELBOW CONNECTOR PLUG 25KV 600A	1	EA
UELBC-CPC	400419990	ELBOW CONNECTOR PLUG 25KV 900A	1	EA

NOTES

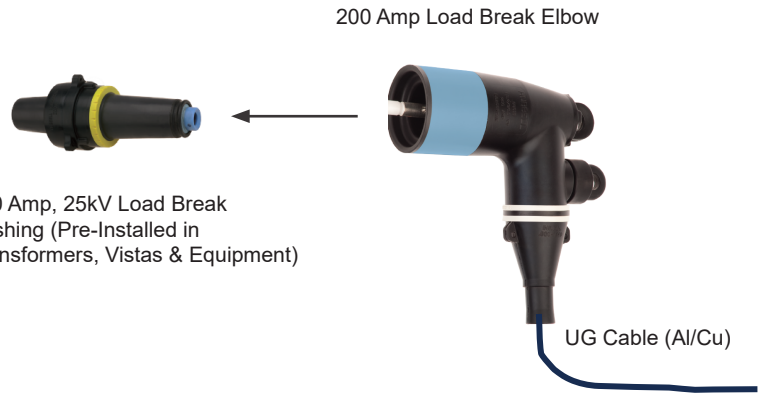
1. Elbow Connector plug is needed for stacking (2) elbows together.
2. 600Amp Elbows can be mounted on 900 Amp Vista Switch Bushings.
3. When stacking elbows, DO NOT mix and match different styles of elbows or cable sizes.
4. When stacking elbows, DO NOT parallel loads. Use serial loop feeds only.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE ATTACHMENT

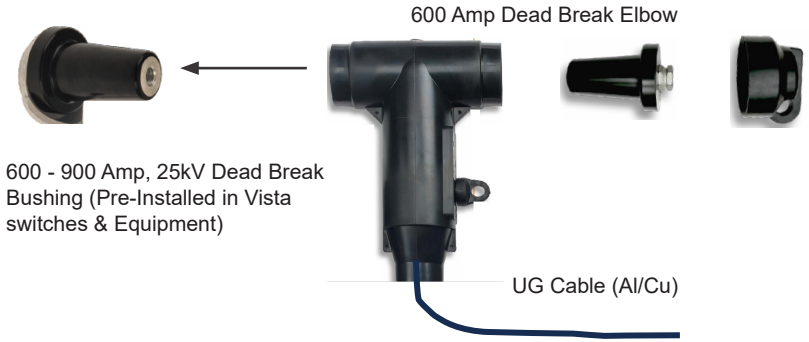
NES

PRIMARY DEAD-FRONT ELBOW (600-900A) DEAD BREAK 25KV CABLE TERMINATIONS



200 Amp Equipment Bushing <—> 200 Amp Elbow Connection

CU CODE	STOCK #	DESCRIPTION	QUANTITY	CABLE TYPE	MAX. (AMPS)	AMPS LIMITIED BY
UELBC-1	400396000	#1AL/CU 200A 25KV W/ SEAL KIT	1	ALUMINUM	145	CABLE
UELBC-4/0	400400000	4/0 AL/CU 25KV200A W/ SEAL KIT	1	ALUMINUM	200	BUSHING / ELBOW
UELBC-4/0CU	400412000	4/0 CU 25KV 200A W/ SEAL KIT	1	COPPER	200	BUSHING / ELBOW



600-900 Amp Equipment Bushing <—> 600 Amp Elbow Connection

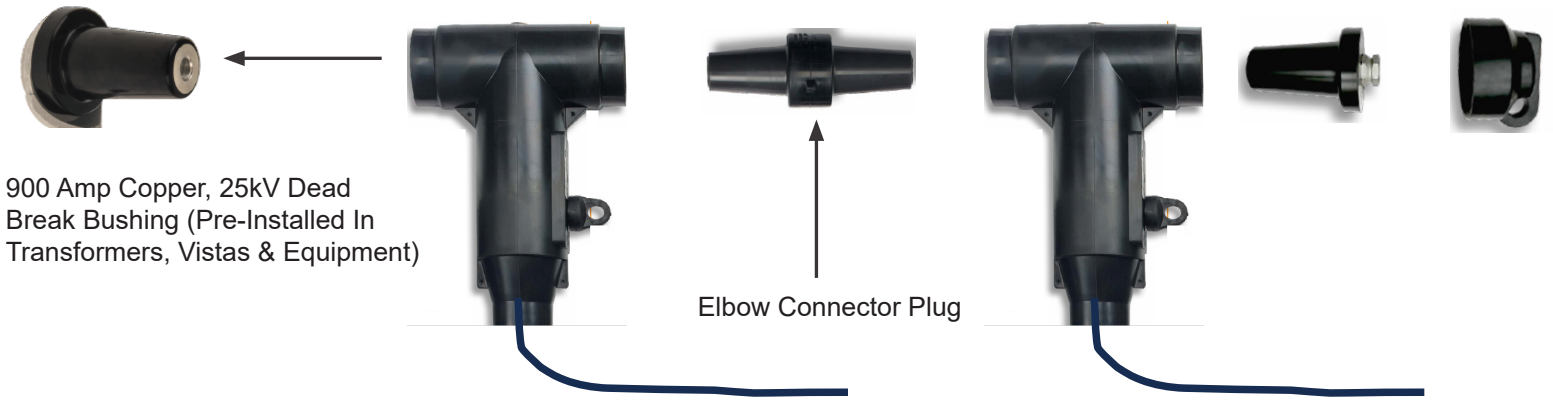
CU CODE	STOCK #	DESCRIPTION	QUANTITY	CABLE TYPE	MAX. (AMPS)	AMPS LIMITIED BY
UELBC-1-6	400414700	#1 AL/CU 25KV 600A W/ SEAL KIT	1	ALUMINUM	145	CABLE
UELBC-4/0-6	400415000	4/0 AL/CU 25KV 600A W/ SEAL KIT	1	ALUMINUM	245	CABLE
				COPPER	317	CABLE
UELBC-500-6	400416000	500 AL/CU 25KV600A W/ SEAL KIT	1	ALUMINUM	400	CABLE
				COPPER	513	CABLE
UELBC-750-6	400418000	750 AL/CU 25KV600A W/ SEAL KIT	1	COPPER	600	BUSHING / ELBOW
UELBC-CP	400417000	ELBOW CONNECTOR PLUG 25KV 600A	1	-----	600	BUSHING / ELBOW

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

200-600 AMP BUSHINGS & ELBOWS INSTALLATION DETAILS

900 Amp Equipment Bushing <—> 900 Amp Elbow Connection



900 Amp Dead Break Elbow - Connection Stack

NOTES

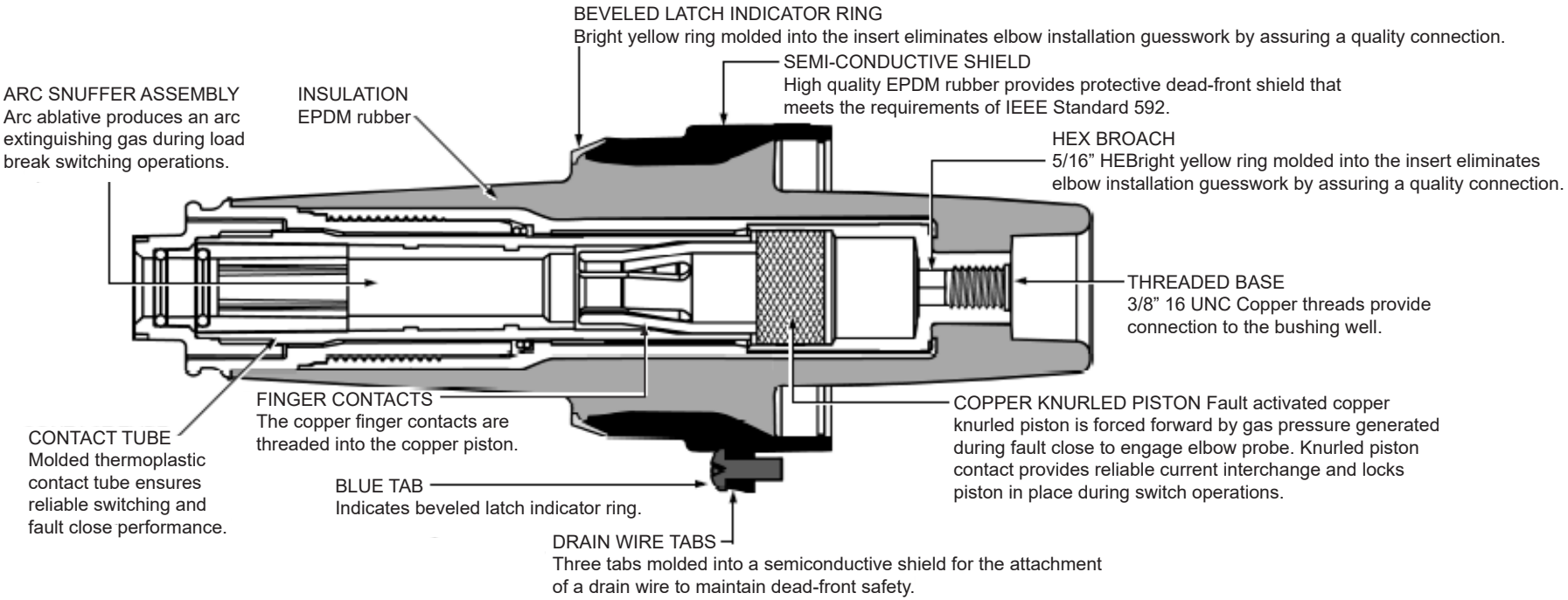
1. 600 Amp elbow / cable combinations can be used on 900 Amp equipment bushings up to 600 Amps max.
2. Do not mix different size cables in one stack.
3. Do not feed different parallel loads from (1) cable stack.

CU CODE	STOCK #	DESCRIPTION	QUANTITY	CABLE TYPE	MAX. (AMPS)	AMPS LIMITIED BY
UELBC-4/0-9	400419400	4/0 AL/CU 25KV 900A W/ SEAL KIT	2	COPPER	635	CABLE
UELBC-500-9	400419500	500 AL/CU 25KV 900A W/ SEAL KIT	2	ALUMINUM	800	CABLE
			2	COPPER	900	BUSHING / ELBOW
UELBC-CPC	400419990	ELBOW CONNECTOR PLUG 25KV 900A	1	----	900	BUSHING / ELBOW

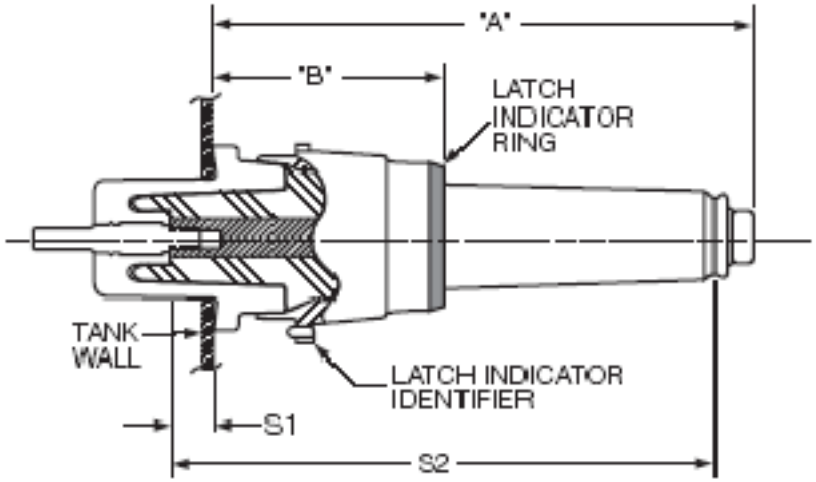
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

900 AMP BUSHINGS & ELBOWS INSTALLATION DETAILS



COOPER POWER SYSTEMS BUSHING INSERT CUTAWAY



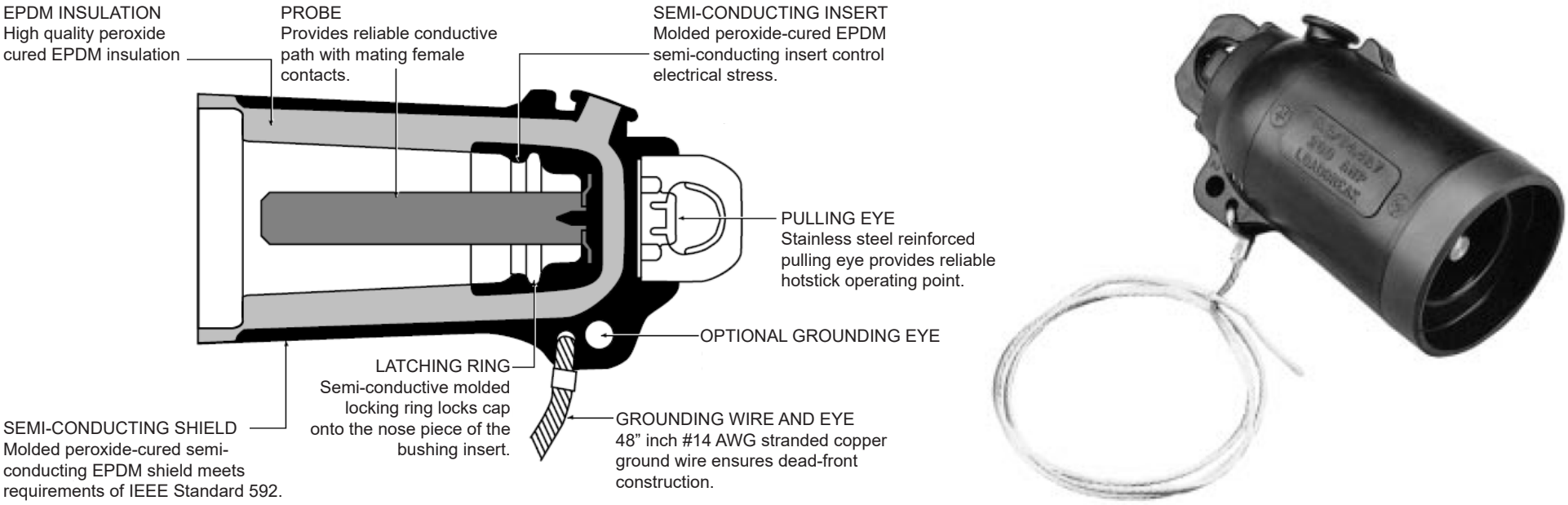
CABLE TERMINATIONS				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UBINS200A	401073000	BUSHING INSERT 200A 25KV	1	EA
UBINS600A	041071050	BUSHING INSERT 600A 25KV	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE ATTACHMENT

NES

PRIMARY DEAD-FRONT (200-600A) EQUIPMENT 25KV BUSHING INSERT



COOPER POWER SYSTEMS INSULATING CAP CUTAWAY

CABLE TERMINATIONS				
MATERIAL LIST				
CU CODE	**STOCK #**	**DESCRIPTION**	**QUANTITY**	**UNIT**
UBINSCAP200A	401344000	UG BUSHING INSERT INSULATING CAP 25kV, 200A	1	EA
UBINSCAP600A	401034100	UG BUSHING INSERT INSULATING CAP 25kV, 600-900A	1	EA

NOTES

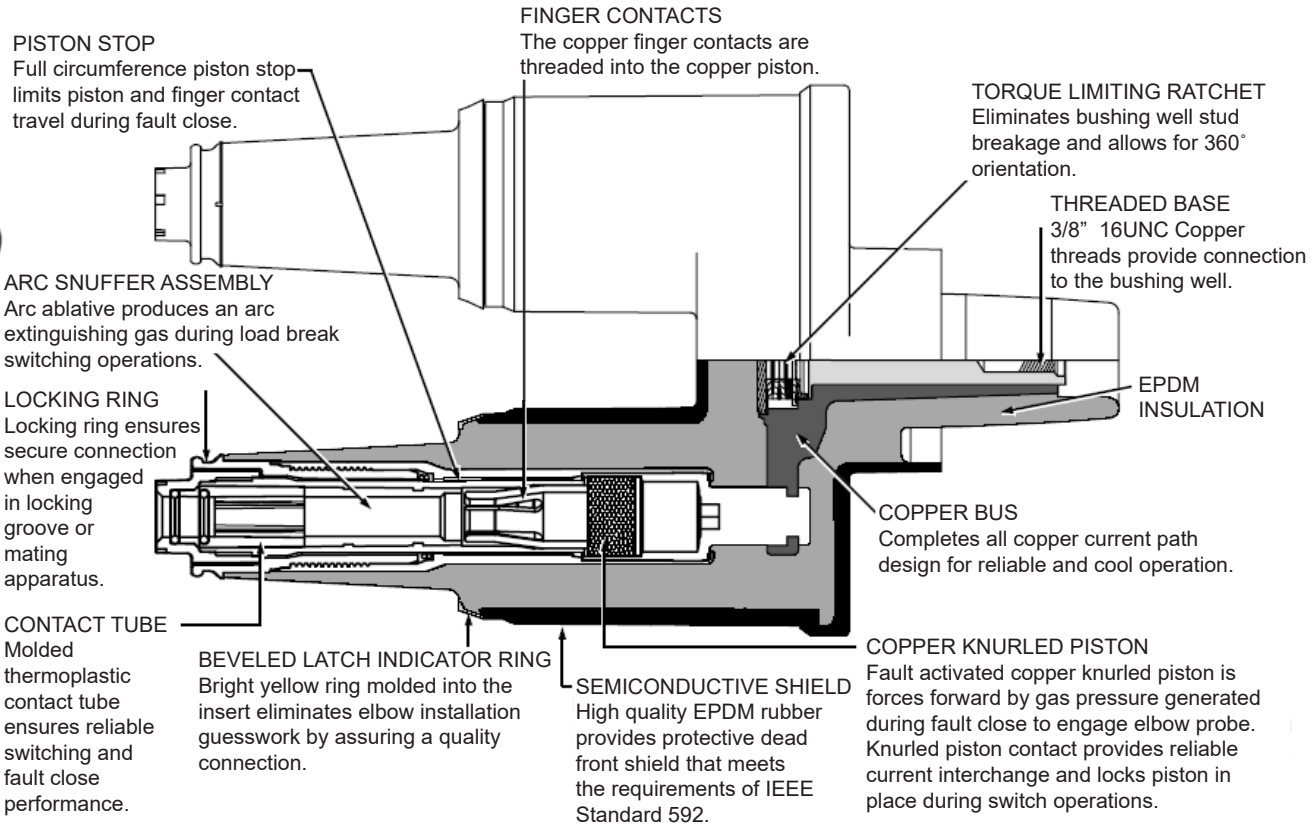
1. This device must be installed on any unused bushing insert such as in termination cabinets when all the poles are not needed. Never leave a live bushing insert uncovered.
2. Not to be used on dead-end transformer in place of arrester.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY DEAD-FRONT (200-900A) EQUIPMENT 25KV INSULATING CAP

CABLE ATTACHMENT



COOPER POWER SYSTEMS FEED THROUGH BUSHING INSERT CUTAWAY

NOTES

1. This device provides a convenient method to send a single phase circuit in two directions without having to install a terminating cabinet.
2. This device is only used in dead front single phase transformers.
3. The standard bushing insert is removed and the feed through insert is installed.

CABLE TERMINATIONS

MATERIAL LIST

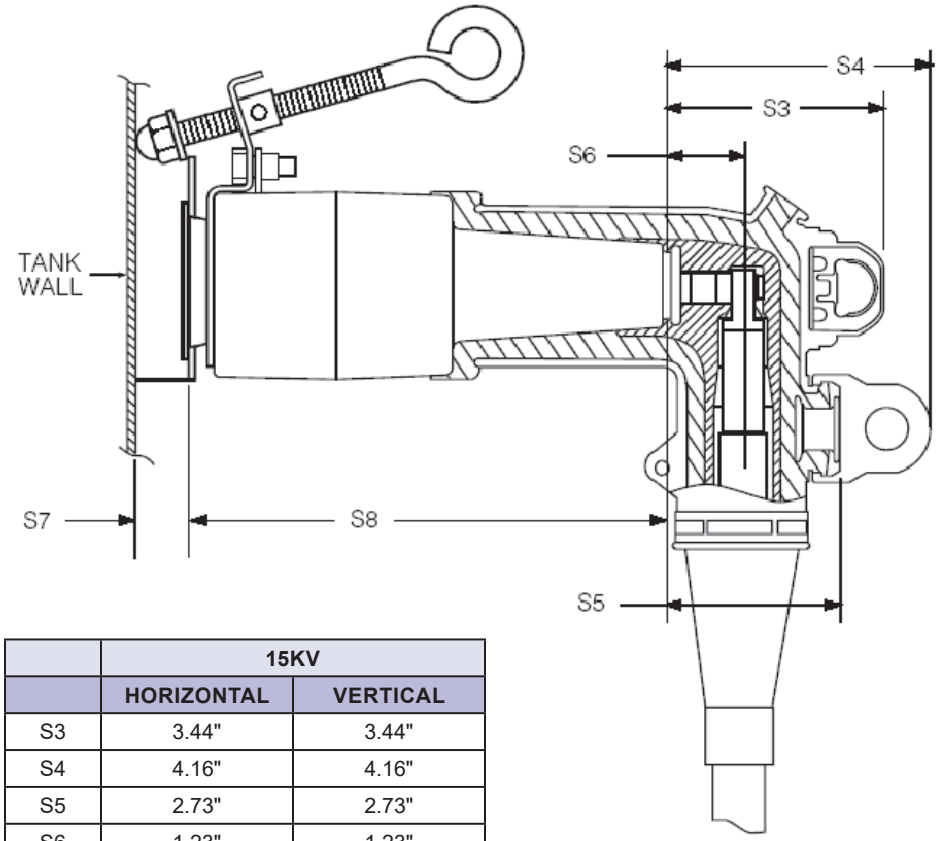
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UBINS200A-F	401072000	BUSHING INSERT FEED-THROUGH 200A 25KV	1	EA

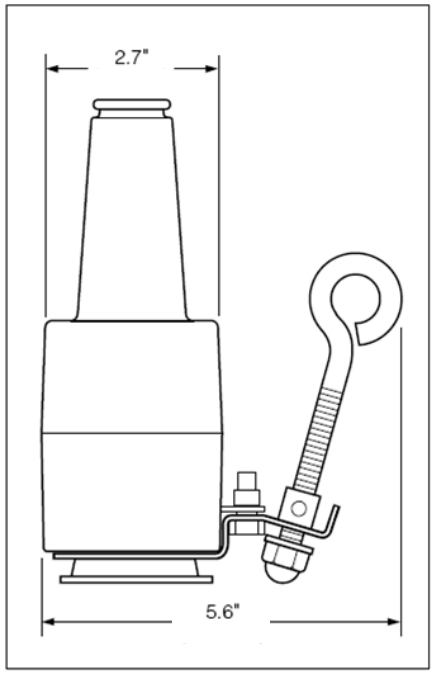
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE ATTACHMENT

NES

PRIMARY DEAD-FRONT (200A) STANDOFF W/ INSERT 25KV FEED-THRU BUSHING





NOT A DESIGN ITEM
USED IN CABLE RESTORATION
OPERATIONS

	15KV	
	HORIZONTAL	VERTICAL
S3	3.44"	3.44"
S4	4.16"	4.16"
S5	2.73"	2.73"
S6	1.23"	1.23"
S7	0.75"	0.75"
S8	7.07"	7.20"

CABLE TERMINATIONS				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
USTAOFF-FDHR	401078000	BUSHING STANDOFF FEED THROUGH 200A 25KV	1	EA

NOTES

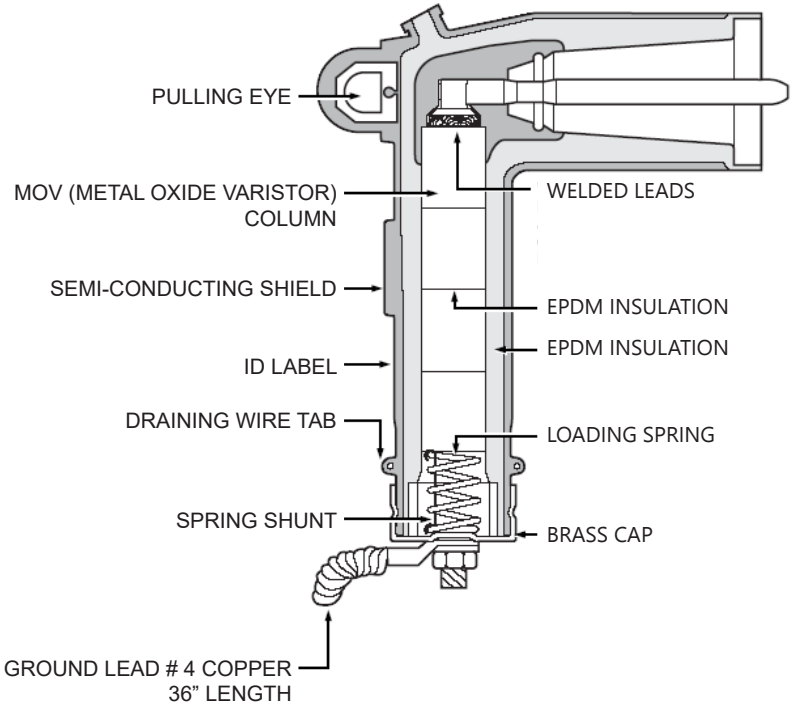
1. This feed through bushing is not used in engineering designs. It is typically used to temporarily ground a cable during maintenance.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY DEAD-FRONT (200A) TEMPORARY STANDOFF 25KV FEED-THRU BUSHING

CABLE ATTACHMENT



COOPER POWER SYSTEMS ELBOW ARRESTER CUTAWAY

GENERAL NOTES:
Install one arrester per phase at the end of any underground circuit. These units may only be used with dead front transformers, dead front terminating cabinets and dead front switches equipped with 200A 25kV bushing inserts.

As of October 2005, all 4kV and 7.96kV transformers are ordered with 200A 25kVbushing inserts to simplify future conversion to 23.9kV system voltages. Elbow arresters equipped for these transformers are in inventory.

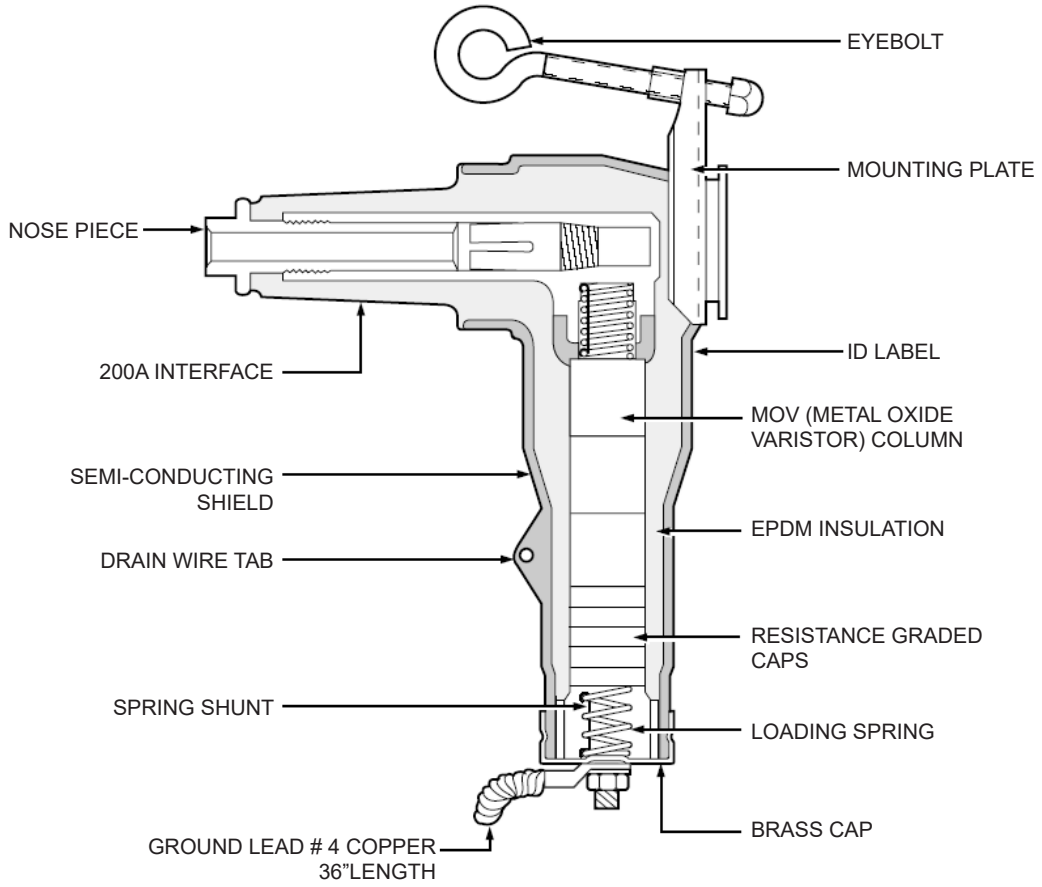
DEAD-FRONT LIGTHNING ARRESTERS					
MATERIAL LIST					
CU CODE	STOCK	DESCRIPTION	SYSTEM VOLTAGE (kV)	QTY	UNIT
ULA3DF	140190100	SURGE ARRESTER 3KV, DF,TRANS TC, OR SWITCH	4.16	1	EA
ULA12DF	140190200	SURGE ARRESTER 12KV, DF,TRANS TC, OR SWITCH	13.8 OR 7.96	1	EA
ULA18DF	140191000	SURGE ARRESTER 18KV, DF,TRANS, TC, OR SWITCH	23.9	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY DEAD-FRONT SURGE ARRESTERS

CABLE ATTACHMENT



COOPER POWER SYSTEMS PARKING STAND ARRESTER CUTAWAY

GENERAL NOTES:
Parking stand arresters are only used as a temporary cable termination when a dead front transformer is taken out of service for repairs.

PARKING STAND ARRESTER				
MATERIAL LIST				
CU CODE	**STOCK**	**DESCRIPTION**	**QTY**	**UNIT**
ULA18DF-PKS	140193000	SURGE ARRESTER 18KV DF PARKING STAND	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY DEAD-FRONT PARKING STAND ARRESTERS

CABLE ATTACHMENT

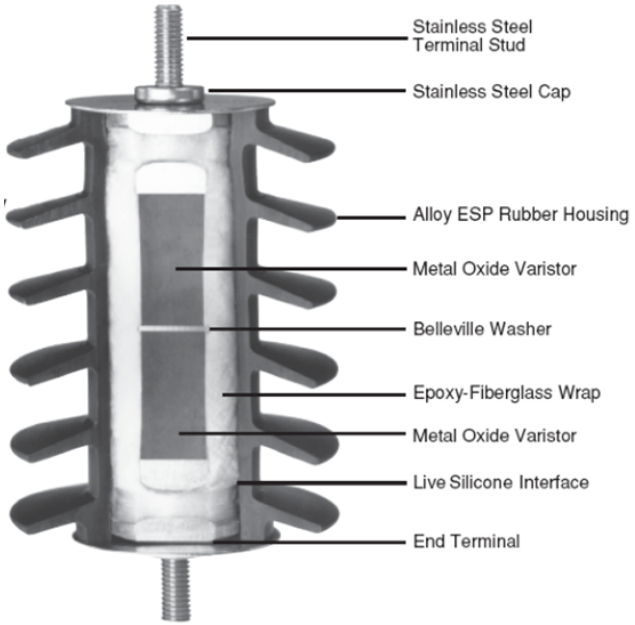
ARRESTER PLACEMENT.

1. ONE ARRESTER PER PHASE WIRE AT THE LAST TRANSFORMER, TERMINATING CABINET OR SWITCH OF AN UNDERGROUND CIRCUIT.
2. TWO ARRESTERS PER PHASE AT EVERY OPEN SWITCH POINT. ONE ARRESTER ON EACH SIDE OF THE OPENING.
3. IT IS OPTIONAL TO INSTALL ARRESTERS ON THE UNUSED JUNCTIONS OF A TERMINATING CABINET WHERE THE CABLE LOOPS THROUGH THE JUNCTIONS.
4. RISER CLASS ARRESTERS SHOULD BE USED ON THE 23.9kV SYSTEM RISER POLES.
5. INSTALL ONE ARRESTER PER PHASE ON ANY DEVICE PLACED IN A CIRCUIT THAT DIPS FROM OVERHEAD TO UNDERGROUND THEN BACK TO OVERHEAD.

LIVE FRONT ARRESTERS

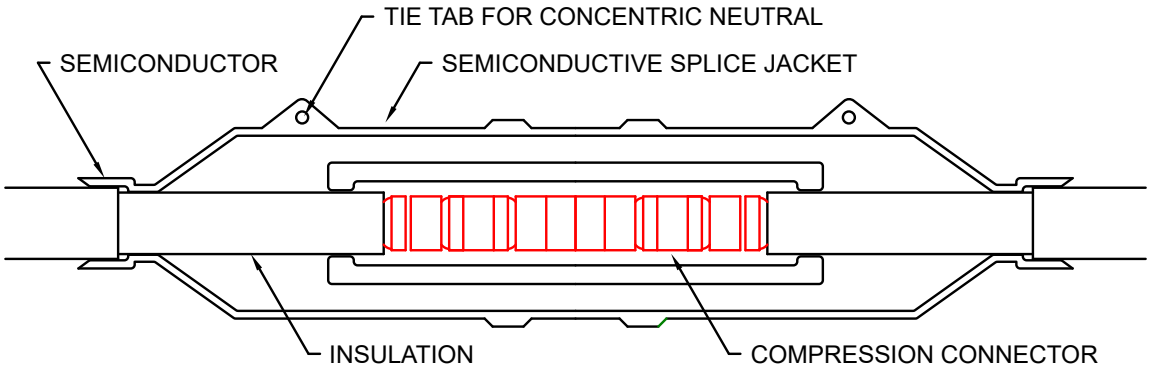
NOTE:

These arresters may vary in appearance due to the number of design changes over time .

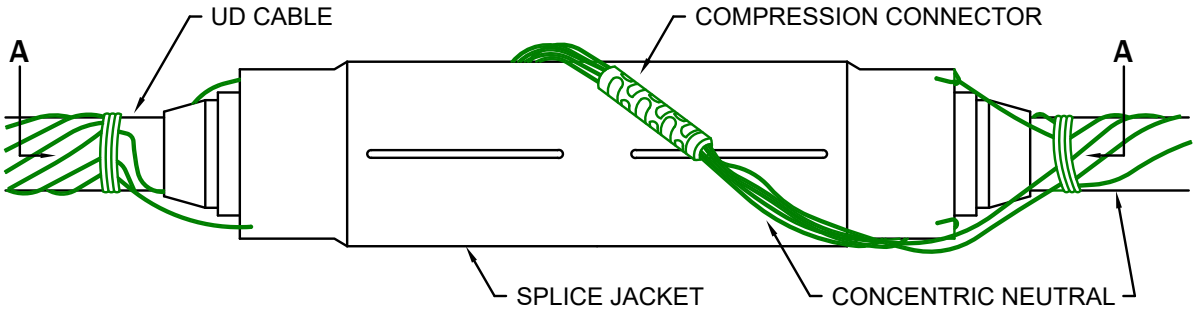


CABLE TERMINATIONS					
MATERIAL LIST					
CU CODE	STOCK	DESCRIPTION	SYSTEM VOLTAGE (kV)	QTY	UNIT
ULA3LF	140120000	SURGE ARRESTER 3KV, LV,TRANS AND SWITCH	4.16	1	EA
ULA12LF	140180000	SURGE ARRESTER 12KV, LF,TRANS AND SWITCH	13.8 and 7.96	1	EA
ULA18LF	140320000	SURGE ARRESTER 18KV, LF,TRANS	23.9	1	EA
ULA18LF-SW	140310000	SURGE ARRESTER 18KV, LF SWITCHA	23.9	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE



SECTION AA



STRAIGHT SPLICES				
MATERIAL LIST				
CU CODE	**STOCK**	**DESCRIPTION**	**QTY**	**UNIT**
UCN-SPL1	401983000	STRAIGHT PREFORMED SPLICE FOR USE WITH #1 AL. 25KV (JCN)	1	EA
UCN-SPL40	401985000	STRAIGHT PREFORMED SPLICE FOR USE WITH #40 AL/CU. 25KV (JCN)	1	EA
	400318200	CABLE ACCESSORY SEALING KIT, INCLUDES MASTIC STRIPS	1	EA
UCN-SPL500	401986000	STRAIGHT PREFORMED SPLICE FOR USE WITH #500 AL. 25KV (JCN)	1	EA
UCN-SPL750CU	401984000	STRAIGHT PREFORMED SPLICE FOR USE WITH #750 CU. 25KV (JCN)	1	EA

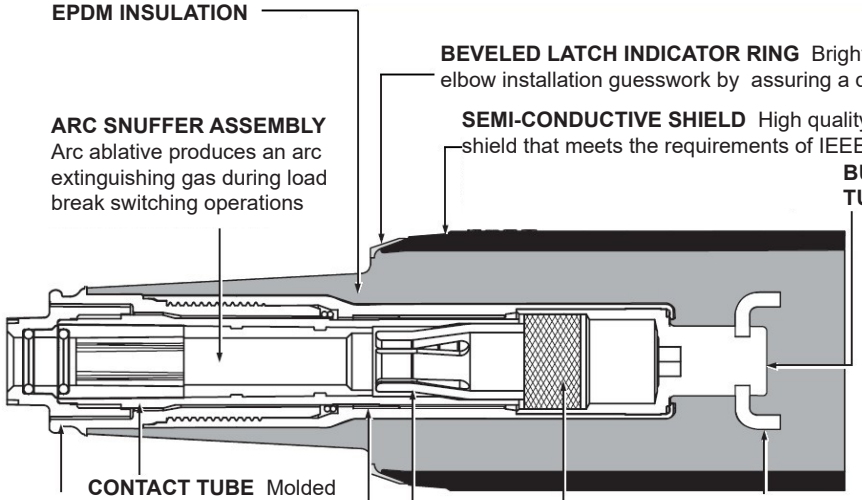
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

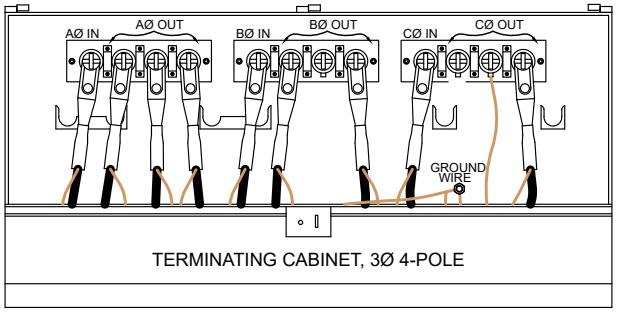
PRIMARY CABLE STRAIGHT SPLICE

LOAD BREAK MODULE.

The three position or pole is pictured. This unit is stocked only in the four position module.
Two position modules are also available.



COOPER POWER SYSTEMS LOAD BREAK



TERMINATING CABINET, 3Ø 4-POLE

GENERAL NOTES:
Junctions may be used to hold elbow arresters, insulating caps as well as cable elbows. Each position must have an accessory mounted before the circuit is energized. The junctions do not provide the necessary insulation to maintain circuit integrity and dead-front safety without the attachments.

4 POSITION LOAD BREAK MODULE FOR TERMINATING CABINETS				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
ULBMOD4POLE	401090000	PAD MOUNTED TERMINATING CABINET 3 PHASE 4 POLE	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY DEAD-FRONT TERMINATION CABINET CABLE JUNCTION

CABLE ATTACHMENT

OPERATING SPECS:

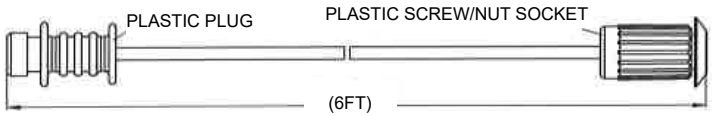
MAX VOLTAGE:	**46kV L-L**
MINIMUM TRIP CURRENT:	**200A @200 MSEC.**
LOAD TRACKING START:	**50 AMPS**
TEMP RANGE:	**-40 to +85 Deg. C**
CURRENT WITHSTAND:	**25kA, 170 MSEC**
ACCURACY:	**+10% @20 DEG. C**
CURRENT RESET:	**5 Amps (small) /10Amps (large)**
TIME RESET:	**4 Hours**

SMALL CORE FCI MODULE

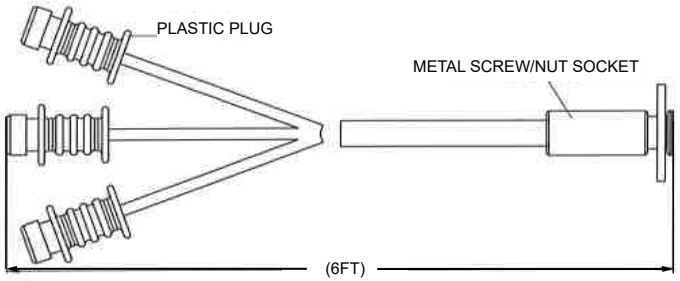
LARGE CORE FCI MODULE

NOTES

1. FCI modules are for use in both 1 phase and 3 phase (delta/wye) installations.
2. FCI modules can be mounted on elbows or cable.
3. FCI module reset pre-configured for time + current based operation.
4. Units have self-adjusting trip rating to load current (50 Amps min.)
5. Units are self powered w/ no field adjustments or calibration required.
6. To be installed w/ standard hot stick tools.
7. Each kit contains: FCI module & fiber-optic cable.
8. Includes lithium battery w/ 20 year shelf-life.
9. Reflective FCI labels are stocked as separate items.



1 PHASE FIBER-OPTIC CABLE

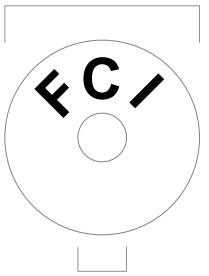


3 PHASE FIBER-OPTIC CABLE

REMOTE FIBER OPTIC

MINOR MATERIAL LIST			
STOCK	**DESCRIPTION**	**QTY**	**UNIT**
465260056	FCI REFLECTIVE LABEL (MOUNTED OVER PANEL LED OPENING)	1	EA

FAULT CURRENT INDICATOR KIT W/ FIBER OPTIC LED						
MATERIAL LIST						
CU CODE	**STOCK**	**DESCRIPTION**	**QTY**	**FCI MODULES**	**FIBER OPTIC CABLE**	**UNIT**
FCI-1LARGE	346245030	UG FCI 1 PH LG DIAM FOR 500MCM & ABOVE	1	1	1 PHASE	EA
FCI-1SMALL	346245020	UG FCI 1 PH SMALL DIAM FOR 4/0 & BELOW	1	1	1 PHASE	EA
FCI-3LARGE	346245010	UG FCI 3 PH LG DIAM FOR 500MCM & ABOVE	1	3	3 PHASE	EA
FCI-3SMALL	346245000	UG FCI 3 PH SMALL DIAM FOR 4/0 & BELOW	1	3	3 PHASE	EA



FCI REFLECTIVE LABEL

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY CABLE FAULT INDICATOR COMPONENTS

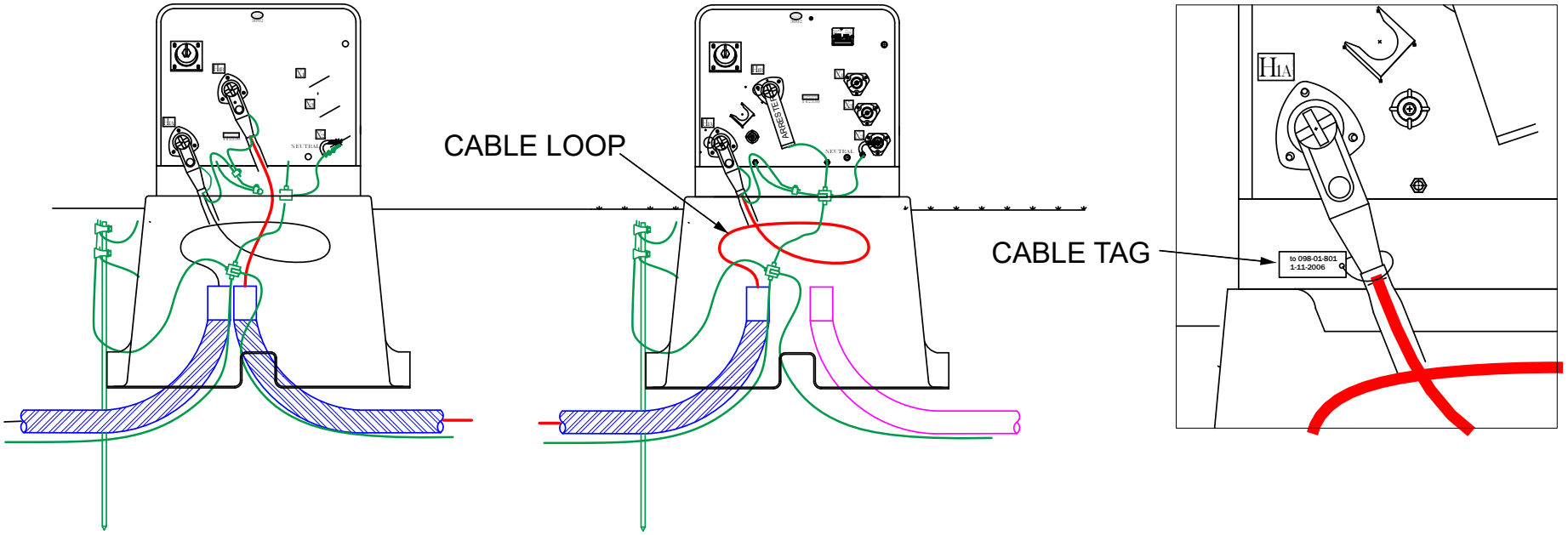
CABLE ATTACHMENT

CABLE INSTALLATION

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

TABLE OF CONTENTS



PRIMARY CABLE LOOP:
A large loop of primary cable should be installed at the end of each cable run. This will provide slack for replacement of failed terminations. Additionally, during a dig-in, this could prevent damage to the equipment. This is good practice and should be installed wherever space permits. Follow all cable minimum bending radius requirements when installing the loop (see Primary Cable, Pg. 2). At every installation point there must be enough slack in the cable to prevent temperature related contraction of the cable from pulling off an elbow or otherwise damaging the device. Although only a single-phase transformer installation is pictured, these rules apply to all under-ground installations. It is critical that cables spliced in a manhole have this additional cable because of the high failure rate of primary cable splices.

CABLE TAGS:
Every cable should be tagged with the number of the device or manhole that is next on the circuit. The tag should also have the installation date of the cable embossed on the tag. The table below indicates a code for each of the common devices. This is a good practice for assisting crews during trouble calls. It speeds location of the next transformer and confirms information on the maps. Having the cable installation date will help determine if the cable should be replaced

Device	Tag Code
TRANSFORMER	NUMBERONLY
TERMINATINGCABINET	T
MANHOLE	M
SWITCH	S
RISER	POLE

NOTES

1. This plate applies to all transformers, terminating cabinets, manholes, pull boxes and switches. For simplicity, only a single phase transformer is pictured.

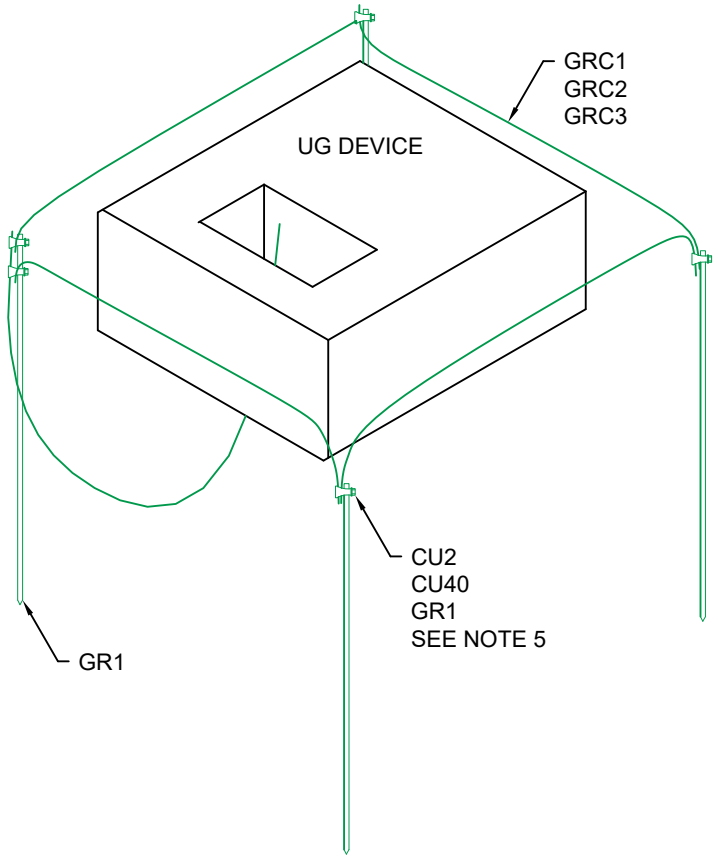
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PAD-MOUNTED EQUIPMENT
CABLE LOOPS AND TAG DETAILS

USE THE FOLLOWING TABLE TO ADD LABOR AND WIRE TO THE JOB FOR THE GROUND RING		
C.U.	ULAB-ELECT	UCCS40
EQUIPMENT TYPE	MAN-HOURS	QUANTITY (FT)
MANHOLE	10	100
METAL ENCLOSED SW	12	AS REQ'D
PAD TRANSFORMER	10	50
PULL BOX	10	50
SWITCH	10	50
TERMINATING CABINET	10	50
VAULT	N/A	100 TO SERVICE ENTRANCE

PAD MOUNTED EQUIPMENT GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	ITEM CODE
011000000	CABLE CU BHD 2 7S	CU2H
011210000	CABLE CU BSD 2 7S	CU2
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223486000	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	GC2
223490000	GROUND CONNECTOR 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	GRC2
223494000	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	GRC3
223496000	GRD CONN 4/0 MCM CU.TO 5/8" GRD ROD	GC5
223498000	GRD CONN 500 TO 4/0 MCM COPPER CABLE	GC6



COUNTERPOISE GROUND WIRE SIZE			
MATERIAL LIST			
CABLE CU	CABLE SIZE	GROUND WIRE SIZE	GROUND WIRE CU
UCAL1	1	2CU	UCCH2
UCAL1-3CP	1	2CU	UCCH2
UCAL40-3CP	4/0	2CU	UCCH2
UCAL500	500	4/0 CU	UCCS40
UCCU40-3CP	4/0CU	2 CU	UCCH2
UCCU500	500MCM CU	4/0 CU	UCCS40
UCCU750	750MCM CU	4/0 CU	UCCS40
UCCU750 –1/C	750MCM CU	4/0 CU	UCCS40

NOTES

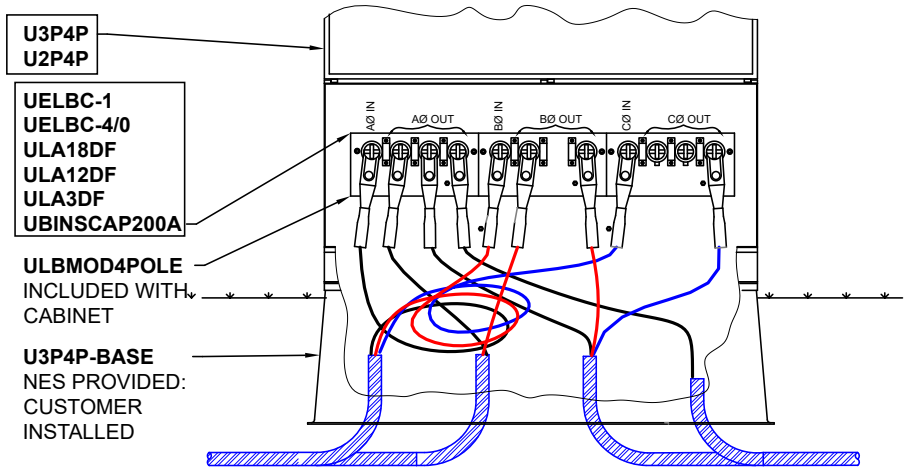
1. Ground Ring is required on all equipment energized by underground primary cables.
2. Ground Ring must be tied to the rebar at each corner of a concrete pad.
3. Ground Ring is to be installed 12" below grade and 12" away from the device.
4. Ground wire must be tied before attaching grounding clamps.
5. Caution: Metallic above ground, enclosed, communication equipment within 6' or less needs to be bonded to system ground wire for equipotential grounding.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

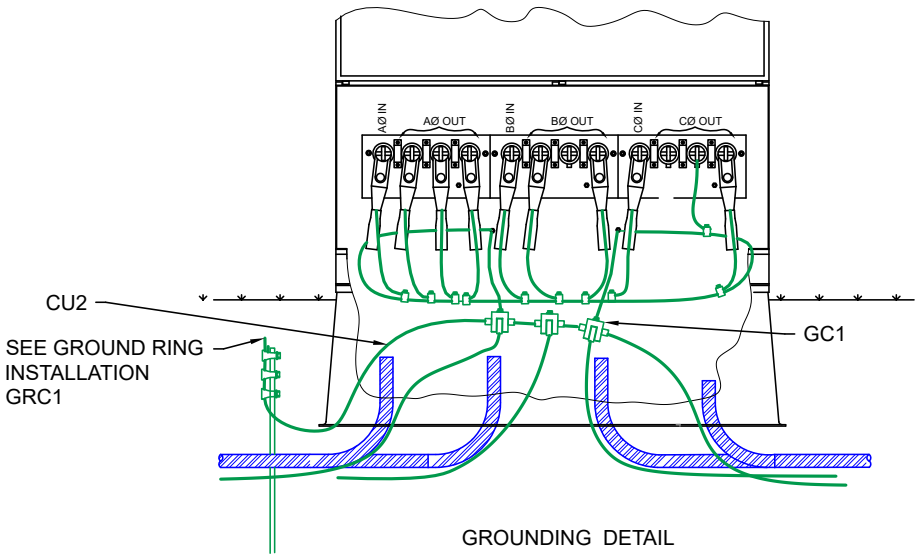
CABLE INSTALLATION

NES

PAD-MOUNTED EQUIPMENT GROUNDING DETAILS



PRIMARY CABLE DETAIL



GROUNDING DETAIL

PAD MOUNTED EQUIPMENT GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	ITEM CODE
011210000	CABLE CU BSD 2 7S	CU2
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1

CAUTION:
ANY COMBINATION OF THE FOLLOWING DEVICES MAY BE INSTALLED ON THE LOAD BREAK MODULE. INSTALL THE APPROPRIATE VOLTAGE ARRESTER WHEN A SINGLE TERMINAL IS OPEN. INSTALL A BUSHING INSERT CAP ON ANY ADDITIONAL FREE TERMINAL.

NOTES

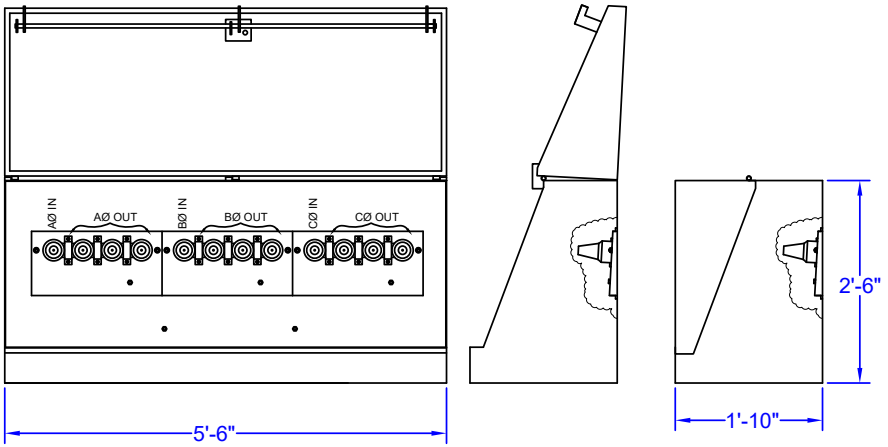
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring not pictured (see Pg. 3).
4. Elbow, arrester and bushing cap bleed wires not shown. Only install arrester when module is the open termination in the circuit.
5. Because of the similarity between the three phase and two phase units, the two phase units are not shown. Both units use the same base and attachments.
6. All junction points must be covered before the unit is energized.

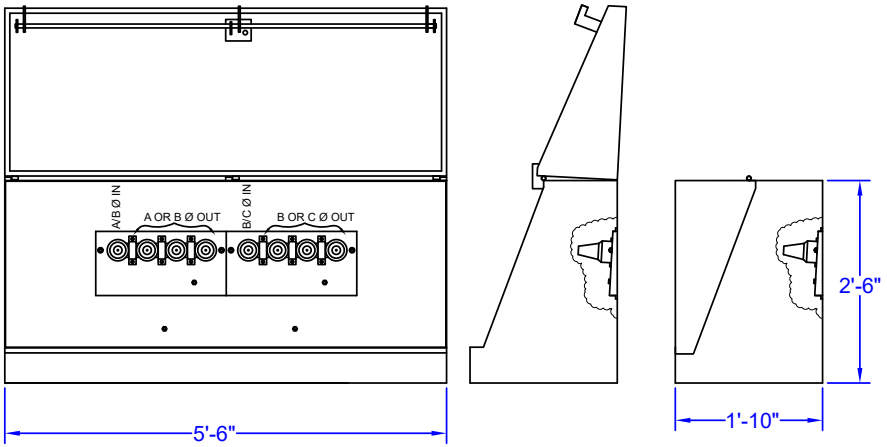
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

3-PH TERMINATION CABINET INSTALLATION DETAILS

TWO PHASE, FOUR POLE TERMINATING CABINET				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U2P4P	965982000	PAD MOUNTED TERMINATING CABINET 2 PHASE 4 POLE	1	EA





THREE PHASE, FOUR POLE TERMINATING CABINET				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U3P4P	966005000	PAD MOUNTED TERMINATING CABINET 3 PHASE 4 POLE	1	EA

NOTES

1. Cabinet designs may vary by manufacturer. The designs shown are only to illustrate the general appearance and overall dimensions.
2. NES specifications require the cabinets be constructed of 12 guage steel and that the 25kV 200A load-break modules be furnished with the cabinets.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE INSTALLATION

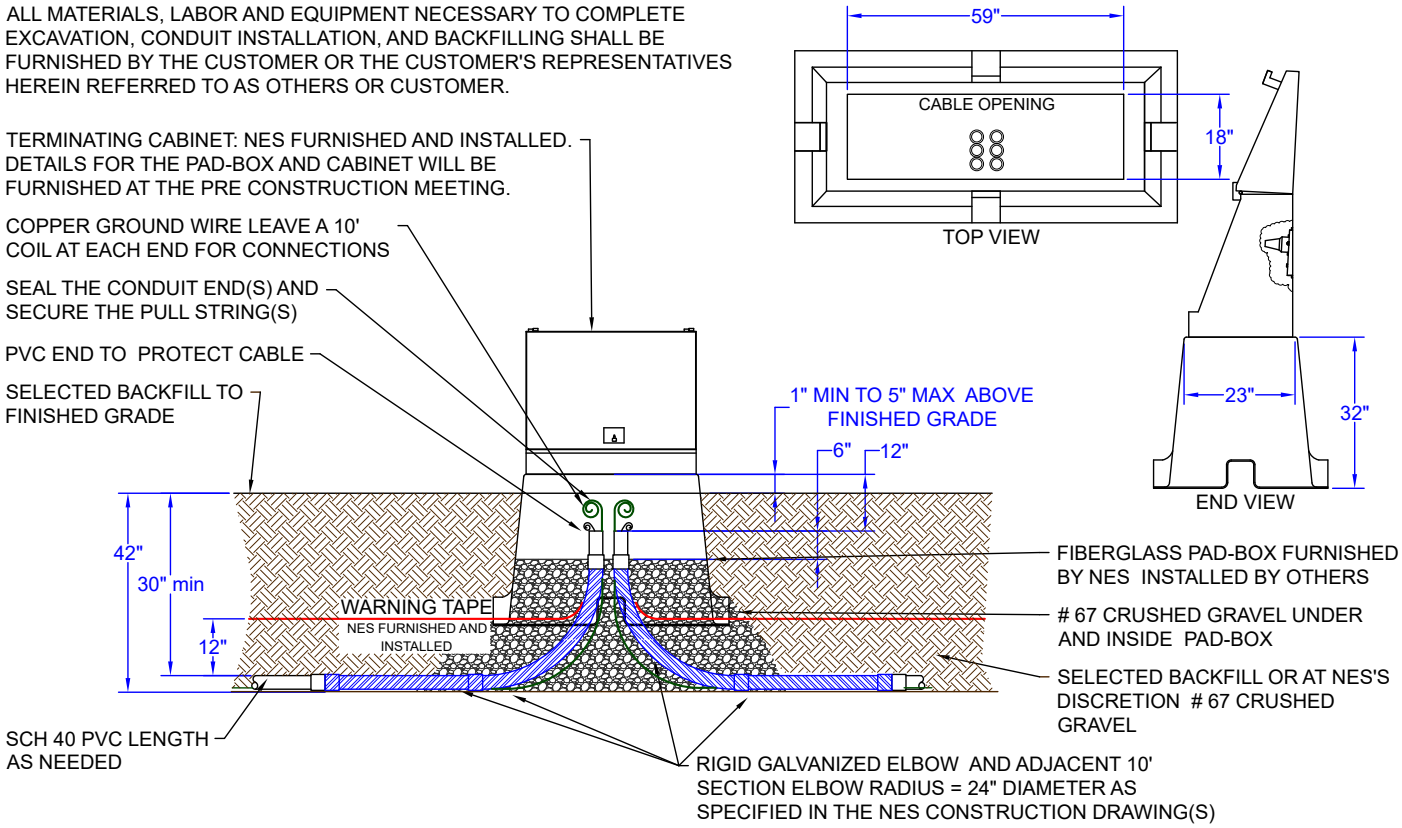
NES

3-PH TERMINATION CABINET MATERIAL LIST

THREE PHASE, FOUR POLE AND TWO PHASE, FOUR POLE TERMINATING CABINET BASE (UGS-0016)				
MATERIAL LIST				
CU CODE	**STOCK**	**DESCRIPTION**	**QTY**	**UNIT**
U3P4P-BASE	060015000	TERM CAB BASE FOR 2P OR 3P 4 POLE	1	EA

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	**DESCRIPTION**	**QTY**	**UNIT**
011210000	CABLE CU BSD 2 7S	50	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	**GROUND CONNECTOR 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD**	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

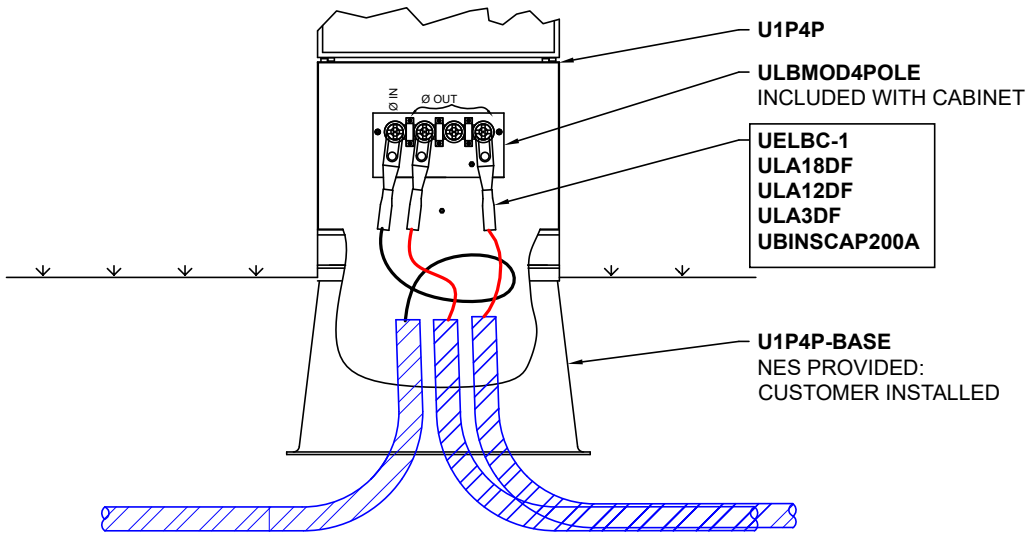
1. The pad is normally installed by the developer's contractor during the utility installation phase of the project.
2. Grounding is performed by NES crews.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

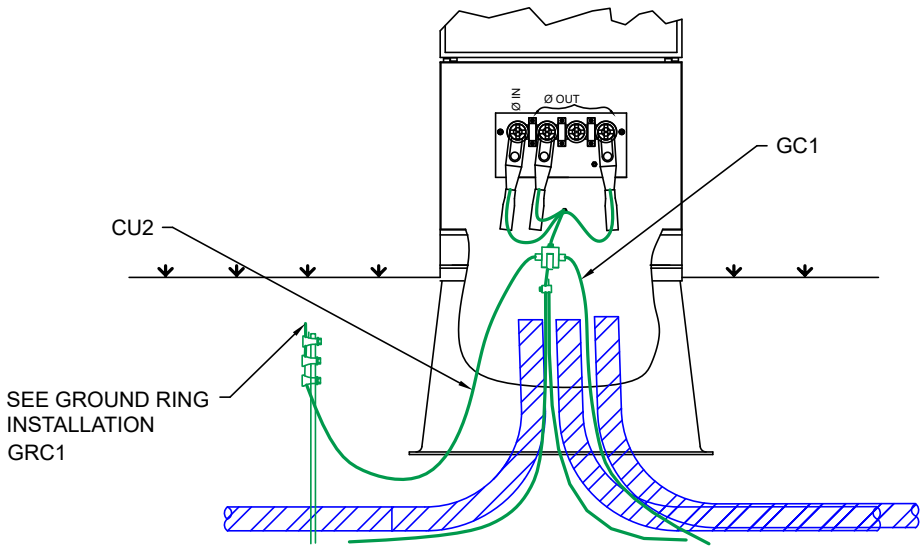
CABLE INSTALLATION

NES

3-PH TERMINATION CABINET BASE DETAILS



PRIMARY CABLE DETAIL



GROUNDING DETAIL

PAD MOUNTED EQUIPMENT GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	ITEM CODE
011210000	CABLE CU BSD 2 7S	CU2
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1

CAUTION:
INSTALL THE APPROPRIATE VOLTAGE ARRESTER WHEN A SINGLE TERMINAL IS OPEN. INSTALL A BUSHING INSERT CAP ON ANY ADDITIONAL FREE TERMINAL.

NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring not pictured (See Pg. 3).
4. Elbow and bushing cap bleed wires are not shown.
5. All junction points must be covered before the unit is energized.

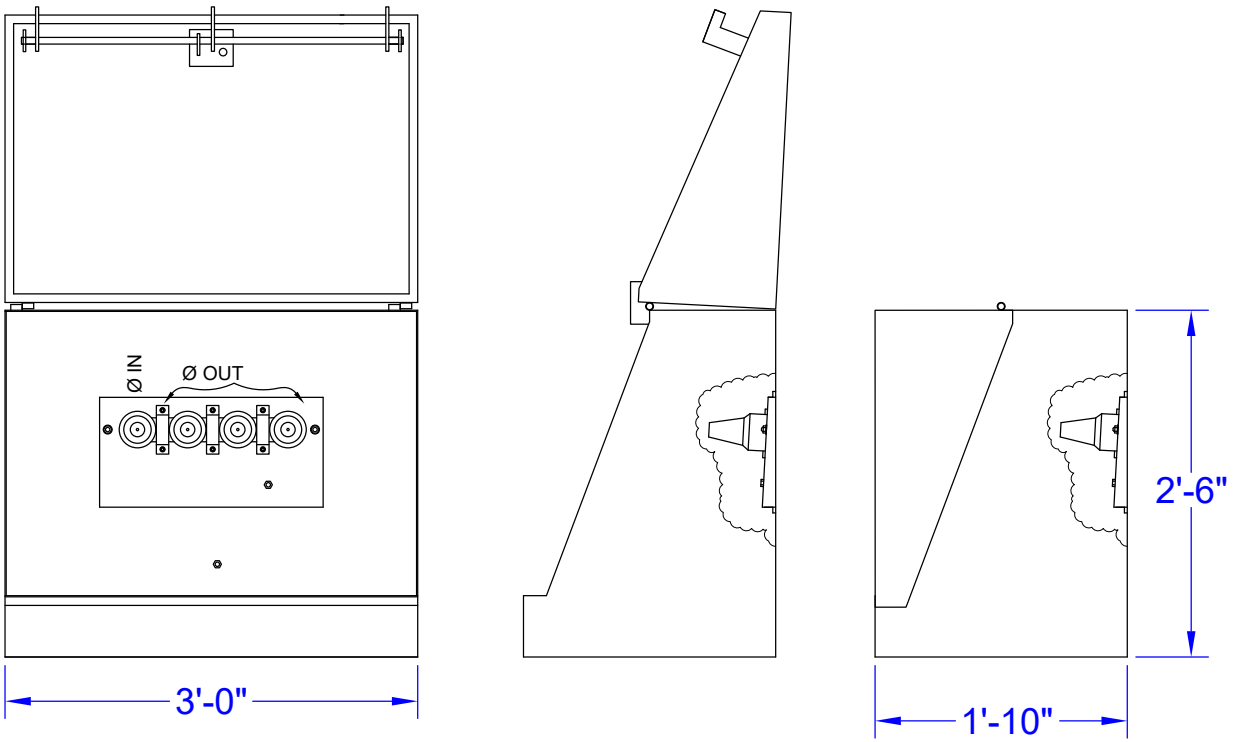
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE INSTALLATION

NES

1-PH TERMINATION CABINET INSTALLATION DETAILS

SINGLE PHASE, FOUR POLE TERMINATING CABINET				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U1P4P	965978000	PAD MOUNTED TERMINATING CABINET 1 PHASE 4 POLE	1	EA



NOTES

1. Cabinet designs may vary by manufacturer. The designs shown are only to illustrate the general appearance and overall dimensions.
2. NES specifications require the cabinets be constructed of 12 guage steel and that the 25kV 200A load break modules be furnished with the cabinets.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

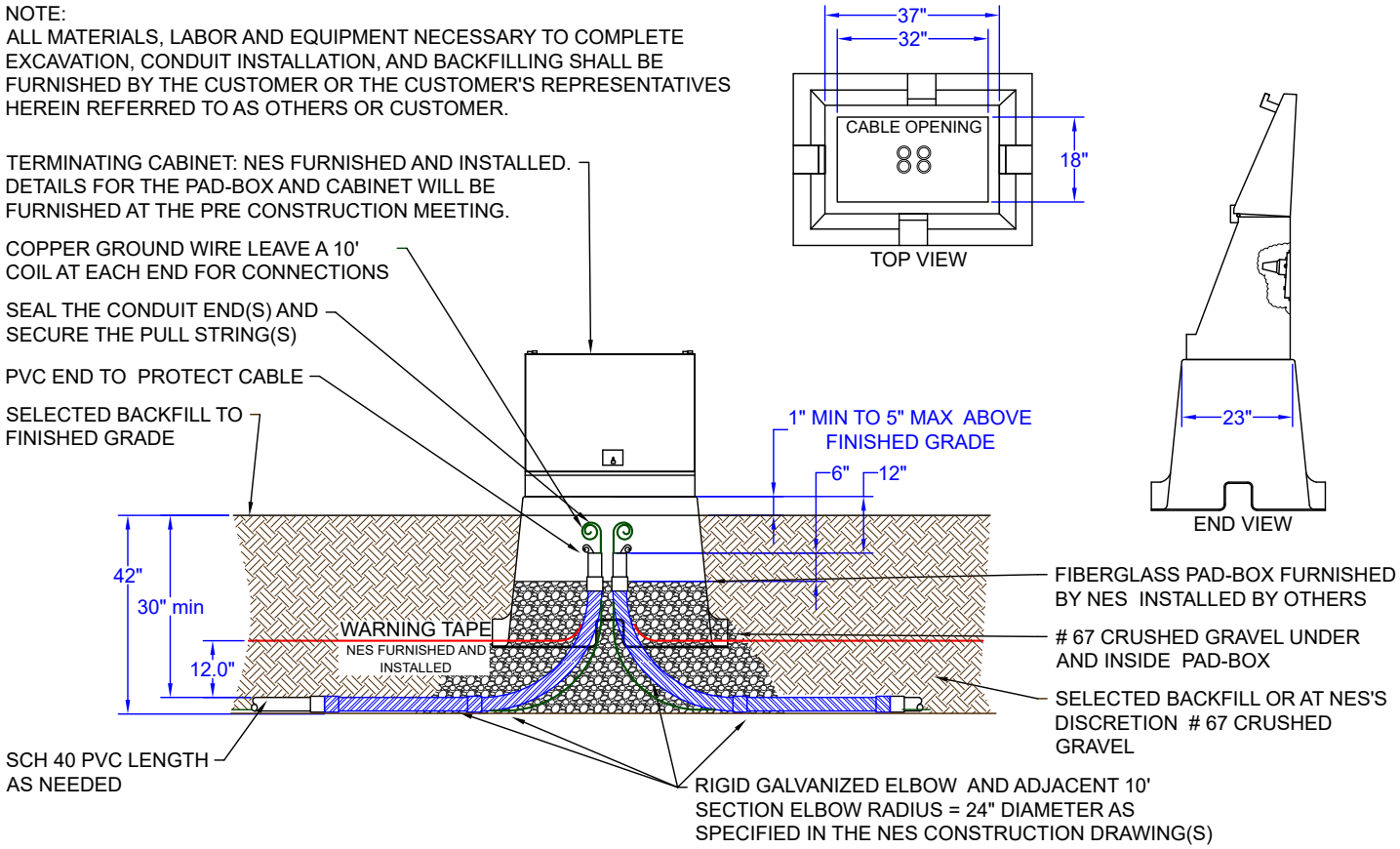
NES

1-PH TERMINATION CABINET MATERIAL LIST

BASE FOR SINGLE PHASE, FOUR POLE TERMINATING CABINET Drawing (UGS0018)				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U1P4P-BASE	060010000	TERM CABINET BASE (1PH-4 POLE)	1	EA

BASE FOR SINGLE PHASE, FOUR POLE TERMINATING CABINET Drawing (UGS0018)			
MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	50	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	**GROUND CONNECTOR 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD**	4	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	4	EA

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. The pad is normally installed by the developer's contractor during the utility installation phase of the project.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

CABLE INSTALLATION

NES

1-PH TERMINATION CABINET BASE DETAILS

APPENDIX A - CABLE PULLING

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

TABLE OF CONTENTS

PULLING TENSIONS

The information provided herein may serve as a guide to installing cables in ducts or conduits and is based in part on industry studies. Where experience has justified it, we have included our own figures. Two tension calculations are required for each cable installation. First must be calculated the MAXIMUM ALLOWABLE TENSION for the particular cable that is to be installed. This value is dependent upon the method of attaching to the cable, the allowable sidewall bearing pressure and the construction of the cable. Second, knowing the weight of the cable and the details of the conduit run the ESTIMATED PULLING TENSION that can occur during installation is calculated and compared with the MAXIMUM ALLOWABLE TENSION. The following gives details for calculating each of the above tension values.

Conditions for Maximum Allowable Tension

(1) Based on pull by conductor:
Tm = .008 x n x CM (applies to both annealed copper and hard drawn aluminum conductors)
Tm = maximum allowable tension in lbs.
n = number of conductors in cable (assumes equal tension in each conductor)
CM = circular mil area of each conductor.

(2) Based on pull by Kellems grip over lead sheath:
Tm = 4712 x t(D-t)
D = outside diameter of cable in inches
t = lead sheath thickness in inches.

(3) Based on pull by Kellems grip applied over:
Non-shielded, jacketed cables - 2000 lbs.*
Shielded, jacketed cables - 1000 lbs.*
*Do not exceed tension limit of Condition 1 above.

(4) Based on pull by Kellems grip applied directly on the insulation or outer Permashield® layer of Kerite Double Permashield® cables after removing the shielding:
3,000 lbs. per inch of conductor diameter.*
*Do not exceed tension limit of Condition 1 above.

(5) Based on maximum allowable side bearing pressure when pulling around a conduit bend:
(a) Single conductor or multi-conductor
Tm = 450 x D x R
Tm = maximum allowable tension on cable in lbs.
D = outside diameter of cable in inches
R = radius of bend in feet
(b) Three conductor twisted
Tm = 225 x D1 x R
(c) Three 1/C cables in parallel Tm = 675 x D1 x R
For (b) and (c)
Tm = maximum allowable tension on three cables
D1 = diameter of one individual cable in inches
R = radius of bend in feet

The actual allowable tension will be governed by the lowest of the above calculated tensions for the method of pull selected.

All information in Appendix A is copied from Kerite Cable's Published information.

Example 1:

Determine the maximum allowable pulling tension on three 1/C 500 kcmil copper, 15kV, 175 mil, 100% insulation wall, copper tape shield, PVC jacketed cable, paralleled, to be pulled around a 3 ft. radius bend **by Kellems grip applied over outer jackets. (**Refer to page 2 for conditions 1 thru 5).

Conditions 1 and 2 do not apply.

Limit by Condition 3 - Shielded, jacketed - 1,000 lbs.

Condition 4 does not apply.

Limit by Condition 5 - Sidewall bearing pressure:
Tm = 675 x D1 x R
D1 = 1.51
Tm = 675 x 1.51 x 3
Tm = 3,058 lbs.

The maximum pulling tension is limited by Condition 3 -1,000 lbs.

Example 2:

Determine the maximum allowable pulling tension on three 1/C 500 kcmil copper, 15kV, 175 mil, 100% insulation wall, copper tape shield, PVC jacketed cable, paralleled, to be pulled around a 3 ft. radius bend **by conductor. (**Refer to page 2 for conditions 1 thru 5).

Limit by Condition 1
Tm = .008 x n x CM
Tm = .008 x 3 x 500,000
Tm = 12,000 lbs.

Conditions 2, 3 and 4 do not apply.

Limit by Condition 5 - Sidewall bearing pressure
Tm = 675 x D1 x R
D1 = 1.51
Tm = 675 x 1.51 x 3
Tm = 3,058 lbs.

The maximum pulling tension is limited by Condition 5 - 3,058 lbs.

Estimated pulling tension must be calculated to ensure it does not exceed the maximum allowable pulling tension.

Estimated Pulling Tension

Pulling tensions anticipated for an installation are governed by cable size and weight, length of run, number and angle of bends. Usually only approximations can be made, the following simple assumptions provide safe guideline limits.

Calculation of Tension(s)

(1) Straight horizontal run:

$$T = W \times L \times n \times C.F.$$

where:
T = tension in lbs.
W = cable weight in lbs./ft. L = length of run in ft.
n = number of cables C.F.= coefficient of friction

The coefficient of friction will vary between 0.3 for well lubricated cables pulled into new, smooth wall conduits to 0.5 for lubricated cables pulled into rough or dirty conduits or ducts.

(2) Pulls around static bends:

Multiplying factors, shown below, must be used to estimate the increase in tension due to pulling around bends. The tension at the point just ahead of the bend is multiplied by the appropriate factor from the table below, the product being the tension that exists immediately past the bend. This factor must be applied in the calculation of the estimated pulling tension at each point where the cable encounters a bend as it is pulled through the duct or conduit run.

MULTIPLYING FACTOR						
Coefficient of Friction	Angle of Bend in Degrees					
	15	30	45	60	75	90
0.30	1.08	1.17	1.27	1.37	1.48	1.60
0.40	1.11	1.23	1.37	1.52	1.69	1.87
0.50	1.14	1.30	1.48	1.69	1.92	2.19

Example:

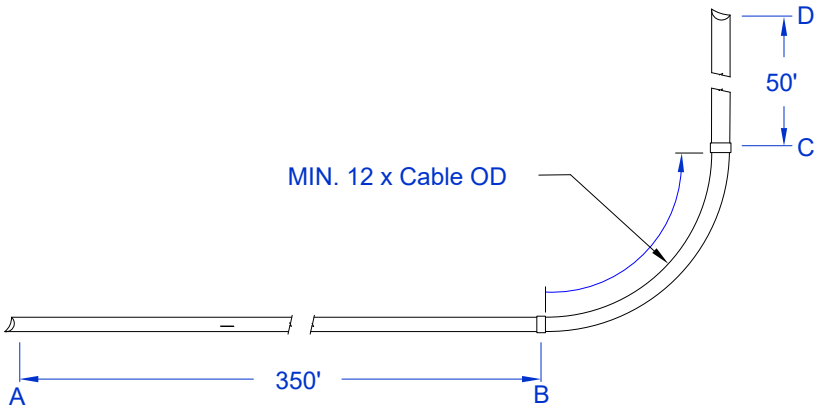
Determine the tension required to pull three 1/C 500 kcmil copper, 15kV, 175 mil insulation wall, copper tape shield, PVC jacketed cable, in a horizontal duct as shown below.

Initial Set-up
Assume pay off reel at A.

For pull A to B:
TB = W x L x n x C.F.
W = 2.346 lbs./ft. of 1/C cable
L = 350 ft.
n =3
C.F.= 0.4 (assume average condition of duct wall)
TB = 2.346 x 350 x 3 x 0.4 = 985 lbs.

For pull B to C:
TC =TB x Multiplying Factor for 90° Bend
TC = 985 x 1.87 TC = 1,842 lbs.

For pull C to D:
TD = W x L x n x C.F. + TC
TD = 2.346 x 50 x 3 x 0.4 + 1.842
TD = 141 + 1,842 = 1,983 lbs.



Alternative Set-up
Assume pay off reel at D.

For pull D to C:
TC = W x L x n x C.F.
TC = 2.346 x 50 x 3 x 0.4
TC = 141 lbs.

For pull C to B:
TB =TC x Multiplying Factor for 90° Bend
TB = 141 x 1.87
TB = 264 lbs.

For pull B to A:
TA = W x L x n x C.F. + TB
TA = 2.346 x 350 x 3 x 0.4 + 264
TA = 985 + 264 + 1,249 lbs.

FOR VERTICAL PULLS UP RISERS ADD: TENSION VERTICAL = W x L x n

Result:

Pull by Kellems grip over the jacket is not allowed (1,000 lbs. maximum versus calculated pulling tension of 1,983 lbs. or 1,249 lbs. depending upon direction of pull). Pull by conductor is allowed. Tension is less when pay-off reel is at the "D" end nearest the bend location. The above calculations are based on the use of an approved pulling compound on the entire surface of the cable with approximately 1/16 " layer of compound to be applied as the cable enters the duct or conduit.

PRIMARY CABLE INFORMATION							
SIZE	MATERIAL	CONFIG.	MAX. JACKET OD (IN)	1 CABLE WT. (LBS/FT)	100% MAX. TENSION (LBS)	66% MAX. TENSION (LBS)	MAX SWP (LBS/FT)
#1 AWG	AL	1C	1.263	0.745	670	442	514
#1 AWG	AL	2CP	1.263	0.745	1,339	884	432
#1 AWG	AL	3CP	1.263	0.664	2,009	1,326	472
#4/0 AWG	AL	3CP	1.468	1.011	5,078	3,352	702
#4/0 AWG	CU	3CP	1.478	1.526	5,078	3,352	717
500 KCMIL	AL	3CP	1.889	1.774	12,000	7,920	956
500 KCMIL	CU	3CP	1.924	3.094	12,000	7,920	1,009
750 KCMIL	CU	3CP	2.175	4.351	18,000	11,880	1,239

FACTOR LIMITING PULL

T - LIMITED BY PULLING TENSION
S - LIMITED BY SIDE WALL PRESSURE (SWP) THROUGH BEND

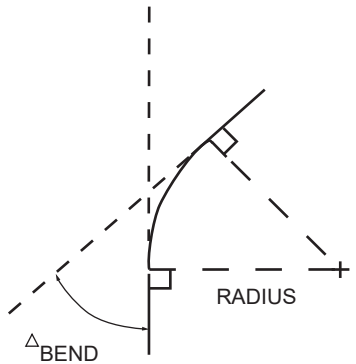
CONDUIT INFORMATION	
TRADE SIZE	MIN. CONDUIT ID (SCH 40)
2"	2.067
2.5"	2.469
3"	3.068
4"	4.026
5"	5.047
6"	6.065

ASSUMPTIONS:

COF = 0.3 (well lubricated cable pulled into new, smooth wall conduit)
COF = 0.4 (well lubricated cable pulled into average smooth wall conduit)
COF = 0.5 (well lubricated cable pulled into rough or dirty conduit)
Incoming Tension = 100 lbs.
40-FT Up Riser for 4/0, 500, 750
30-FT Up Riser for #1
3-FT R Sheave w/ 100 lbs.tension adder
Multiple Conductors are Pulled Together
Crew Selects Appropriate Attachment Device

SWEEP BEND DETAIL

SPECIAL CASE DETAILS FOR CONDUIT SWEEPS ARE DEFINED FOR RADIUS (FT) WITH THE CONDUIT BENT, WITHOUT HEATING, FOR THE DEFLECTION BEND ANGLE.



REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY CABLE PULLING IN CONDUIT TENSION SUMMARY

CONDUCTOR NES STOCK #	# OF COND.	DUCT SIZE	ELBOW RADIUS	ELBOW DESCRIPTION	COEF. OF FRICT	MAXIMUM PULL DISTANCE (FT)					
						PAD TO RISER/PAD		MH TO RISER/PAD		MH TO MH (W/SHEAVE)	
#1 AWG - AL	1	2"	24"	MIN	0.5	210	T	522	T	1260	T
020542000					0.4	538	T	820	T	1575	T
					0.3	1098	T	1354	T	2100	T
		2.5"	24"	STD	0.5	210	T	522	T	1260	T
					0.4	538	T	820	T	1575	T
					0.3	1098	T	1354	T	2100	T
#1 AWG - AL	2	3"	24"	STD	0.5	133	T	316	T	1091	T
020542000					0.4	363	T	522	T	1364	T
					0.3	767	T	906	T	1818	T
		3"	36"	OPT	0.5	138	T	316	T	1091	T
					0.4	367	T	521	T	1364	T
					0.3	772	T	906	T	1818	T
		4"	24"	STD	0.5	363	T	522	T	1364	T
					0.4	664	T	807	T	1705	T
					0.3	1193	T	1321	T	2274	T
		4"	36"	OPT	0.5	367	T	521	T	1364	T
					0.4	668	T	806	T	1705	T
					0.3	1199	T	1320	T	2274	T
#1 AWG - AL	3	4"	24"	STD	0.5	235	S	362	S	1420	T
020542000					0.4	464	S	576	S	1775	T
					0.3	870	S	966	S	2366	T
		4"	36"	OPT	0.5	358	T	481	T	1420	T
					0.4	649	T	756	T	1775	T
					0.3	1168	T	1260	T	2366	T

FACTOR LIMITING PULL: **T=**LIMITED BY PULLING TENSION, **S=**LIMITED BY SIDE WALL PRESSURE THROUGH THE BEND

CONDUCTOR NES STOCK #	# OF COND.	DUCT SIZE	ELBOW RADIUS	ELBOW DESCRIPTION	COEF. OF FRICT	MAXIMUM PULL DISTANCE (FT)					
						PAD TO RISER/PAD		MH TO RISER/PAD		MH TO MH (W/SHEAVE)	
#4/0 AWG - AL	3	4"	24"	MIN	0.5	135	S	222	S	1153	S
020550030					0.4	287	S	362	S	1443	S
					0.3	560	S	624	S	1924	S
		4"	36"	OPT	0.5	274	S	356	S	1153	S
					0.4	501	S	572	S	1443	S
					0.3	915	S	975	S	1924	S
		5"	36"	STD	0.5	660	S	733	S	1947	S
					0.4	1060	S	1124	S	2434	S
					0.3	1780	S	1832	S	3246	S
#4/0 AWG - CU	3	4"	24"	MIN	0.5	91	S	146	S	766	S
024020030					0.4	192	S	238	S	958	S
					0.3	372	S	412	S	1277	S
		4"	36"	OPT	0.5	184	S	234	S	766	S
					0.4	334	S	377	S	958	S
					0.3	608	S	643	S	1277	S
		5"	36"	STD	0.5	435	S	479	S	1284	S
					0.4	698	S	736	S	1605	S
					0.3	1171	S	1202	S	2140	S
500 KCMIL - AL	3	5"	36"	STD	0.5	212	S	254	S	844	S
020580000					0.4	374	S	408	S	1054	S
					0.3	670	S	698	S	1406	S
		5"	48"	OPT	0.5	310	S	347	S	844	S
					0.4	525	S	555	S	1054	S
					0.3	921	S	945	S	1406	S
		6"	36"	STD	0.5	451	S	488	S	1346	S
					0.4	721	S	752	S	1683	S
					0.3	1210	S	1235	S	2244	S
		6"	48"	OPT	0.5	628	S	661	S	1346	S
					0.4	989	S	1016	S	1683	S
					0.3	1643	S	1663	S	2244	S

FACTOR LIMITING PULL: T=LIMITED BY PULLING TENSION, **S=**LIMITED BY SIDE WALL PRESSURE THROUGH THE BEND

CONDUCTOR NES STOCK #	# OF COND.	DUCT SIZE	ELBOW RADIUS	ELBOW DESCRIPTION	COEF. OF FRICT	MAXIMUM PULL DISTANCE (FT)					
						PAD TO RISER/PAD		MH TO RISER/PAD		MH TO MH (W/SHEAVE)	
500 KCMIL - CU	3	5"	36"	STD	0.5	123	S	142	S	483	S
024040000					0.4	214	S	229	S	604	S
					0.3	382	S	393	S	805	S
		5"	48"	OPT	0.5	180	S	194	S	483	S
					0.4	301	S	311	S	604	S
					0.3	526	S	531	S	805	S
		6"	36"	OPT	0.5	261	S	277	S	777	S
					0.4	416	S	428	S	971	S
					0.3	696	S	705	S	1295	S
		6"	48"	OPT	0.5	363	S	375	S	777	S
					0.4	570	S	578	S	971	S
					0.3	946	S	949	S	1295	S
750 KCMIL - CU	3	6"	36"	STD	0.5	155	S	163	S	510	S
024050000					0.4	252	S	258	S	638	S
NOTE: JAMMING IS PROBABLE					0.3	431	S	434	S	850	S
		6"	48"	OPT	0.5	217	S	221	S	510	S
					0.4	347	S	348	S	638	S
					0.3	587	S	584	S	850	S

FACTOR LIMITING PULL: **T=**LIMITED BY PULLING TENSION, **S=**LIMITED BY SIDE WALL PRESSURE THROUGH THE BEND

SPECIAL CASE: This chart illustrates the effect of a sweep on maximum pulling distance.

CONDUCTOR SIZE/MTL NES STOCK # LENGTH/REEL (FT)	# OF COND.	DUCT SIZE	ELBOW RADIUS	ELBOW DESCRIPTION	COEF. OF FRICT	MAXIMUM PULL DISTANCE (FT)					
						PAD TO RISER/PAD		WITH 20° SWEEP		WITH 90° SWEEP	
#1 AWG - AL	1	2"	24"	MIN	0.5	210	T				
020542000					0.4	538	T				
4,000’					0.3	1098	T				
25-FT RADIUS		2.5"	24"	STD	0.5	210	T				
					0.4	538	T	413	T	0	
					0.3	1098	T				
#1 AWG - AL	2	3"	24"	STD	0.5	133	T				
020542000					0.4	363	T	244	S	0	
4,000’					0.3	767	T				
3” DUCT w/ 35-FT RADIUS 4” DUCT w/ 40-FT RADIUS		3"	36"	OPT	0.5	138	T				
					0.4	367	T				
					0.3	772	T				
		4"	24"	OPT	0.5	363	T				
					0.4	664	T	562	T	235	T
					0.3	1193	T				
		4"	36"	OPT	0.5	367	T				
					0.4	668	T				
					0.3	1199	T				
#1 AWG - AL	3	4"	24"	STD	0.5	235	S				
020542000					0.4	464	S	383	S	120	S
(3) 1,000’					0.3	870	S				
40-FT RADIUS		4"	36"	OPT	0.5	358	T				
					0.4	649	T	553	T	240	T
					0.3	1168	T				

FACTOR LIMITING PULL: T=LIMITED BY PULLING TENSION, **S=**LIMITED BY SIDE WALL PRESSURE THROUGH THE BEND

CONDUCTOR SIZE/MTL NES STOCK # LENGTH/REEL (FT)	# OF COND.	DUCT SIZE	ELBOW RADIUS	ELBOW DESCRIPTION	COEF. OF FRICT	MAXIMUM PULL DISTANCE (FT)					
						PAD TO RISER/PAD		WITH 20° SWEEP		WITH 90° SWEEP	
#4/0 AWG - AL	3	4"	24"	MIN	0.5	135	S				
020550030					0.4	287	S				
(3) 1,000’					0.3	560	S				
50-FT RADIUS		4"	36"	OPT	0.5	274	S				
					0.4	501	S				
					0.3	915	S				
		5"	36"	STD	0.5	660	S				
					0.4	1060	S	946	S	570	S
					0.3	1780	S				
#4/0 AWG - CU	3	4"	24"	MIN	0.5	91	S				
024020030					0.4	192	S				
(3) 1,000’					0.3	372	S				
50-FT RADIUS		4"	36"	OPT	0.5	184	S				
					0.4	334	S				
					0.3	608	S				
		5"	36"	STD	0.5	435	S				
					0.4	698	S	622	S	370	S
					0.3	1171	S				
500 KCMIL - AL	3	5"	36"	STD	0.5	212	S				
020580000					0.4	374	S	318	S	139	S
1,500’					0.3	670	S				
5” DUCT w/ 50-FT RADIUS 6” DUCT w/ 60-FT RADIUS		5"	48"	OPT	0.5	310	S				
					0.4	525	S				
					0.3	921	S				
		6"	36"	STD	0.5	451	S				
					0.4	721	S	642	S	382	S
					0.3	1210	S				
		6"	48"	OPT	0.5	628	S				
					0.4	989	S	889	S	555	S
					0.3	1643	S				

FACTOR LIMITING PULL: **T=**LIMITED BY PULLING TENSION, **S=**LIMITED BY SIDE WALL PRESSURE THROUGH THE BEND

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY CABLE PULLING IN CONDUIT SWEEP LIMITS (4/0 - 500 AL)

SPECIAL CASE: This chart illustrates the effect of a sweep on maximum pulling distance.

CONDUCTOR SIZE/MTL NES STOCK # LENGTH/REEL (FT)	# OF COND.	DUCT SIZE	ELBOW RADIUS	ELBOW DESCRIPTION	COEF. OF FRICT	MAXIMUM PULL DISTANCE (FT)					
						PAD TO RISER/PAD		WITH 20° SWEEP		WITH 90° SWEEP	
500 KCMIL - CU	3	5"	36"	STD	0.5	123	S				
024040000					0.4	214	S	180	S	66	S
1,500’					0.3	382	S				
5” DUCT W/ 50-FT RADIUS 6” DUCT W/ 60-FT RADIUS		5"	48"	OPT	0.5	180	S				
					0.4	301	S				
					0.3	526	S				
		6"	36"	OPT	0.5	261	S				
					0.4	416	S	368	S	206	S
					0.3	696	S				
		6"	48"	OPT	0.5	363	S				
					0.4	570	S	510	S	310	S
					0.3	946	S				
750 KCMIL - CU	3	6"	36"	STD	0.5	155	S				
024050000					0.4	252	S	216	S	96	S
1,200’					0.3	431	S				
60-FT RADIUS NOTE: JAMMING IS PROBABLE		6"	48"	OPT	0.5	217	S				
					0.4	347	S	305	S	162	S
					0.3	587	S				

FACTOR LIMITING PULL: T=LIMITED BY PULLING TENSION, **S=**LIMITED BY SIDE WALL PRESSURE THROUGH THE BEND

TRANSFORMERS

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

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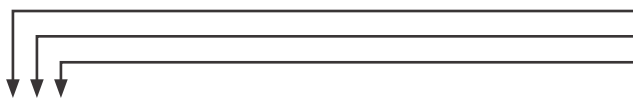
TRANSFORMER STOCK CODES

VOLTAGE CODE

CODE	PRIMARY VOLTAGE	SECONDARY VOLTAGE	CODE	PRIMARY VOLTAGE	SECONDARY VOLTAGE
02	PM 2400/4160Y LF	120/240	31	13,200	240
03	PM 2400/4160Y DF	120/240	32	13,200	240/480
04	2400/4160Y POLE TYPE	120/240	33	13,200	240X480
05	4160/2400 DRY	240/120	34	13,200	230/460
06	2400/4160Y	240/480	35	13,200	277
08	4160P	120/240	37	13,200	440
10	4160P	208Y/120	38	13,200	460
12	4160P	208Y/120	39		
13	PM 4160Y DF	208Y/120	40	13200 POLE MT	2.4/4.16Y OR 2.52/4.36Y KV
14	4160Y	240	41	13200 PLATFORM	2.4/4.16Y OR 2.52/4.36Y KV
15	PM 4160Y LF	208Y/120	42	13200 OTHER	2.4/4.16Y OR 2.52/4.36Y KV
16	4160Y	240X480	44	13,200/22,860Y NO TAP	120/240
17	PM 4160Y LF	480Y/277	46	13,800	120/240
18	4160P	480Y/277	47	13,800	125/250
19	PM 4160Y DF	480Y/277	48	13,800/23,900Y	125/250
20	11,800/13,200	2300/4000	49	13,800P	208Y/120
22	PM 13,800Y/7970 LF	120/240	50	13,800	230/460
23	PM 13,800Y/7970 DF	120/240	51	13,800	230X460
24	13,200Y/7620	240/480	52	13,800	240/480
25	13,200Y/7620	208Y/120	53	13,800	240X480
26	13,200/12,540/11,880	120/240/480	54	13,800/23,900	277
27	PM 13,200Y/7620 DF	208Y/120	55	13,800P	240X480
28	13,200	120/240	56	PM 13,800Y/7960 DF	208Y/120
29	13,200	125/250	57	13,800	277
30	13,200	220/440	58	13,800/23,900	277

KVA CODE

06	5		52	500
12	10		55	667
14	15		46	333
16	25		49	400
18	30		52	500
20	37.5		55	667
22	45		58	750
24	50		61	833
26	75		64	1,000
28	100		67	1,250
30	112.5		70	1,500
32	150		73	1,667
34	167		76	2,000
36	200		79	2,500
38	225		80	3,000
40	250		82	3,750
			85	5,000
43	300		90	7,500
46	333			
49	400		92	10,000



NES TRANSFORMER STOCK #: 928116000 The front of the transformer should be labeled 8116.

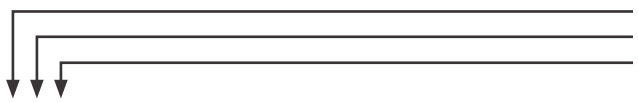
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

STOCK CODE NUMBERS

VOLTAGE CODE					
CODE	PRIMARY VOLTAGE	SECONDARY VOLTAGE	CODE	PRIMARY VOLTAGE	SECONDARY VOLTAGE
59	13,800	460	80	14,400/24,940Y	120/240
61	PM 13,800PLF	208Y/120	81	PM 13,800/23,900Y DF	120/240
62	13,800P	480Y/277	82	14,400/24,940Y	240/480
63	PM 13800 LF	480Y/277	83	PM 13,800/23,900Y DRY	240/120
64	13800 POLE MT	2400/4160Y OR 2520/4360Y	84	23,900Y/13,800	208Y/120
65	13800 PLATFORM	2400/4160Y OR 2520/4360Y	86	23,900Y/13,800	240X480
66	13800 OTHER	2400/4160Y OR 2520/4360Y	87	23900GRDY/13800	480/240
67	13800GRDY/7970	480/240	88	23,900Y/13,800	480Y/277
68	14,400	120/240	89	PM 14.4/24.9GRDY/14.4	7.96/13.8GRDY/7.96
69	14,400	125/250	90	23,900Y/13,800	7.97X13.8
70	14,400	208Y/120	91	DV 14.4/24,9Y/14,4 DRY VAULT	208Y/120
71	14,400	240/480	92	24,940Y/14,400	120/240
72	14,400	240X480	93	PM 14.4/24,9Y/14,4 DF	208Y/120
74	14,400	277	94	PM 14.4/24,9Y/14,4 LF	208Y/120
75	14,400/24,940	277	95	PM 14.4/24,9Y/14,4 DF	480Y/277
76	14400 POLE MT	2400/4160Y OR 2520/4360Y	96	PM 14.4/24,9Y/14,4 LF	480Y/277
77	14400 PLATFORM	2400/4160Y OR 2520/4360Y	97	PM 14.4/24,9Y/14,4 LF	4,160/2,400
78	14400 OTHER	2400/4160Y OR 2520/4360Y	98	PM 14.4/24,9Y/14,4 DF	4,160/2,400
79	PM 13,800/23,900Y LF	120/240	99	DV 13.8/23.9GRDY/13.8 DRY VAULT	480Y/277

TRANSFORMER TYPE CODE			
91	SINGLE PHASE POLE TYPE	94	THREE PHASE PAD-MOUNTED
92	SINGLE PHASE PAD-MOUNTED	95	THREE PHASE SUBMERSIBLE
93	THREE PHASE POLE TYPE	97	THREE PHASE DRY VAULT



NES TRANSFORMER STOCK #: 928116000 The front of the transformer should be labeled 8116.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

STOCK CODE NUMBERS (CONT'D)

SINGLE PHASE TRANSFORMER & COMPONENTS COMPATIBLE UNITS

XFMR TYPE	TRANSFORMER VOLTAGE							PRIMARY CABLE TERMINATOR & ARRESTER							
	4kV	7.96kV [1]	7.96kV [1]	13.8kV	13.8kV	23.9kV	23.9kV	4kV		7.96kV		13.8kV		23.9kV	
	120/240	120/240	480/240	120/240	480/240	120/240	480/240	TERM.	ARR.	TERM.	ARR.	TERM.	ARR.	TERM.	ARR.
kVA	**DEAD-FRONT TRANSFORMERS**														
25			UT6716 [3]	UT4616 [4]	UT4617 [4]	UT8116	UT8716							UELBC-1	ULA18DF
50	UT0324	UT2324 [3]		UT4624 [4]		UT8124		UELBC-1	ULA3DF	UELBC-1	ULA12DF			UELBC-1	ULA18DF
75	UT0326	UT2326 [3]				UT8126		UELBC-1	ULA3DF	UELBC-1	ULA12DF			UELBC-1	ULA18DF
100	UT0328	UT2328 [3]	UT6728 [3]	UT4628 [4]		UT8128	UT8728	UELBC-1	ULA3DF	UELBC-1	ULA12DF			UELBC-1	ULA18DF
167		UT2334 [3]				UT8134				UELBC-1	ULA12DF			UELBC-1	ULA18DF
250		UT2340 [3]				UT8140				UELBC-1	ULA12DF			UELBC-1	ULA18DF
kVA	**LIVE-FRONT TRANSFORMERS**														
25	UT0216 [2]							UCN-STRM1-40	ULA3LF			UCN-STRM1-40	ULA12LF		
50	UT0224 [2]			UT7924				UCN-STRM1-40	ULA3LF			UCN-STRM1-40	ULA12LF		
75				UT7926								UCN-STRM1-40	ULA12LF		
100	UT0228 [2]			UT7928								UCN-STRM1-40	ULA12LF		
167				UT7934								UCN-STRM1-40	ULA12LF		
250				UT7940								UCN-STRM1-40	ULA12LF		

The footnote number within table denotes the associated note number below.

NOTES

1. All 7.96 kV transformers are considered special application transformers check inventory stock level.
2. Only use these live front transformers to replace existing units where the cable will not allow installation of dead front equipment. Consult Operations department before using live front 4 kV units.
3. Caution: 7.96 kV transformers require effectively grounded system neutral to substation supply transformer.
4. Solid Dielectric Insulated Submersible “Turtle” style transformers.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

THREE PHASE TRANSFORMER & COMPONENTS COMPATIBLE UNITS

XFMR TYPE	TRANSFORMER VOLTAGE						PRIMARY CABLE TERMINATOR & ARRESTER					
	4kV	13.8kV	23.9kV	4kV	13.8kV	23.9kV	4kV		13.8kV		23.9kV	
	208/120	208/120	208/120	480/277	480/277	480/277	TERM.	ARR.	TERM.	ARR.	TERM.	ARR.
kVA	DEAD-FRONT TRANSFORMERS											
75		UT9326	UT9326		UT9526	UT9526					UELBC-1	ULA18DF
150		UT9332	UT9332		UT9532	UT9532					UELBC-1	ULA18DF
225		UT9338	UT9338		UT9538	UT9538					UELBC-1	ULA18DF
300		UT9343	UT9343		UT9543	UT9543					UELBC-1	ULA18DF
500		UT9352	UT9352		UT9552	UT9552					UELBC-1	ULA18DF
750		UT9358	UT9358		UT9558	UT9558					UELBC-1	ULA18DF
1000		UT9364	UT9364		UT9564	UT9564					UELBC-1	ULA18DF
1500		UT9370	UT9370		UT9570	UT9570					UELBC-1	ULA18DF
kVA	LIVE-FRONT TRANSFORMERS											
75		UT9426 [1]	UT9426 [1]						UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
112.5				UT1730 [1]			UCN-STRM1-40	ULA3LF				
150	UT1526 [1]	UT9432 [1]	UT9432 [1]	UT1732 [1]			UCN-STRM1-40	ULA3LF	UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
225					UT9638 [1]	UT9638 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
300	UT1543 [1]	UT9443 [1]	UT9443 [1]		UT9643 [1]	UT9643 [1]	UCN-STRM1-40	ULA3LF	UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
500		UT9452 [1]	UT9452 [1]						UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
750		UT9458 [1]	UT9458 [1]		UT9658 [1]	UT9658 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
1000		UT9464 [1]	UT9464 [1]		UT9664 [1]	UT9664 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
1500		UT9470 [1]	UT9470 [1]		UT9670 [1]	UT9670 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
2000					UT9676 [1]	UT9676 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
2500					UT9679 [1]	UT9679 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF
3750					UT9682 [1]	UT9682 [1]			UCN-STRM1-40	ULA12LF	UELBC-1	ULA18DF

The footnote number within table denotes the associated note number below.

NOTES

1. Live-front transformers are considered special application transformers check inventory stock level.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

THREE PHASE PAD-MOUNT TRANSFORMER CHART

SINGLE PHASE TRANSFORMER - REMOVALS		
C.U. NAME	DESCRIPTION	PROP. UNIT
RUT0216	REM PAD 1PH LF 25KVA 4160/2400-240/120	92021600
RUT0224	REM PAD 1PH LF 50KVA 4160/2400-240/120	92022400
RUT0228	REM PAD 1PH LF 100KVA 4160/2400-240/120	92022800
RUT0324	REM PAD 1PH DF 50KVA 2.4/4.16-120/240	92032400
RUT0326	REM PAD 1PH DF 75KVA 2.4/4.16-120/240	92032600
RUT0328	REM PAD 1PH DF 100KVA 2.4/4.16-120/240	92032800
RUT2134	REM PAD 1PH LF 167KVA 7200/4160-240/120	92213400
RUT2324	REM PAD 1PH DF 50KVA, 13.2/7.62-120/240	92232400
RUT2326	REM PAD 1PH DF 75KVA, 13.2/7.62-120/240	92232600
RUT2328	REM PAD 1PH DF 100KVA, 13.2/7.62-120/240	92232800
RUT2334	REM PAD 1PH DF 167KVA, 13.2/7.62-120/240	92233400
RUT2340	REM PAD 1PH DF 167KVA, 13.2/7.62-120/240	92234000
RUT4616	REM SI DF 1P 25KVA 13.8 120/240 (TURTLE)	96461600
RUT4617	REM SI DF 1P 25KVA 13.8 240/480 (TURTLE)	96461700
RUT4624	REM SI DF 1P 50KVA 13.8 120/240 (TURTLE)	96462400
RUT4628	REM SI DF 1P 100KVA 13.8 120/240 (TURTLE)	96462800
RUT5611	REM PAD 1PH DF 25KVA 13.8/7.97 480/240	92561160
RUT6716	REM PAD 1PH DF 25KVA 13.8/7.97 480/240	92671600
RUT6728	REM PAD 1PH DF 100KVA 13.8/7.97 480/240	92672800
RUT7024	REM TR PM LF 1P 50KVA 14.4-240/120 95BIL	92702400

SINGLE PHASE TRANSFORMER - REMOVALS		
C.U. NAME	DESCRIPTION	PROP. UNIT
RUT7026	REM PAD MTD 1PH LF 75KVA 14.4-120/240	92702600
RUT7028	REM TR PM LF 1P 75 14.4-240/120 95BIL	
RUT7034	REM PAD MTD 1PH LF 167KVA 14.4-120/240	92703400
RUT7040	REM PAD MTD 1PH LF 250KVA 14.4-120/240	92704000
RUT7924	REM PAD 1PH LF 50KVA 14.4/24.9-120/240LF	92792400
RUT7926	REM PAD 1PH LF 75KVA 14.4/24.9-120/240LF	92792600
RUT7928	REM PAD 1PH LF 100KVA 14.4/24.9-120/240L	92792800
RUT7934	REM PAD 1PH LF 167KVA 14.4/24.9-120/240L	92793400
RUT7940	REM PAD 1PH LF 250KVA 14.4/24.9-120/240L	92794000
RUT8116	REM PAD 1PH DF 25KVA 14.4/24.9-120/240	92811600
RUT8124	REM PAD 1PH DF 50KVA 14.4/24.9-120/240	92812400
RUT8126	REM PAD 1PH DF 75KVA 14.4/24.9-120/240	92812600
RUT8128	REM PAD 1PH DF 100KVA 14.4/24.9-120/240	92812800
RUT8134	REM PAD 1PH DF 167KVA 14.4/24.9-120/240	92813400
RUT8140	REM PAD 1PH DF 250KVA 14.4/24.9-120/240	92814000
RUT8324	REM TR PM LF 1P 50 24.9Y/14.4-240/120	92832400
RUT8326	REM TR PM LF 1P 75 24.9Y/14.4-240/120	92832600
RUT8660	REM PAD 1PH DF 25KVA 23.9/13.8 480/240	92866000
RUT8716	REM PAD 1PH DF 25KVA 23.9/13.8 480/240	92871600
RUT8728	REM PAD 1PH DF 100KVA 23.9/13.8 480/240	92872800

THREE PHASE TRANSFORMER - REMOVALS		
C.U. NAME	DESCRIPTION	PROP. UNIT
RUT1138	REM PAD MTD 3PH LF 225KVA 4160-208Y/120	94113800
RUT150-24-48	REM XMFR 3PH 23.9Y/13.8 150KVA 480/277	94963200
RUT1522	REM PAD MTD 3PH LF 45KVA 4160-216Y/125	94152200
RUT1526	REM PAD MTD 3PH LF 75KVA 4160-216Y/125	94152600
RUT1532	REM PAD MTD 3PH LF 150KVA 4160-216Y/125	94153200
RUT1540	REM PAD MTD 3PH LF 300KVA 4160-216Y/125	94154000
RUT500-24-48	REM XMFR 3PH 23.9Y/13.8 - 277/480 500KVA	94965200
RUT5626	REM TR PM 3P DF 75KVA 13.8/7.96-216Y/125	94562600
RUT5632	REM TR PM 3P DF 150KVA 13.8/7.96-216/125	94563200
RUT8779	REM TR PM 3P LF 2500 23.9/13.8-216Y/125	94877900
RUT8996	REM TR PM 3P LF 15MVA 23.9/13.8-13.8/7.9	94899600
RUT9164	REM TR DV 3PH 1000KVA 14.4/24.9-216Y/125	94916400
RUT9170	REM TR DV 3PH 1500KVA 14.4/24.9-216Y/125	94917000
RUT9326	REM TR PM DF 3P 75KVA 14.4/24.9-125/216	94932600
RUT9332	REM TR PM DF 3P 150KVA 14.4/24.9-125/216	94933200
RUT9338	REM TR PM DF 3P 225KVA 14.4/24.9-125/216	94933800
RUT9343	REM TR PM DF 3P 300KVA 14.4/24.9-125/216	94934300
RUT9352	REM TR PM DF 3P 500KVA 14.4/24.9-125/216	94935200
RUT9358	REM TR PM DF 3P 750KVA 14.4/24.9-125/216	94935800
RUT9364	REM TR PM DF 3P 1000 14.4/24.9-125/216	94936400
RUT9370	REM TF PM DF 3P 1500 14.4/24.9-125/216	94937000
RUT9426	REM TR PM 3P LF 75KVA 24.9/14.4-216Y/125	94942600

THREE PHASE TRANSFORMER - REMOVALS		
C.U. NAME	DESCRIPTION	PROP. UNIT
RUT9432	REM TR PM 3P LF 150KVA 24.9/14.4-216/125	94943200
RUT9438	REM PAD MTD 3PH LF 225KVA 24.9/14.4-216Y	94943800
RUT9443	REM PAD MTD 3PH LF 300KVA 24.9/14.4-216Y	94944300
RUT9452	REM TR PM 3P LF 500KVA 24.9/14.4-216/125	94945200
RUT9458	REM PAD MTD 3PH LF 750KVA 14.4/24.9-216	94945800
RUT9464	REM PAD MTD 3PH LF 1000KVA 14.4/24.9-216	94946400
RUT9470	REM TR PM 3PH LF 1500 14.4/24.9-125/216Y	94947000
RUT9526	REM PAD MTD 3PH DF 75KVA 14.4/24.9-480	94952600
RUT9532	REM PAD MTD 3PH DF 150KVA 14.4/24.9-480	94953200
RUT9538	REM PAD MTD 3PH DF 225KVA 14.4/24.9-480	94953800
RUT9543	REM PAD MTD 3PH DF 300KVA 14.4/24.9-480	94954300
RUT9552	REM PAD MTD 3PH DF 500KVA 14.4/24.9-480	94955200
RUT9558	REM PAD MTD 3PH DF 750KVA 14.4/24.9-480	94955800
RUT9564	REM PAD MTD 3PH DF 1000KVA 14.4/24.9-480	94956400
RUT9570	REM PAD MTD 3PH DF 1500KVA 14.4/24.9-480	94957000
RUT9574	REM PAD MTD 3PH DF 2000KVA 14.4/24.9-480	94957400
RUT9579	REM PAD 3PH DF 2500KVA 14.4/24.9-277/480	94957900
RUT9638	REM PAD MTD 3PH LF 225KVA 14.4/24.9-480	94963800
RUT9643	REM PAD MTD 3PH LF 300KVA 14.4/24.9-480	94964300
RUT9658	REM PAD MTD 3PH LF 750KVA 14.4/24.9-480	94965800
RUT9579	REM PAD 3PH DF 2500KVA 14.4/24.9-277/480	94957900
RUT9638	REM PAD MTD 3PH LF 225KVA 14.4/24.9-480	94963800

THREE PHASE TRANSFORMER - REMOVALS		
C.U. NAME	DESCRIPTION	PROP. UNIT
RUT9643	REM PAD MTD 3PH LF 300KVA 14.4/24.9-480	94964300
RUT9658	REM PAD MTD 3PH LF 750KVA 14.4/24.9-480	94965800
RUT9664	REM PAD MTD 3PH LF 1000KVA 14.4/24.9-480	94966400
RUT9670	REM PAD MTD 3PH LF 1500KVA 14.4/24.9-480	94967000
RUT9676	REM PAD MTD 3PH LF 2000KVA 14.4/24.9-480	94967600
RUT9679	REM PAD MTD 3PH LF 2500KVA 14.4/24.9-480	94967900
RUT9682	REM PAD MTD 3PH LF 3750KVA 14.4/24.9-480	94968200
RUT9764	REM TR PM 3PH LF 1000 14.4/24.9-2.4/4.1	94976400
RUT9779	REM TR PM 3PH LF 2500 14.4/24.9-2.4/4.1	94977900
RUT9782	REM TR PM 3PH LF 3750 14.4/24.9-2.4/4.1	94978200
RUT9784	REM TR PM 3PH LF 5000 14.4/24.9-2.4/4.1	94978400
RUT9792	REM TR PM 3PH LF 10MVA 14.4/24.9-2.4/4.1	94979200
RUT9870	REM TR PM 3PH DF 1500 14.4/24.9-4.16/2.4	94987000
RUT9964	REM DRY VAULT 3PH 1000KVA 14.4/24.9-480	94996400
RUT9970	REM DRY VAULT 3PH 1500KVA 14.4/24.9-480	94997000
RUT9979	REM DRY VAULT 3PH 2500KVA 14.4/24.9-480	94997900
RUT9980	REM DRY VAULT 3PH 3000KVA 14.4/24.9-480	94998000
RUT4616	REM TURTLE - SI DF 1P 25KVA 13.8	96461600
RUT4617	REM TURTLE - SI DF 1P 25KVA 13.8 240/480	96461700
RUT4624	REM TURTLE - SI DF 1P 50KVA 13.8 120/240	96462400
RUT4626	REM TURTLE - SI DF 1P 75KVA 13.8 120/240	96462600
RUT4628	REM TURTLE - SI DF 1P 100KVA 13.8 120/240	96462800

THREE PHASE LIVE FRONT WITHOUT INTERNAL FUSING

FUSE TYPE		TRANSFORMER kVA	4KV		13.8KV		23.9KV	
			XFMR	RISER	XFMR	RISER	XFMR	RISER
S&C E TYPE SM-4		750*			25E	NOTES 1&2	15E	NOTES 1&2
		1000*			40E		20E	
		1500*			50E		30E	
		2000			80E		40E	
		2500			100E		50E	
		3750			175E		80E	

* At these sizes always install internally fused transformers. These numbers are only for maintenance purposes.

SINGLE PHASE (INTERNALLY FUSED) DEAD & LIVE FRONT TRANSFORMERS

FUSE TYPE	TRANSFORMER kVA	4KV		7.96KV		13.8 Δ or 23.9KV	
		XFMR	RISER	XFMR	RISER	XFMR	RISER
CURRENT SENSING BAY-O-NET	25		NOTES 1&2	6	NOTES 1&2	6	NOTES 1&2
	50	40		15		10	
	75	65		15		10	
	100	65		25		15	
	167			40		25	
	250			65		40	

THREE PHASE (INTERNALLY FUSED) DEAD & LIVE FRONT TRANSFORMERS

FUSE TYPE	TRANSFORMER kVA	4KV		13.8KV		23.9KV	
		XFMR	RISER	XFMR	RISER	XFMR	RISER
CURRENT SENSING BAY-O-NET	75	25	NOTES 1&2	10	NOTES 1&2	6	NOTES 1&2
	150	40		15		10	
	225	65		15		15	
	300	65		25		15	
	500			40		25	
	750			65		40	
	1000			65		40	
	1500			100		65	

THREE PHASE (NON-FUSED) VAULT DEAD FRONT TRANSFORMERS

FUSE TYPE	TRANSFORMER kVA	13.8KV		23.9KV	
		XFMR	SWITCH/RISER	XFMR	SWITCH/RISER
N/A	500		NOTES 1&2		NOTES 1&2
	1000				
	1500				
	2500				
	3000				

FUSING CHART FOR EXISTING XFMRS IN SERVICE ONLY (REFERENCE ONLY)

FUSE TYPE	TRANSFORMER kVA	4KV		7.96KV		13.8KV		23.9KV	
		XFMR	RISER	XFMR	RISER	XFMR	RISER	XFMR	RISER
DRYWELL CANISTER (NX) RISER (D OR K)	25			6	10	3	10	3	10
	50	25	30	10	12	6	10	6	10
	75	50	65	18	20	10	10	10	10
	100	65	65	25	25	12	12	12	12
	167			40	50	18	20	18	20
	250			45	50	30	30	30	30

NOTES

1. Engineering designer to consult with design engineering for riser fuse sizes based on location for fuse coordination. Indicate fuse size on installation drawing required.
2. Operations crew - contact the load dispatcher when replacing riser fuses to ensure matching GIS/CADOPS maps. (Transformer fusing initially fused by Manufacturer listed in the individual Transformer Materials plate within ths section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER & RISER FUSING CHART

SECONDARY CURRENT @ 100% OF THE NAMEPLATE RATING

TRANSFORMER		SECONDARY VOLTAGE					
SIZE	Z%	208	480	480	240	4160	13800
kVA	-7.50%	Y/120	Y/277	Delta	Delta	Y/2400	y/7960
45	3.46875	120	54	54	108		
75	3.46875	200	90	90	180		
112.5	3.46875	300	135	135	270		
150	3.46875	400	180	180	360		
225	3.46875	600	270	270	540		
300	3.46875	801	360	360	720		
500	5.31875	1,334	600	600	1,201		
750	5.31875	2,001	901	901	1,801		
1,000	5.31875	2,668	1,201	1,201	2,402	139	42
1,500	5.31875	4,003	1,801	1,801	3,602	208	63
2,000	5.31875	5,337	2,402	2,402	4,803	277	84
2,500	5.31875		3,002	3,002	6,004	346	104
3,000	5.31875		3,602	3,602	7,205	416	125
3,750	5.31875		4,503	4,503	9,006	520	157
5,000	5.31875					693	209
7,500	5.31875						313
10,000	5.31875						418

Formula:
Current = kVA / 1.735*Voltage

FAULT CURRENT AVAILABLE @ THE TRANSFORMER SECONDARY

TRANSFORMER		SECONDARY VOLTAGE					
SIZE	Z%	208	480	480	240	4160	13800
kVA	-7.50%	Y/120	Y/277	Delta	Delta	Y/2400	y/7960
45	3.46875		2,596	1558	3,116		
75	3.46875	6,430	5,193	2596	5,193		
112.5	3.46875		7.789	3,894	7,789		
150	3.46875	12,860	10,385	5,193	10,385		
225	3.46875	19,291	11,288	77,89	15,578		
300	3.46875	25,721	16,932	10,385	20,770		
500	5.31875	28,203	22,576	11288	22576		
750	5.31875	42,304	33,864	16932	33,864		
1,000	5.31875	56,406	45,152	22,576	45,152	2,605	785
1,500	5.31875	84,608	56,440	33,864	67,728	3,907	1,178
2,000	5.31875		67,728	45,152	90,305	5,210	1,571
2,500	5.31875		84,661	56,440	112,881	6,512	1,963
3,000	5.31875			67,728	135,457	7,815	2,356
3,750	5.31875			84,661	169,321	9,769	2,945
5,000	5.31875					13,025	3,926
7,500	5.31875						5,889
10,000	5.31875						7,853

These figures do not apply to the downtown network area.
Base Secondary Current @ 100% of Transformer Rating / Z%

NOTES

1. Operations crew to contact Energy Services Engineering when making Emergency transformer replacements that increase or decrease transformer kVA size.
2. CAUTION: Limit increase of one larger transformer size due to Customers Service Fault Current rating.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER FAULT CURRENT TABLE

STOCK CODE	ITEM DESCRIPTION	STOCK CODE	ITEM DESCRIPTION	STOCK CODE	ITEM DESCRIPTION
CURRENT LIMITING FUSES		**TRANSFORMER FUSE (BAY-O-NET TYPE)**		**RISER CUTOUT FUSE HOLDERS**	
260280000	FUSE CAP CUR LMTG/1-12A K LINK	260203000	FUSE 3 AMP CURRENT SENSING BAYONET	144800000	FUSE HOLDER 100 A LBU ABB
260300000	FUSE CUR LMTG/20-25A D LINK	260206000	FUSE 6 AMP CURRENT SENSING BAYONET	144805000	FUSE HOLDER 200 A LBU ABB
260310000	FUSE CUR LMTG/30-40A D LINK	260210000	FUSE 8 AMP CURRENT SENSING BAYONET	144807000	FUSE HOLDER 100 AMP UNIVERSAL
RISER CUTOUT EXPULSION FUSES		260210010	FUSE 10 AMP CURRENT SENSING BAYONET	**RISER POWER FUSES**	
261051000	FUSE LINK 1A TYPE D	260220000	FUSE 15 AMP CURRENT SENSING BAYONET	263474500	FUSE REFILL 250E 23KV SMU-40 STD
261051500	FUSE LINK 1.5A TYPE D	260230000	FUSE 25 AMP CURRENT SENSING BAYONET	263475000	FUSE RFL 300E 23KV SMU-40 SLOW
261052000	FUSE LINK 2A TYPE D	260230040	FUSE 40 AMP CURRENT SENSING BAYONET	263475500	FUSE RFL 300E 23 KV SMU-40 STD
261053000	FUSE LINK 3A TYPE D	260240000	FUSE 50 AMP CURRENT SENSING BAYONET	263476000	FUSE RFL 400E 23KV SMU-40 SLOW
261054000	FUSE LINK 4A TYPE D	260240100	FUSE 100 AMP CURRENT SENSING BAYONET	**TRANSFORMER FUSE (SM-TYPE)**	
261055000	FUSE LINK 5A TYPE D	260250000	BAYONET COPPER LINK SHORTING BAR	150100000	CLIP FUSE S&C SM4 NDT
261057000	FUSE LINK 7A TYPE D	260250010	FUSE 125 AMP CURRENT SENSING BAYONET	150120000	CLIP FUSE S&C SM5 NDT
261060000	FUSE LINK 10A TYPE D	260250020	FUSE 140 AMP CURRENT SENSING BAYONET	150350000	HOLDER FUSE 15KV 400A SM-5 NDT
261063000	FUSE LINK 15A TYPE D	260260000	FUSE BAY-O-NET CART & END CAP	150360000	HOLDER FUSE 23KV 200A SM-4 NDT
261065000	FUSE LINK 20A TYPE D	260265000	FUSE BAY-O-NET INNER HOLDER	150362000	HOLDER FUSE 25KV 200A SM-4S NDT
261067000	FUSE LINK 25A TYPE K	260266500	FUSE 65 AMP CURRENT SENSING BAYONET	150365000	HOLDER FUSE 23KV 300A SM-5 DT
261069000	FUSE LINK 30A TYPE K	**TRANSFORMER FUSE (DRYWELL)**		150540000	MOUNT/LESS HOLDER 200A 25KV SM-4
261072000	FUSE LINK 40A TYPE K	265100000	FUSE DRYWELL 12A 8.3KV	263192000	FUSE REFILL 25E A 15KV SM-4
261074000	FUSE LINK 50A TYPE K	265120000	FUSE DRYWELL 25A 8.3KV	263193000	FUSE REFILL 40E A 15KV SM-4
261077000	FUSE LINK 65A TYPE K	265130000	FUSE DRYWELL 30A 8.3KV	263194000	FUSE REFILL 65E A 15KV SM-4
261080000	FUSE LINK 80A TYPE K	265140000	FUSE DRYWELL 45A 8.3KV	263200000	FUSE REFILL 100E A 15KV SM-4
261083000	FUSE LINK 100A TYPE K	265170000	FUSE DRYWELL 25A 8.3KV	263220000	FUSE REFILL 125E A 15KV SM-4
261083200	FUSE LINK 102A COORDINATING FUSE	265200000	FUSE DRYWELL 4A 15.5KV	263220200	FUSE REFILL 150EA 15KV SM4
261083300	FUSE LINK 103A COORDINATING FUSE	265210000	FUSE DRYWELL 8A 15.5KV	263225000	FUSE REFILL 25E 14.4KV SM-5; SLOW SPEED
261086000	FUSE LINK 140A TYPE K	265220000	FUSE DRYWELL 12A 15.5KV	263230000	FUSE REFILL 65A 14.4KV SM-5
261089000	FUSE LINK 200A TYPE K	265230000	FUSE DRYWELL 18A 15.5KV	263235000	FUSE REFILL 125A 14.4 KV SM-5

STOCK CODE	ITEM DESCRIPTION
TRANSFORMER FUSE (SM-TYPE)	
263240000	FUSE REFILL 150E A 15KV SM-5
263250000	FUSE REFILL 175E A 14.4KV SM-5
263260000	FUSE REFILL 200E A 15KV SM-5
263280000	FUSE REFILL 250E A 15KV SM-5
263300000	FUSE REFILL 300E A 15KV SM-5
263310000	FUSE REFILL 400E A 14.4KV SM-5
263376000	FUSE REFILL 15E A 23KV SM-4
263378000	FUSE REFILL 20E A 23KV SM-4
263380000	FUSE REFILL 25E A 23KV SM-4
263382000	FUSE REFILL 30E A 23KV SM-4
263384000	FUSE REFILL 40E A 23KV SM-4
263386000	FUSE REFILL 50E A 23KV SM-4
263390000	FUSE REFILL 65E A 23KV SM-4
263395000	FUSE REFILL 80E A 23KV SM-4
263400000	FUSE REFILL 100E A 23KV SM-4
263420000	FUSE REFILL 125E A 23KV SM-4
263440000	FUSE REFILL 150E A 23KV SM-4
263460000	FUSE REFILL 175E A 23KV SM-4
263461000	FUSE REFILL 200E A 23KV SM-4
263464000	FUSE REFILL 65E A 23KV SM-5
263466000	FUSE REFILL 125E A 23KV SM-5
263468000	FUSE REFILL 150E A 23KV SM-5
263472000	FUSE REFILL 250E A 23KV SM-5
263474000	FUSE REFILL 300E A 23KV SM-5

STOCK CODE	ITEM DESCRIPTION
REPLACEMENT ONLY- XFMR FUSE (NX-TYPE)	
263503000	FUSE UNIT NX SAND 3A 15.5KV/HINGE
263506000	FUSE UNIT NX SAND 6A 15.5KV/HINGE
263508000	FUSE UNIT NX SAND 8A 15.5KV/HINGE
263510000	FUSE UNIT NX SAND 10A 15.5KV/HINGE
263512000	FUSE UNIT NX SAND 12A 15.5KV/HINGE
263514000	FUSE UNIT NX SAND 18A 15.5KV/HINGE
263516000	FUSE UNIT NX SAND 30A 15.5KV/HINGE
263517000	FUSE UNIT NX SAND 40A 15.5KV/HINGE
263600000	FUSE NX SAND 3A 15.5KV/CANSTR
263602000	FUSE NX SAND 6A 15.5KV/CANSTR
263604000	FUSE NX SAND 8A 15.5KV/CANSTR
263606000	FUSE NX SAND 10A 15.5KV/CANSTR
263608000	FUSE NX SAND 12A 15.5KV/CANSTR
263610000	FUSE NX SAND 15A 15.5KV/CANSTR
263612000	FUSE NX SAND 18A 15.5KV/CANSTR
263614000	FUSE NX SAND 20A 15.5KV/CANSTR
263616000	FUSE NX SAND 25A 15.5KV/CANSTR
263618000	FUSE NX SAND 30A 15.5KV/CANSTR
263620000	FUSE NX SAND 40A 15.5KV/CANSTR
263624000	FUSE NX SAND 50A 15.5KV/CANSTR

STOCK CODE	ITEM DESCRIPTION
REPLACEMENT ONLY - SPARE PARTS[1]	
263020000	FUSE PRI 50-75KVA 14.4KV CTC
263022000	FUSE PRI 100KVA 14.4KV CTC
263024000	FUSE PRI 167KVA 14.4KV CTC
263026000	FUSE PRI 250KVA 14.4KV CTC
263040000	FUSE PRI 50KVA 14.4KV GE
263042000	FUSE PRI 75KVA 14.4KV GE
263044000	FUSE PRI 100KVA 14.4KV GE
263046000	FUSE PRI 167/250KVA 14.4KV GE
263070000	FUSE PRI 50KVA 14.4KV ME
263072000	FUSE PRI 75KVA 14.4KV ME
263074000	FUSE PRI 100/167KVA 14.4KV ME
263076000	FUSE PRI 250KVA 14.4KV ME
263170000	FUSE PRI 50KVA 14.4KV/TAP WH
263171000	FUSE PRI 75KVA 14.4KV/TAP WH
263172000	FUSE PRI 75KVA 14.4KV/STUD WH
263173000	FUSE PRI 100KVA 14.4KV/TAP WH
263174000	FUSE PRI 100KVA 14.4KV/STUD WH
263175000	FUSE PRI 167KVA 14.4KV/TAP WH
263176000	FUSE PRI 167KVA 14.4KV/STUD WH
263178000	FUSE PRI 250KVA 14.4KV/TAP WH
263185000	FUSE REFILL; S&C FAULT FITER ELECTRONIC

The footnote number within table denotes the associated note number below.

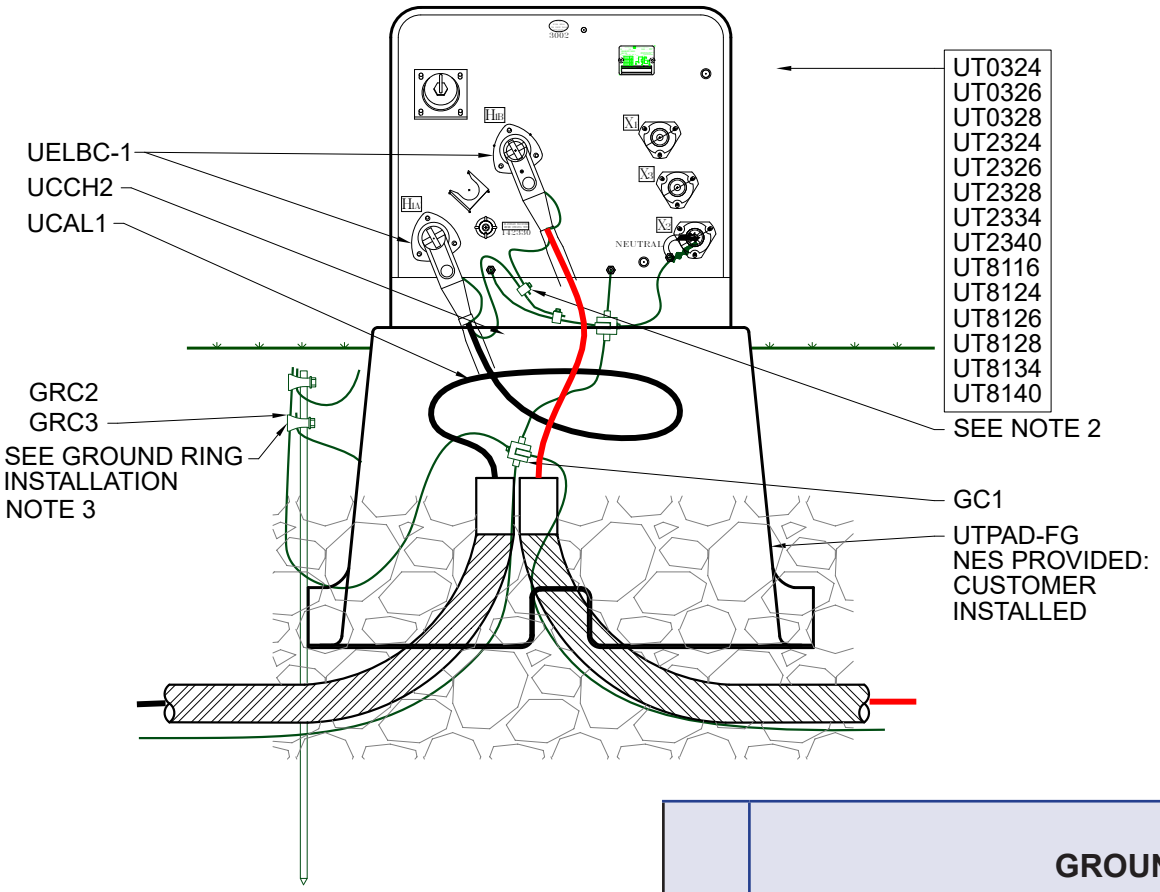
NOTES

1. Special Installed Fuses with specific fuse curves maintained as “spares” use abbreviations as follows:

CTC = Central Transformer Company
GE = General Electric
ME = McGraw-Edison
WH = Westinghouse

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SINGLE PHASE
PAD-MOUNT & TURTLE
TRANSFORMERS



GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

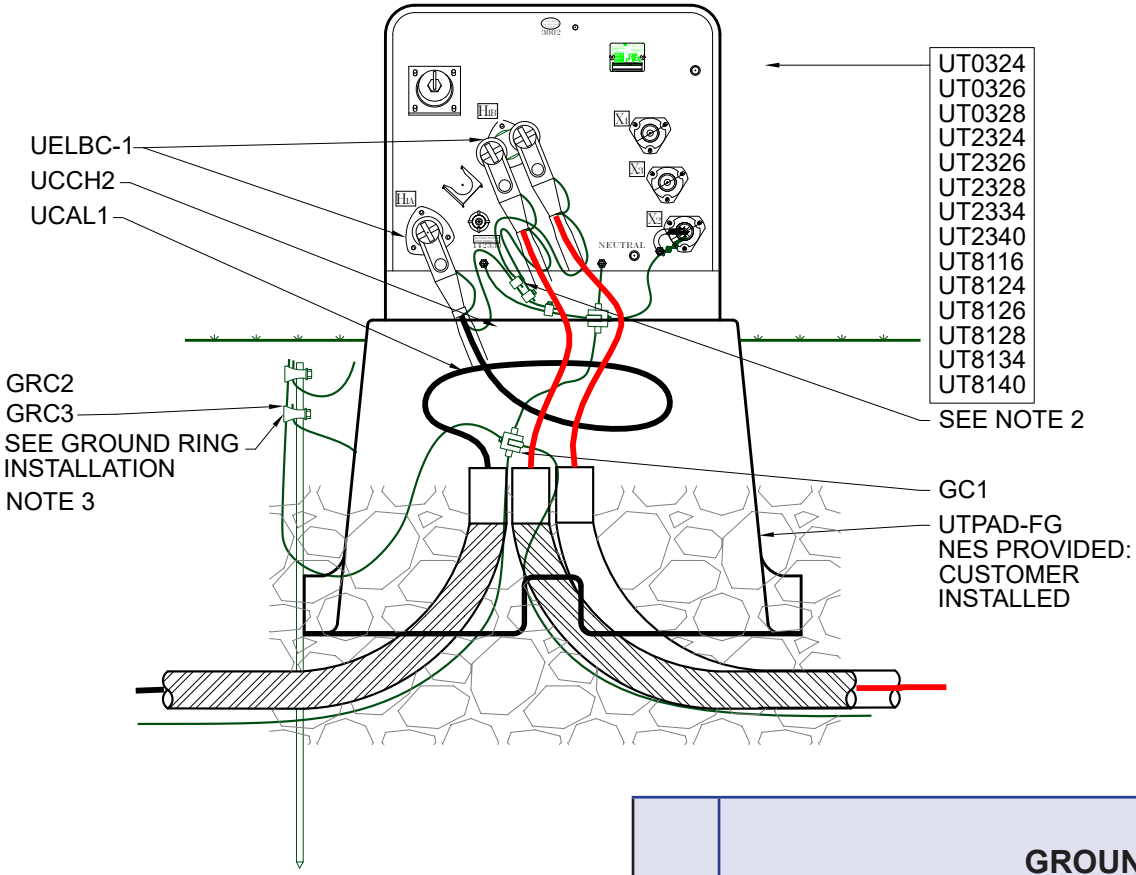
NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (DF) PAD-MOUNT TRANSFORMER LOOP FEED



GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

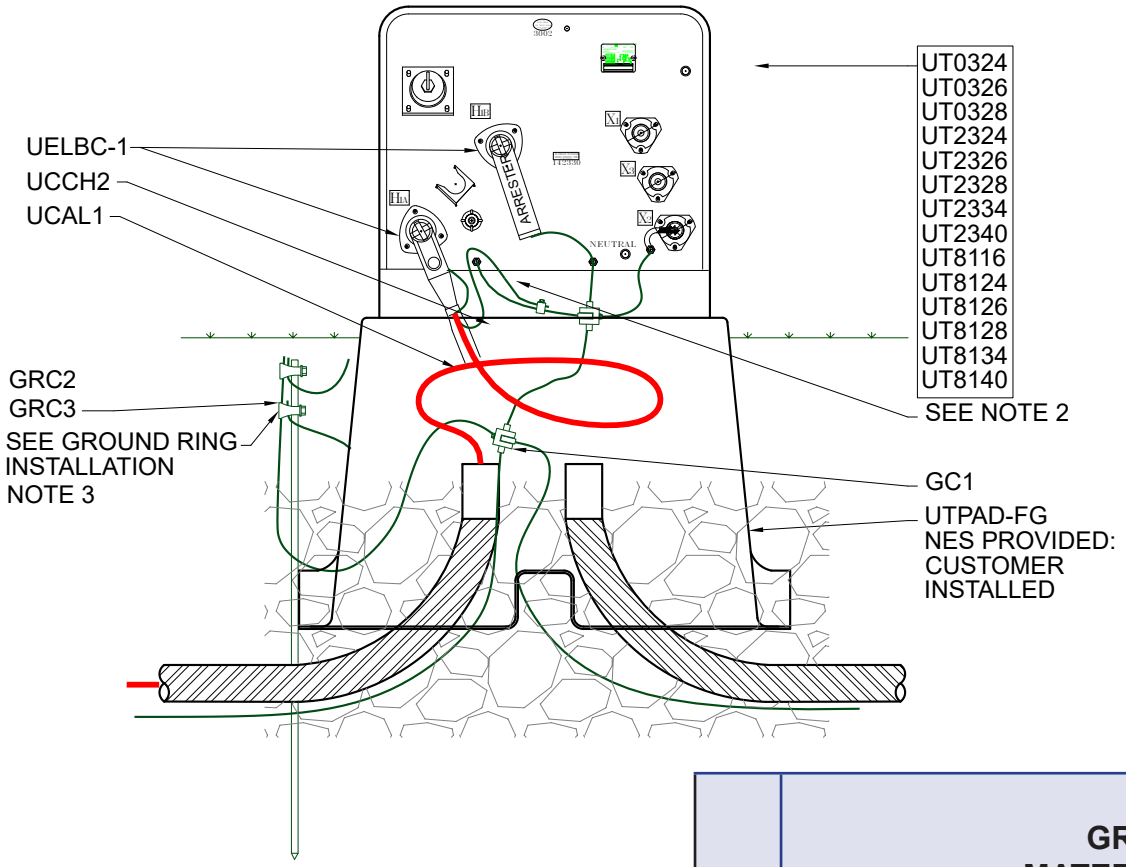
NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (DF) PAD-MOUNT TRANSFORMER FEED THRU



GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

NOTES

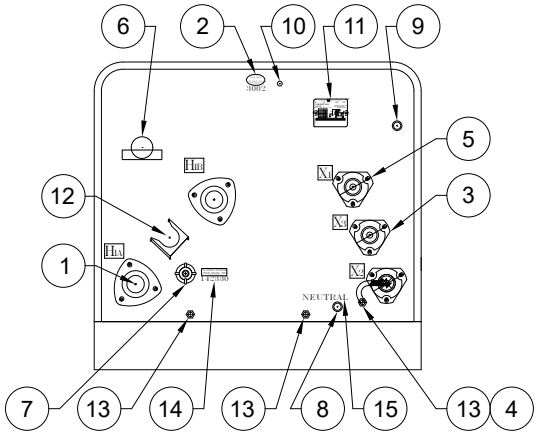
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).
4. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

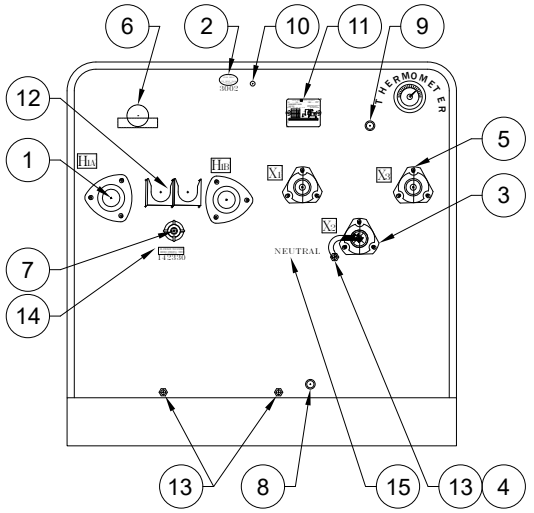
NES

SINGLE PHASE (DF) PAD-MOUNT TRANSFORMER DEAD-END

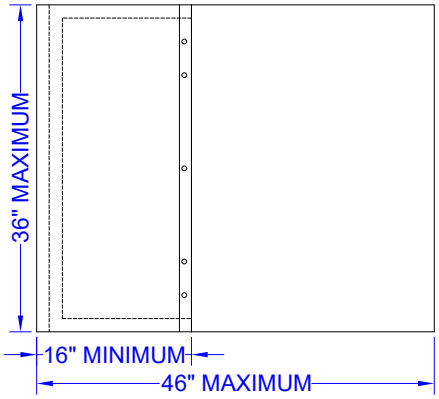
DEAD FRONT TRANSFORMER	
TYPICAL COMPONENTS	
ITEM	DESCRIPTION
1	HIGH VOLTAGE WELLS (LOOP FEED)
2	PRESSURE RELIEF VALVE DECAL
3	LOW VOLTAGE BUSHING
4	REMOVABLE COPPER GROUND STRAP
5	4/6/8 HOLE H TYPE SPADES
6	BAYONET FUSE
7	TAP CHANGER SWITCH
8	1/2” DRAIN PLUG
9	1/2” FILL PLUG
10	PRESSURE RELIEF VALVE
11	TYPE A NAMEPLATE
12	PARKING STAND
13	1/2”-13 GROUND PAD
14	TAP CHANGER DE-ENERGIZE DECAL
15	STENCIL NEUTRAL IN 1/2” YELLOW LETTERS



FRONT VIEW
25-100kVA



FRONT VIEW
167-250kVA



LIMITING DIMENSIONS

TRANSFORMER KVA	IMPEDANCE
25	Z > 2.1%
50	Z > 2.1%
75	Z > 3.2%
100	Z > 2.1%
167	Z > 3.2%
250	Z > 4.8%

NOTES

1. NES Specification number: ET-561-X
2. Transformers may vary in placement of features and dimensions.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (DF) PAD-MOUNT TRANSFORMER DETAILS

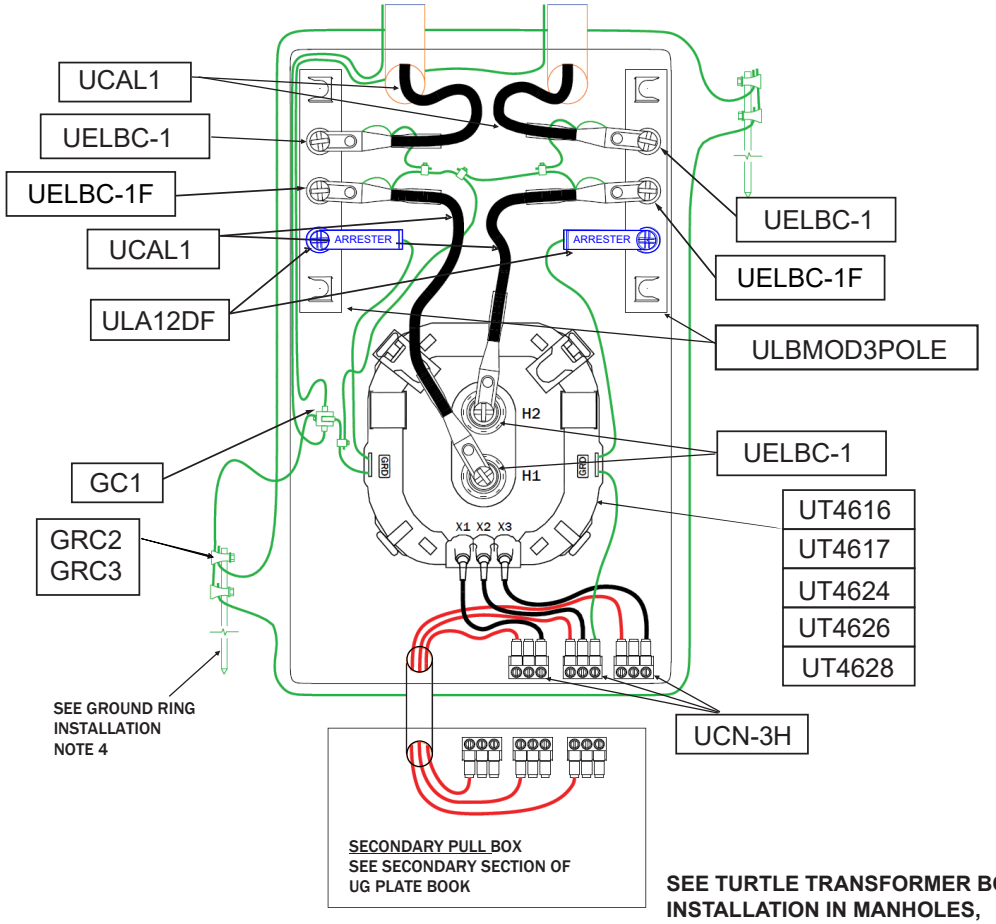
SINGLE PHASE - DEAD-FRONT - PAD-MOUNTED TRANSFORMERS								
COMPATIBLE UNIT	NES STOCK #	PRIMARY VOLTAGE (V)	SECONDARY VOLTAGE (V)	RATING (kVA)	BIL (kV)	FUSE SIZE (AMPS)	FUSE TYPE	TAP SETTINGS (kV)
UT0324	920324000	4,160 GRD WYE/2,400	240/120	50	60	40	BAY-O-NET	2.52 2.46 2.40 2.34 2.28
UT0326	920326000	4,160 GRD WYE/2,400	240/120	75	60	65	BAY-O-NET	
UT0328	920328000	4,160 GRD WYE/2,400	240/120	100	60	65	BAY-O-NET	
UT6716	926716000	13,800 GRD WYE /7,970	480/240	25	95	6	BAY-O-NET	8.37 8.16 7.97 7.77 7.57
UT2324	922324000	13,800 GRD WYE /7,970	240/120	50	95	15	BAY-O-NET	
UT2326	922326000	13,800 GRD WYE /7,970	240/120	75	95	25	BAY-O-NET	
UT2328	922328000	13,800 GRD WYE /7,970	240/120	100	95	25	BAY-O-NET	
UT2334	922334000	13,800 GRD WYE /7,970	240/120	167	95	40	BAY-O-NET	
UT2340	922340000	13,800 GRD WYE /7,970	240/120	250	95	65	BAY-O-NET	
UT8116	928116000	23,900 GRD WYE /13,800	240/120	25	125	6	BAY-O-NET	14.4 14.1 13.8 13.5 13.2
UT8124	928124000	23,900 GRD WYE /13,800	240/120	50	125	10	BAY-O-NET	
UT8126	928126000	23,900 GRD WYE /13,800	240/120	75	125	10	BAY-O-NET	
UT8128	928128000	23,900 GRD WYE /13,800	240/120	100	125	15	BAY-O-NET	
UT8134	928134000	23,900 GRD WYE /13,800	240/120	167	125	25	BAY-O-NET	
UT8140	928140000	23,900 GRD WYE /13,800	240/120	[1]250	125	40	BAY-O-NET	
The footnote number within table denotes the associated note number below.								

ITEMS REQUIRED FOR CABLE CONNECTION						
SYSTEM VOLTAGE	23.9kV		7.96kV		4kV	
CABLE CONFIGURATION	CU	QTY	CU	QTY	CU	QTY
LOOP FEED	UELBC-1	2	UELBC-1	2	UELBC-1	2
LOOP WITH FEED-THROUGH BUSHING	UELBC-1	3	UELBC-1	3	UELBC-1	3
DEAD END	UELBC-1	1	UELBC-1	1	UELBC-1	1
	ULA18DF	1	ULA12DF	1	ULA3DF	1

NOTES

1. All dead-front transformers ordered since the date of this standard should arrive with 200A 25kV bushing inserts. This includes both the 13.8kV and 4kV transformers.
2. These transformers can only be used on 13.8kV circuits where there is a system neutral from the substation to the riser pole feeding the underground circuit. Care must be taken before selecting these transformers because the 13.8kV system is predominately a delta configuration.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE



SEE TURTLE TRANSFORMER BOX INSTALLATION IN MANHOLES, BOXES, PADS SECTION.

FUSE REPLACEMENT ITEMS MATERIAL LIST			
CU ITEM	DESCRIPTION	QTY	STOCK #
UELBC-1F	CONN ELBOW NLB FUSED 1AL 15/25KV 200A	1	400414800
	FUSE 15KV CLF 6A ELBOW MOUNTED	1	260299000
	CABLE SEALING KIT #1 - 4/0	1	400318000

NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
4. Ground Ring re'q (see pg. 3 - Cable Installation section).
5. UELBC-1F provides (2) fused elbows w/ 6 Amp fuses for localized protection.
6. Fused elbows shall be fitted with cable tags showing installed fuse amperage = 6 Amps.
7. In the event of a blown fuse, both fuses shall be replaced.

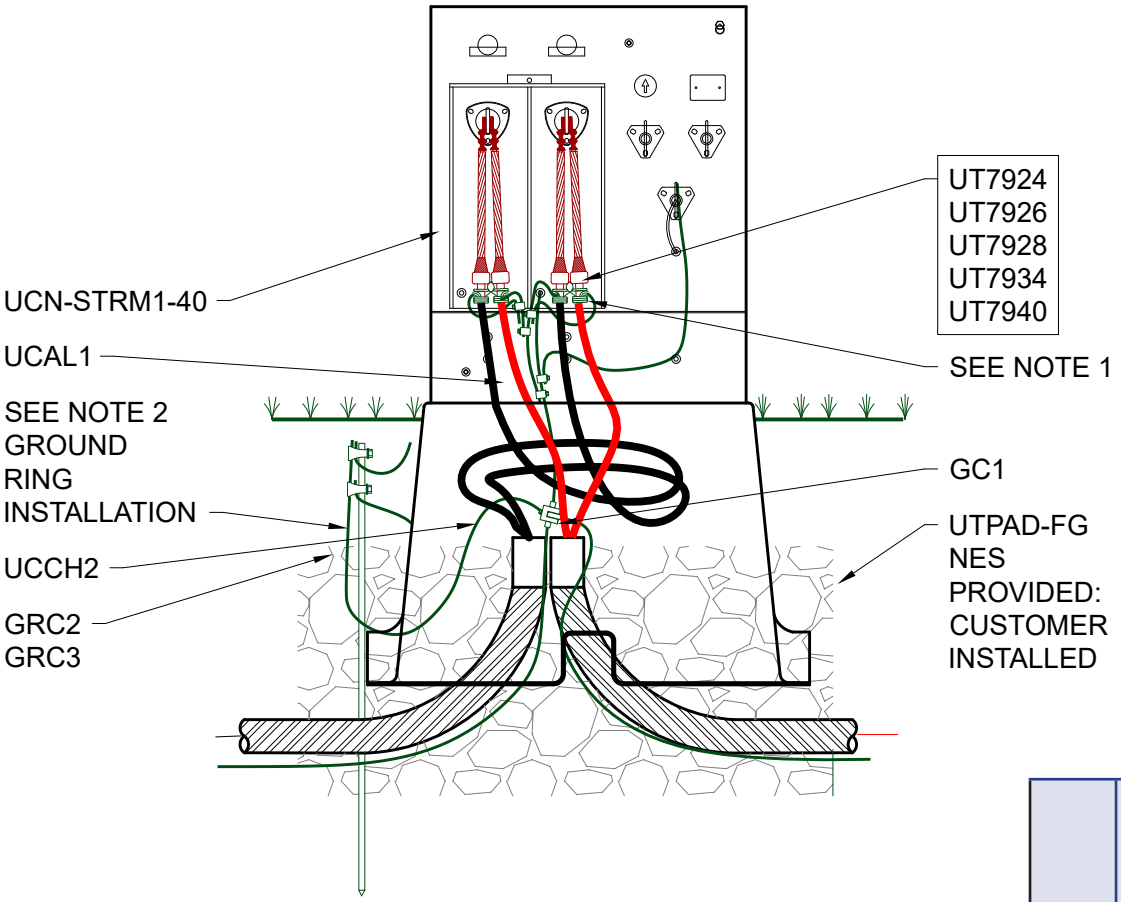
GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (DF) TURTLE TRANSFORMER 13.8KV - DEAD END



CAUTION:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

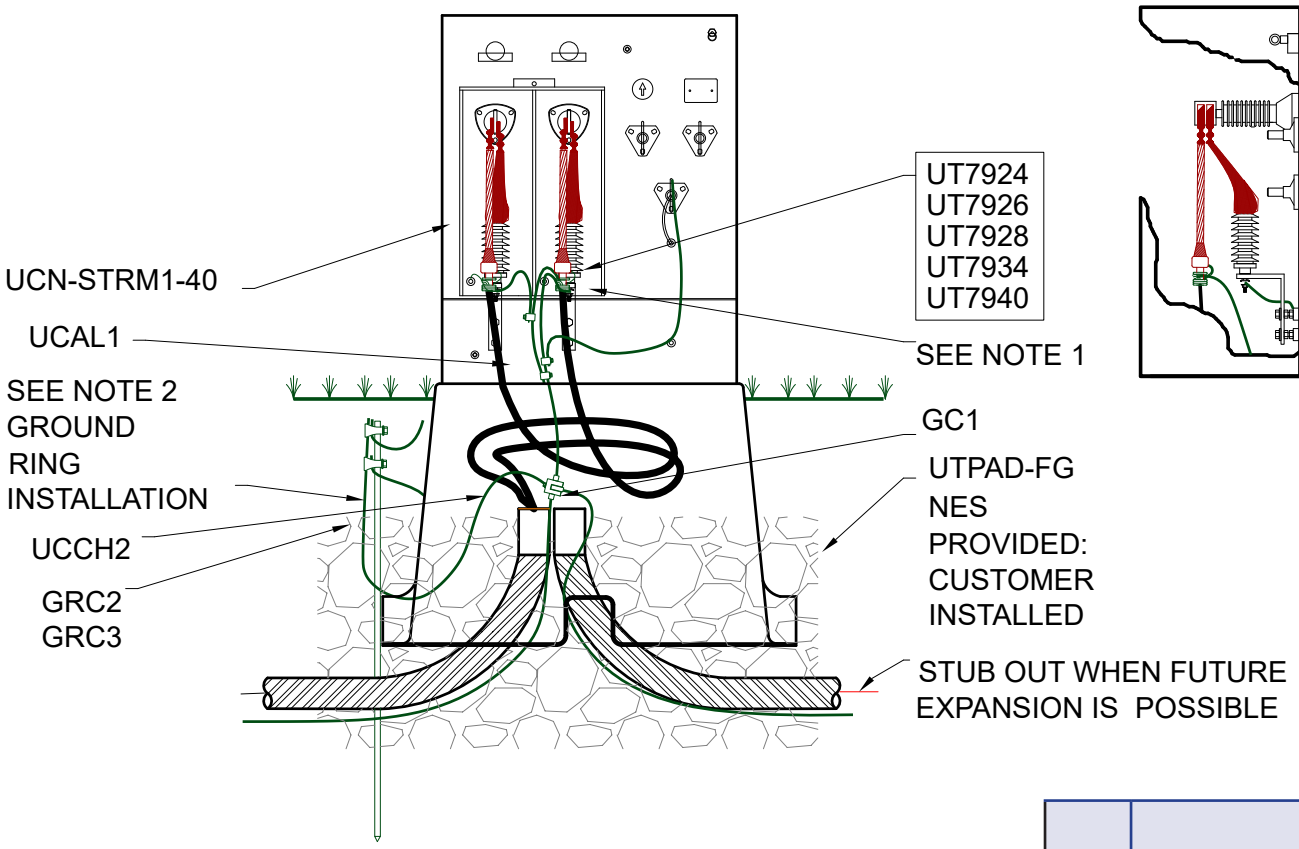
NOTES

1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground Ring not shown (see pg. 3 - Cable Installation section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (LF) PAD-MOUNT TRANSFORMER 13.8KV - LOOP FEED



CAUTION:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

NOTES

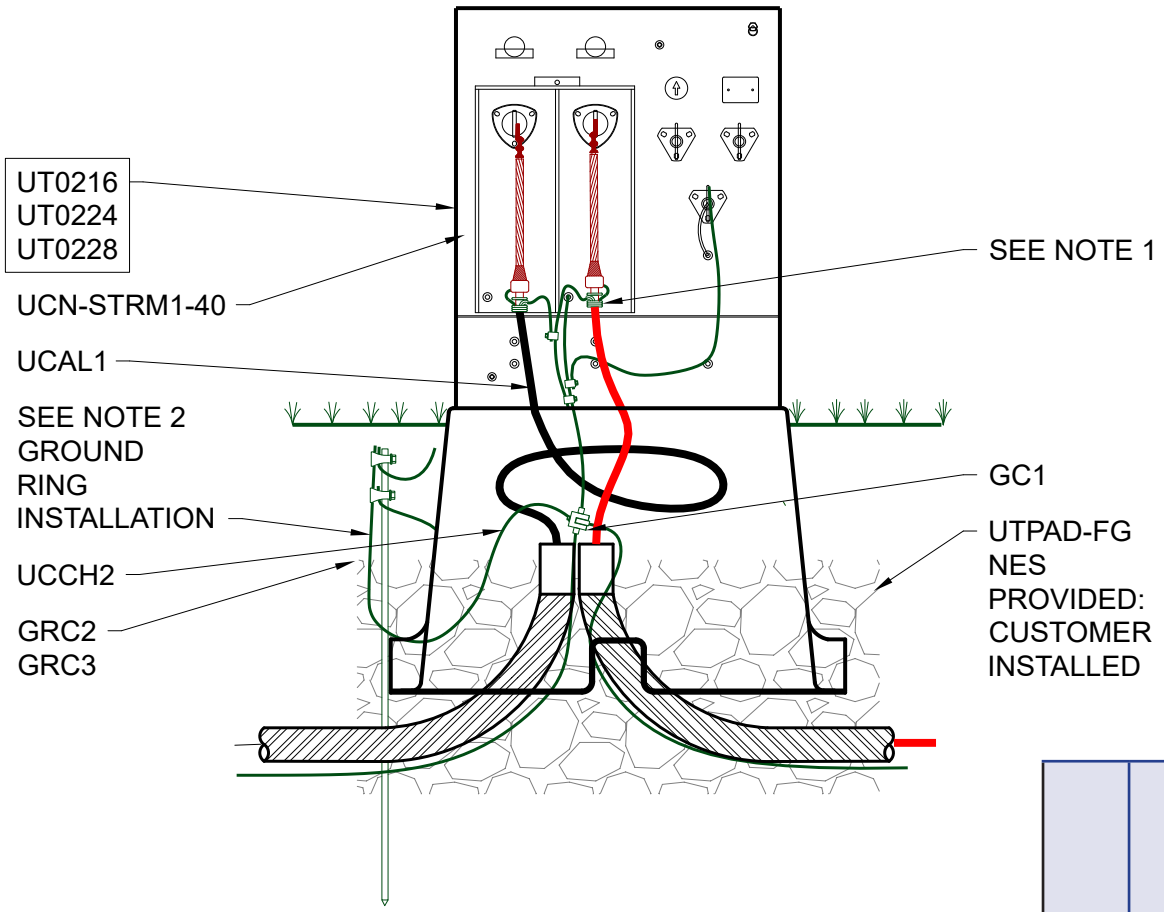
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground Ring not shown (see pg. 3 - Cable Installation section).
3. Leads from the arrester to the transformer tank and HV bushing must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

TRANSFORMERS

NES

SINGLE PHASE (LF) PAD-MOUNT TRANSFORMER 13.8KV - DEAD END



CAUTION:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

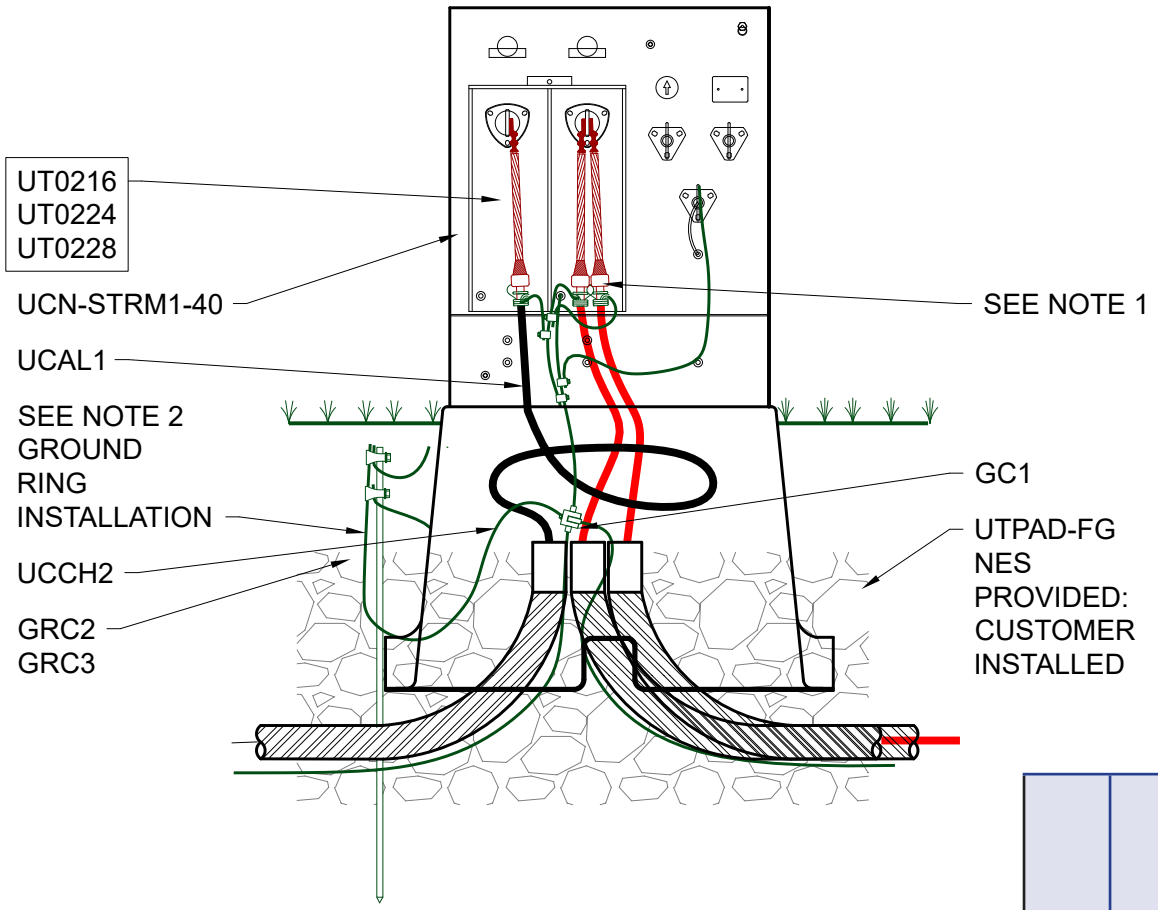
NOTES

1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground Ring not shown (see pg. 3 - Cable Installation section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (LF) PAD-MOUNT TRANSFORMER 4KV - LOOP FEED



CAUTION:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

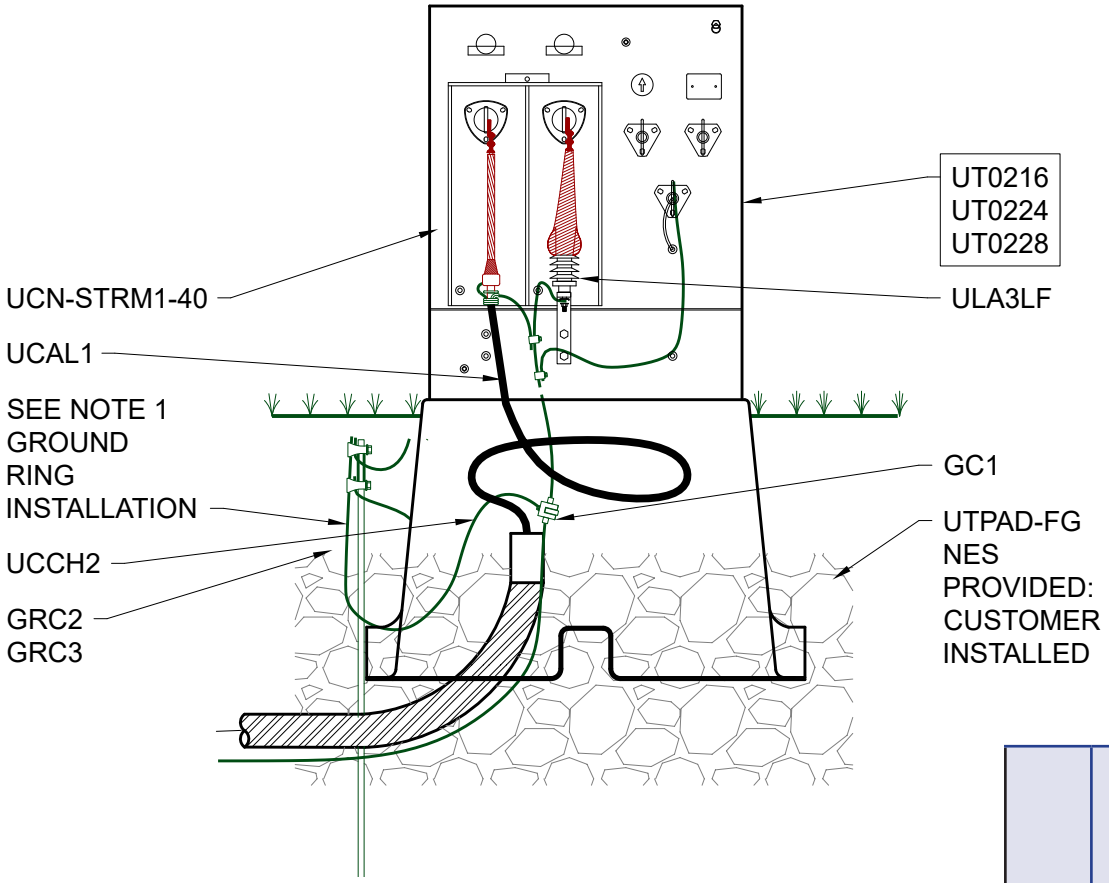
GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

NOTES

1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground Ring not shown (see pg. 3 - Cable Installation section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE



CAUTION:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

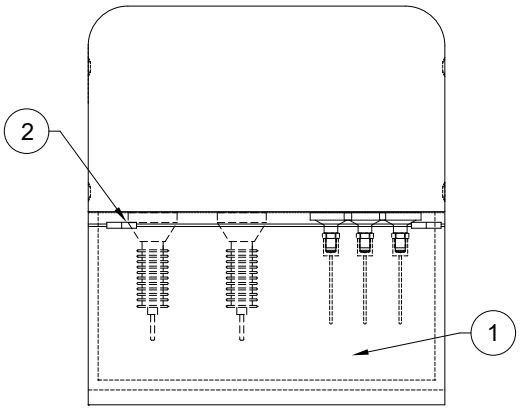
NOTES

1. Ground Ring not shown (see pg. 3 - Cable Installation section).
2. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

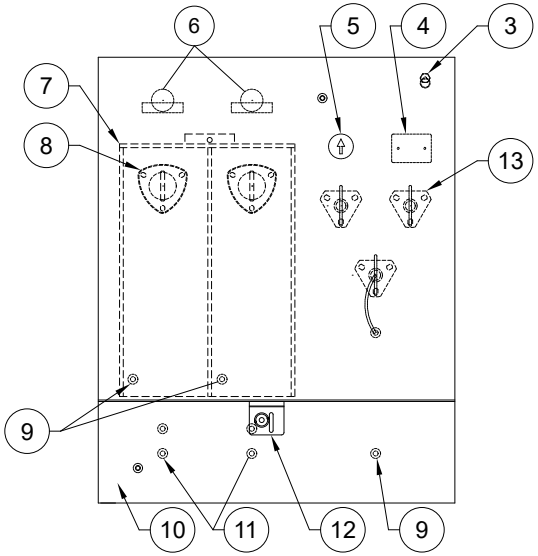
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (LF) PAD-MOUNT TRANSFORMER 4KV - DEAD END

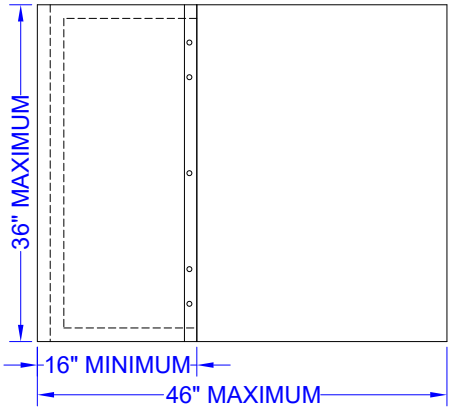


TOP VIEW
25-250kVA



FRONT VIEW
25-250kVA

TRANSFORMER KVA	IMPEDANCE
25	Z > 2.1%
50	Z > 2.1%
75	Z > 3.2%
100	Z > 2.1%
167	Z > 3.2%
250	Z > 4.8%



LIMITING DIMENSIONS

ITEM	DESCRIPTION
1	CABLE ENTRANCE AREA
2	COMPARTMENT COVER W/STAINLESS STEEL HINGES
3	PRESSURE RELIEF VALVE
4	DIAGRAMMATIC NAMEPLATE
5	NO- LOAD TAP CHANGER
6	BAYONET FUSE W/DRIP SHIELD
7	HV BARRIER ASSEMBLY
8	HV BUSHING ,EXT. CLAMPED W/2 HOLE VERTICAL SPADE
9	GROUND NUT
10	REMOVABLE SILL
11	ARRESTER MOUNTING PROVISION (18KV)
12	COMPARTMENT LIFT TAB W/PENTA-HEAD BOLT AND PADLOCK PROVISION
13	LV BUSHING, EXT. CLAMPED W/6 HOLE SQ. SPADE

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE (LF) PAD-MOUNT TRANSFORMER DETAILS

SINGLE PHASE - LIVE FRONT - PAD-MOUNTED TRANSFORMERS								
COMPATIBLE UNIT	NES STOCK #	PRIMARY VOLTAGE (V)	SECONDARY VOLTAGE (V)	RATING (kVA)	BIL (kV)	FUSE SIZE (AMPS)	FUSE TYPE	TAP SETTINGS (kV)
UT0216	920216000	4,160 GRD WYE/2,400	240/120	50	60	25	BAY-O-NET	2.52 2.46 2.40 2.34 2.28
UT0224	920224000	4,160 GRD WYE/2,400	240/120	75	60	40	BAY-O-NET	
UT0228	920228000	4,160 GRD WYE/2,400	240/120	100	60	65	BAY-O-NET	
UT7924[2]	927924000	23,900 GRD WYE /13,800	240/120	50	125	10	BAY-O-NET	14.4 14.1 13.8 13.5 13.2
UT7926[2]	927926000	23,900 GRD WYE /13,800	240/120	75	125	10	BAY-O-NET	
UT7928[2]	927928000	23,900 GRD WYE /13,800	240/120	100	125	15	BAY-O-NET	
UT7934[2]	927934000	23,900 GRD WYE /13,800	240/120	167	125	25	BAY-O-NET	
UT7940[2]	927940000	23,900 GRD WYE /13,800	240/120	250	125	40	BAY-O-NET	
The footnote number within table denotes the associated note number below.								

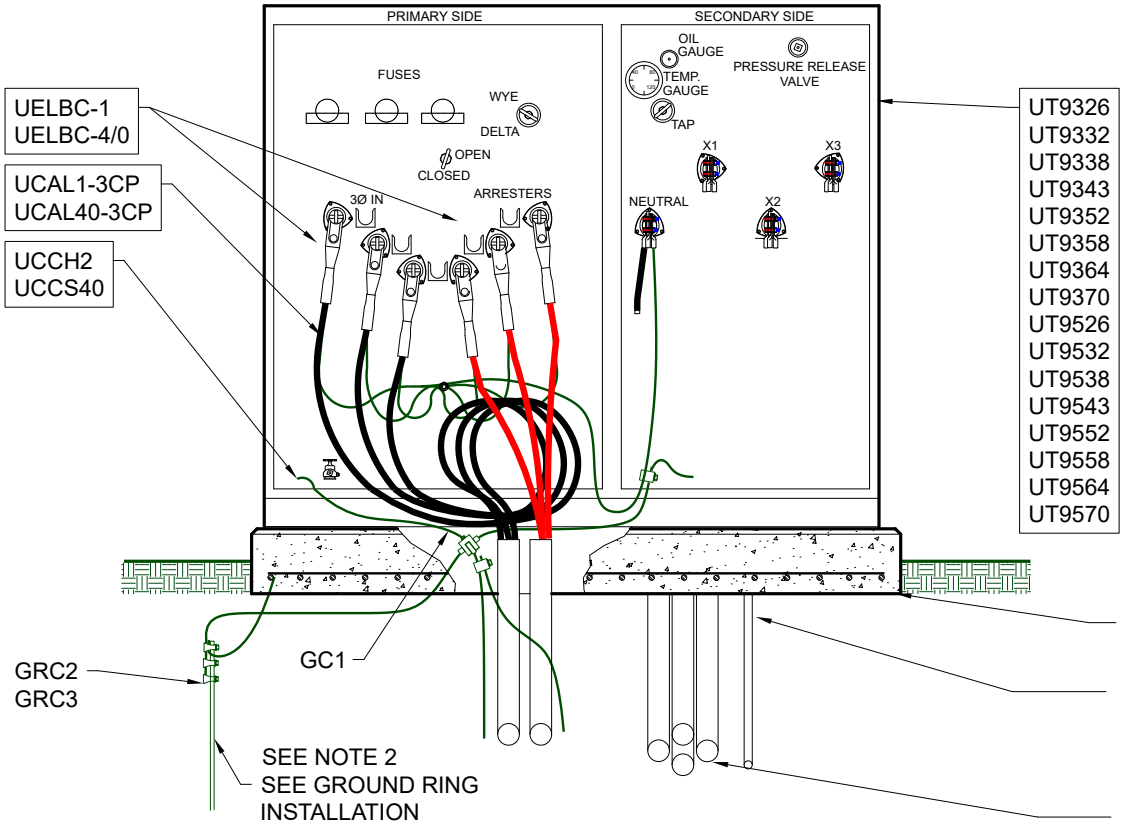
ITEMS REQUIRED FOR CABLE CONNECTION						
SYSTEM VOLTAGE	23.9kV		13.8kV		4kV	
CABLE CONFIGURATION	CU	QTY	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	2	UCN-STRM1-40	4	UCN-STRM1-40	2
DEAD END	UCN-STRM1-40	1	UCN-STRM1-40	2	UCN-STRM1-40	1
	ULA18LF	1	ULA12LF	2	ULA3LF	1

NOTES

1. NES Specification number: BER ET-244-X
2. Requires two Primary Phases typically used on 13.8 kV system.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

THREE PHASE PAD-MOUNT TRANSFORMERS



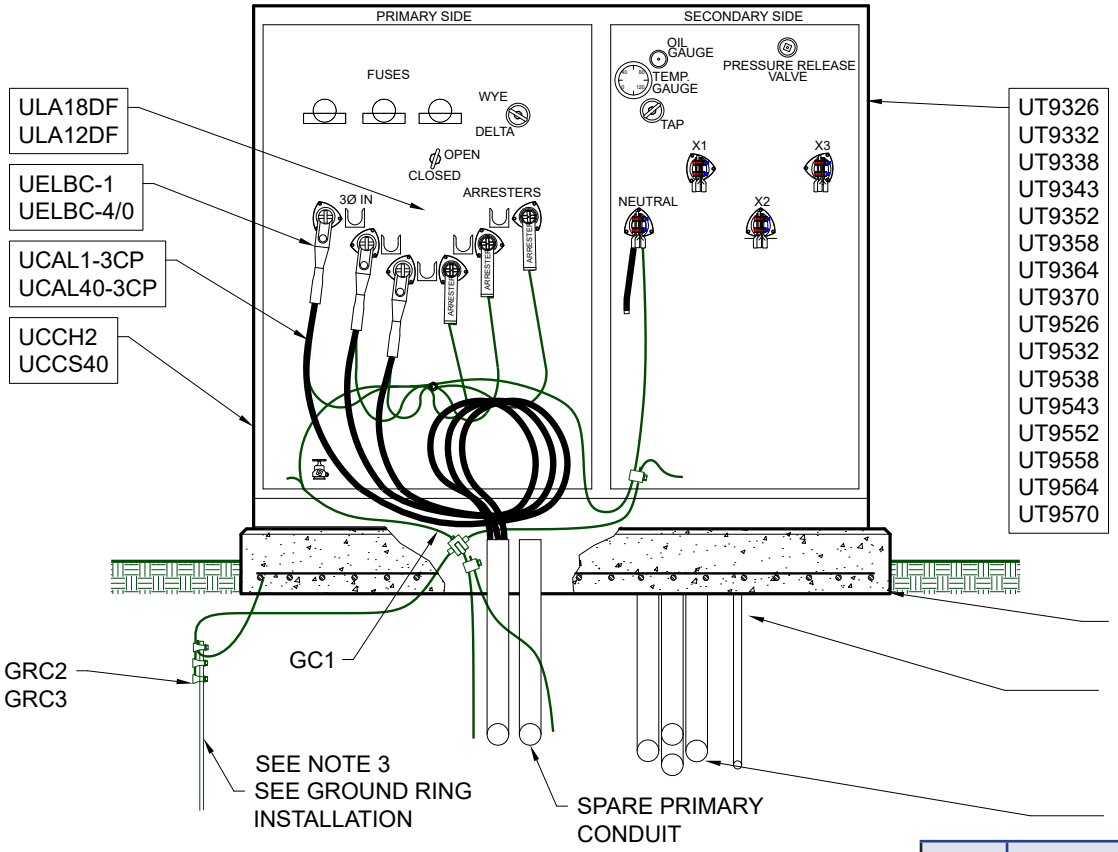
GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).
4. Rebar in pad must be tied to the ground ring at all four corners.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE



GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

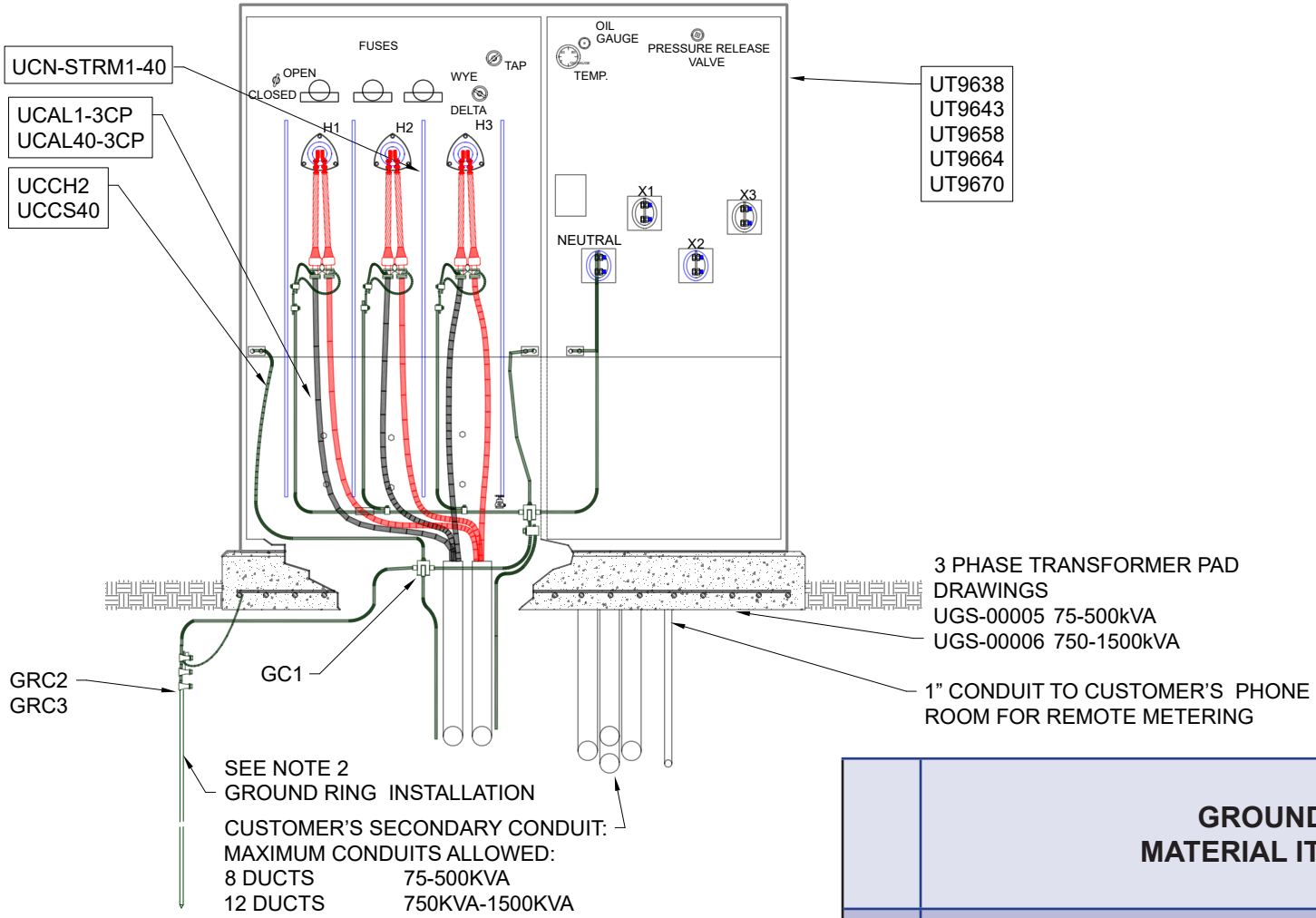
NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).
4. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
5. Rebar in pad must be tied to the ground ring at all four corners.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

THREE PHASE (DF) PAD-MOUNT TRANSFORMER DEAD END



GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

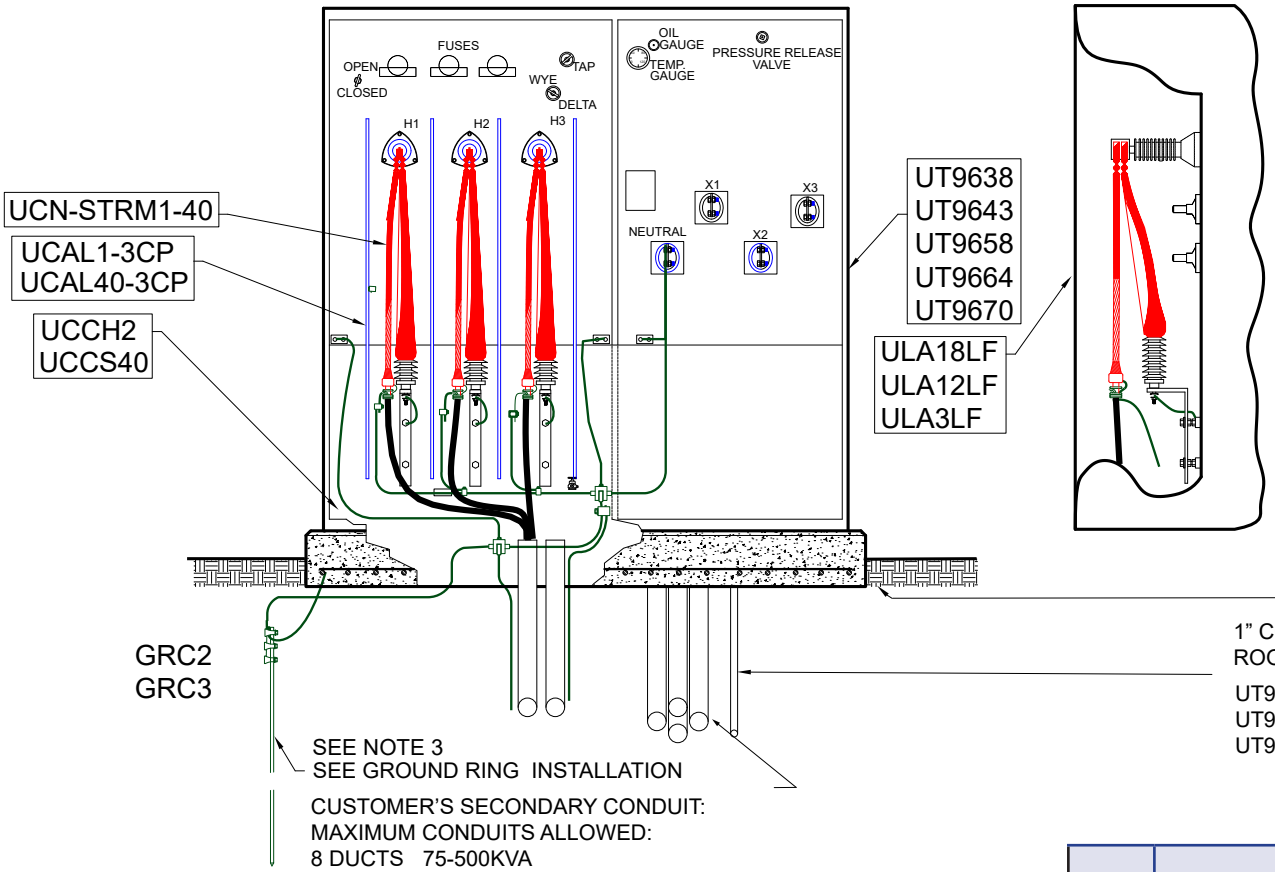
NOTES

1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground Ring not shown (see pg. 3 - Cable Installation section).
3. Rebar in pad must be tied to the ground ring at all four corners.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

THREE PHASE (LF) PAD-MOUNT TRANSFORMER LOOP FEED



3 PHASE TRANSFORMER PAD DRAWINGS

UGS-00005U	75-500kVA
GS-00006UG	750-1500kVA
S-00007	2000-3750kVA

1" CONDUIT TO CUSTOMER'S PHONE ROOM FOR REMOTE METERING.

UT9676
UT9679
UT9682

ALTHOUGH THE PRIMARY CONNECTION IS THE SAME AS IN THIS DRAWING, 2000-3750KVA TRANSFORMERS DO NOT HAVE INTERNAL FUSING AND MUST BE FUSED FOR THE TRANSFORMER AT THE RISER POLE.

SEE NOTE 3
SEE GROUND RING INSTALLATION

CUSTOMER'S SECONDARY CONDUIT:
MAXIMUM CONDUITS ALLOWED:
8 DUCTS 75-500KVA
12 DUCTS 750KVA-1500KVA

NOTES

1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Omit the secondary neutral connection if a ground strap is present.
3. Ground Ring not shown (see pg. 3 - Cable Installation).
4. Rebar in pad must be tied to the ground ring at all four corners.
5. Stress cones must be positioned at the arrester's base.
6. Leads from the arrester to the transformer tank and HV bushing must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

GROUNDING MATERIAL ITEM LIST

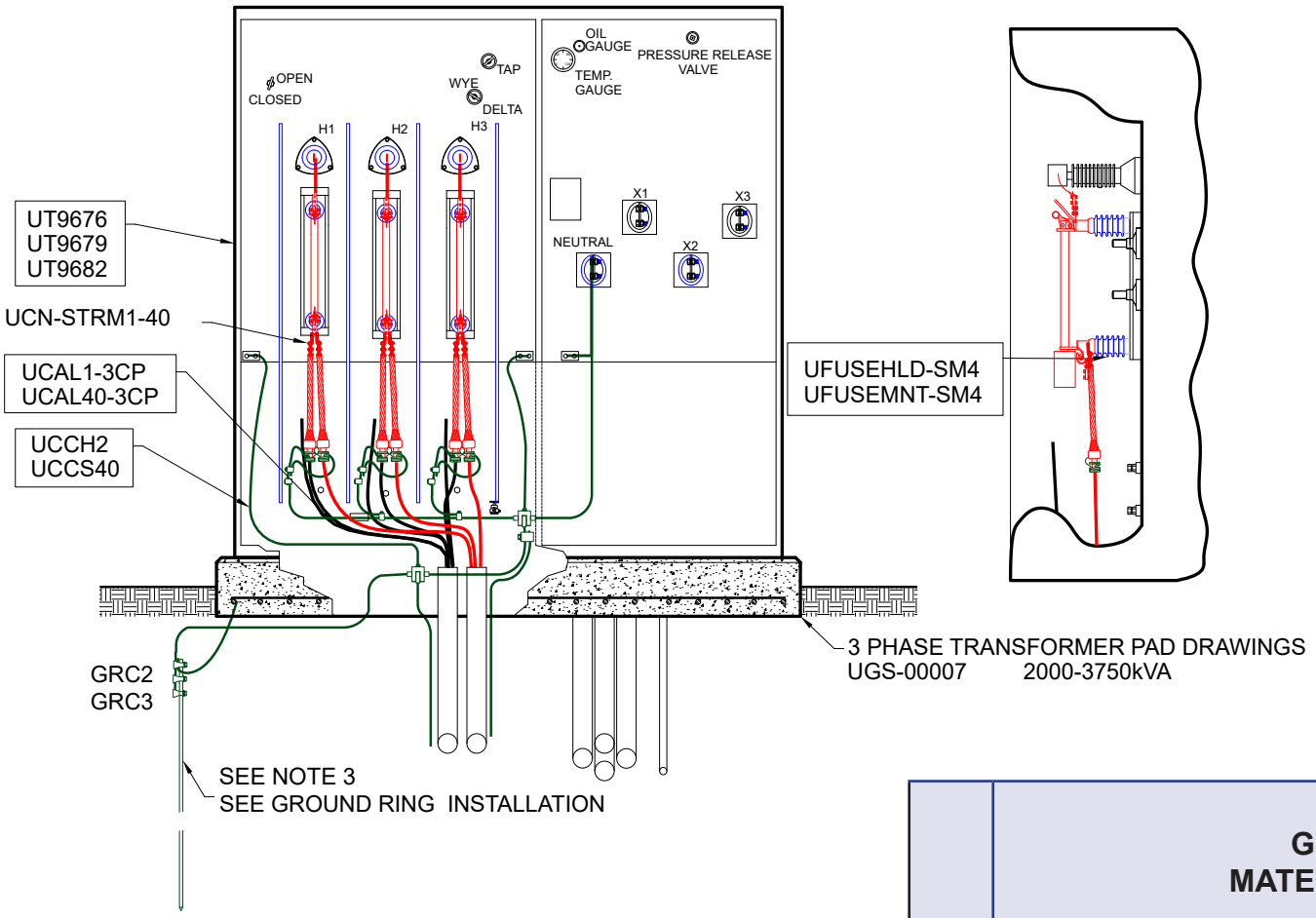
ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

TRANSFORMERS

NES

THREE PHASE (LF) PAD-MOUNT TRANSFORMER DEAD-END



GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

NOTES

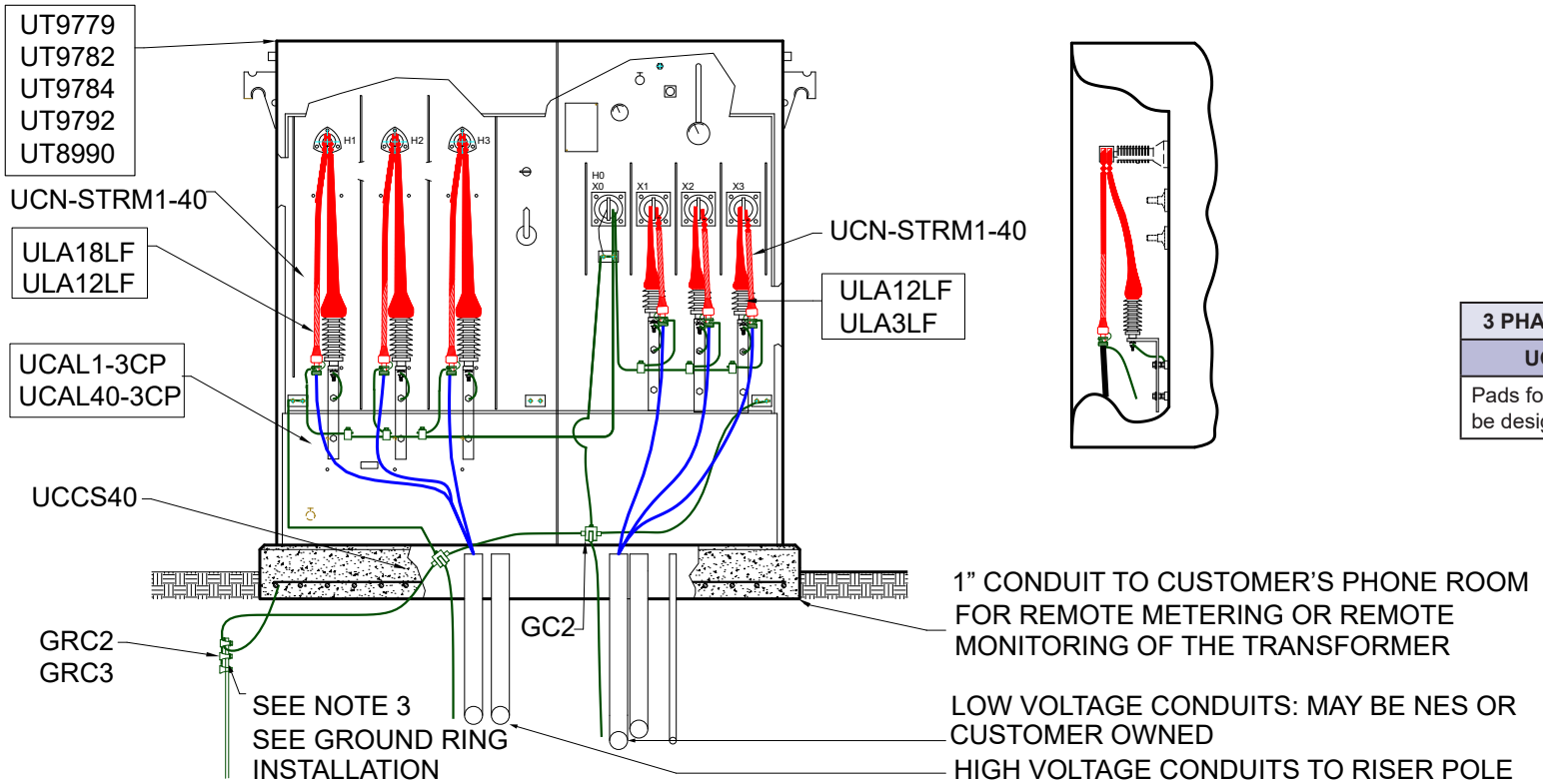
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Omit the secondary neutral connection if a ground strap is present.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).
4. Rebar in pad must be tied to the ground ring at all four corners.
5. Typical installation practice is to fuse 2000kVA and larger transformers from individual bays of a switch or from individual riser poles. Use this plate only if it is not possible to install multiple risers or a pad mounted switch.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

TRANSFORMERS

NES

THREE PHASE (LF) PAD-MOUNT (2000-3750 KVA) TRANSFORMER FUSED LOOP



3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00007	2000-3750kVA
Pads for transformers 5000kVA and larger, must be designed to fit the transformer's foot print.	

NOTES

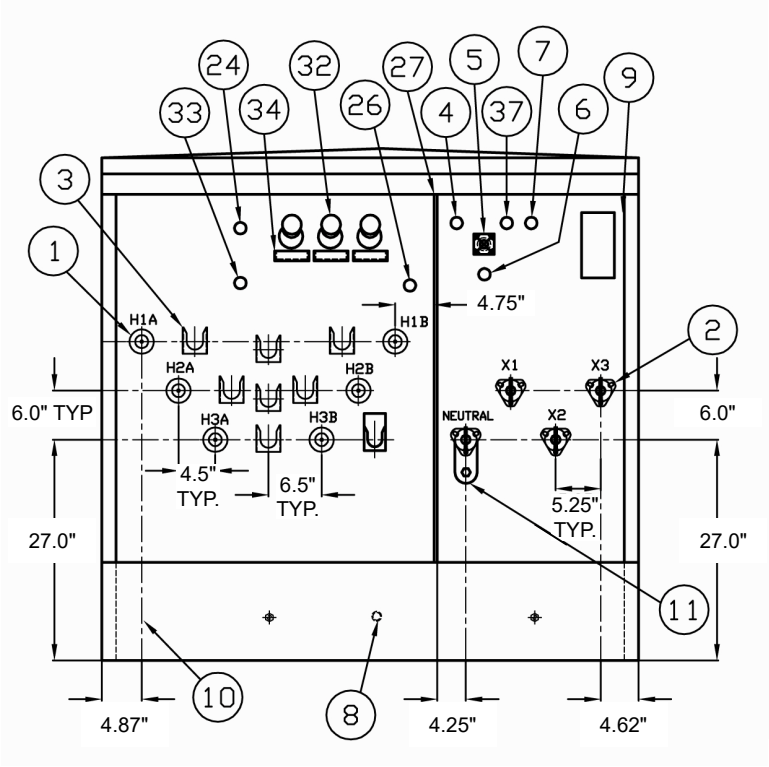
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Omit the secondary neutral connection if a ground strap is present.
3. Ground Ring not shown (see pg. 3 - Cable Installation section).
4. Rebar in pad must be tied to the ground ring at all four corners.
5. Stress cones must be positioned at the arrester's base.
6. Leads from the arrester to the transformer tank and to the bushings must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
7. Arresters must be installed on both the high and low voltage leads.

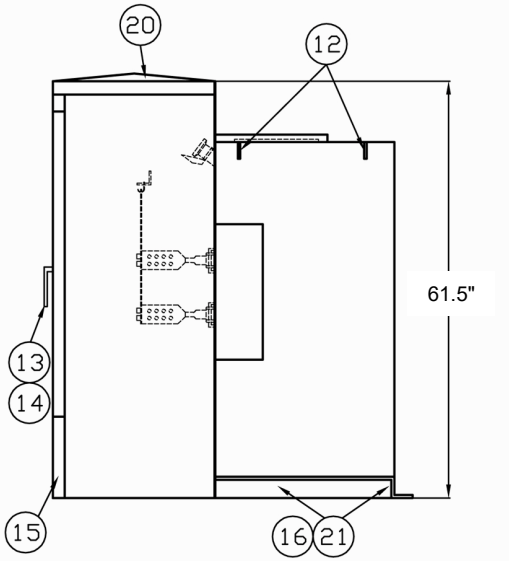
GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

75-1500kVA DEAD-FRONT TRANSFORMERS	
FEATURES LIST	
ITEM	DESCRIPTION
1	HIGH VOLTAGE BUSHING
2	LOW VOLTAGE BUSHING
3	PARKING STAND
4	OIL GAUGE
5	OIL TEMPERATURE GAUGE
6	OIL SIGHT GAUGE
7	OIL FILL VALVE
8	OIL DRAIN VALVE
9	NAMEPLATE
10	GROUND NUTS WITH LUGS
11	GROUND STRAP
12	LIFTING LUGS
13	DOOR HANDLE
14	PENTAHEAD LOCK
15	REMOVABLE LOWER FRONT SILL
16	BASE
17	RADIATOR
20	DOMED TOP
21	JACKING PROVISIONS
24	TAP CHANGER
27	HIGH-LOW BARRIER
32	BAYONET FUSES
33	LOADBREAK SWITCH
34	DRIP SHIELD
37	SCHRADER VALVE





TRANSFORMER KVA	IMPEDANCE
75-300	Z = 3.5%
500-3750	Z = 5.75%

NOTES

1. NES Specifications number: BER ET-570-X
2. Transformers may vary in placement of features and dimensions.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

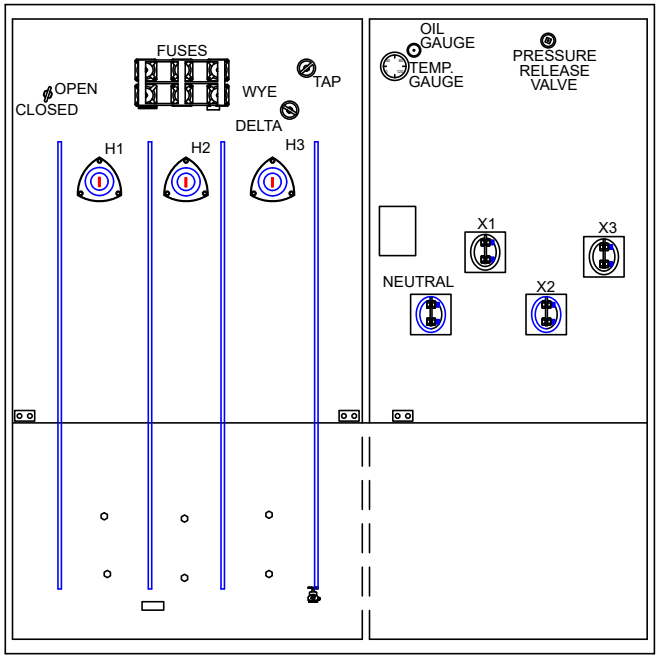
NES

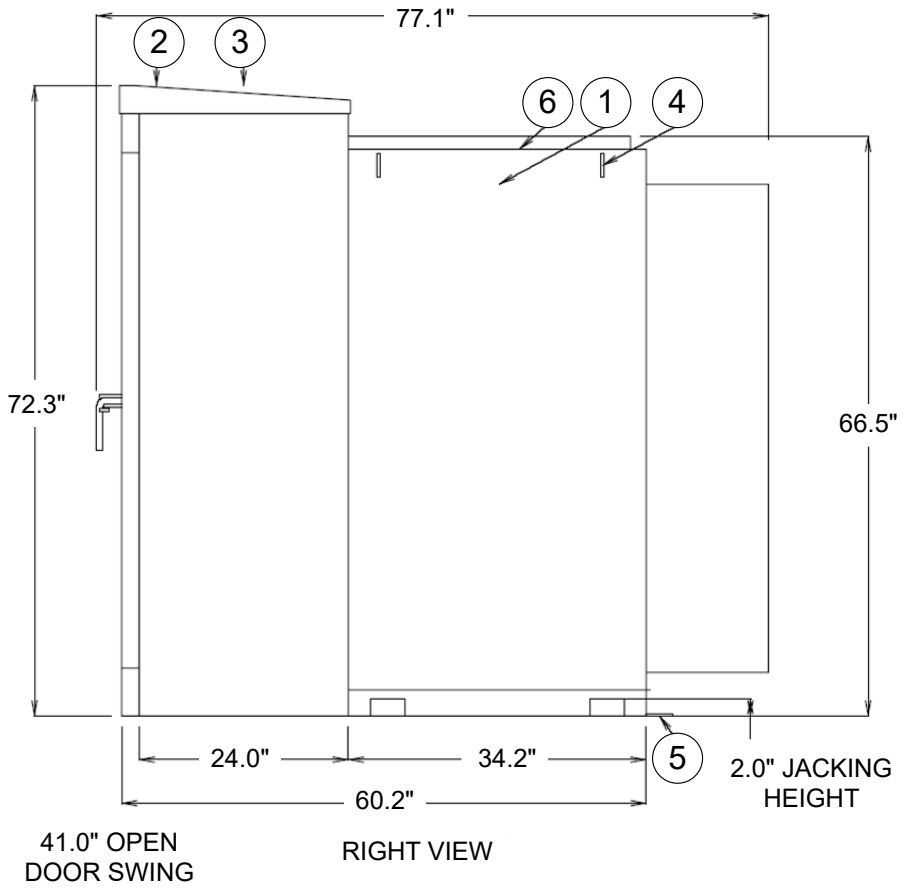
THREE PHASE (DF) PAD-MOUNT (75-1500 KVA) TRANSFORMER DETAILS

THREE PHASE - DEAD FRONT - PAD-MOUNTED TRANSFORMERS							
COMPATIBLE UNIT	NES STOCK #	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (V)	RATING (kVA)	BAY-O-NET TYPE FUSES		TAP SETTINGS (kV)
					13.8KV (AMPS)	23.9KV (AMPS)	
UT9326	949326000	13.8/23.9GRDY/13.8	208Y/120	75	10	6	14.4 14.1 13.8 13.5 13.2
UT9332	949332000	13.8/23.9GRDY/13.8	208Y/120	150	15	10	
UT9338	949338000	13.8/23.9GRDY/13.8	208Y/120	225	15	15	
UT9343	949343000	13.8/23.9GRDY/13.8	208Y/120	300	25	15	
UT9352	949352000	13.8/23.9GRDY/13.8	208Y/120	500	40	25	
UT9358	949358000	13.8/23.9GRDY/13.8	208Y/120	750	65	40	
UT9364	949364000	13.8/23.9GRDY/13.8	208Y/120	1000	65	40	
UT9370	949370000	13.8/23.9GRDY/13.8	208Y/120	1500	100	65	
UT9526	949526000	13.8/23.9GRDY/13.8	480Y/277	75	10	6	14.4 14.1 13.8 13.5 13.2
UT9532	949532000	13.8/23.9GRDY/13.8	480Y/277	150	15	10	
UT9538	949538000	13.8/23.9GRDY/13.8	480Y/277	225	15	15	
UT9543	949543000	13.8/23.9GRDY/13.8	480Y/277	300	25	15	
UT9552	949552000	13.8/23.9GRDY/13.8	480Y/277	500	40	25	
UT9558	949558000	13.8/23.9GRDY/13.8	480Y/277	750	65	40	
UT9564	949564000	13.8/23.9GRDY/13.8	480Y/277	1000	65	40	
UT9570	949570000	13.8/23.9GRDY/13.8	480Y/277	1500	100	65	

ITEMS REQUIRED FOR CABLE CONNECTION				
SYSTEM VOLTAGE	23.9kV		13.8kV	
PRIMARY CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UELBC-1	6	UELBC-1	6
DEAD END	UELBC-1	3	UELBC-1	3
	ULA18DF	3	ULA12DF	3

REV.	ENG.	DESCRIPTION OF CHANGE	DATE





75-1500kVA LIVE-FRONT TRANSFORMERS	
FEATURES LIST	
ITEM	DESCRIPTION
1	TANK
2	REMOVABLE SILLS
3	WEATHER COVER
4	LIFTING HOOKS
5	SHIPPING BRACKETS
6	HANDHOLE

NOTES

1. 45kVA-1500kVA live front transformers should only be used to replace damaged units or as a substitute for dead-front transformers when a stock outage occurs.
2. NES Specification number: ET-570-X
3. Transformers may vary in placement of features and dimensions.
4. This drawing indicates the transformer components required by NES's current specification.

TRANSFORMER KVA	IMPEDANCE
75-300	Z = 3.5%
500-3750	Z = 5.75%

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

TRANSFORMERS

NES

THREE PHASE (LF) PAD-MOUNT (45-1500 KVA) TRANSFORMER DETAILS

THREE PHASE - LIVE FRONT - PAD-MOUNTED TRANSFORMERS								
COMPATIBLE UNIT	NES STOCK #	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (V)	RATING (kVA)	FUSE SIZE (AMPS)		FUSE TYPE	TAP SETTINGS (kV)
NOTE 1	941522000	4.16Y/2.4	208Y/120	45	15		BAY-O-NET	2.52 2.46 2.40 2.34 2.28
NOTE 1	941526000	4.16Y/2.4	208Y/120	75	25			
NOTE 1	941532000	4.16Y/2.4	208Y/120	150	40			
NOTE 1	941138000	4.16Y/2.4	208Y/120	225	65			
NOTE 1	941540000	4.16Y/2.4	208Y/120	300	65			
PRIMARY VOLTAGE - VARIABLE TAP - TRANSFORMERS					**13.8kV**	**23.9kV**	**FUSE TYPE**	
UT9426	949426000	13.8/23.9GRDY/13.8	208Y/120	75	10	6	DRY-WELL	14.4 14.1 13.8 13.5 13.2
UT9432	949432000	13.8/23.9GRDY/13.8	208Y/120	150	15	10		
UT9438	949438000	13.8/23.9GRDY/13.8	208Y/120	225	15	15		
UT9443	949443000	13.8/23.9GRDY/13.8	208Y/120	300	25	15		
UT9452	949452000	13.8/23.9GRDY/13.8	208Y/120	500	40	25		
UT9458	949458000	13.8/23.9GRDY/13.8	208Y/120	750	65	40		
UT9464	949464000	13.8/23.9GRDY/13.8	208Y/120	1000	65	40		
UT9470	949470000	13.8/23.9GRDY/13.8	208Y/120	1500	100	65		
UT9638	949638000	13.8/23.9GRDY/13.8	480Y/277	225	15	15		14.4 14.1 13.8 13.5 13.2
UT9643	949643000	13.8/23.9GRDY/13.8	480Y/277	300	25	15		
UT9658	949658000	13.8/23.9GRDY/13.8	480Y/277	750	65	40		
UT9664	949664000	13.8/23.9GRDY/13.8	480Y/277	1000	65	40		
UT9670	949670000	13.8/23.9GRDY/13.8	480Y/277	1500	100	65		

ITEMS REQUIRED FOR CABLE CONNECTION						
SYSTEM VOLTAGE	**23.9kV**		**13.8kV**		**4kV**	
PRIMARY CABLE CONFIGURATION	**CU**	**QTY**	**CU**	**QTY**	**CU**	**QTY**
LOOP FEED	UCN-STRM1-40	6	UCN-STRM1-40	6	UCN-STRM1-40	6
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA18LF	3	ULA12LF	3	ULA3LF	3

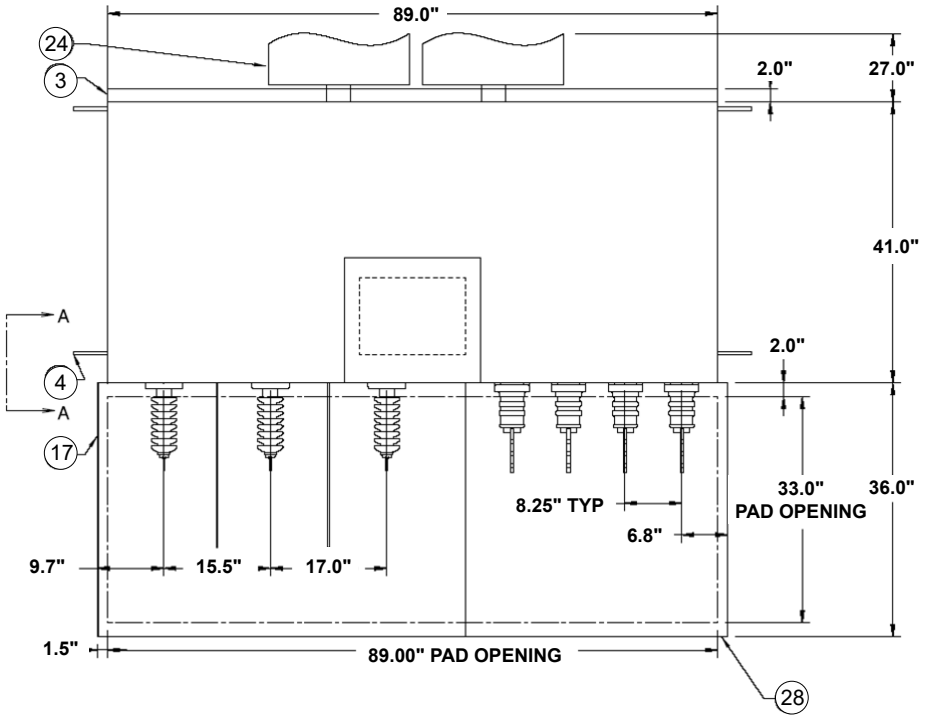
NOTES

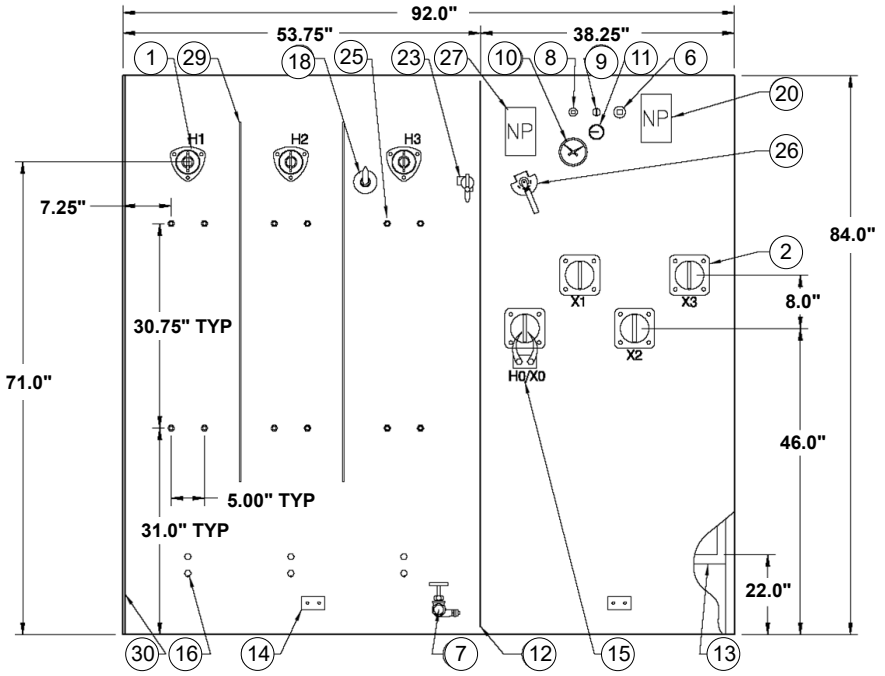
1. Contact the Engineering Standards group to have this number created.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

THREE PHASE (LF) PAD-MOUNT (45-1500 KVA) TRANSFORMER MATERIALS





TRANSFORMER KVA	IMPEDANCE
500-3750	Z = 5.75%

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

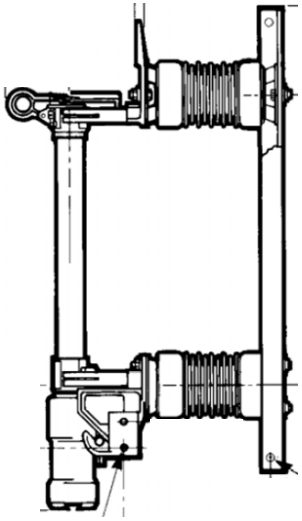
TRANSFORMERS

THREE PHASE (LF)
PAD-MOUNT (2000-3750 KVA)
TRANSFORMER DETAILS

COMPATIBLE UNIT	NES STOCK NUMBER	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (V)	RATING (kVA)	FUSE SIZE		TAP SETTINGS (kV)
					13.8 kV (AMPS)	23.9 kV (AMPS)	
UT9676	949676000	13.8/23.9GRDY/13.8	480Y/277	2000	125E	100E	14.4 14.1 13.8 13.5 13.2
UT9679	949679000	13.8/23.9GRDY/13.8	480Y/277	2500	150E	125E	
UT9682	949682000	13.8/23.9GRDY/13.8	480Y/277	3750	175E	150E	

ITEMS REQUIRED FOR CABLE CONNECTION				
SYSTEM VOLTAGE	23.9kV		13.8kV	
PRIMARY CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	6	UCN-STRM1-40	6
	UFUSEMNT-SM4	3	UFUSEMNT-SM4	3
	UFUSEHLD-SM4	3	UFUSEHLD-SM4	3
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA18LF	3	ULA12LF	3

SM-4Z FUSE MOUNTING MATERIAL LIST			
CU CODE	STOCK	DESCRIPTION	QTY
UFUSEHLD-SM4	150362000	FUSE HOLDER S&C SM-4 200A 25KV	1
UFUSEMNT-SM4	150540000	FUSE MOUNTING FOR S&C SM-4	1



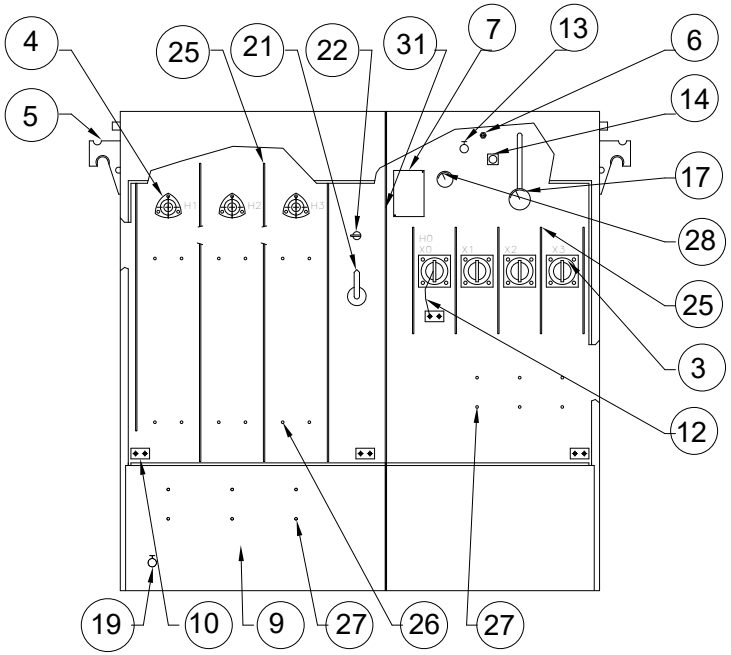
SM-4 FUSE DETAIL

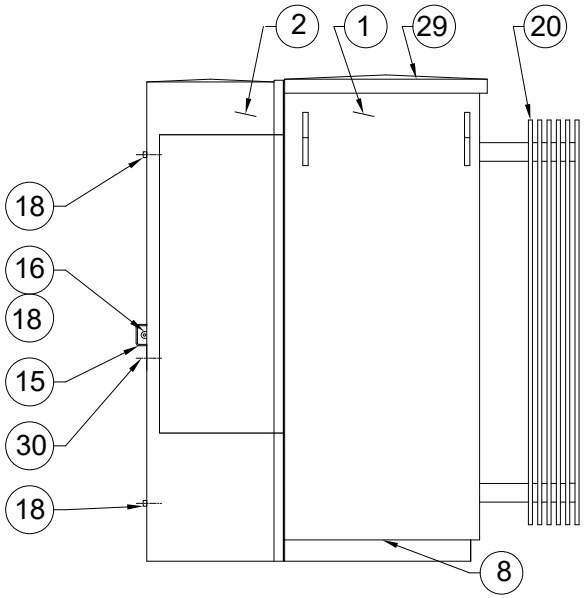
2000-3750kVA LIVE FRONT TRANSFORMERS TYPICAL FEATURES LIST	
ITEM	DESCRIPTION
1	HIGH VOLTAGE BUSHING WITH 2 HOLE SPADE
2	LOW VOLTAGE BUSHING WITH 4 HOLE SPADE
3	TANK BASE WITH JACKING AND ROLLING PROVISIONS
4	LIFTING LUGS
5	WELDED COVER WITH HANDLE
6	ONE INCH UPPER FILTER PRESS. CONN. AND FILL PLUG
7	DRAIN VALVE WITH OIL SAMPLER
8	PRESSURE VAC GAUGE PROVISION
9	PRESSURE RELIEF DEVICE
10	THERMOMETER
11	MAGNETIC OIL LEVEL GAGE
12	GPO INSULATING DIVIDER PLATE
13	REMOVABLE SILL
14	GROUND PAD
15	GROUND STRAP AND PAD FOR HO/XO
16	ARRESTER MOUNTING PROVISION
17	HIGH SECURITY CABINET W PENTA HEAD DOOR BOLTS
18	TAP CHANGER
20	NAMEPLATE
23	HIGH VOLTAGE DELTA-WYE SWITCH
24	COOLING RADIATORS
25	1/2-13 STAINLESS STEEL NUTS FOR SM-4Z FUSE MOUNT
26	LOW VOLTAGE DELTA-WYE SWITCH
27	LOW VOLTAGE DELTA-WYE SWITCH NAME PLATE
28	NON-PCB DECAL
29	GPO INSULATING INTERPHASE BARRIERS
30	GPO INSULATING CABINET SIDE BARRIER

NOTES

1. Generally these transformers have no internal fusing. Fusing is installed at the riser pole or pad mounted switch. The fuse mountings are only required if other transformers are on the same circuit. Jobs that require these transformers should be designed such that there is only one transformer on the circuit beyond the riser pole or pad mounted switch. Do not install these fuses unless the circuit loops through the transformer.
2. NES Specification number: ET-570-X
3. Transformers may vary in placement of features and dimensions.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE





2000-3750kVA LIVE FRONT TRANSFORMERS	
TYPICAL FEATURES LIST	
ITEM	**DESCRIPTION**
1	TRANSFORMER TANK
2	CABLE COMPARTMENT
3	LV BUSHING
4	HV BUSHING
5	LIFTING LUG
6	PRESSURE RELIEF DEVICE
7	NAMEPLATE
8	JACKING PROVISION
9	REMOVABLE SILL
10	GROUNDING PAD
11	INTENTIONALLY BLANK
12	GROUND STRAP
13	OIL FILL VALVE
14	OIL LEVEL GAUGE
15	DOOR HANDLE
16	PADLOCK PROVISION
17	PRESSURE GAUGE
18	PENTAHEAD BOLT
19	OIL DRAIN VALVE
20	RADIATORS
21	TAP SWITCH
22	LOAD BREAK SWITCH
25	INTERPHASE BARRIERS
26	SM-4 FUSE MOUNTING
27	ARRESTER MOUNTING
28	THERMOMETER
29	BOLTED COVER
30	HV DOOR LOCK
31	HV/LV COMPARTMENT BARRIER

NOTES

1. NES Specification number ET-559-X
2. Transformers may vary in placement of features.

TRANSFORMER KVA	IMPEDANCE
2500-10000	Z = 5.75%

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

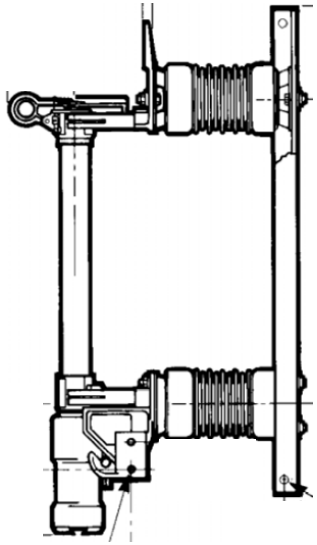
THREE PHASE (LF) STEP-DOWN (1000-10,000 KVA) TRANSFORMER DETAILS

COMPATIBLE UNIT	NES STOCK NUMBER	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (kV)	RATING (kVA)	FUSE SIZE		TAP SETTINGS (kV)
					13.8kV (AMPS)	23.9kV (AMPS)	
UT9764	949764000	13.8/23.9GRDY/13.8	2.4/4.16Y	1000	65E	40E	14.4 14.1 13.8 13.5 13.2
UT9779	949779000	13.8/23.9GRDY/13.8	2.4/4.16Y	2500	150E	125E	
UT9782	949782000	13.8/23.9GRDY/13.8	2.4/4.16Y	3750	175E	150E	
UT9784	949784000	13.8/23.9GRDY/13.8	2.4/4.16Y	5000	RECLOSER	150E	
UT9792	949792000	13.8/23.9GRDY/13.8	2.4/4.16Y	10000	RECLOSER	RECLOSER	
UT8990	948990000	13.8/23.9GRDY/13.8	7.96/13.8GRDY/7.96	7500	RECLOSER	RECLOSER	

ITEMS REQUIRED FOR CABLE CONNECTION (HV COMPARTMENT)				
SYSTEM VOLTAGE	23.9kV		13.8kV	
PRIMARY CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	6	UCN-STRM1-40	6
	UFUSEMNT-SM4	3	UFUSEMNT-SM4	3
	UFUSEHLD-SM4	3	UFUSEHLD-SM4	3
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA18LF	3	ULA12LF	3

ITEMS REQUIRED FOR CABLE CONNECTION (LV COMPARTMENT)				
SYSTEM VOLTAGE	13.8kV		4kV	
LOW VOLTAGE CABLE	CU	QTY	CU	QTY
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA12LF	3	ULA3LF	3

SM-4 FUSE DETAIL



NOTES

1. Transformers having no internal fusing must be protected with fuses at riser pole or switch.
2. The fuse mountings are only required if other transformers are on the same circuit.
3. Installations that require these transformers should be designed such that there is only one transformer on the circuit beyond the riser pole or switch fusing.

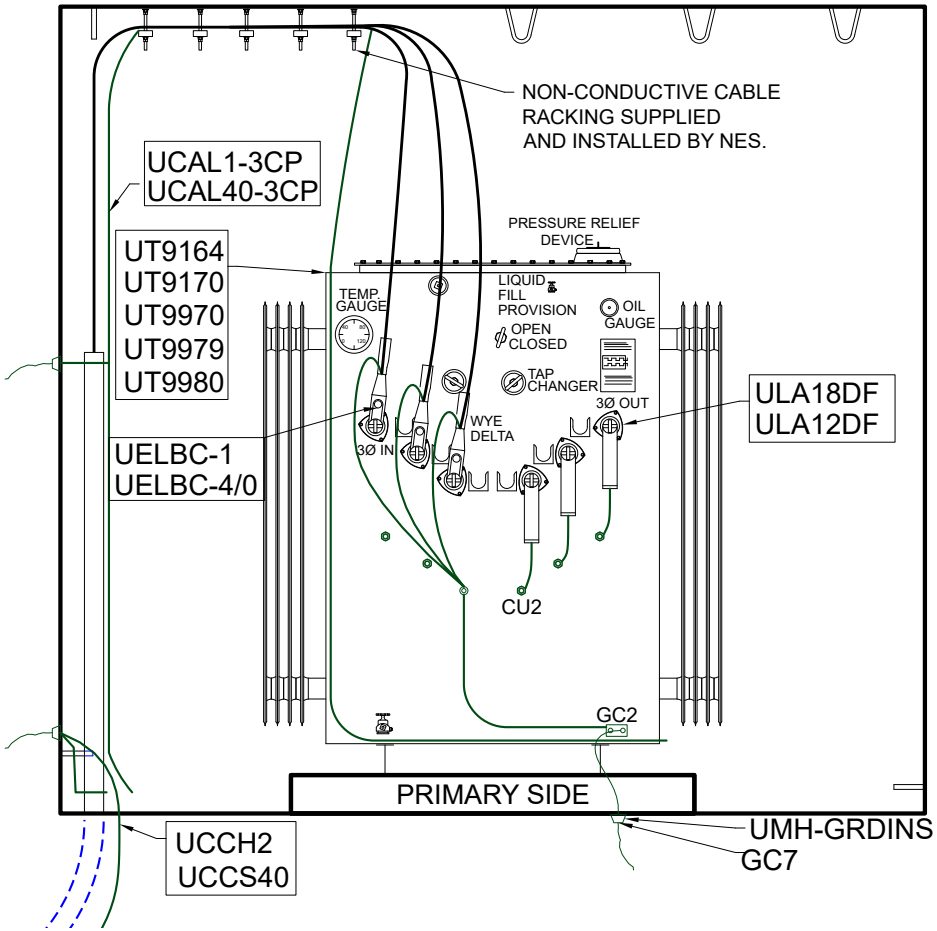
SM-4Z FUSE MOUNTING MATERIAL LIST			
CU CODE	STOCK	DESCRIPTION	QTY
UFUSEHLD-SM4	150362000	FUSE HOLDER S&C SM-4 200A 25KV	1
UFUSEMNT-SM4	150540000	FUSE MOUNTING FOR S&C SM-4	1

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

THREE PHASE (LF) STEP-DOWN (1000-10,000 KVA) TRANSFORMER MATERIALS

THREE PHASE
VAULT
TRANSFORMERS



NOTES

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Grounding must be tied to the building structure. The builder will position ground inserts per NES specifications.
4. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
5. A spare primary conduit is always required for vault installations.
6. Contact Engineering Standards Group to obtain the latest revision of the “Vault Design Guide”.

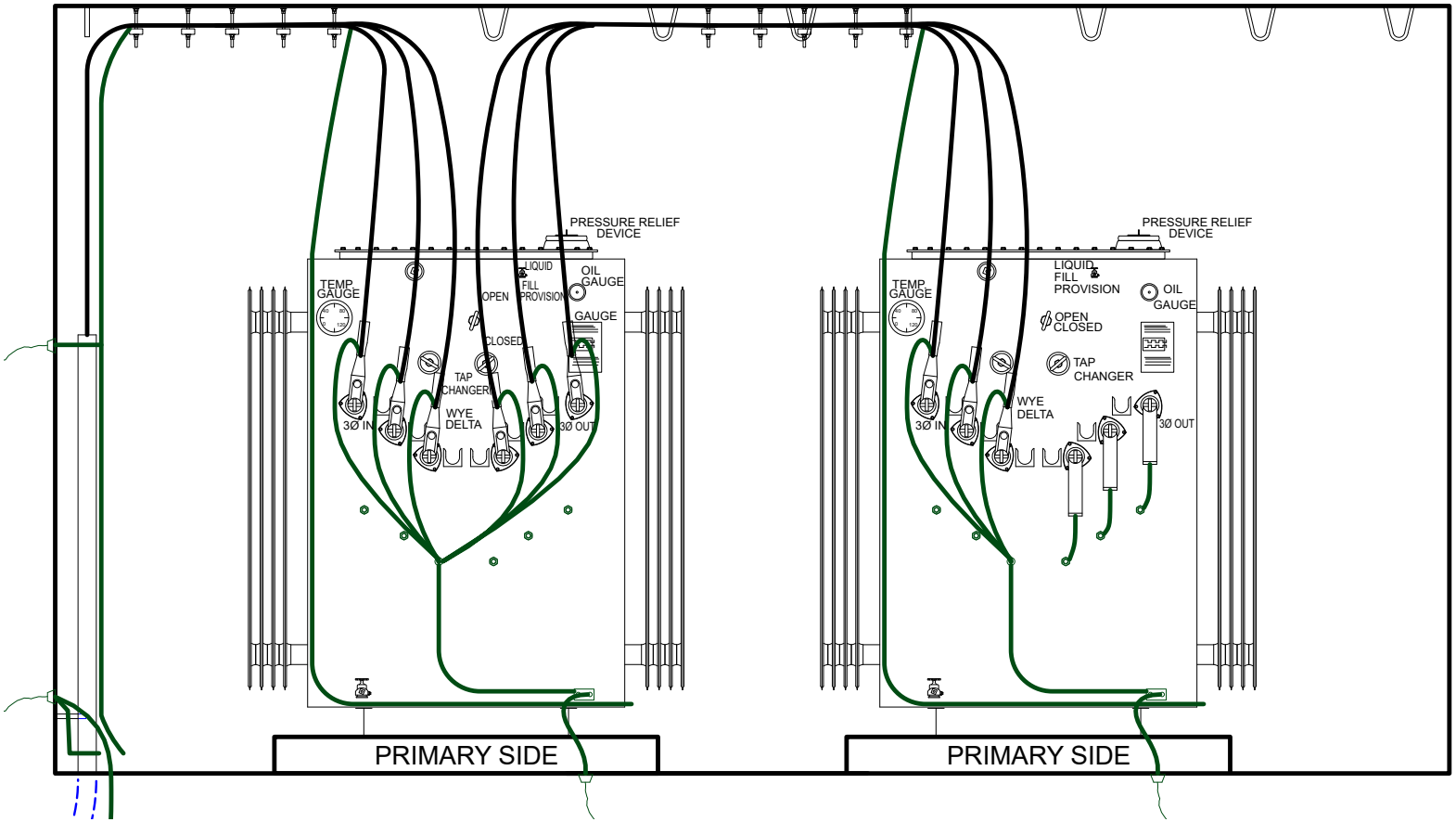
GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8” GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000
GC5	GRD CONN 500 TO 4/0 MCM COPPER CABLE	223496000

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

THREE PHASE (DF) VAULT TRANSFORMER DEAD-END



NOTES

1. The NES standard for non network vault installations is to have a single transformer fed from the riser pole or an isolated switch bay.
2. It is preferable to have multiple risers, individual switch bays and vaults when multiple transformers are required. This limits the impact of a transformer failure to the customers served from the failed unit. This also limits the number of customers affected by maintenance.
3. The drawing above indicates how to install a loop feed configuration in a single vault.
4. Cable conduits should not be installed in the floor where they cross transformer ingress/egress path. The weight of the transformer could collapse the pipe.
5. Cables should be racked to the ceiling. Do not lay the cables on the floor where they could become a tripping hazard.
6. All materials are the same as the dead-end installation.
7. Connect the concentric neutrals to each other before tying to the grounding system.

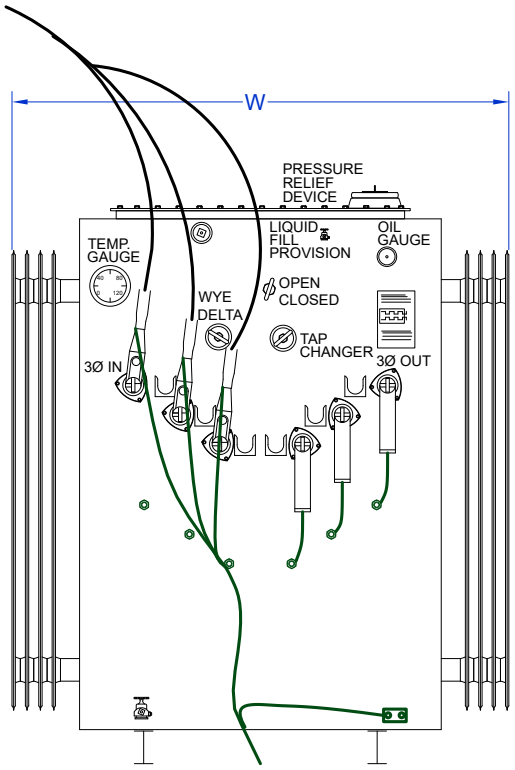
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

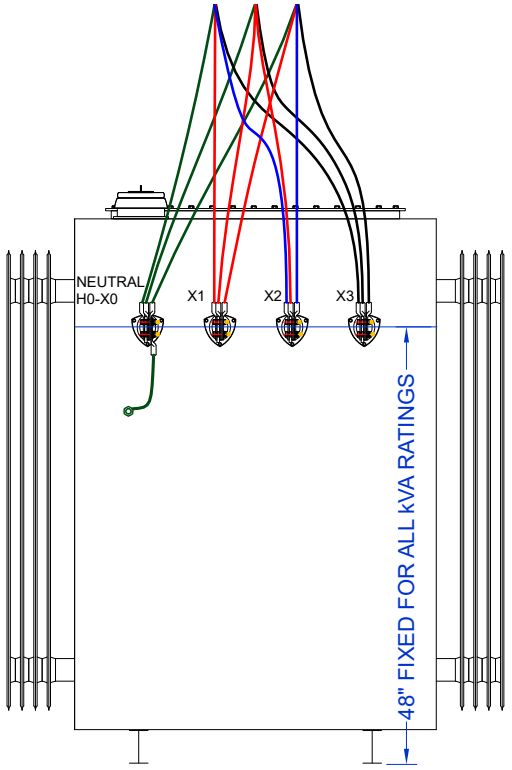
THREE PHASE (DF) VAULT TRANSFORMER LOOP FEED

NOTES

1. Customer must build vault in accordance per the latest version of NES “Vault Design Guide”.
2. These transformers must be installed in a vault room with a minimum four-hour fire rating and secondary oil containment.
3. The vault room must provide sufficient ventilation to evacuate the heat generated by the core and winding losses in the transformers.
4. These transformers may be used in the 23.9kV GRD Wye areas and in 13.8kV Delta areas.
5. These “Submersible” transformers are only fused at the riser pole.
6. Transformers may vary in placement of features and dimensions.
7. Specific requirements for vault transformers are available in NES Specification ET-260 (Contact Engineering Standards Group for the latest revision).



PRIMARY SIDE



SECONDARY SIDE

(NON-FUSED) SUBMERSIBLE VAULT TRANSFORMERS								
COMPATIBLE UNIT	NES STOCK #	PRIMARY VOLTAGE (kV)	SECONDARY VOLTAGE (V)	RATING (kVA)	PRIMARY WINDING BIL (kV)	SECONDARY WINDING BIL (kV)	IMPEDANCE (%)	TAP SETTINGS (kV)
UT9152	949152000	13.8/23.9GRDY/13.8	208Y/120	500	150	30	5.75	14.4 14.1 13.8 13.5 13.2
UT9164	949164000	13.8/23.9GRDY/13.8	208Y/120	1000	150	30	5.75	
UT9170	949170000	13.8/23.9GRDY/13.8	208Y/120	1500	150	30	5.75	
UT9964	949964000	13.8/23.9GRDY/13.8	480Y/277	1000	150	30	5.75	14.4 14.1 13.8 13.5 13.2
UT9970	949970000	13.8/23.9GRDY/13.8	480Y/277	1500	150	30	5.75	
UT9979	949979000	13.8/23.9GRDY/13.8	480Y/277	2500	150	30	5.75	
UT9980	949980000	13.8/23.9GRDY/13.8	480Y/277	3000	150	30	5.75	

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

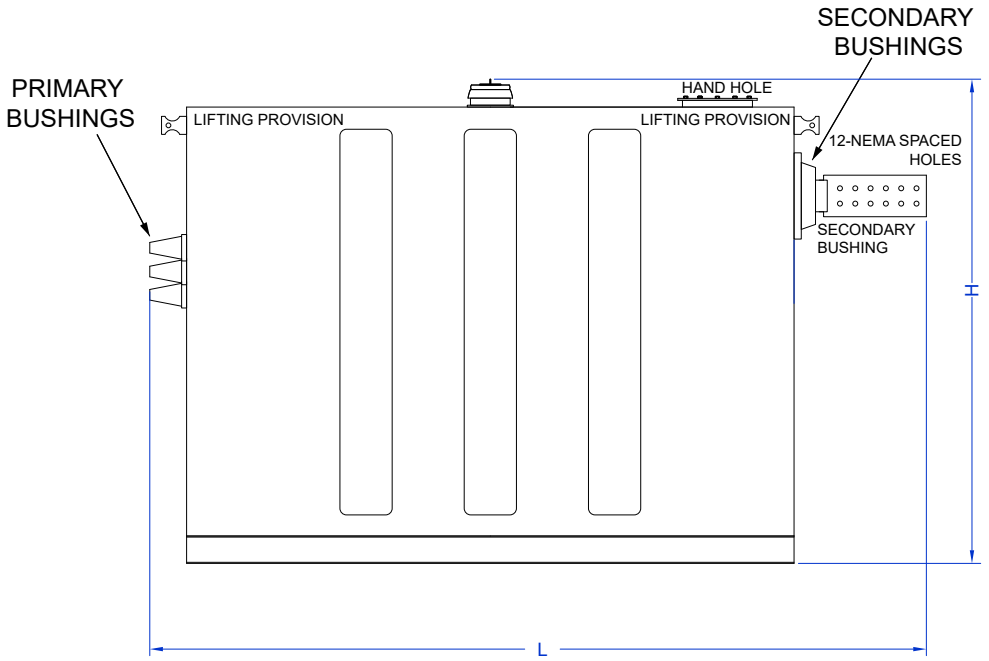
NES

THREE PHASE (DF) SUBMERSIBLE VAULT TRANSFORMER DETAILS

VAULT TRANSFORMER LIMITING DIMENSIONS					
KVA	"W" WIDTH (IN)	"L" LENGTH (IN)	HEIGHT (IN)	WEIGHT (US POUNDS) ±20%	OIL VOLUME (US GALLONS) ±20%
150 kV BIL					
1000	72	108	93	9,500	450
1500	72	108	97	12,000	510
2000	84	108	113	16,000	575
2500	84	120	117	20,000	650
3000	96	120	120	25,000	850
3750	97	85	76	31,300	706

GROUNDING MATERIAL ITEM LIST

ITEM	DESCRIPTION	STOCK #
CU40	CABLE CU BSD 4/0 19S	011260000
GR1	ROD GROUND CW 5/8X8	184380000
GRC1	CLAMP GR ROD 8-2 CU	220500000
GC1	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	223480000
GRC2	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000
GRC3	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000
GC5	GRD CONN 500 TO 4/0 MCM COPPER CABLE	223496000



ITEMS REQUIRED FOR CABLE CONNECTION				
SYSTEM VOLTAGE	23.9kV		13.8kV	
CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UELBC-1	6	UELBC-1	6
DEAD END	UELBC-1	3	UELBC-1	3
	ULA18DF	3	ULA12DF	3

NOTES

1. Grounding must be tied to the building steel and vault reinforcing steel. Ground inserts must be issued and installed per the vault design.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

THREE PHASE (DF) SUBMERSIBLE VAULT TRANSFORMER MATERIALS

SWITCHES

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

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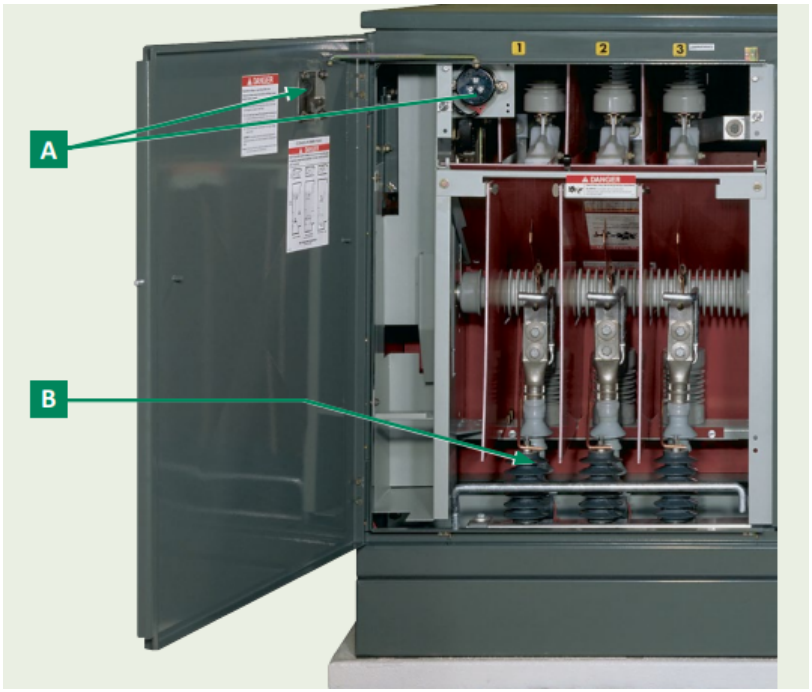
PMH 600A - SWITCH COMPARTMENT



[A] Mounting provisions for the fault indicator with a viewing window in the door (optional in switch compartments) accommodate one three-phase indicator with single-phase sensors (fault indicator shown for illustrative purposes only).

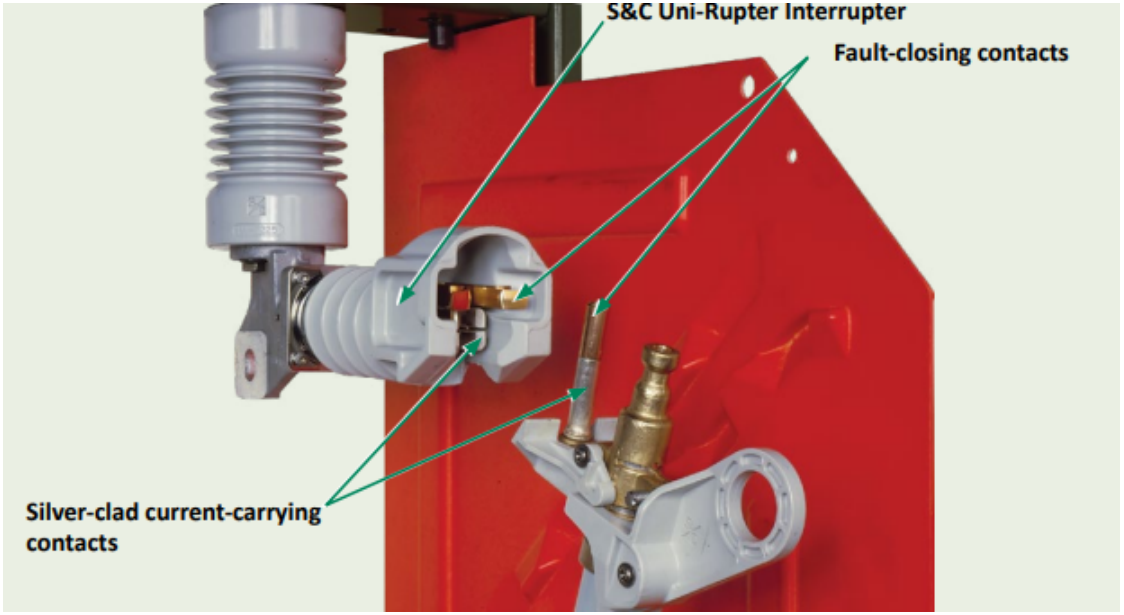
[B] Surge arresters (optional) are available in 9-kV through 18-kV ratings for application at source-side switch terminals. Arresters are grounded through a low-impedance bus.

NOTES

1. If room permits, loop the primary cables under the switch to allow extra for future termination replacements.
2. Install Arresters in 3-phase switch compartments.
3. Stress terminations are required for each used bay.
4. See Stock Number Fuse Table in Transformer section.
5. Consult with Protection Engr. for fusing of switches feeding multiple transformers.

ITEMS REQUIRED FOR CABLE CONNECTION		QTY
UCN-STRM1-40	UG CONNECTOR, STRESS TERMINATOR, #1-4/0	3 PER BAY
UCN-STRM750	UG CONNECTOR, STRESS TERM. 500-750MCM	3 PER BAY
ULA18LF-SW	SURGE ARRESTER 18KV, LF SWITCH	6 PER BAY
ULA12LF	SURGE ARRESTER 12KV, LF,TRANS AND SWITCH	6 PER BAY

UNI-RUPTER INTERRUPTER
RATED FOR 14.4 KV OR 25 KV SYSTEMS



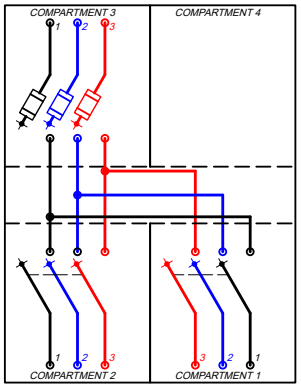
PMH PAD-MOUNTED - LIVE FRONT SWITCHES					
COMPATIBLE UNIT	NES STOCK #	DESCRIPTION	MAIN CIRCUIT BAYS	FUSED BAYS	AMPS
USW-PMH6	965912000	PAD MTD SWITCH LF PMH-6 600A	2	1	600
USW-PMH9	965916000	PAD MTD SWITCH LF PMH-9 600A	2	2	600
USW-PMH11	965919000	PAD MTD SWITCH LF PMH-11 600A	3	1	600
USW-PMH12	965924000	PAD MTD SWITCH LF PMH-12 600A	1	3	600
USW-PMH9AUT	965916100	SW PAD PMH-9 / 25KV AUTO-TRANSFER	2	2	600
USW-PMH913.8	965914000	SW PAD PMH-9 / 14.4KV AUTO-TRANSFER	2	2	600

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

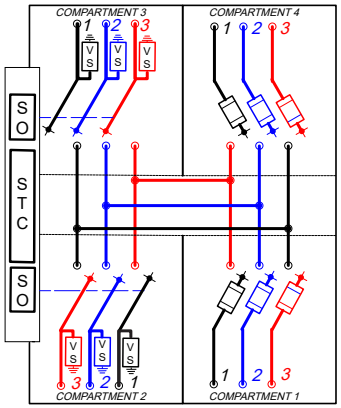
SWITCHES

NES

PADMOUNT LIVE-FRONT PMH SWITCH GEAR DETAILS

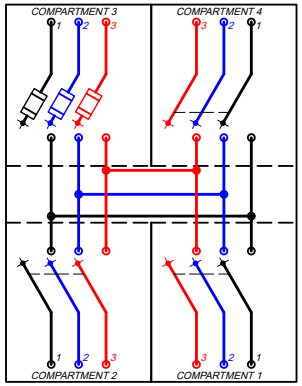


PMH-6

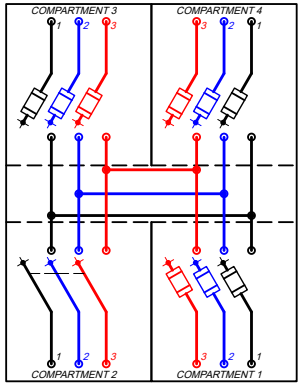


PMH-9 AUTO

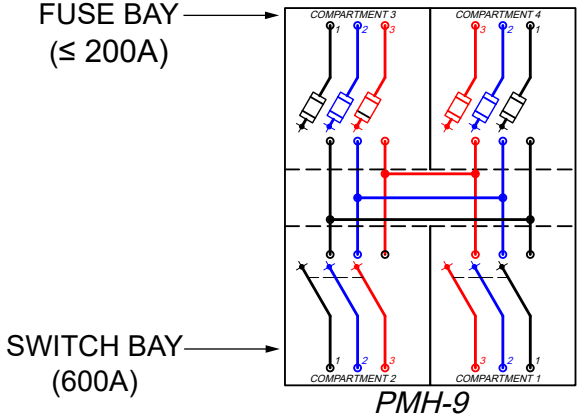
AUTOMATIC SOURCE TRANSFER SWITCH CONTROLLER PARTS LIST	
STOCK #	**DESCRIPTION**
367701000	S&C CARD ANALOG INPUT METAL ENC MICRO AT
367702000	S&C CARD ANALOG INPUT PAD MT MICRO AT
367703000	S&C CARD BURDEN METAL ENC MICRO AT
367703500	S&C CARD BURDEN PAD MOUNTED MICRO AT
367704000	S&C CARD CPU MICRO AT
367705000	S&C CARD DIGITAL INPUT MICRO AT
367706000	S&C CARD RELAY OUTPUT MET ENC MICRO AT
367706500	S&C CARD RELAY OUTPUT PAD MMT MICRO AT
367707000	S&C CARD REMOTE INDICATION MICRO AT
367708000	S&C CARD POWER SUPPLY MICRO AT



PMH-11



PMH-12



PMH-9

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SWITCHES

NES

PADMOUNT LIVE-FRONT PMH SWITCH GEAR ONE-LINE DIAGRAMS

AUTOMATIC SOURCE TRANSFER SWITCH MICRO AT CONTROL PARTS LIST	
STOCK #	**DESCRIPTION**
367701000	S&C CARD ANALOG INPUT METAL ENC MICRO AT
367702000	S&C CARD ANALOG INPUT PAD MT MICRO AT
367703000	S&C CARD BURDEN METAL ENC MICRO AT
367703500	S&C CARD BURDEN PAD MOUNTED MICRO AT
367704000	S&C CARD CPU MICRO AT
367705000	S&C CARD DIGITAL INPUT MICRO AT
367706000	S&C CARD RELAY OUTPUT MET ENC MICRO AT
367706500	S&C CARD RELAY OUTPUT PAD MMT MICRO AT
367707000	S&C CARD REMOTE INDICATION MICRO AT
367708000	S&C CARD POWER SUPPLY MICRO AT

THE MANUFACTURER PROVIDES AN ETCHED METAL TAG FOR EACH BAY: THE TAG MUST INCLUDE THE FOLLOWING INFORMATION:
BAY FUNCTION: ENTRANCE, FEEDER, METER, FUSE, TRANSFER ETC.
BAY NUMBER: THIS COORDINATES WITH THE MANUFACTURER'S SWITCH DRAWING.

FEEDER, FUSE OR ENTRANCE BAYS NEED TO HAVE THE NUMBER OF THE NEXT DEVICE IN THE CIRCUIT: RISER NUMBER, MANHOLE, TRANSFORMER, ETC.

NOTES

1. This switchgear is special ordered for an individual customer's switching scheme.
   Typical load capacities include 600 and 1200 amps at 15 or 25kV.

2. There are any number of bay configurations. The bays may perform the following functions:
   Source Entrance Bays
   Fuse Bays
   Meter Bays
   Source Transfer Bays
   Feeder Bays

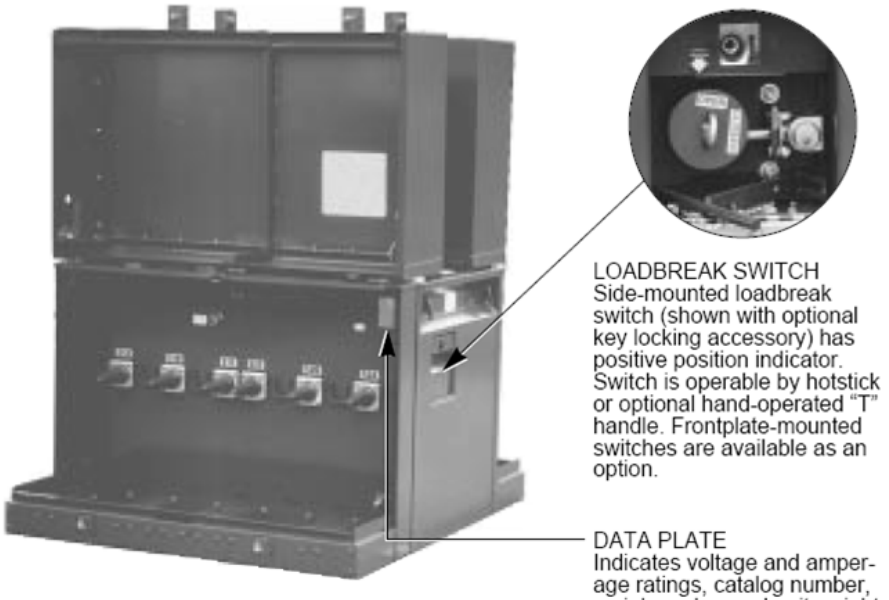
3. CRITICAL INSTALLATION NOTE:
   The concrete pad is custom designed to each switch. The pad must be level to 1/16" across its entire length. Surface imperfections exceeding 1/16" will prevent the sections from aligning.
   The nine bay unit above is rated for 600amps. It is approximately 50' long. Additional room may be required for the meter equipment pad.
   Communications conduits from the customer's building and to each riser pole are required.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PADMOUNT LIVE-FRONT METAL ENCLOSED SWITCH GEAR DETAILS

SOURCE SIDE



LOADBREAK SWITCH
Side-mounted loadbreak switch (shown with optional key locking accessory) has positive position indicator. Switch is operable by hotstick or optional hand-operated "T" handle. Frontplate-mounted switches are available as an option.

DATA PLATE
Indicates voltage and amperage ratings, catalog number, serial number and unit weight.

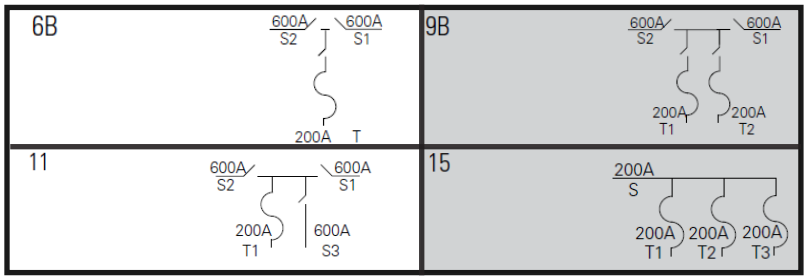
TAP SIDE

ONE-LINE DIAGRAM
Easy-to read one-line diagrams are provided on both source and tap sides.

ENERGY-LIMITING FUSES
RTE Components energy-limiting fuses are housed in an under-oil wet-well assembly. A fuse driptray is provided.

CONVENIENT OPERATION
RTE Components bushings, installed at a convenient height, give dependable, sure operation. Phase designations are clearly labeled. At least one standoff bracket per bushing is provided.

1/2–13 ground nut is mounted beneath each bushing as standard.



MOST PAD-MOUNTED - LIVE FRONT SWITCHES					
COMPATIBLE UNIT	NES STOCK #	DESCRIPTION	MAIN CIRCUIT BAYS	FUSED BAYS	AMPS
USW-MOST6B	965950000	PAD MTD SWITCH DF MOST6B 200A	2	1	200
USW-MOST9B	965954000	PAD MTD SWITCH DF MOST9B 200A	2	2	200
USW-MOST11	965956000	PAD MTD SWITCH DF MOST11 200A	3	1	200
USW-MOST15	965960000	PAD MTD SWITCH DF MOST15 200A	1	3	200

REPLACEMENT ONLY

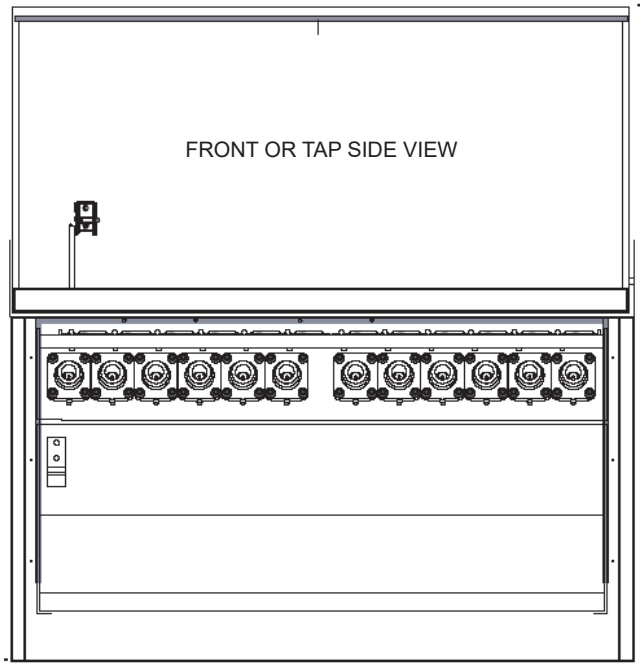
NOTES

1. NES does not install this type of switch on new projects.
2. Pad drawings are omitted because new installations use PMH type switches.

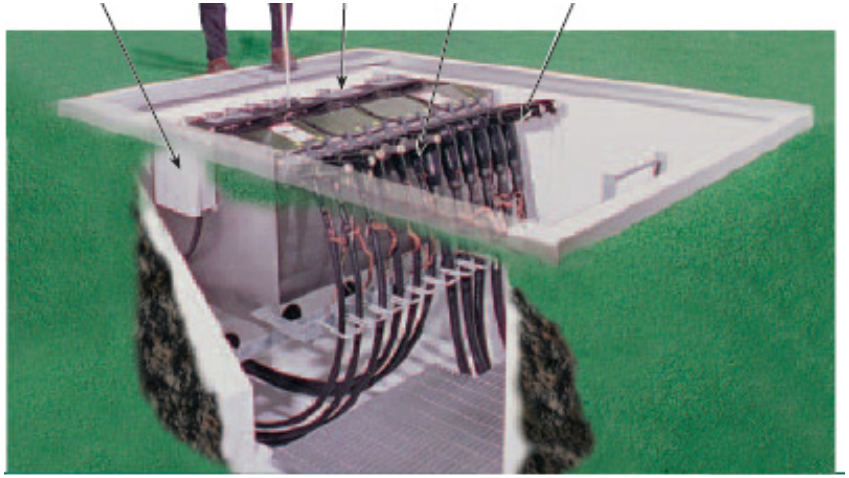
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

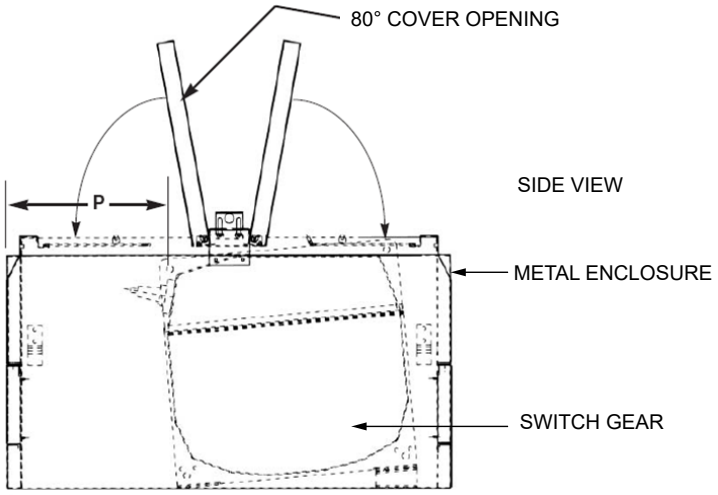
PADMOUNT DEAD-FRONT MOST SWITCH GEAR DETAILS



PADMOUNTED VISTA



“OPTIONAL” BELOW GRADE VAULT VISTA



NOTES

1. VISTA switch gear is submersible to 10 feet thus it may be installed in below grade vaults.
2. Automatic Source Transfer are a manufacturers option.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

DEAD-FRONT VISTA SWITCH GEAR DETAILS

VISTA SWITCH GEAR - NAMING CODES

SPACE 1 IS ALWAYS (U)

SPACE 2		SPACE 3		SPACE 4		SPACE 5		SPACE 6		SPACE 7		SPACE 8		SPACE 9		SPACE 10		SPACE 11	
				LOCATION		# WAYS		SEPARATOR		# FEEDER WAYS		# FEEDER WAYS AMPS		# LOAD WAYS		# Load Ways		FAULT CURRENT RATING	
CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.	CODE	DESC.
S	SWITCH	V	VISTA	A	ABOVE GRADE	4	4 WAY	-		2	2 WAY	6	600A	0-4	# WAYS	2	200A	X	12.5K AIC
				B	BELOW GRADE	6	6 WAY			3	3 WAY	9	900A			6	600A	Y	25K AIC
										4	4 WAY	1	1200A			9	900A		

VISTA SWITCH GEAR - COMPATIBLE UNITS

CU NAME	STOCK #	DESCRIPTION	VOLTAGE (kV)	TOTAL WAYS	FEEDER WAYS	LOAD (AMPS)	LOAD WAYS	INTERRUPTERS (AMPS)	FAULT RATING (AMPS)
USVB4-2622X	965938000	SW UG VISTA 422 25KV 12.5KA 125BIL RS	25	4	2	600	2	200	12,500
USVB4-2622Y	965942000	SW UG VISTA 422 15KV 25KA 125BIL RS	15	4	2	600	2	200	25,000
USVB6-2642X	965936000	SW UG VISTA 624 25KV 12.5kA 125BIL RS	25	6	2	600	4	200	12,500
USVB6-2642Y	965940000	SW UG VISTA 624 15KV 25kA 125BIL RS	15	6	2	600	4	200	25,000
USVB6-2949Y	965943000	SW UG VISTA 624 15KV 25kA 900A RS	15	6	2	900	4	900	25,000
USVB6-3632X	965937000	SW UG VISTA 633 25KV 12.5 KA 125BIL RS	25	6	3	600	3	200	12,500
USVB6-3632Y	965941000	SW UG VISTA 633 15KV 25KA 125BIL RS	15	6	3	600	3	200	25,000
USVB6-3939Y	965944000	SW UG VISTA 633 15KV 25KA 900A RS	15	6	3	900	3	900	25,000

NOTES

1. VISTA Switches may be Pad-mounted or Submerged in below Grade Vaults.
2. CAUTION: 15kV, 25kA High Fault Current rated switches required when fed within 3,000 feet of substation breaker.
3. CAUTION: 15kV, 25kA High Fault Current rated switches required Dead-Break “bolt-on” style bushings, caps & elbows.
4. 25kV, 12.5kA Standard Fault Current rated switches require 200A Load-Break bushings, caps & elbows.
5. The 6-Way & 4-Way Vista switch cabinets used in above ground applications use concrete pads as shown in the Manholes, Boxes & Pads Plate Book section.
6. The 6-Way & 4-Way Vista Vault switch used in below ground applications use concrete vaults with H-20 Traffic Rated lids as shown in the Manholes, Boxes & Pads Plate book section.

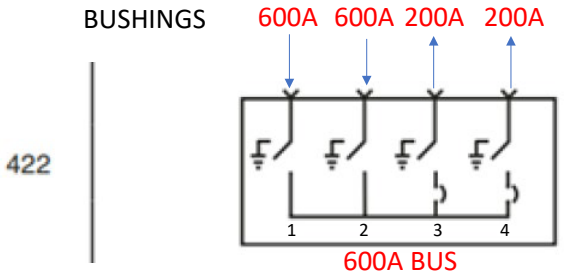
CU NAME	STOCK #	DESCRIPTION
USVB4-CAB	965974400	SW UG VISTA 4WAY CABINET ONLY
USVB6-CAB	965931000	SW UG VISTA 6WAY CABINET ONLY

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

DEAD-FRONT VISTA SWITCH GEAR COMPATIBLE UNITS

600 AMP RADIAL FEED VISTA(s)



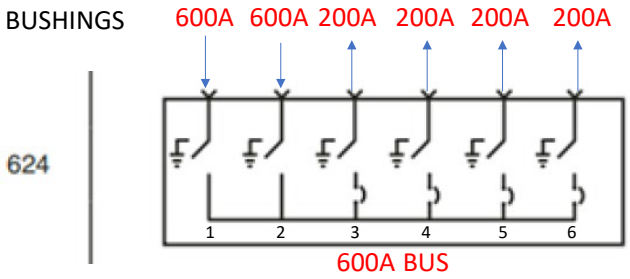
PROGRAMMABLE
VACUUM FAULT INTERRUPTERS
(VFI's)

96593800 - 25kV, 12.5kA FAULT
96594200 - 15kV, 25kA FAULT

NOTES

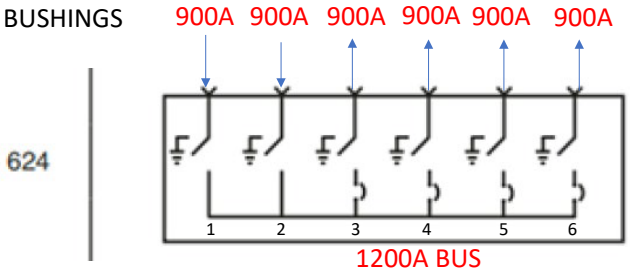
1. Designers should be aware of the Max. Bus Rating for each style of switch and be careful to not overload the bus.
2. The total ampacity of the switch is limited by the bus rating, not the bushing amperage.

600 AMP RADIAL FEED VISTAS

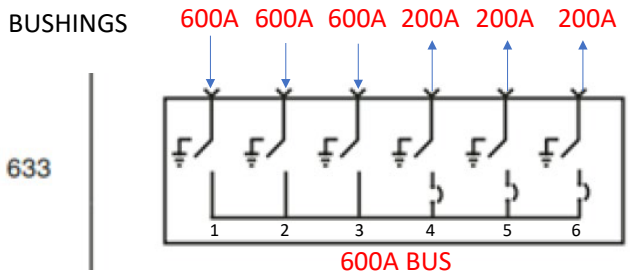


96593600 - 25kV, 12.5kA FAULT
96594000 - 15kV, 25kA FAULT

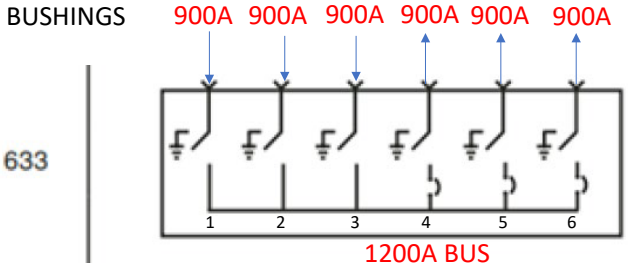
900 AMP CIRCUIT TIE VISTAS



96594300 -15kV, 25kA FAULT



96593700 - 25kV, 12.5kA FAULT
96594100 - 15kV, 25kA FAULT

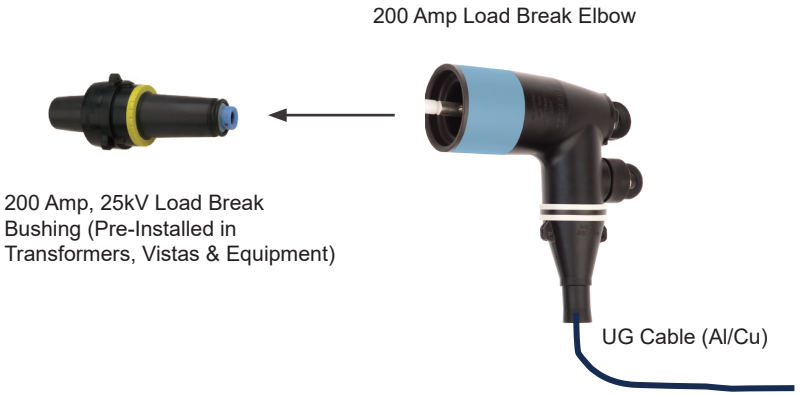


96594400 - 15kV, 25kA FAULT

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

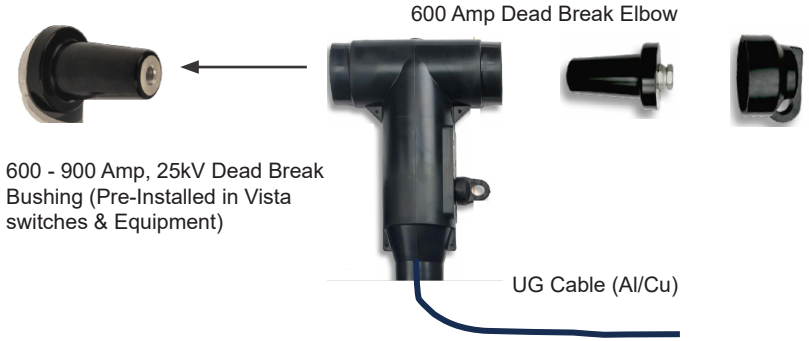
NES

DEAD-FRONT VISTA SWITCH GEAR ONE-LINE DIAGRAMS



200 Amp Equipment Bushing <—> 200 Amp Elbow Connection

CU CODE	STOCK #	DESCRIPTION	QUANTITY	CABLE TYPE	MAX. (AMPS)	AMPS LIMITIED BY
UELBC-1	400396000	#1AL/CU 200A 25KV W/ SEAL KIT	1	ALUMINUM	145	CABLE
UELBC-4/0	400400000	4/0 AL/CU 25KV200A W/ SEAL KIT	1	ALUMINUM	200	BUSHING / ELBOW
UELBC-4/0CU	400412000	4/0 CU 25KV 200A W/ SEAL KIT	1	COPPER	200	BUSHING / ELBOW



600-900 Amp Equipment Bushing <—> 600 Amp Elbow Connection

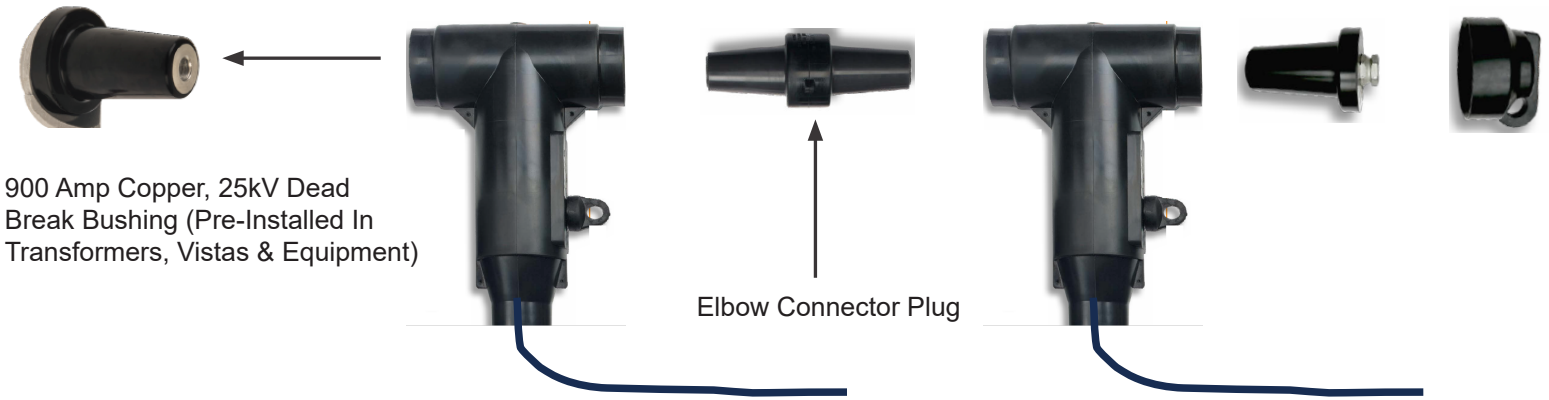
CU CODE	STOCK #	DESCRIPTION	QUANTITY	CABLE TYPE	MAX. (AMPS)	AMPS LIMITIED BY
UELBC-1-6	400414700	#1 AL/CU 25KV 600A W/ SEAL KIT	1	ALUMINUM	145	CABLE
UELBC-4/0-6	400415000	4/0 AL/CU 25KV 600A W/ SEAL KIT	1	ALUMINUM	245	CABLE
				COPPER	317	CABLE
UELBC-500-6	400416000	500 AL/CU 25KV600A W/ SEAL KIT	1	ALUMINUM	400	CABLE
				COPPER	513	CABLE
UELBC-750-6	400418000	750 AL/CU 25KV600A W/ SEAL KIT	1	COPPER	600	BUSHING / ELBOW
UELBC-CP	400417000	ELBOW CONNECTOR PLUG 25KV 600A	1	-----	600	BUSHING / ELBOW

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

200-600 AMP BUSHINGS & ELBOWS INSTALLATION DETAILS

900 Amp Equipment Bushing <—> 900 Amp Elbow Connection



900 Amp Dead Break Elbow - Connection Stack

NOTES

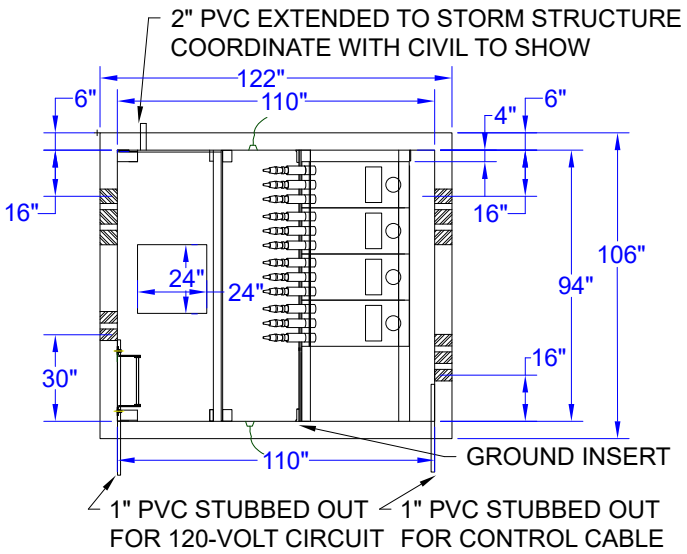
1. 600 Amp elbow / cable combinations can be used on 900 Amp equipment bushings up to 600 Amps max.
2. Do not mix different size cables in one stack.
3. Do not feed different parallel loads from (1) cable stack.

CU CODE	STOCK #	DESCRIPTION	QUANTITY	CABLE TYPE	MAX. (AMPS)	AMPS LIMITED BY
UELBC-4/0-9	400419400	4/0 AL/CU 25KV 900A W/ SEAL KIT	2	COPPER	635	CABLE
UELBC-500-9	400419500	500 AL/CU 25KV 900A W/ SEAL KIT	2	ALUMINUM	800	CABLE
			2	COPPER	900	BUSHING / ELBOW
UELBC-CPC	400419990	ELBOW CONNECTOR PLUG 25KV 900A	1	----	900	BUSHING / ELBOW

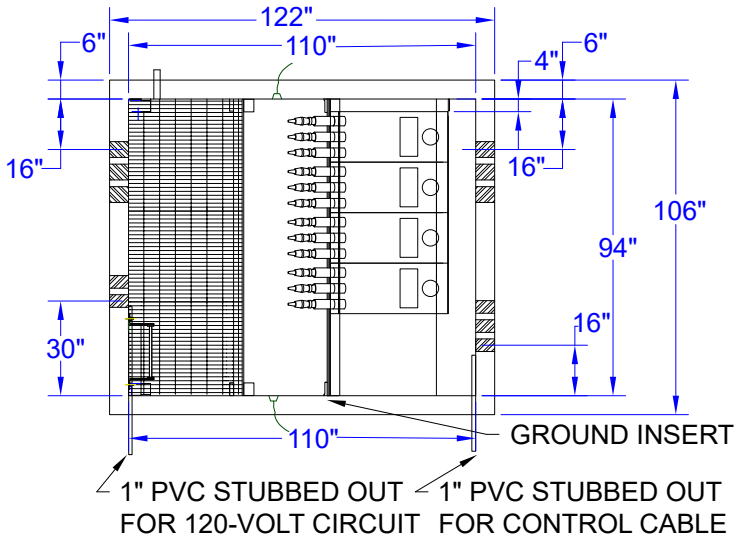
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

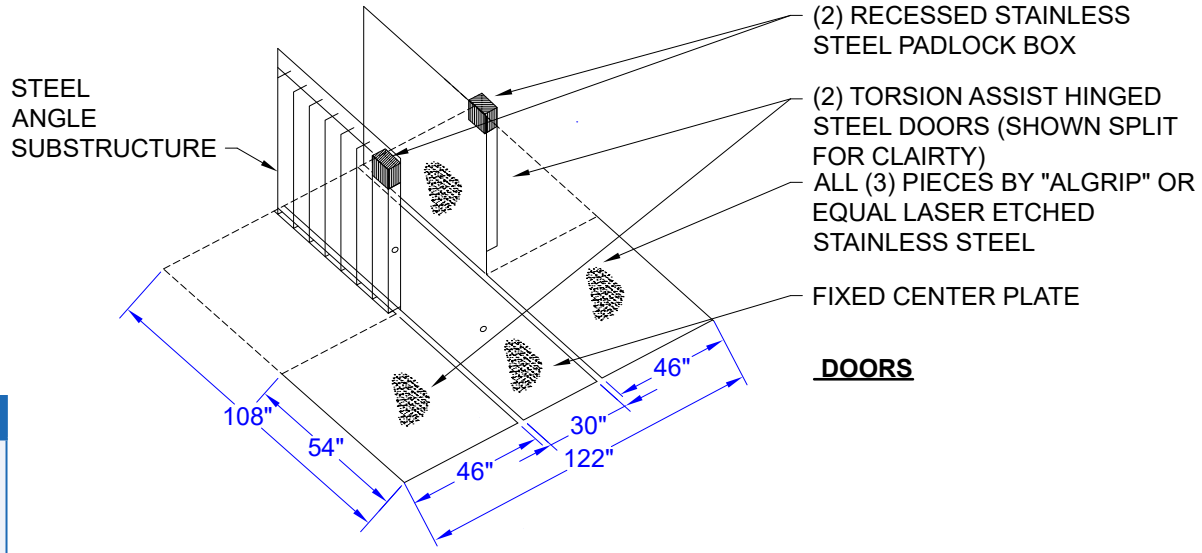
900 AMP BUSHINGS AND ELBOWS INSTALLATION DETAILS



FLOOR PLAN
(WORKING PLATFORM NOT SHOWN)



FLOOR PLAN
(WORKING PLATFORM SHOWN)



NOTES

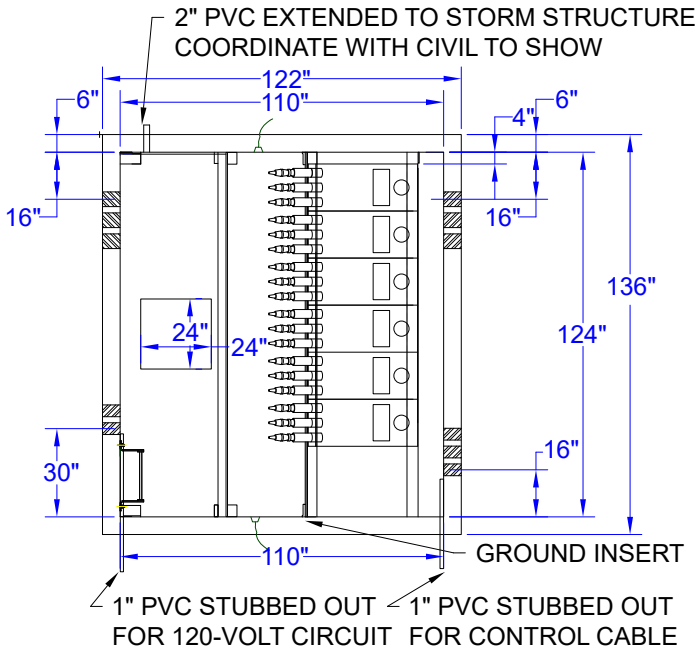
1. This drawing can be found on the Engineering SharePoint page: UGS-00032 latest version.
2. Customers to provide and install Vaults (see pg. 29 of the Manholes, Boxes, and Pads section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

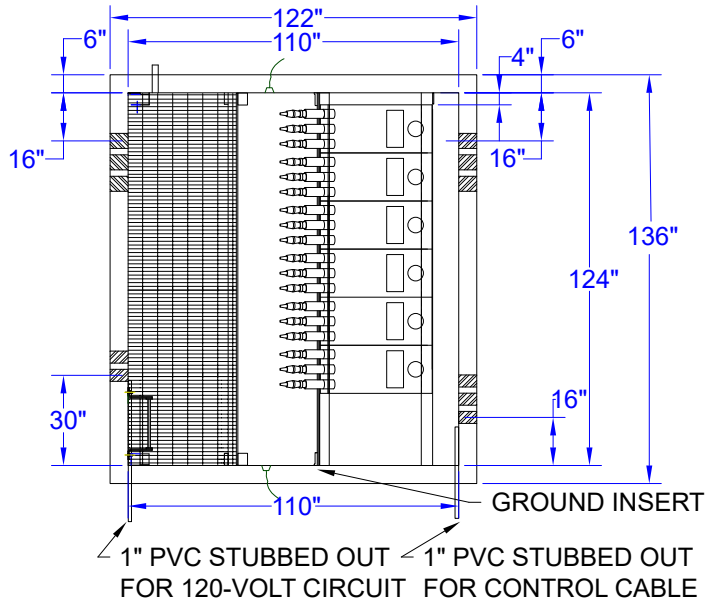
NES

VISTA (4-WAY) SWITCH GEAR VAULT DETAILS

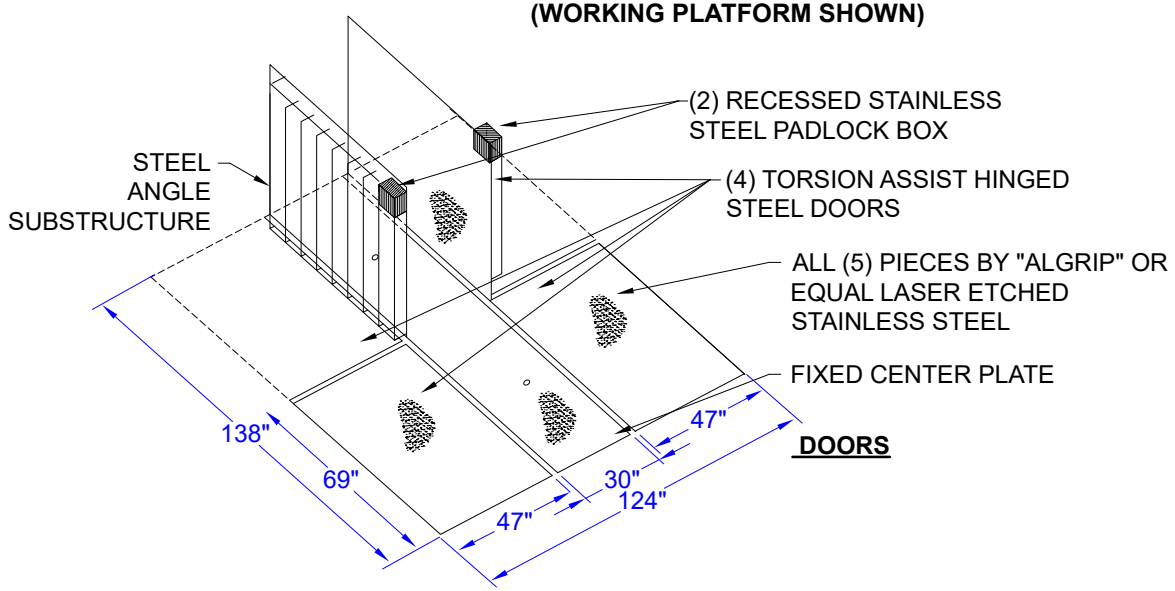
SWITCHES



FLOOR PLAN
(WORKING PLATFORM NOT SHOWN)



FLOOR PLAN
(WORKING PLATFORM SHOWN)



NOTES

1. This drawing can be found on the Engineering SharePoint page: UGS-00028 latest version.
2. Customers to provide and install Vaults (see pg. 31 of the Manholes, Boxes, and Pads section).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

VISTA (6-WAY) SWITCH GEAR VAULT DETAILS

MANHOLES, BOXES, AND PADS

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

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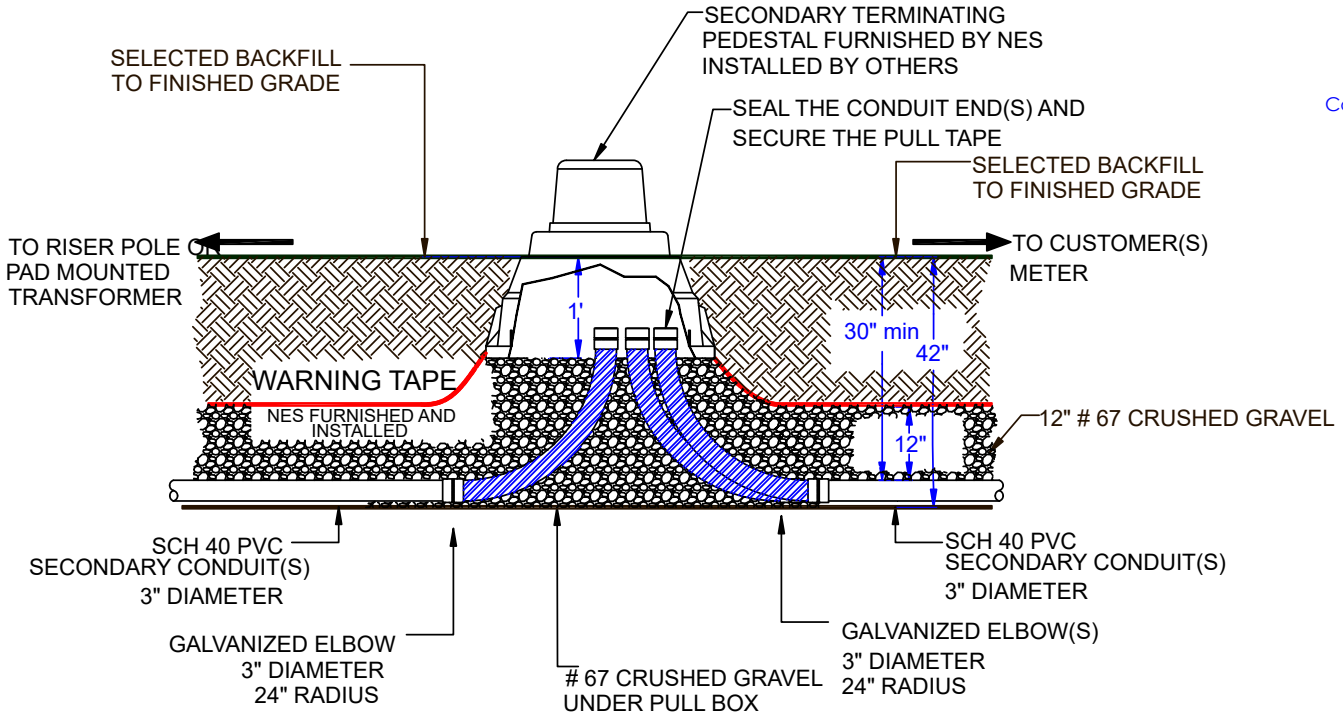
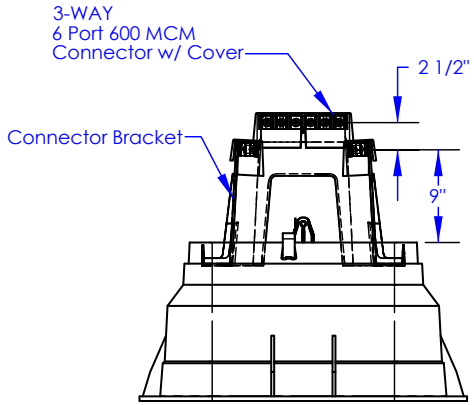
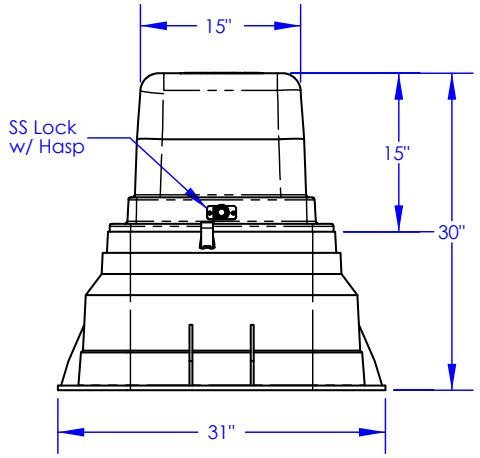
TABLE OF CONTENTS

REV.	ENG.	DESCRIPTION OF CHANGE	DATE







NOTES

1. Pedestal is furnished by NES and installed by the customer
2. 5 Permanent service conduits maximum, including the feeder conduit.
3. 3” Conduits, unless specified otherwise on the design drawing.
4. 1-3” temporary and 1-2” lighting conduit may be added if needed.
5. 3’ clearance required on all sides around the pedestal.
6. Pedestal is for residential, non-network applications only.

All materials, labor and equipment necessary to complete excavation, conduit installation, and backfilling shall be furnished by the customer or the customer’s representative(S) herein referred to as others or customer.

SECONDARY TERMINATING PEDESTAL

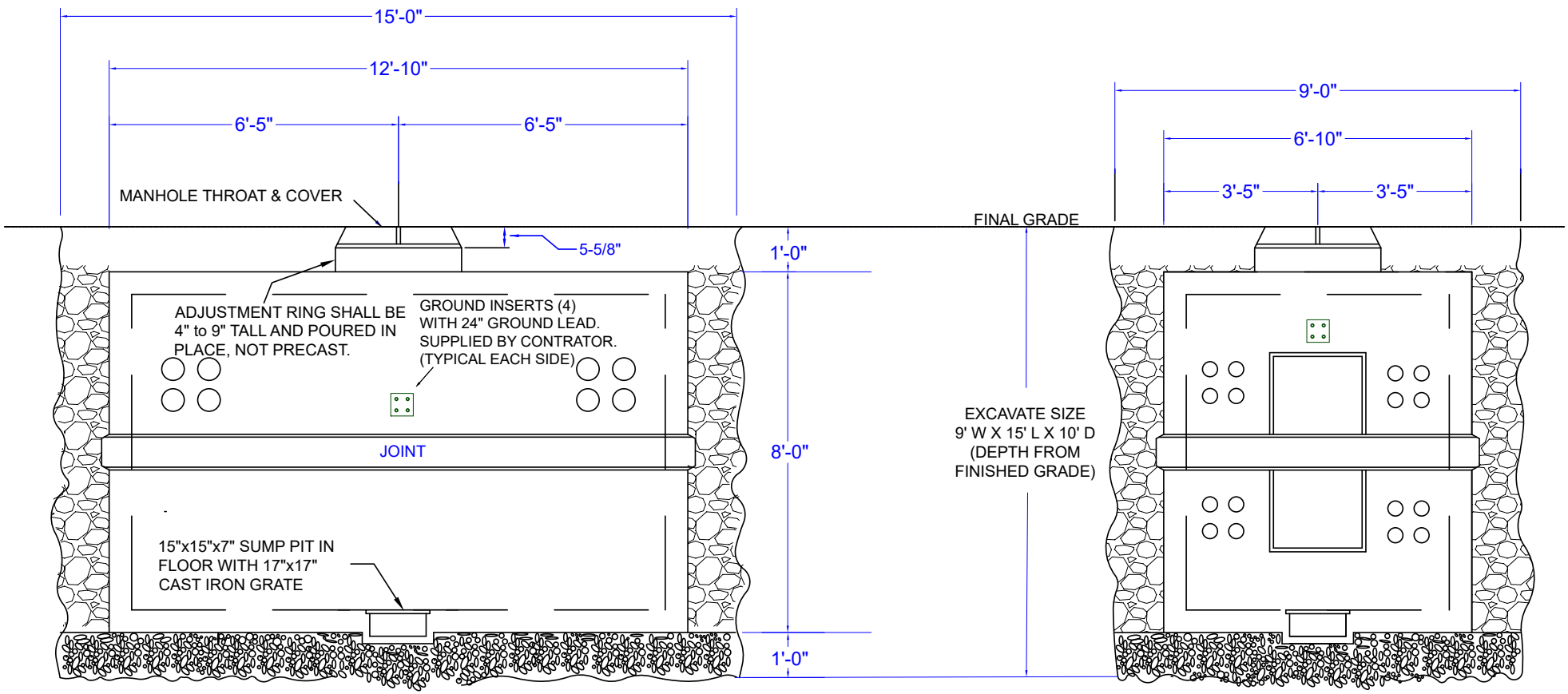
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UVPED-31X31	060395500	URD SERVICE PEDESTAL 31X31	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SECONDARY TERMINATING PEDESTAL



GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

QTY	DESCRIPTION	STOCK #	UNIT
100	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

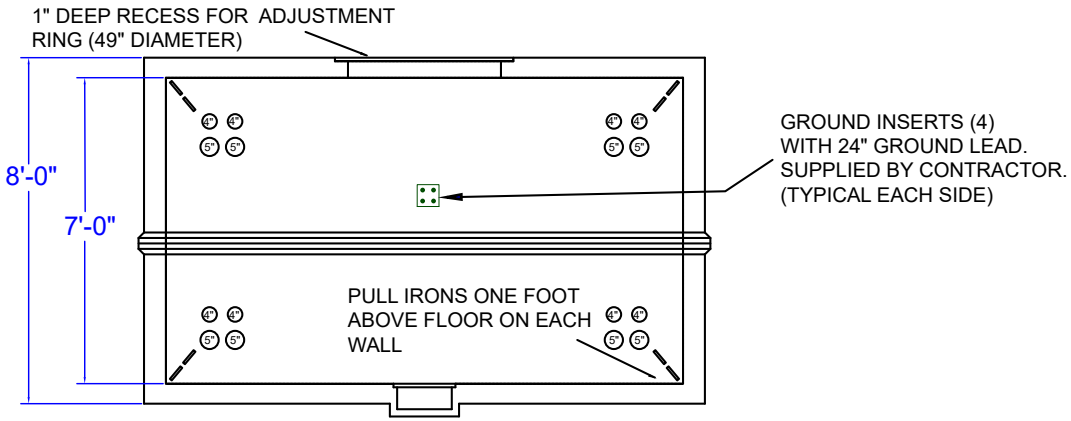
NOTES

1. Typically the customer supplies man-hole, throat & cover, excavation and backfill.
2. The contractor is responsible for excavation and backfill.
3. The backfill should be reasonably level for the placement of the manhole.
4. Set the base half and install seal.
5. Set the top half.
6. Set throat and cover.
7. Install the conduits.
8. Contractor should finish backfill with # 67 gravel to the seam between the manhole sections.
9. Proper shoring or sloping of earth must be in place before entering the hole to install grounding.
10. Backfill to Final grade with slope away from cover.
11. Manufacturer to deliver man-hole to the job site.

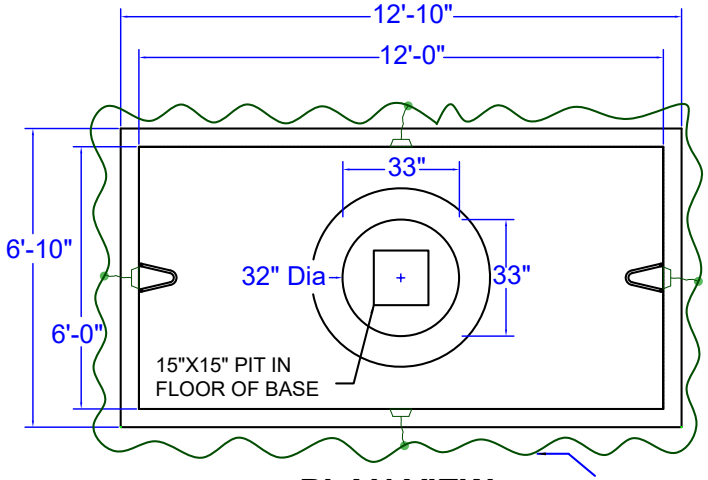
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

LARGE RECTANGULAR MANHOLE INSTALLATION DETAILS

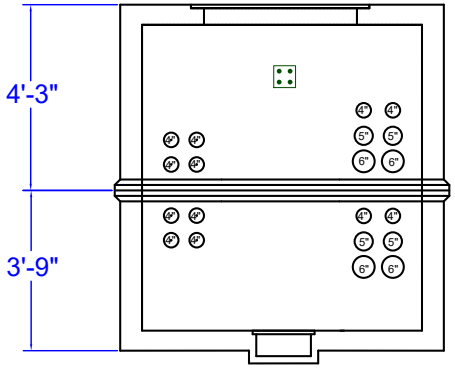


SIDE VIEW



PLAN VIEW

GROUND LOOP PROVIDED AND INSTALLED BY NES - BONDED TO DUCT BANK GROUND PROVIDED BY CONTRACTOR



END VIEW

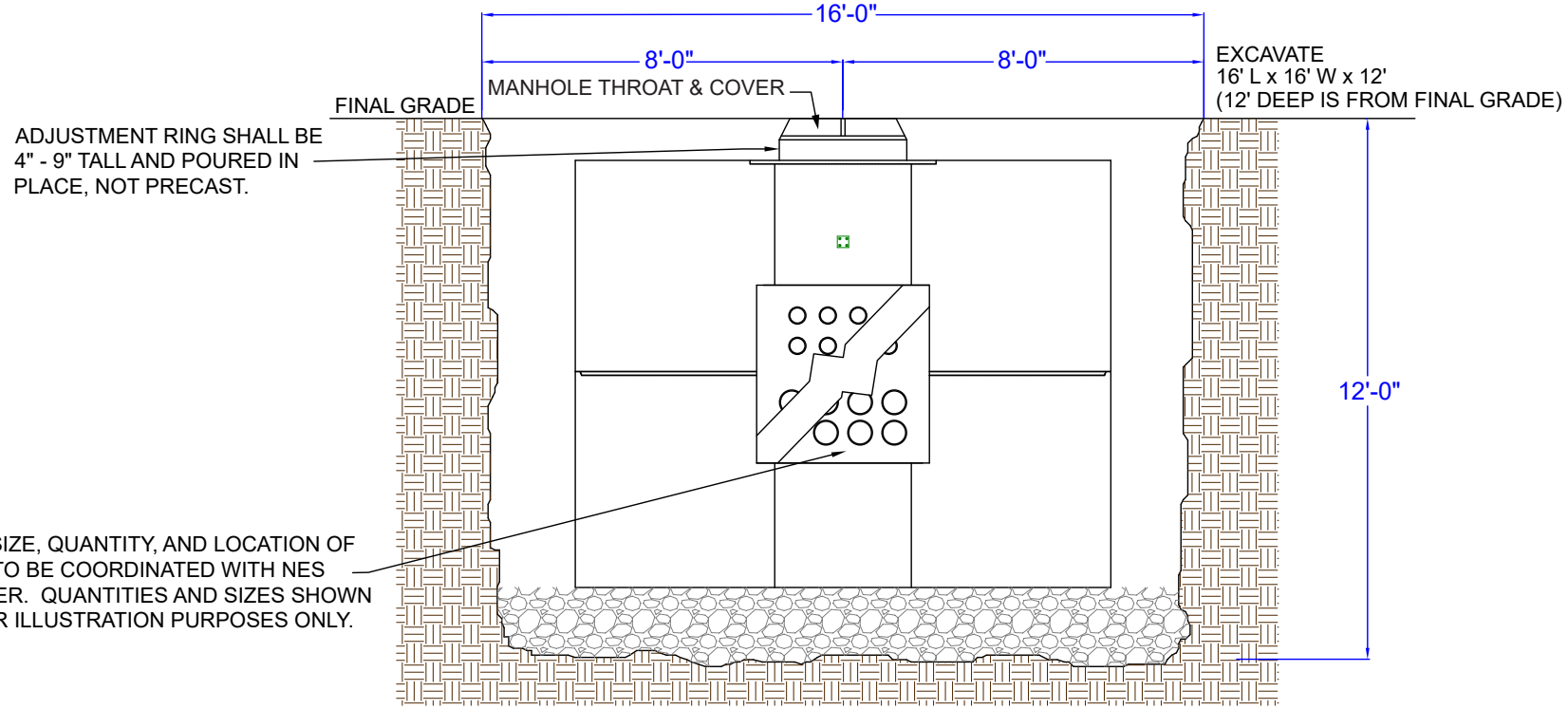
DUCT TERMINATORS ARE TO BE USED WITH MANHOLES SIMILAR TO FORMEX. EXACT SIZE AND LOCATION TO BE COORDINATED WITH NES ENGINEER AND NES STANDARDS. QUANTITIES AND SIZES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

LARGE MANHOLE				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	MANHOLE PRECAST LARGE	060375000	UMNHOLE-LG	EA
1	THROAT AND COVER	063000000		EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

LARGE RECTANGULAR MANHOLE PRE-CAST DETAILS



GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

QTY	DESCRIPTION	STOCK #	UNIT
100	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

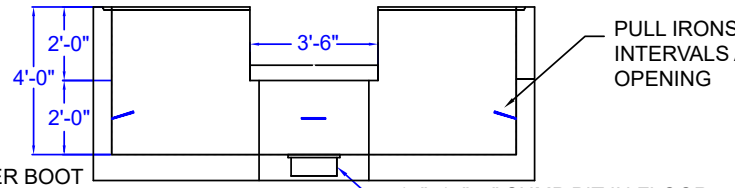
NOTES

1. Typically the customer supplies man-hole, throat & cover, excavation and backfill.
2. The contractor is responsible for excavation and backfill.
3. The backfill should be reasonably level for the placement of the manhole.
4. Set the base half and install seal.
5. Set the top half.
6. Set throat and cover.
7. Install the conduits.
8. Contractor should finish backfill with # 67 gravel to the seam between the manhole sections.
9. Proper shoring or sloping of earth must be in place before entering the hole to install grounding.
10. Backfill to Final grade with slope away from cover.
11. Manufacturer to deliver man-hole to the job site.

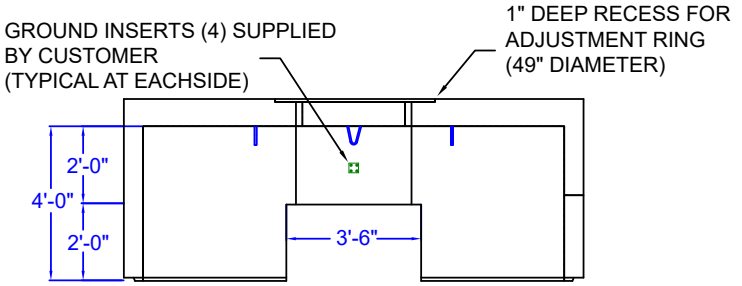
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

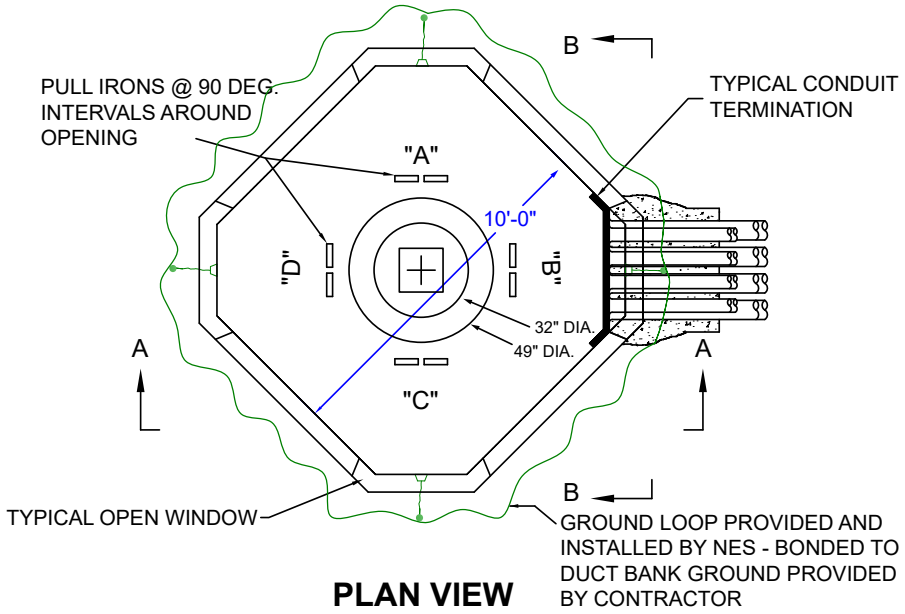
OCTAGONAL MANHOLE INSTALLATION DETAILS



SIDE VIEW BOTTOM SECTION (SECTION AA & SECTION BB)



SIDE VIEW TOP SECTION (SECTION AA & SECTION BB)



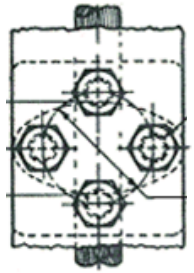
PLAN VIEW

OCTAGONAL MANHOLE				
MATERIAL LIST				
QTY	**DESCRIPTION**	**STOCK #**	**CU CODE**	**UNIT**
1	MANHOLE PRECAST LARGE	060375000	UMNHOLE-OCT	EA
1	THROAT AND COVER	063000000		EA

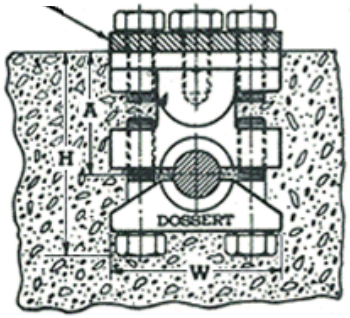
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

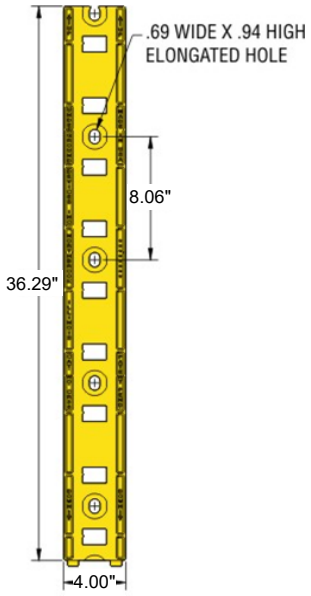
NES

OCTAGONAL MANHOLE PRE-CAST DETAILS



FLAT BUS BAR

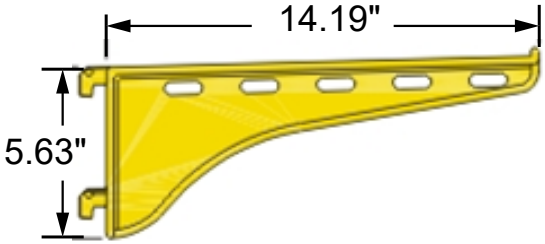




GROUND INSERT				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	INSERT GROUND #1/0-300MCM	380300000	UMH-GRDINS	EA
Note: Currently included with manhole by Customer.				

Require a minimum of 8 Cable Racks with arms per man-hole. Consult UG Crew prior to estimates.

CABLE RACK				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	SUPPORT CABLE BACK 9 HOLE PLAS	381100000	UMH-CARM-SUP	EA



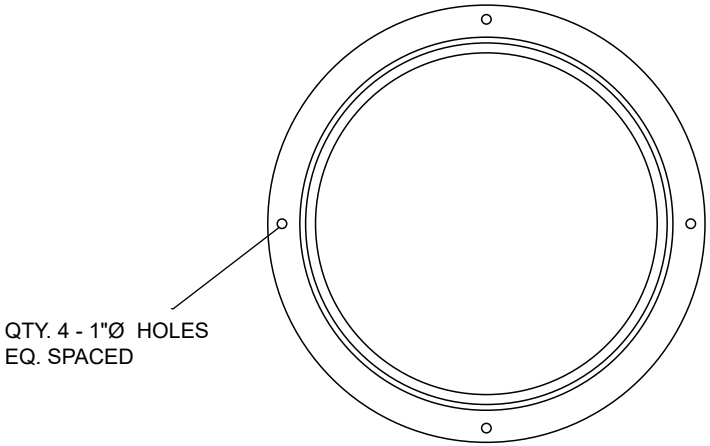
Use 20 inch Cable arms for splices or when racking multiple circuit cables.

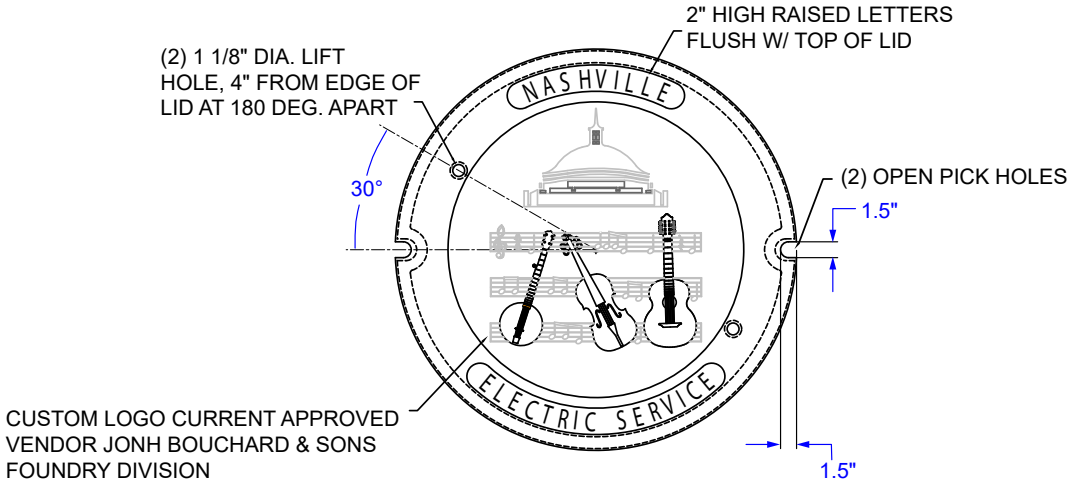
CABLE ARM				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	CABLE ARM 14 INCH PLAS	380080000	NCARM-NM-14	EA
1	CABLE ARM 20 INCH PLAS	380090000	NCARM-NM-20	EA

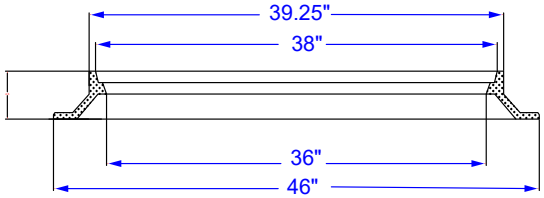
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

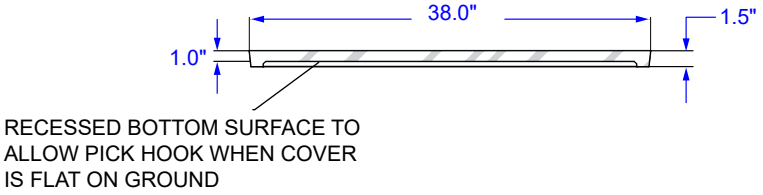
MANHOLE ACCESSORIES GROUNDING AND CABLE RACKS







SECTION OF FRAME



SECTION OF COVER

NOTES

1. Class 35B gray iron machined bearing surfaces heavy duty, H20 load rating art work on cover must be approved by NES Standards. Pick bars or drop handles will not be accepted.

MANHOLE THROAT AND COVER

MATERIAL LIST

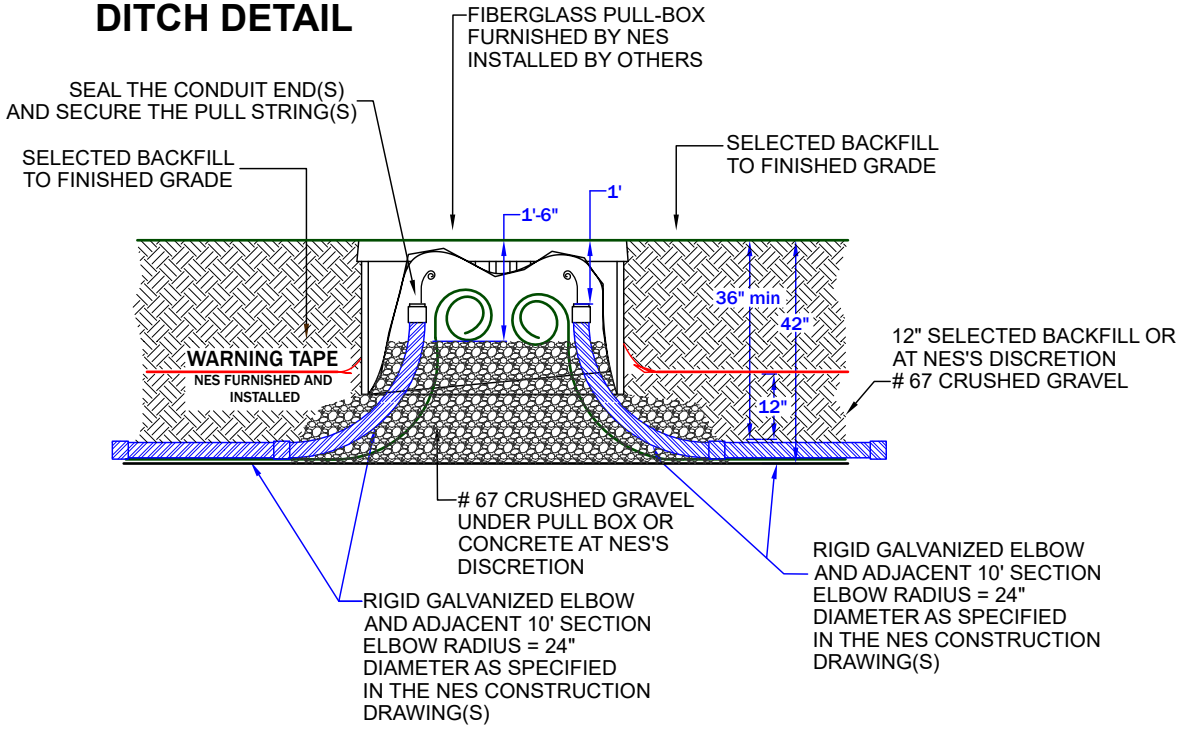
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	THROAT AND COVER	063000000	UMH-THROAT	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

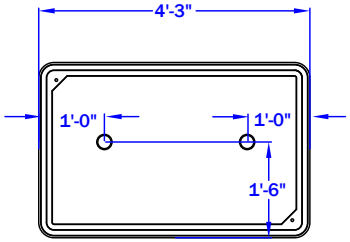
NES

MANHOLE ACCESSORIES THROAT AND COVER

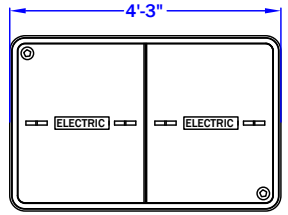
DITCH DETAIL



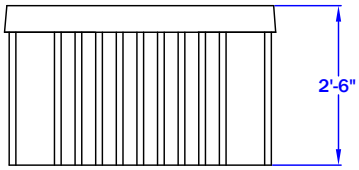
INSIDE VIEW



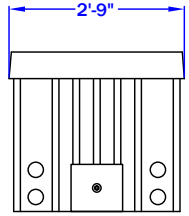
TOP VIEW



SIDE VIEW



END VIEW



NOTES

1. All materials, labor and equipment necessary to complete excavation, conduit installation, and backfilling shall be furnished by the customer or customer's representatives herein referred to as others or customer.

POLYMER PRIMARY PULL BOX (DRAWING UGS0051)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	PRIMARY PULL BOX	060044000	UBOX-PRI	EA

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

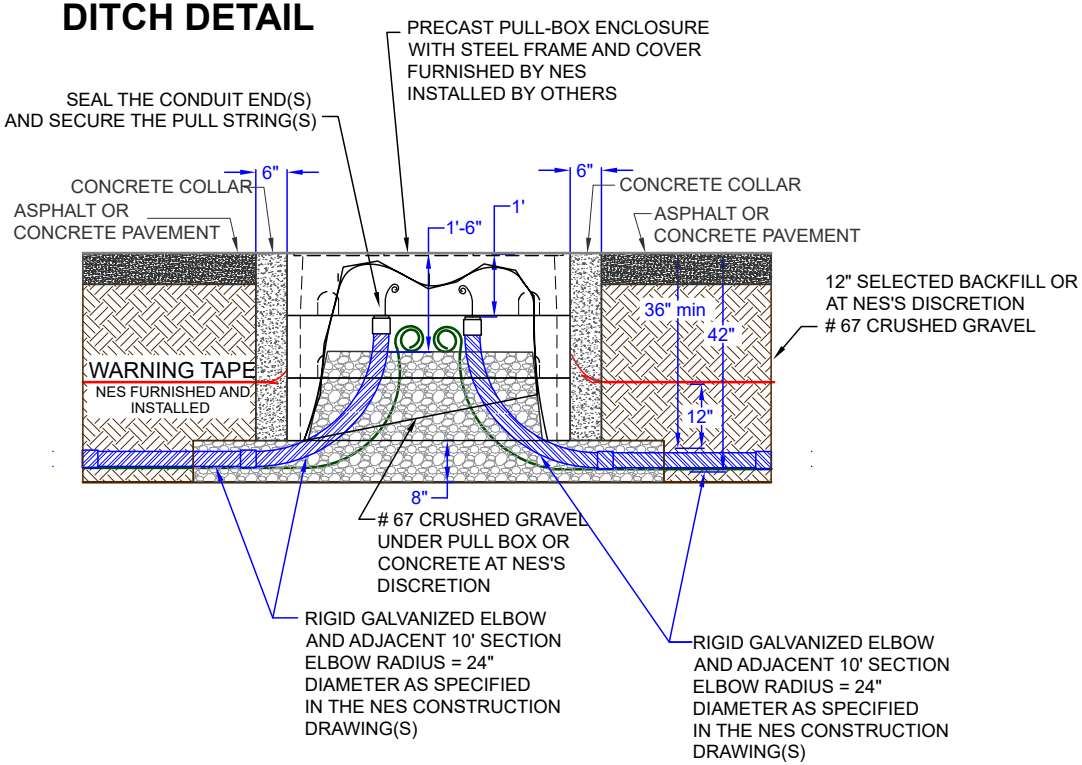
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
2	ROD GROUND CW 5/8X8	184380000	EA
4	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

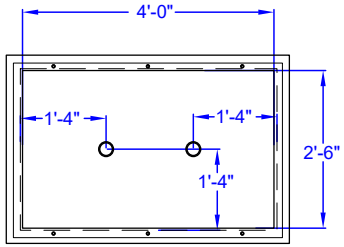
NES

PRIMARY PULL BOX
NON-TRAFFIC RATED

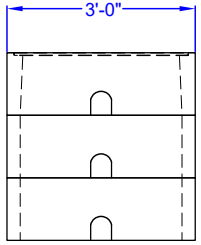
DITCH DETAIL



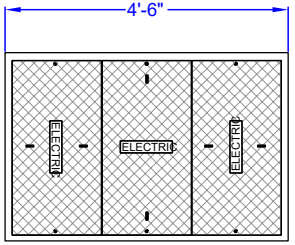
INSIDE VIEW



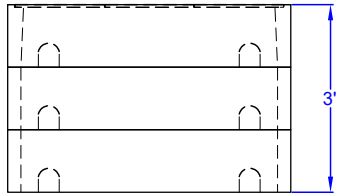
END VIEW



TOP VIEW



SIDE VIEW



NOTES

1. All materials, labor and equipment necessary to complete excavation, conduit installation, and backfilling shall be furnished by the customer or customer's representatives herein referred to as others or customer.

PRECAST CONCRETE PRIMARY PULL BOX (DRAWING UGS0051)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	PRIMARY PULL BOX—TRAFFIC RATED	060045000	UBOX-PRI-TF	EA
2	PRIMARY PULL BOX EXTENSION-TRAFFIC RTD.	060045200	UBOX-PRI-TFX	EA
1	PRIMARY PULL BOX COVER—TRAFFIC RATED	060045500	UBOX-PRI-TFC	EA

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

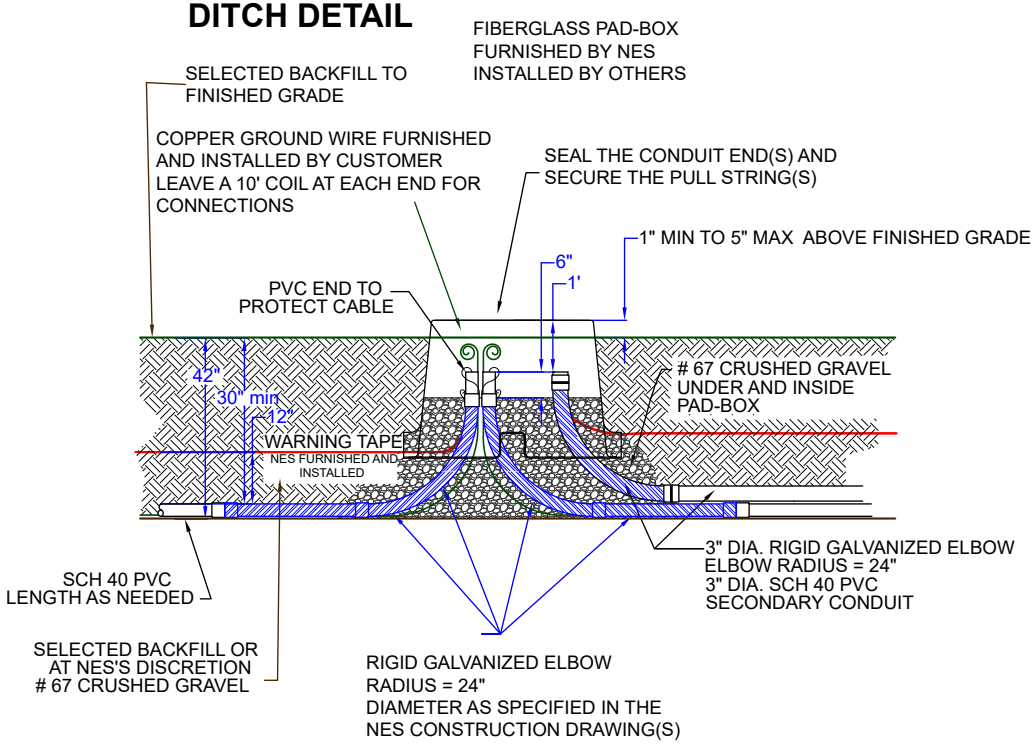
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
2	ROD GROUND CW 5/8X8	184380000	EA
4	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

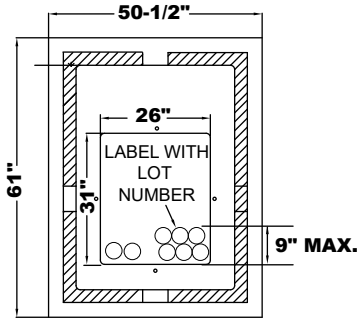
NES

PRIMARY PULL BOX TRAFFIC RATED (AASHTO H20)

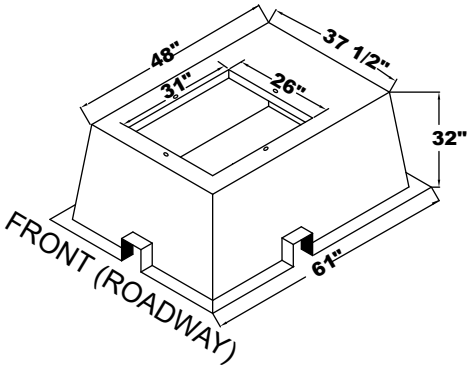
DITCH DETAIL



TOP VIEW



ISOMETRIC VIEW



SPECIAL APPLICATIONS	
TRANSFORMER COVER AVAILABLE FOR SINGLE PHASE TRANSFORMER TO BE INSTALLED FOR TEMPORARY SERVICE. COVER ALLOWS ENCLOSING THE WELL OPENING TO USE AS PULL-BOX WHEN THE TRANSFORMER IS REMOVED.	
STK# 060180100	BOX PAD COVER, 37.5 X 48 XFMR PAD

NOTES

1. All materials, labor and equipment necessary to complete excavation, conduit installation, and backfilling shall be furnished by the customer or customer's representatives herein referred to as others or customer.

FIBERGLASS PAD-BOX FOR SINGLE PHASE TRANSFORMERS (DRAWING UGS0051)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	TRANS BOX PAD FRP 48 X 37 1/2	0603900000	UTPAD-FG	EA

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

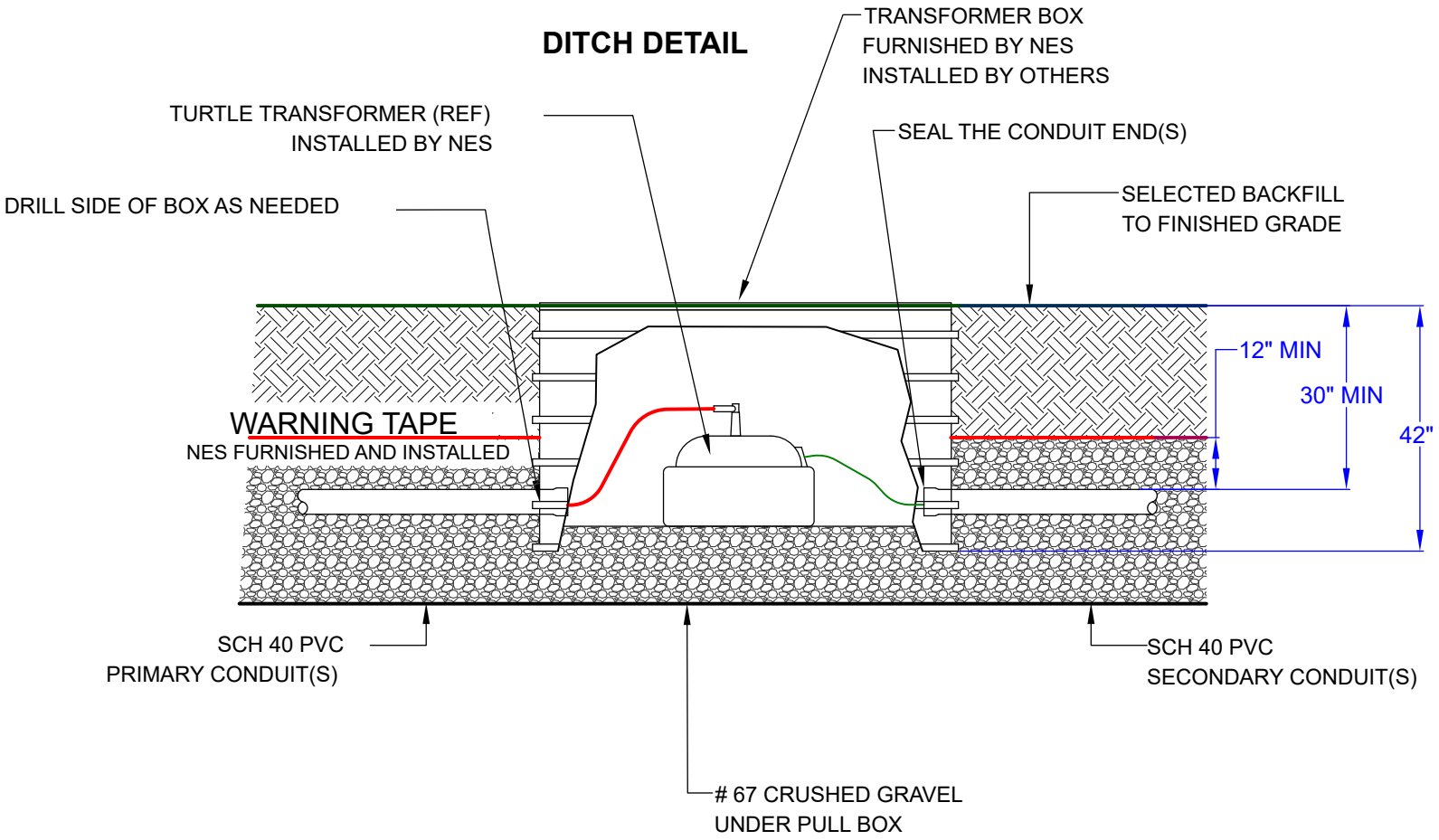
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SINGLE PHASE TRANSFORMER FIBERGLASS BOX

DITCH DETAIL



TURTLE TRANSFORMER BOX (DRAWING UGS-00061)				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	BOX PULL 36W X 60L X 36D	060463600	UBOX-UXFMR	EA

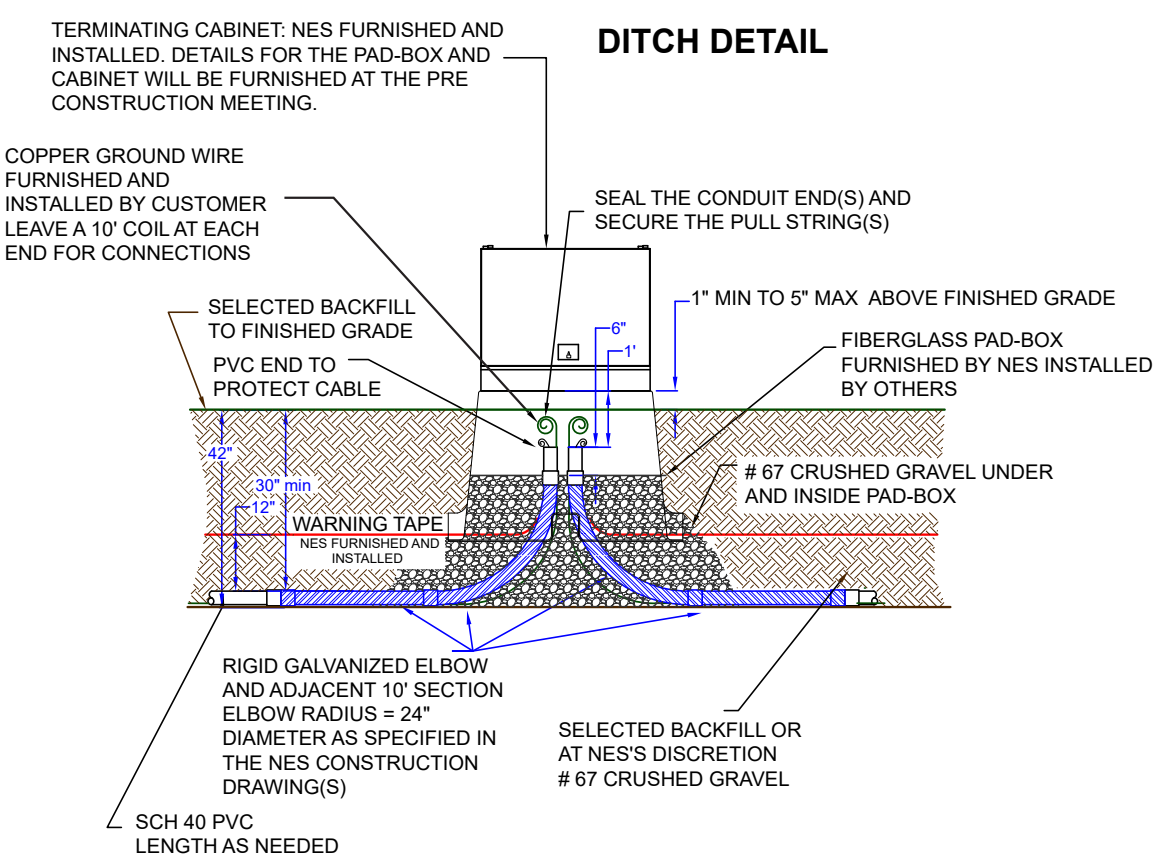
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

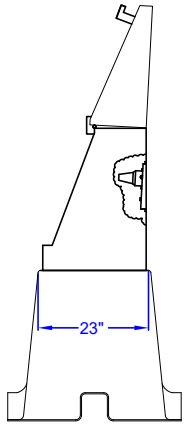
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

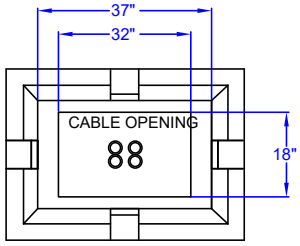
TURTLE TRANSFORMER BOX INSTALLATION DETAILS

DITCH DETAIL





END VIEW



TOP VIEW

NOTES

1. All materials, labor and equipment necessary to complete excavation, conduit installation, and backfilling shall be furnished by the customer or customer's representatives herein referred to as others or customer.

FIBERGLASS PAD-BOX FOR SINGLE PHASE TERMINATING CABINETS (DRAWING UGS0018)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	TERM CAB BASE FOR 1PHASE, 4 POLE	060010000	U1P4P-BASE	EA

GROUNDING ITEMS

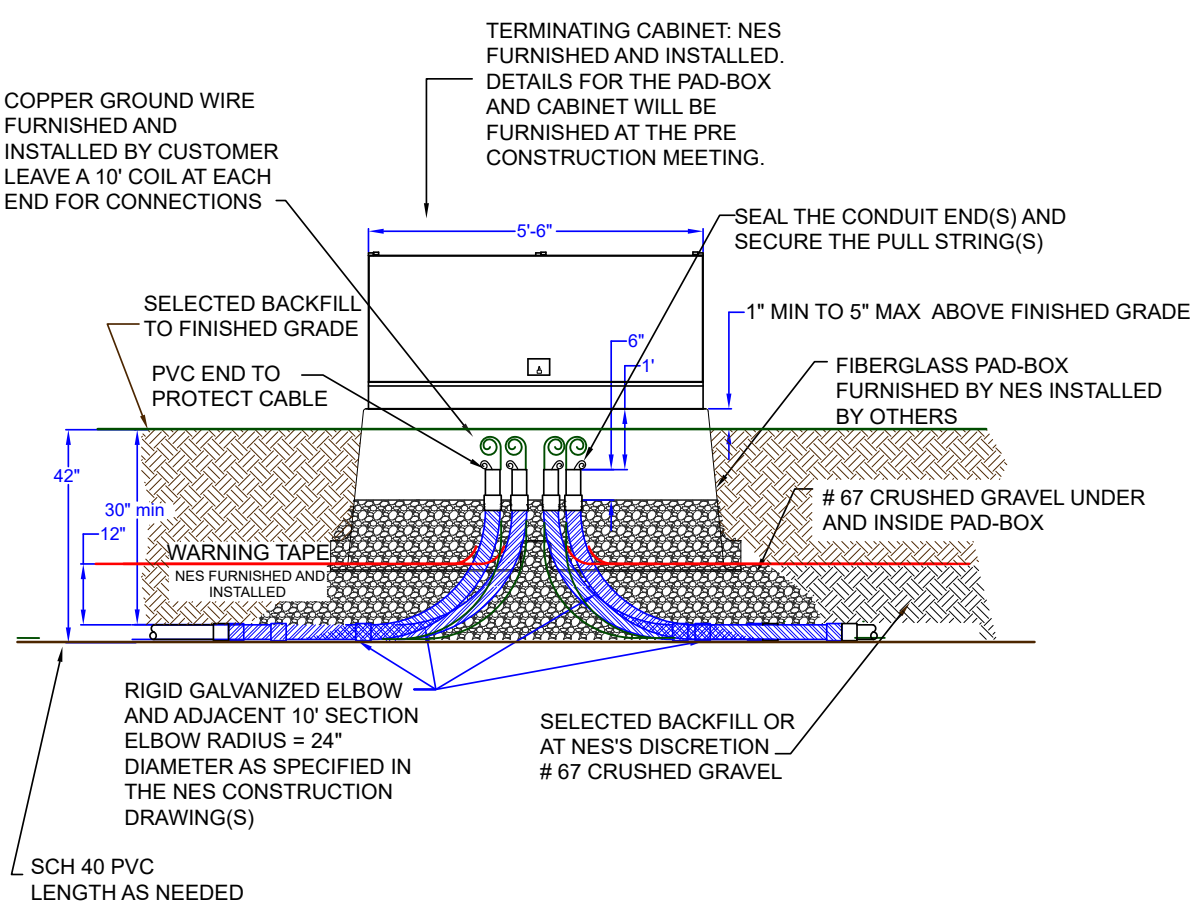
TRUCK STOCK MATERIAL LIST

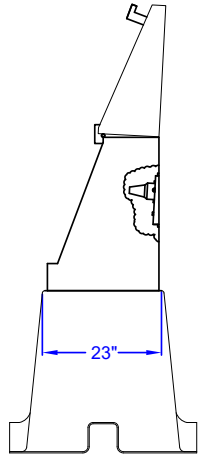
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

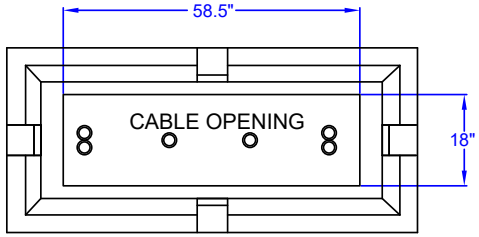
NES

TERMINATING CABINET FIBERGLASS BASE SINGLE PHASE





END VIEW



TOP VIEW

NOTES

1. All materials, labor and equipment necessary to complete excavation, conduit installation, and backfilling shall be furnished by the customer or customer's representatives herein referred to as others or customer.

FIBERGLASS PAD-BOX FOR TWO AND THREE PHASE TERMINATING CABINETS (DRAWING UGS0016)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
1	TERM CAB BASE FOR 2P OR 3P 4 POLE TERMINATING CABINETS	060015000	U3P4P-BASE	EA

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
2	ROD GROUND CW 5/8X8	184380000	EA
4	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

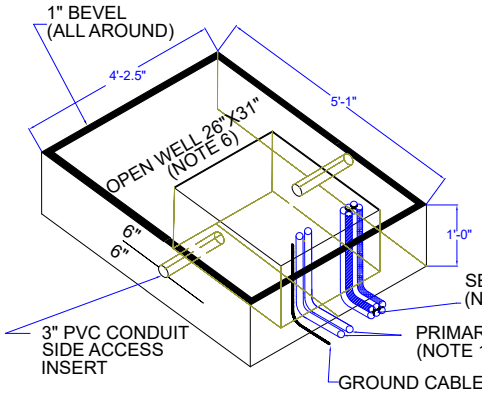
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

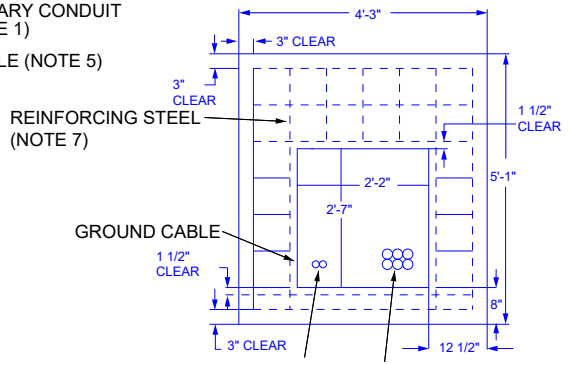
TERMINATING CABINET FIBERGLASS BASE THREE PHASE

NOTES

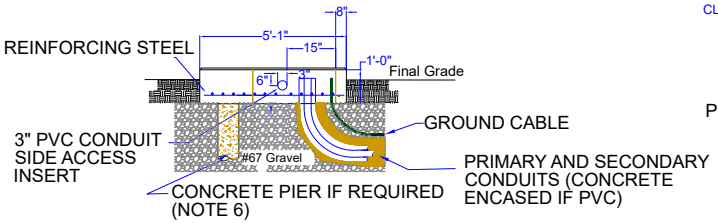
1. A spare NES primary conduit is strongly recommended, and may be required at the NES designer's discretion. NES to inspect all conduit prior to covering or encasing in concrete.
2. Maximum of eight (8) customer secondary conduits, or eight (8) conductors per phase. The secondary conduits shall not cross NES conduits, and must be approved by local Codes.
3. Secondary conduits shall not extend more than 1'-6" from the inside edge of the open well, as shown in the FRONT VIEW.
4. No other utilities shall pass beneath the NES pad location or be located within six feet (6') of the transformer pad.
5. NES will install ground rods and grid at the pad location when excavation is complete, and prior to backfilling or forming the pad. Contact the NES representative above.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Requires using ASTM A-615- Grade 60 (#5 rebar) spaced equally as shown typically on 8" grid or as dimensioned. Must maintain 3" concrete cover between steel rebar and soil contact surface. Requires minimum 1-1/2 rebar concrete cover exposed to open air within transformer well opening.
8. NES will inspect the pad form, PVC Conduit Insert and rebar steel prior to concrete being poured. Contact the NES representative listed above.
9. Concrete shall be a minimum of 3,000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by Customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
11. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the pad.
12. No obstructions to transformer access such as walls, screens or overhangs are permitted.
13. Other brands of precast pads may be considered only if approved by NES Standards Group prior to the Pre-Construction Meeting.
14. The NES Pad shall be excavated formed and poured in place with two - 3" PVC conduit inserts as shown to provide two sided access.



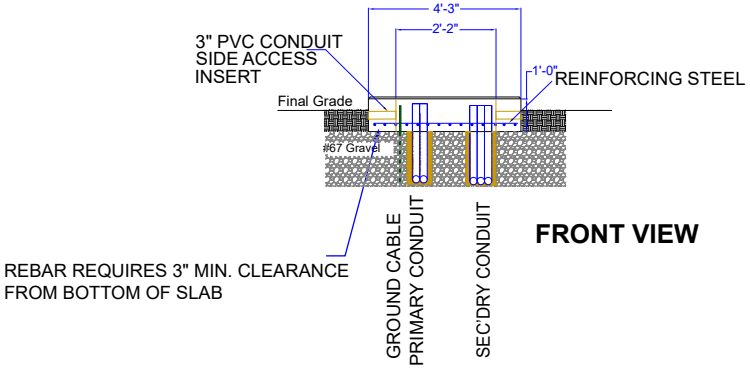
ISOMETRIC VIEW



TOP VIEW



LEFT SIDE VIEW



FRONT VIEW

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

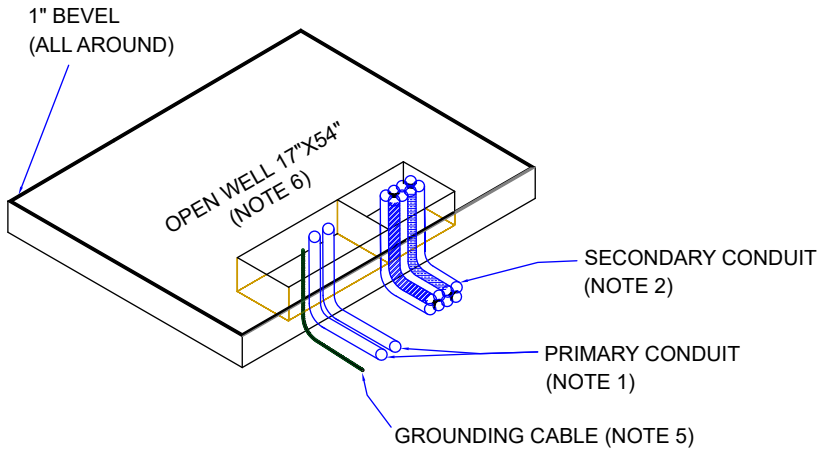
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER PAD 25-250 KVA (1PH) CONCRETE DETAIL

NOTES

1. A spare NES primary conduit is strongly recommended, and may be required at the NES designer's discretion. NES to inspect all conduit prior to covering or encasing in concrete.
2. Maximum of eight (8) customer secondary conduits, or eight (8) conductors per phase. The secondary conduits shall not cross NES conduits, and must be approved by local Codes.
3. Secondary conduits shall not extend more than 1'-6" from the inside edge of the open well, as shown in the FRONT VIEW.
4. No other utilities shall pass beneath the NES pad location or be located within six feet (6') of the transformer pad.
5. NES will install ground rods and grid at the pad location when excavation is complete, and prior to backfilling or forming the pad. Contact the NES representative above.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Requires using ASTM A-615- Grade 60 (#5 rebar) spaced equally as shown typically on 8" grid or as dimensioned. Must maintain 3" concrete cover between steel rebar and soil contact surface. Requires minimum 1-1/2 rebar concrete cover exposed to open air within transformer well opening.
8. NES will inspect the pad form, PVC Conduit Insert and rebar steel prior to concrete being poured. Contact the NES representative listed above.
9. Concrete shall be a minimum of 3,000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by Customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.

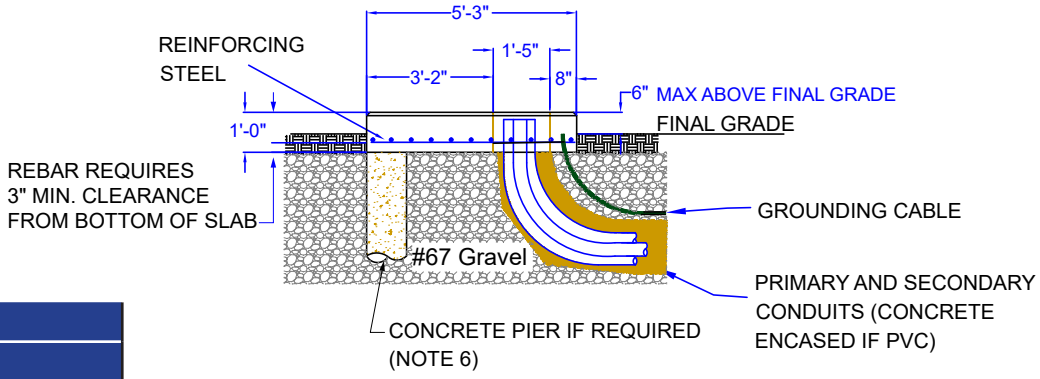


ISOMETRIC VIEW

PAD CLEARANCES
Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front - 6 ft.
Sides & Back - 3 ft.

Walls/Screens/Overhead
No obstructions permitted

Minimum distance from Pad to non Fire-Proof Building
10 ft. for transformer up to 75 kVA
20 ft. for transformers 76-300 kVA
30 ft. for transformers over 300 kVA



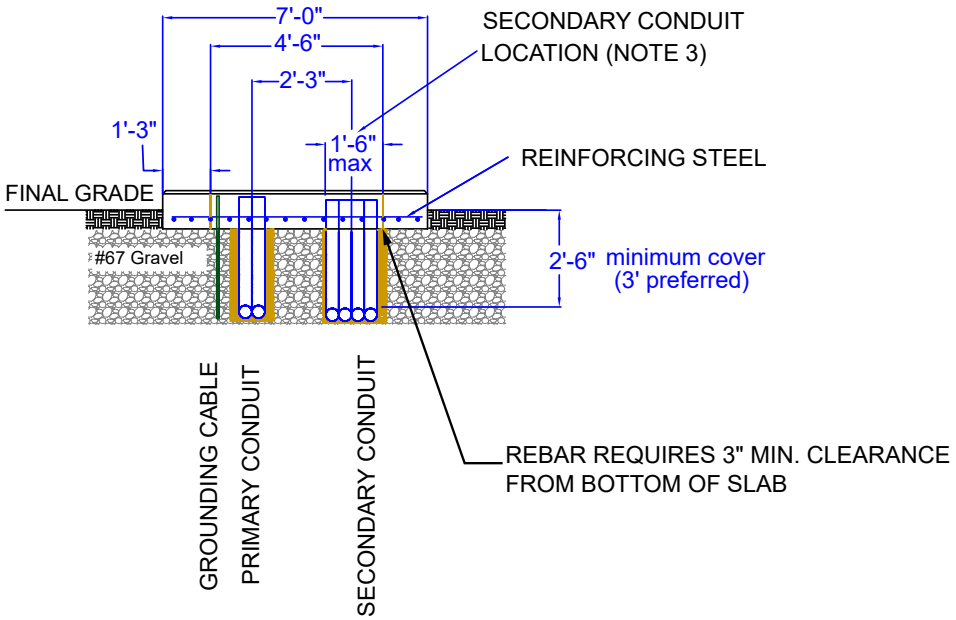
LEFT SIDE VIEW

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

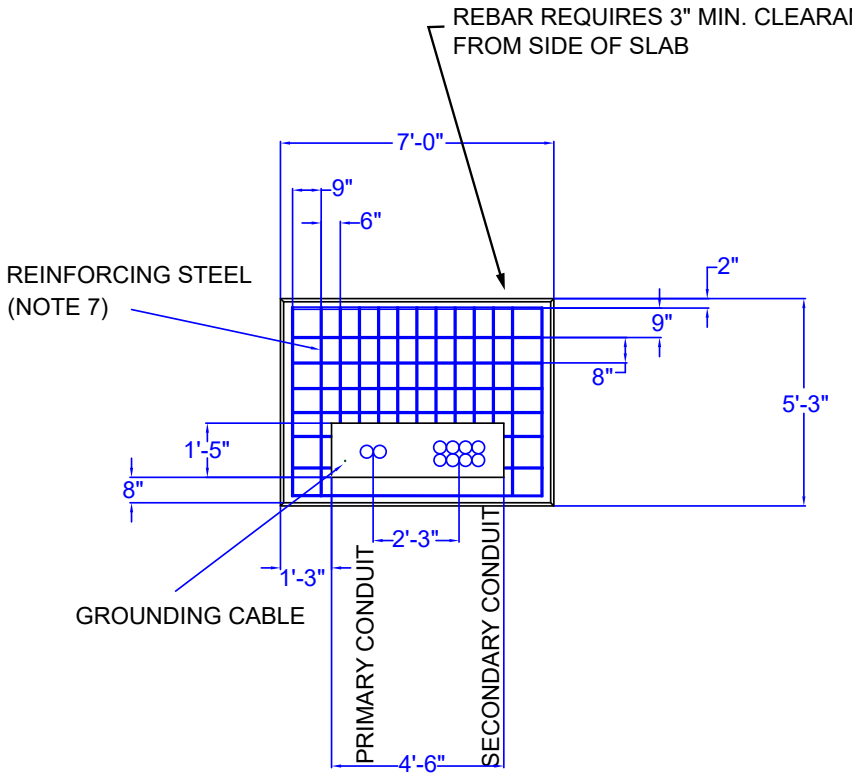
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER PAD 75-500KVA (3 PH) CONCRETE DETAIL



FRONT VIEW



TOP VIEW

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00005)				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
2	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	EA
120	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
40	LABOR, EXCAVATION & FORM WORK		ULAB-CONST	HRS

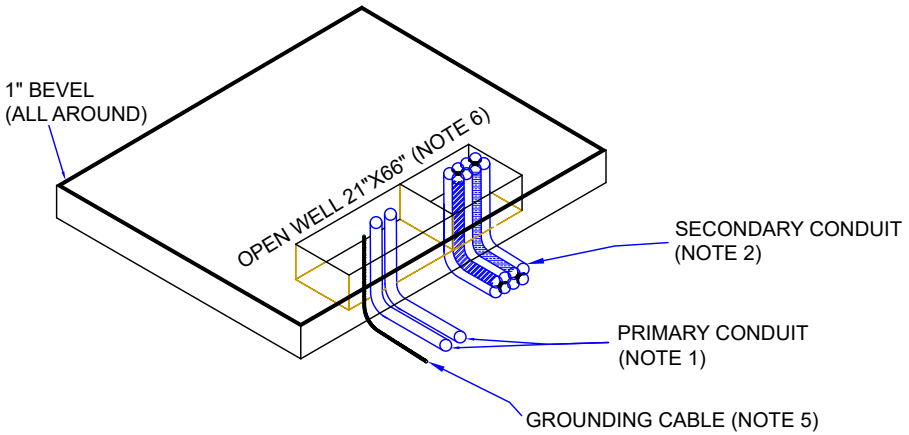
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER PAD 75-500 KVA (3 PH) CONCRETE REINFORCEMENT

NOTES

1. A spare NES primary conduit is strongly recommended, and may be required at the NES designer's discretion. NES to inspect all conduit prior to covering or encasing in concrete.
2. Maximum of eight (8) customer secondary conduits, or eight (8) conductors per phase. The secondary conduits shall not cross NES conduits, and must be approved by local Codes.
3. Secondary conduits shall not extend more than 1'-6" from the inside edge of the open well, as shown in the FRONT VIEW.
4. No other utilities shall pass beneath the NES pad location or be located within six feet (6') of the transformer pad.
5. NES will install ground rods and grid at the pad location when excavation is complete, and prior to backfilling or forming the pad. Contact the NES representative above.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Requires using ASTM A-615- Grade 60 (#5 rebar) spaced equally as shown typically on 8" grid or as dimensioned. Must maintain 3" concrete cover between steel rebar and soil contact surface. Requires minimum 1-1/2 rebar concrete cover exposed to open air within transformer well opening.
8. NES will inspect the pad form, PVC Conduit Insert and rebar steel prior to concrete being poured. Contact the NES representative listed above.
9. Concrete shall be a minimum of 3,000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by Customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.

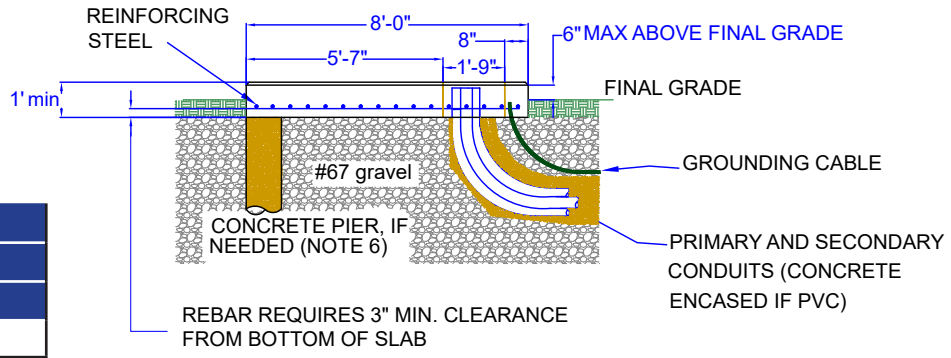


ISOMETRIC VIEW

PAD CLEARANCES
Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front - 6 ft.
Sides & Back - 3 ft.

Walls/Screens/Overhead
No obstructions permitted

Minimum distance from Pad to non Fire-Proof Building
10 ft. for transformer up to 75 kVA
20 ft. for transformers 76-300 kVA
30 ft. for transformers over 300 kVA



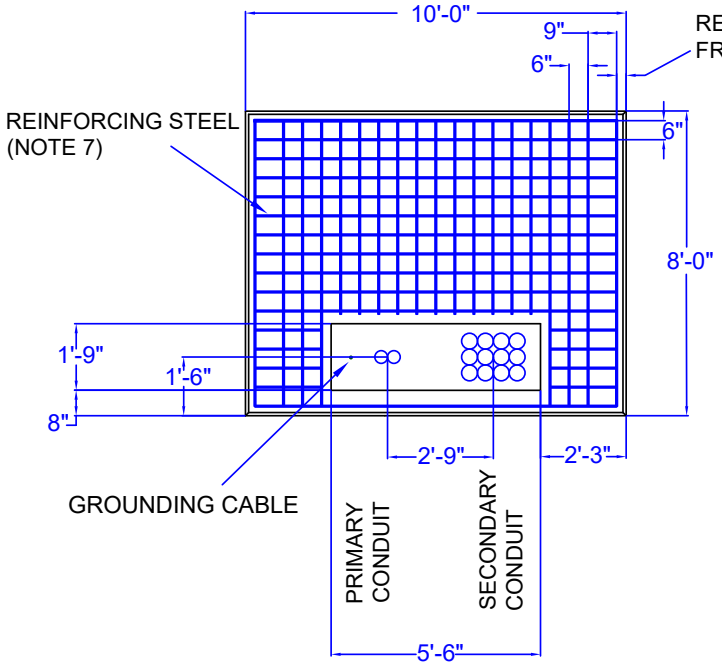
LEFT SIDE VIEW

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

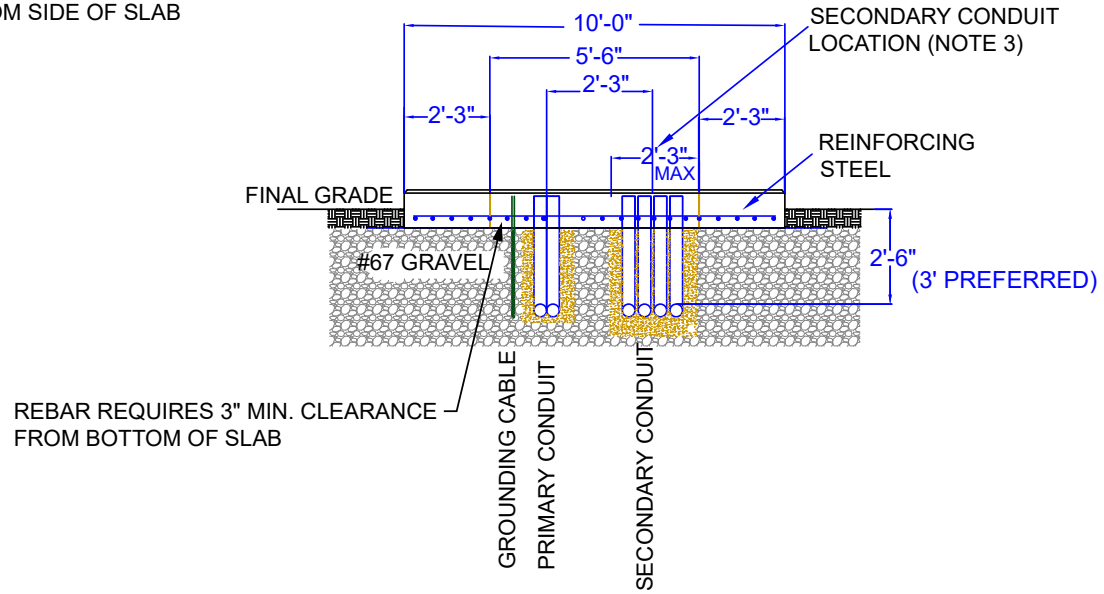
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER PAD 750-1500 KVA (3 PH) CONCRETE DETAIL



TOP VIEW



FRONT VIEW

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00006)				
MATERIAL LIST				
QTY	**DESCRIPTION**	**STOCK #**	**CU CODE**	**UNIT**
3	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
250	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
60	LABOR, EXCAVATION & FORM WORK		ULAB-CONST	HRS

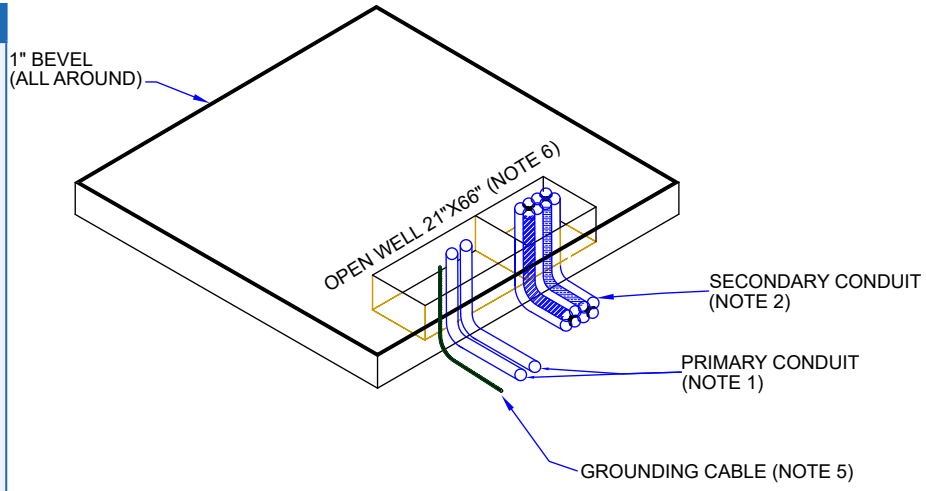
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER PAD
750-1500 KVA (3 PH)
CONCRETE REINFORCEMENT

NOTES

1. A spare NES primary conduit is strongly recommended, and may be required at the NES designer's discretion. NES to inspect all conduit prior to covering or encasing in concrete.
2. Maximum of eight (8) customer secondary conduits, or eight (8) conductors per phase. The secondary conduits shall not cross NES conduits, and must be approved by local Codes.
3. Secondary conduits shall not extend more than 1'-6" from the inside edge of the open well, as shown in the FRONT VIEW.
4. No other utilities shall pass beneath the NES pad location or be located within six feet (6') of the transformer pad.
5. NES will install ground rods and grid at the pad location when excavation is complete, and prior to backfilling or forming the pad. Contact the NES representative above.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Requires using ASTM A-615- Grade 60 (#5 rebar) spaced equally as shown typically on 8" grid or as dimensioned. Must maintain 3" concrete cover between steel rebar and soil contact surface. Requires minimum 1-1/2 rebar concrete cover exposed to open air within transformer well opening.
8. NES will inspect the pad form, PVC Conduit Insert and rebar steel prior to concrete being poured. Contact the NES representative listed above.
9. Concrete shall be a minimum of 3,000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by Customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.

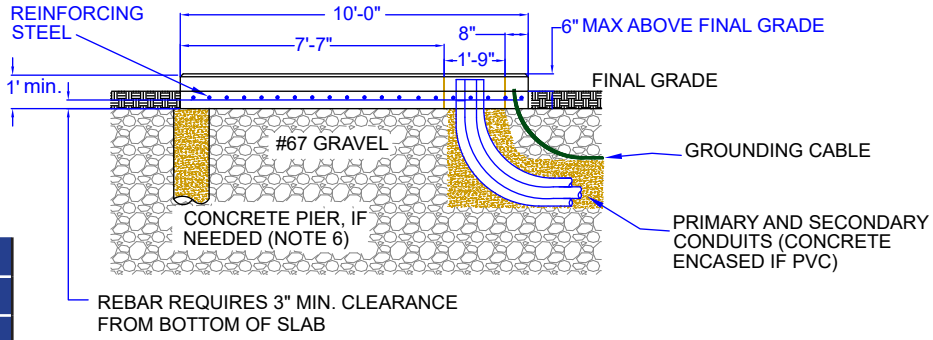


ISOMETRIC VIEW

PAD CLEARANCES
Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front - 6 ft.
Sides & Back - 3 ft.

Walls/Screens/Overhead
No obstructions permitted

Minimum distance from Pad to non Fire-Proof Building
10 ft. for transformer up to 75 kVA
20 ft. for transformers 76-300 kVA
30 ft. for transformers over 300 kVA



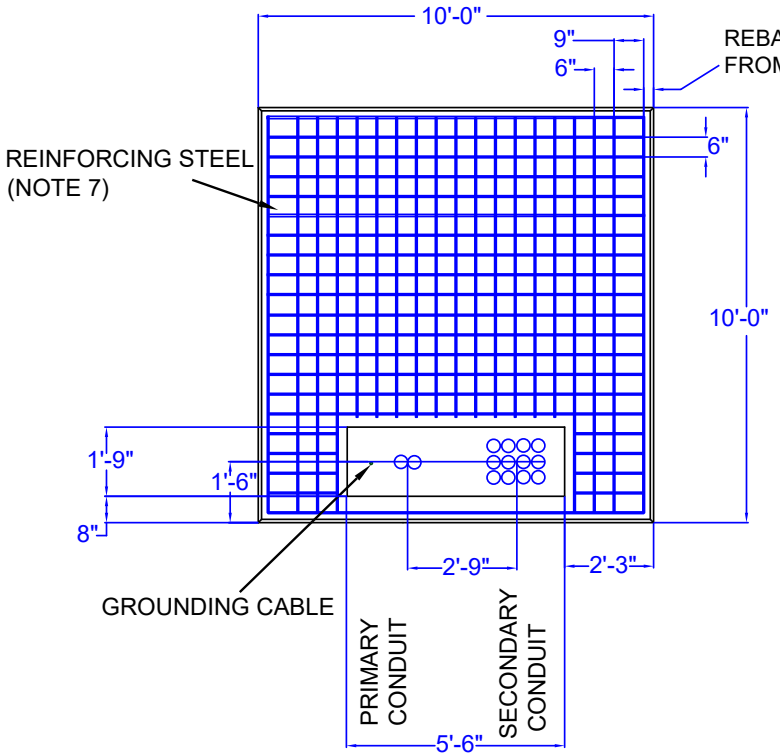
LEFT SIDE VIEW

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

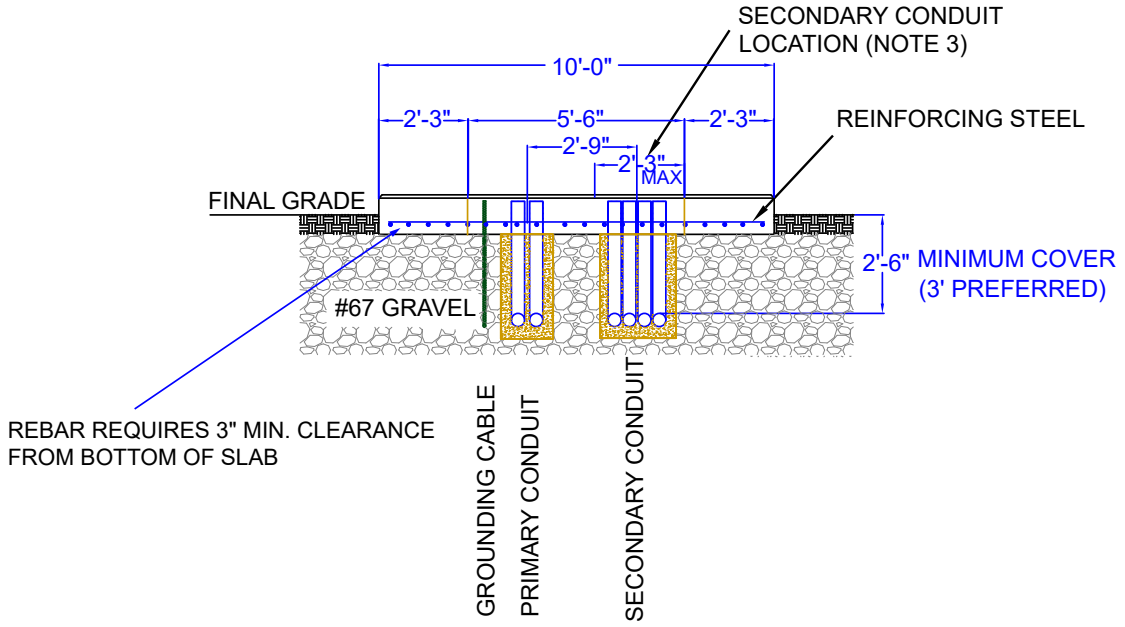
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

TRANSFORMER PAD 2000-3750 KVA (3 PH) CONCRETE DETAIL



TOP VIEW



FRONT VIEW

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00007)				
MATERIAL LIST				
QTY	**DESCRIPTION**	**STOCK #**	**CU CODE**	**UNIT**
4	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
350	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
70	LABOR, EXCAVATION & FORM WORK		ULAB-CONST	HRS

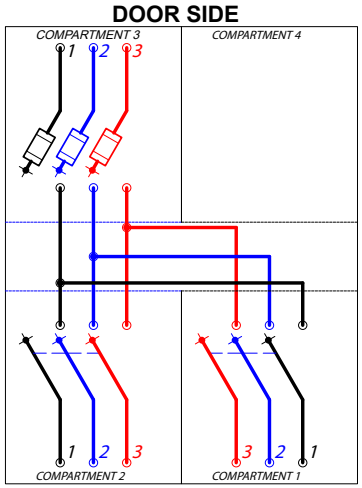
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

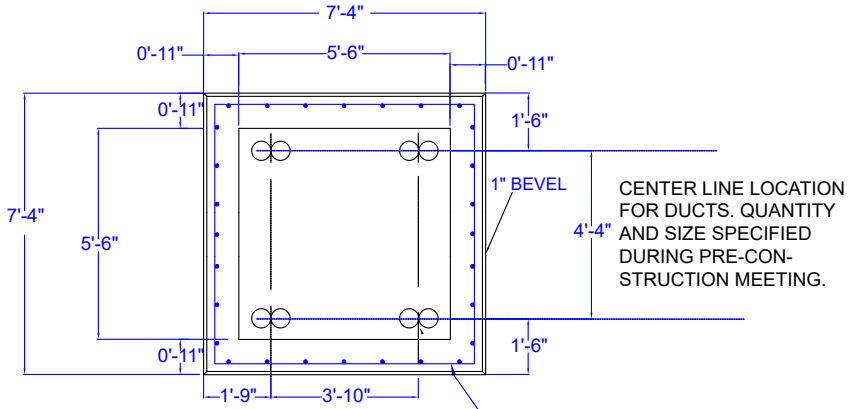
TRANSFORMER PAD
2000-3750 KVA (3 PH)
CONCRETE REINFORCEMENT

NOTES

1. No other utilities may pass beneath the NES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better. Maintain min. 3" Clear from sides.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Minimum 36" Radius Elbows required below switch pads.



PMH-6
DOOR SIDE

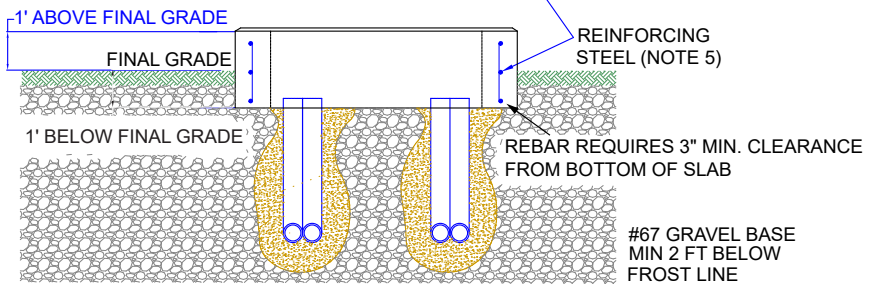


TOP VIEW

PAD CLEARANCES

Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front & Back– 6 ft.
Sides– 3 ft.

Walls/Screens/Overhead
No obstructions permitted



FRONT VIEW

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00008)				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
3	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
115	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
60	LABOR, EXCAVATION & FORM WORK	N/A	ULAB-CONST	HR

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

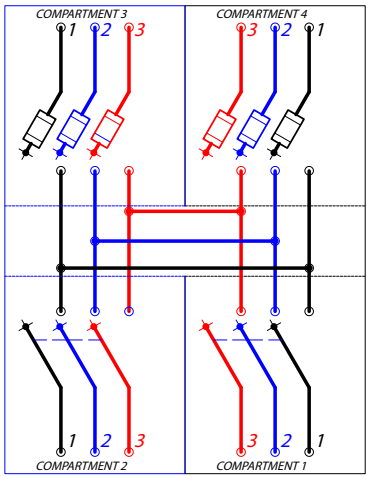
NES

SWITCH PAD PMH-6 CONCRETE DETAIL

NOTES

1. No other utilities may pass beneath the NES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better. Maintain min. 3" Clear from sides.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Minimum 36" Radius Elbows required below switch pads.

DOOR SIDE

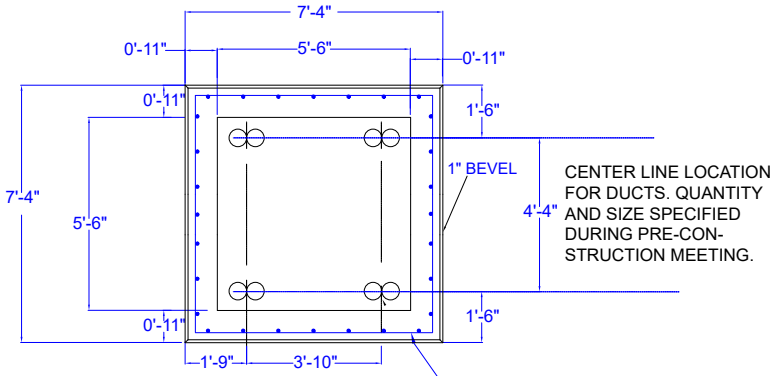


PMH-9
DOOR SIDE

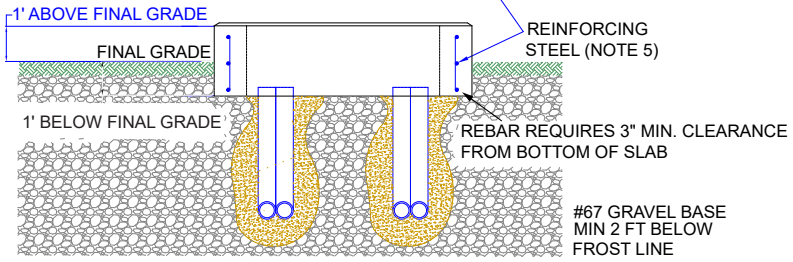
PAD CLEARANCES

Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front & Back– 6 ft.
Sides– 3 ft.

Walls/Screens/Overhead
No obstructions permitted



TOP VIEW



FRONT VIEW

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00008)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
3	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
115	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
60	LABOR, EXCAVATION & FORM WORK	N/A	ULAB-CONST	HR

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

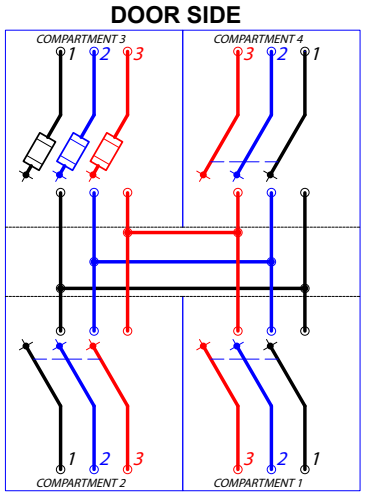
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

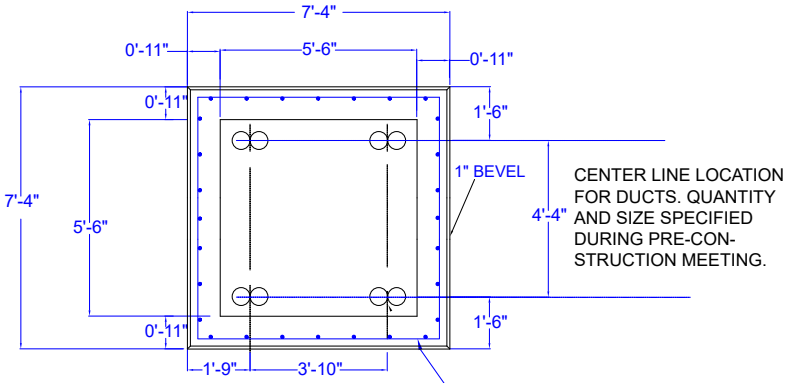
SWITCH PAD PMH-9 CONCRETE DETAIL

NOTES

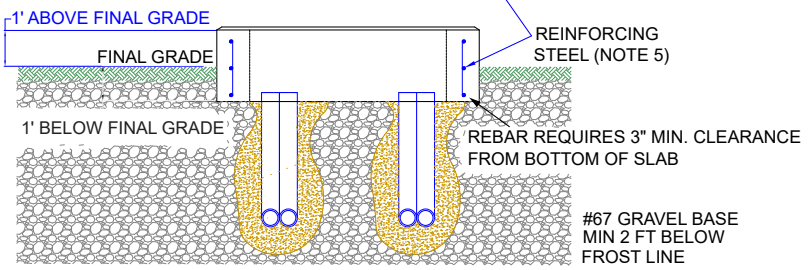
1. No other utilities may pass beneath the NES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better. Maintain min. 3" Clear from sides.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Minimum 36" Radius Elbows required below switch pads.



PMH-11
DOOR SIDE



TOP VIEW



FRONT VIEW

PAD CLEARANCES

Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front & Back– 6 ft.
Sides– 3 ft.

Walls/Screens/Overhead
No obstructions permitted

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00008)

MATERIAL LIST

QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
3	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
115	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
60	LABOR, EXCAVATION & FORM WORK	N/A	ULAB-CONST	HR

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

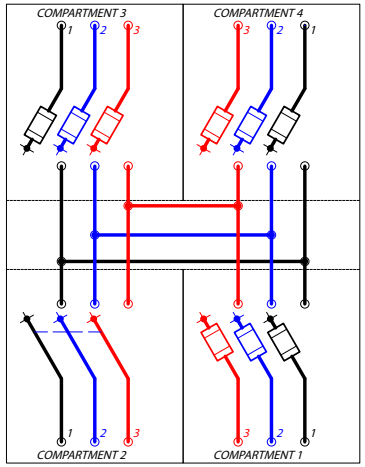
NES

SWITCH PAD PMH-11 CONCRETE DETAIL

NOTES

1. No other utilities may pass beneath the NES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better. Maintain min. 3" Clear from sides.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Minimum 36" Radius Elbows required below switch pads.

DOOR SIDE

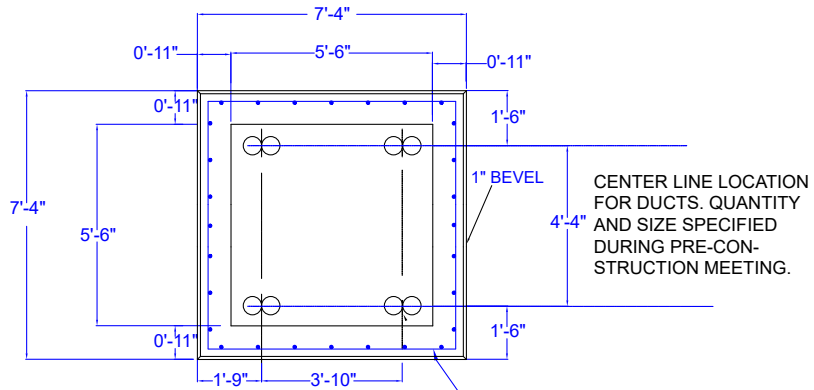


PMH-12
DOOR SIDE

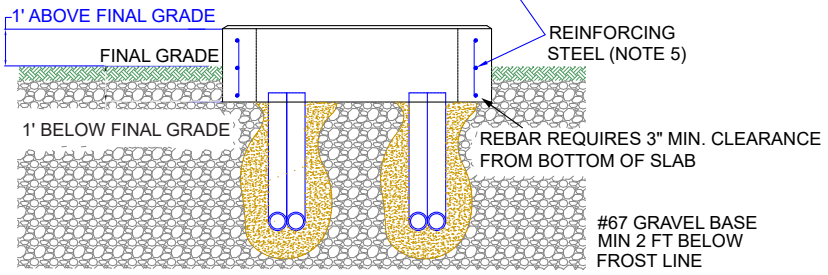
PAD CLEARANCES

Landscaping Shrubbery, Trees
(Minimum clearance from mature growth)
Front & Back– 6 ft.
Sides– 3 ft.

Walls/Screens/Overhead
No obstructions permitted



TOP VIEW



FRONT VIEW

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00008)				
MATERIAL LIST				
QTY	DESCRIPTION	STOCK #	CU CODE	UNIT
3	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
115	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
60	LABOR, EXCAVATION & FORM WORK	N/A	ULAB-CONST	HR

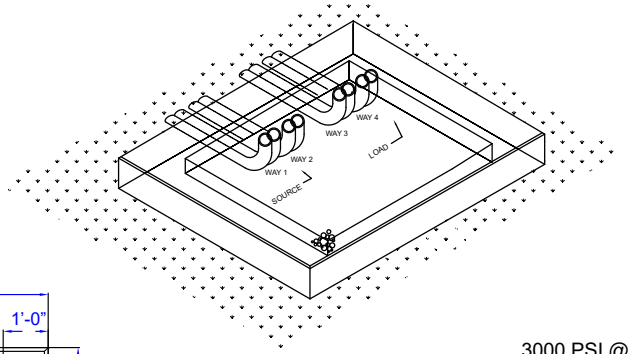
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

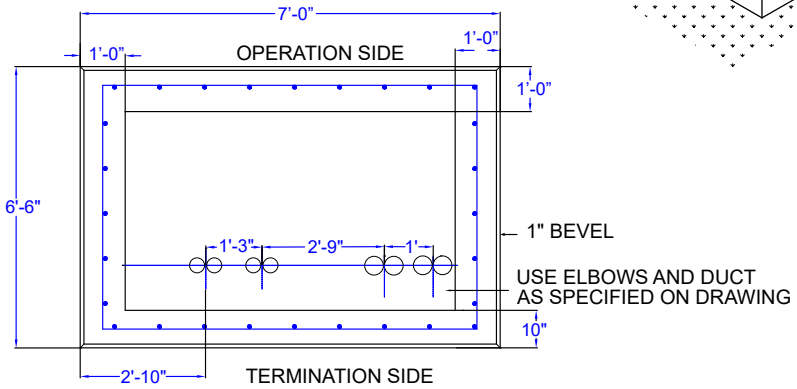
NES

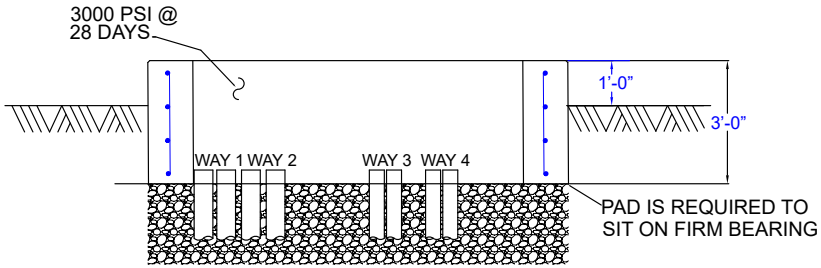
SWITCH PAD
PMH-12
CONCRETE DETAIL

ISOMETRIC VIEW



TOP VIEW





OPERATION SIDE VIEW

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	**DESCRIPTION**	**STOCK #**	**UNIT**
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00009)				
MATERIAL LIST				
QTY	**DESCRIPTION**	**STOCK #**	**CU CODE**	**UNIT**
4	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
140	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
70	LABOR, EXCAVATION & FORM WORK	N/A	ULAB-CONST	HRS

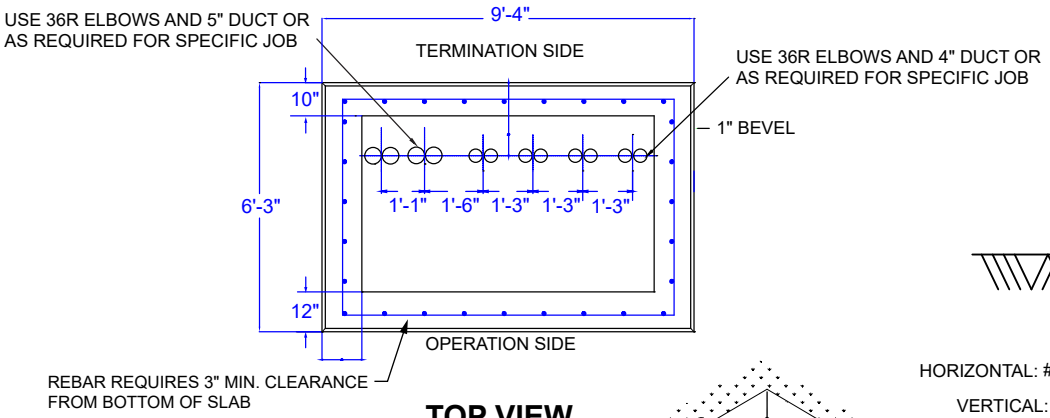
NOTES

1. Inspection of the pad will be required before and after concrete is poured.
2. NES installs ground grid prior to pouring concrete.
3. Other utilities will not be located under the switch pad. Divert other utilities away from NES equipment 15' before and after coming into the proximity of NES equipment.
4. All concrete 3000 psi compressive strength after 48 days.
5. Reinforcing steel shall be ASTM A615 grade 60.
6. Pad will be on firm bearing. Increase pad depth or concrete piers may be used to reach firm bearing.
7. Primary conduit elbow will be rigid galvanized, standard radius minimum.
8. First 10' length of conduit from pad will be rigid galvanized.
9. 10' separation between water hydrants and NES equipment.
10. Fill conduit well with #67 washed gravel.
11. Barrier posts will be provided by the contractor where pad is exposed to traffic, per NES standard drawing USK-1126.
12. All conduits shown in detail include a spare.

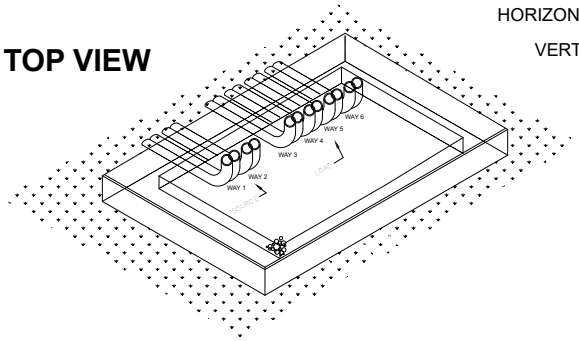
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

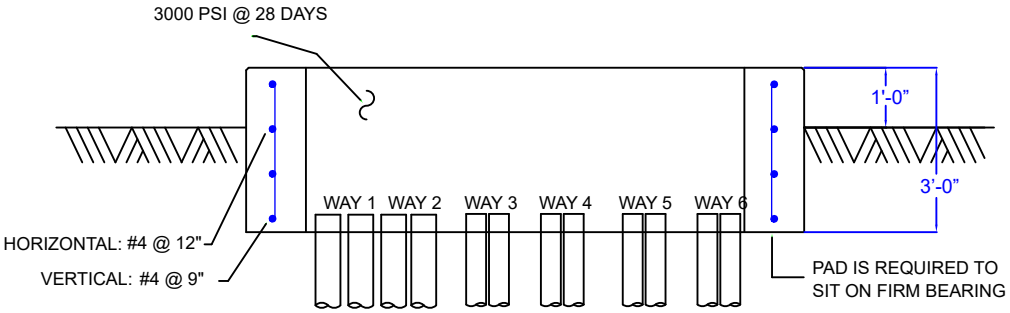
SWITCH PAD VISTA (4-WAY) CONCRETE DETAIL



TOP VIEW



ISOMETRIC VIEW



OPERATION SIDE VIEW

CLEARANCES

FRONT - 6' MINIMUM
SIDES - 3' MINIMUM
BACK - 6' MINIMUM
OVERHEAD - NO OBSTRUCTIONS PERMITTED

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	**DESCRIPTION**	**STOCK #**	**UNIT**
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

CONCRETE PAD MATERIAL LIST (SEE NES DRAWING UGS-00009)				
MATERIAL LIST				
QTY	**DESCRIPTION**	**STOCK #**	**CU CODE**	**UNIT**
4	CONCRETE 1 CUBIC YARD	509000000	UCONCRETE	YD^3
140	REINFORCING STEEL 5/8 (#5 BAR)	491800000	NREBAR-5	FT
70	LABOR, EXCAVATION & FORM WORK	N/A	ULAB-CONST	HRS

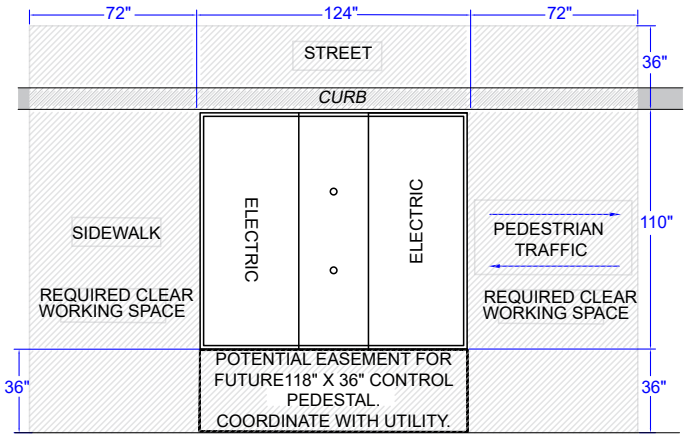
NOTES

1. Inspection of the pad will be required before and after concrete is poured.
2. NES installs ground grid prior to pouring concrete.
3. Other utilities will not be located under the switch pad. Divert other utilities away from NES equipment 15' before and after coming into the proximity of NES equipment.
4. All concrete 3000 psi compressive strength after 48 days.
5. Reinforcing steel shall be ASTM A615 grade 60.
6. Pad will be on firm bearing. Increase pad depth or concrete piers may be used to reach firm bearing.
7. Primary conduit elbow will be rigid galvanized, standard radius minimum.
8. First 10' length of conduit from pad will be rigid galvanized.
9. 10' separation between water hydrants and NES equipment.
10. Fill conduit well with #67 washed gravel.
11. Barrier posts will be provided by the contractor where pad is exposed to traffic, per NES standard drawing USK-1126.
12. All conduits shown in detail include a spare.

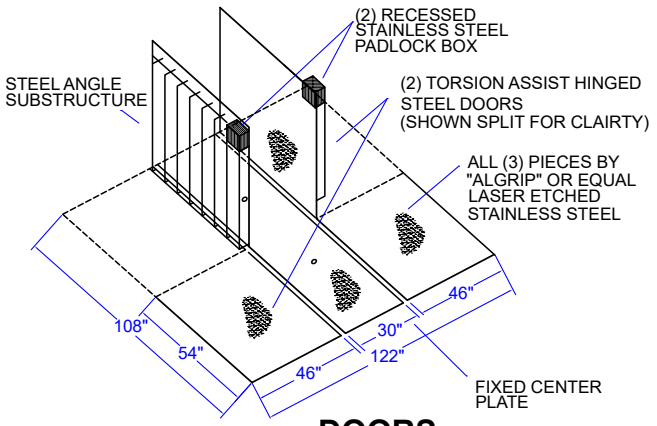
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

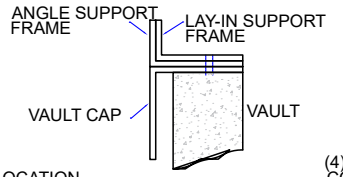
SWITCH PAD VISTA (6-WAY) CONCRETE DETAIL

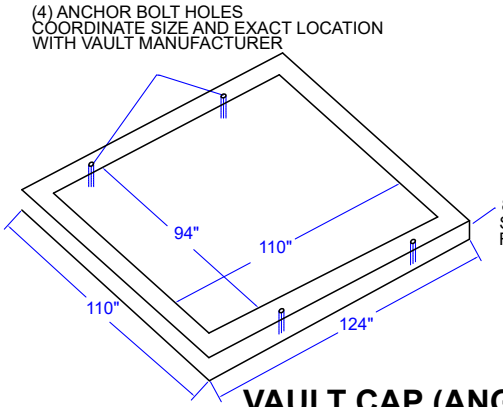


TOP VIEW

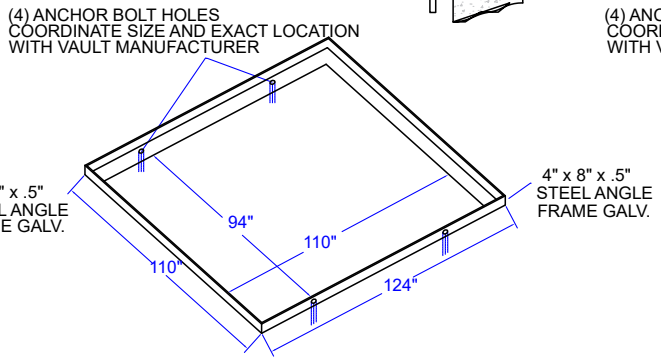


DOORS

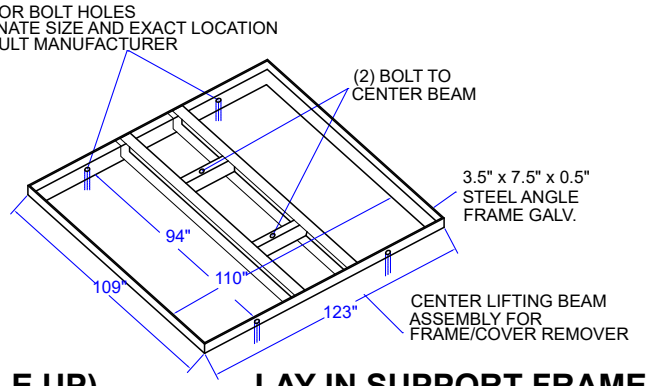




VAULT CAP (ANGLE DOWN)



ANGLE SUPPORT FRAME (ANGLE UP)



LAY IN SUPPORT FRAME

PRECAST VAULT		
DESCRIPTION	**STOCK #**	**CU**
PRECAST VAULT 9'X10' VISTA 4-W	060372600	USV-V4WAY-P

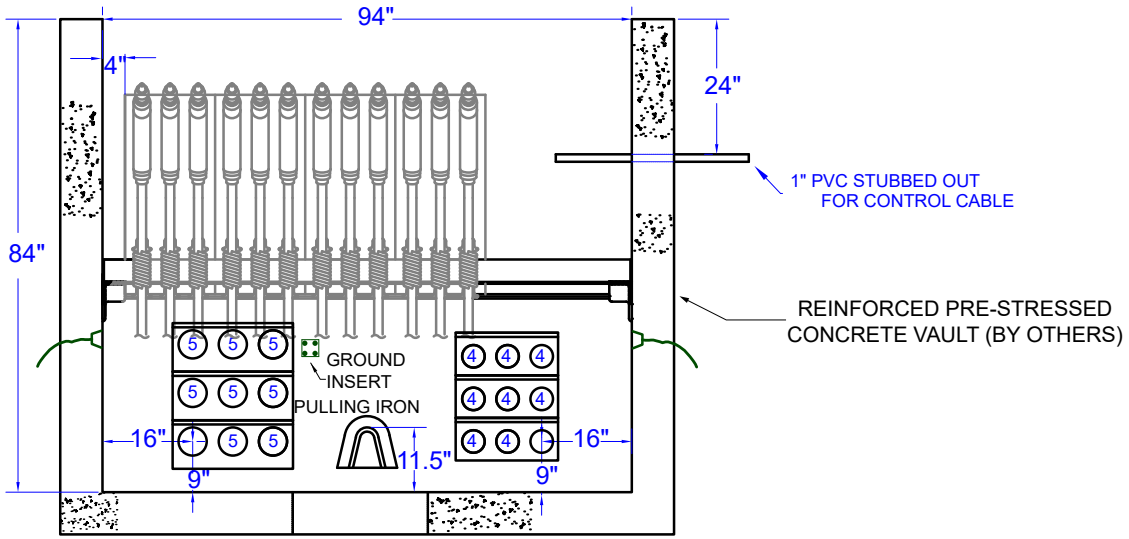
NOTES

1. See Construction Detail Standard 6-Way Vista Vault Drawing: UGS-00032.
2. The Customer provides the Pre-cast Concrete Vista Vaults and Covers per the written Approval of NES Engineering.
3. The Customer installs the Vista Vault with the overview and acceptance by C&M crew prior to NES grounding the vault.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SWITCH VAULT VISTA (4-WAY) COVER & FRAME DETAIL



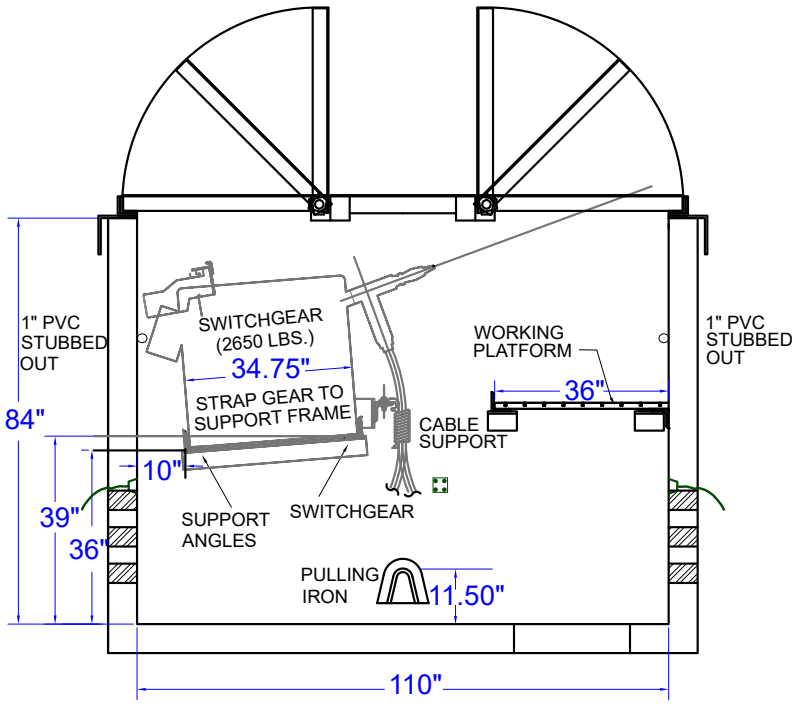
SIDE VIEW

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GDN ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

NOTES

1. Provide shop drawings of vault to NES Standards for approval prior to manufacturing. Shop drawings shall be stamped by a Structural PE.
2. Vault and covers shall be designed to support H20 loading.
3. Inside dimensions for vault and cover openings shall be maintained.
4. Vault and all accessories shall be provided and installed per NES requirements.
5. Vault should set 5" to 8" below finished grade so top of vault cover will be at finished grade.
6. Reference the NES Drawing UGS-00032 for more details

END VIEW

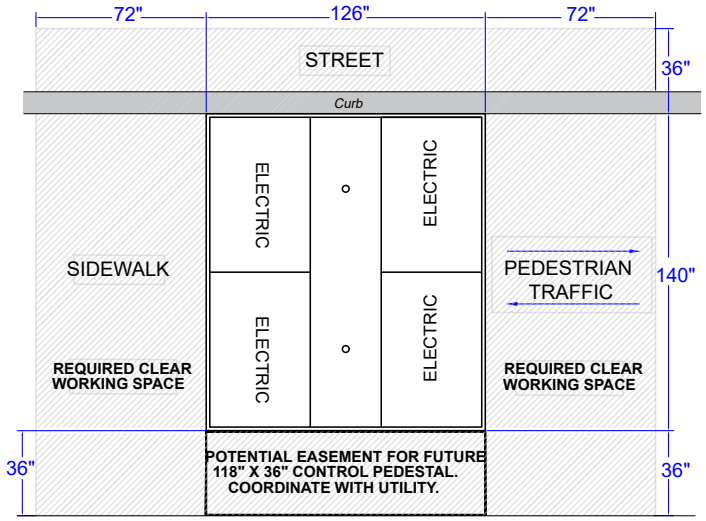


REV.	ENG.	DESCRIPTION OF CHANGE	DATE

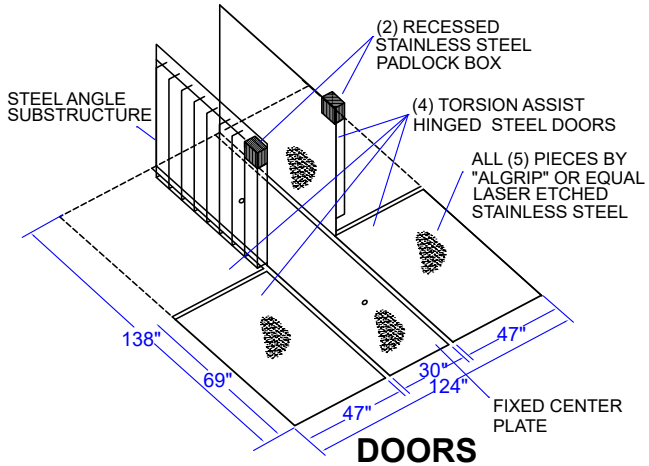
MANHOLES, BOXES, AND PADS

NES

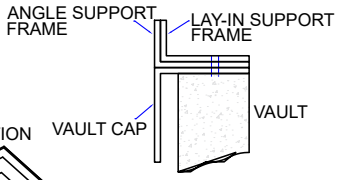
SWITCH VAULT VISTA (4-WAY) CONCRETE DETAILS

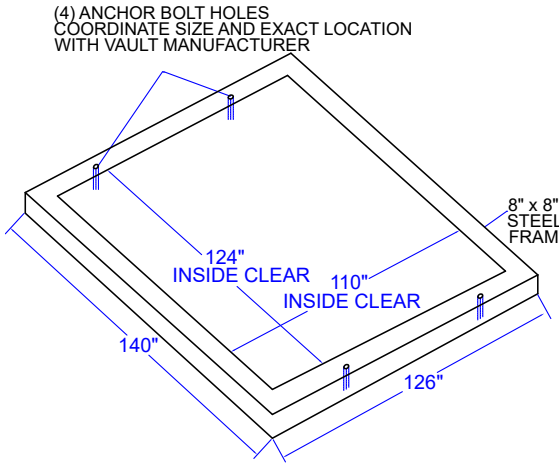


TOP VIEW

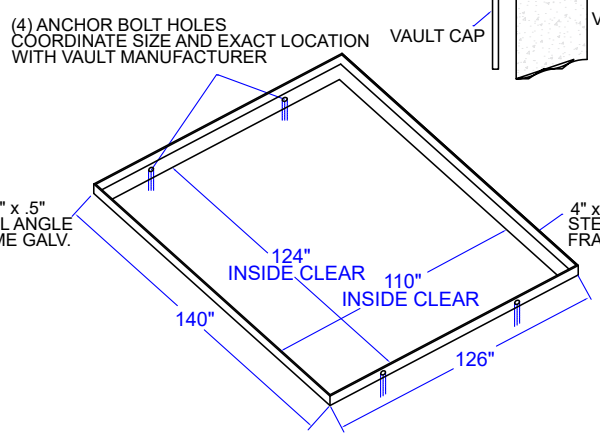


DOORS

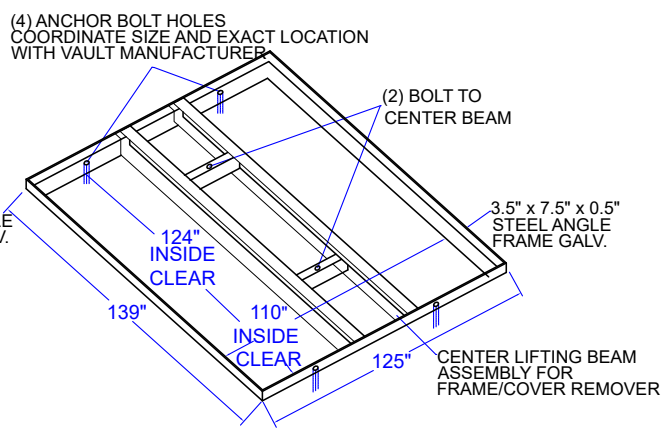




VAULT CAP (ANGLE DOWN)



ANGLE SUPPORT FRAME (ANGLE UP)



LAY IN SUPPORT FRAME

PRECAST VAULT		
DESCRIPTION	**STOCK #**	**CU**
PRECAST VAULT 9'X10' VISTA 6	060372400	USV-V6WAY-P

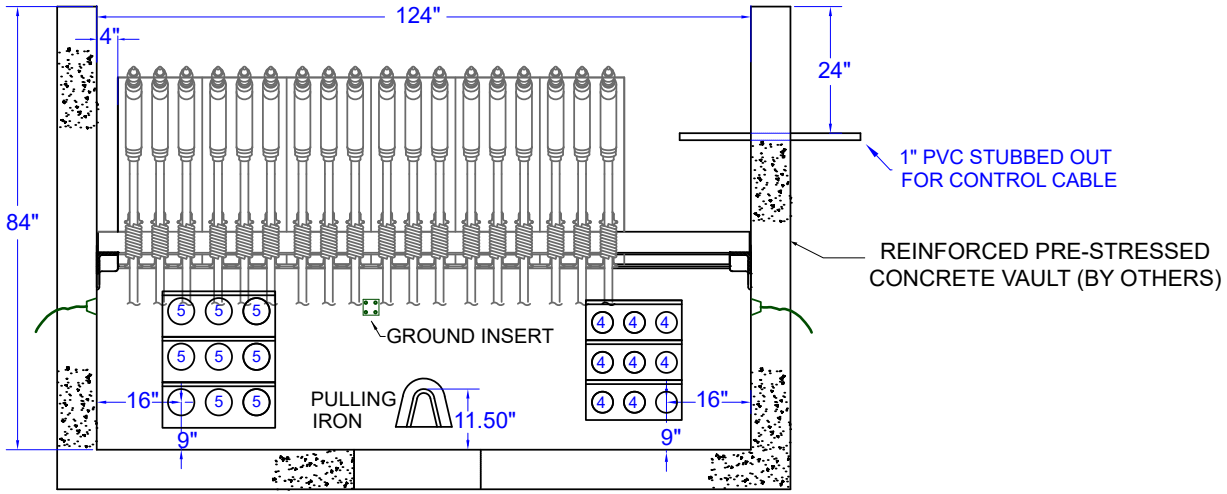
NOTES

1. See Construction Detail Standard 6-Way Vista Vault Drawing: UGS-00028.
2. The Customer provides the Pre-cast Concrete Vista Vaults and Covers per the written Approval of NES Engineering.
3. The Customer installs the Vista Vault with the overview and acceptance by C&M crew prior to NES grounding the vault.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

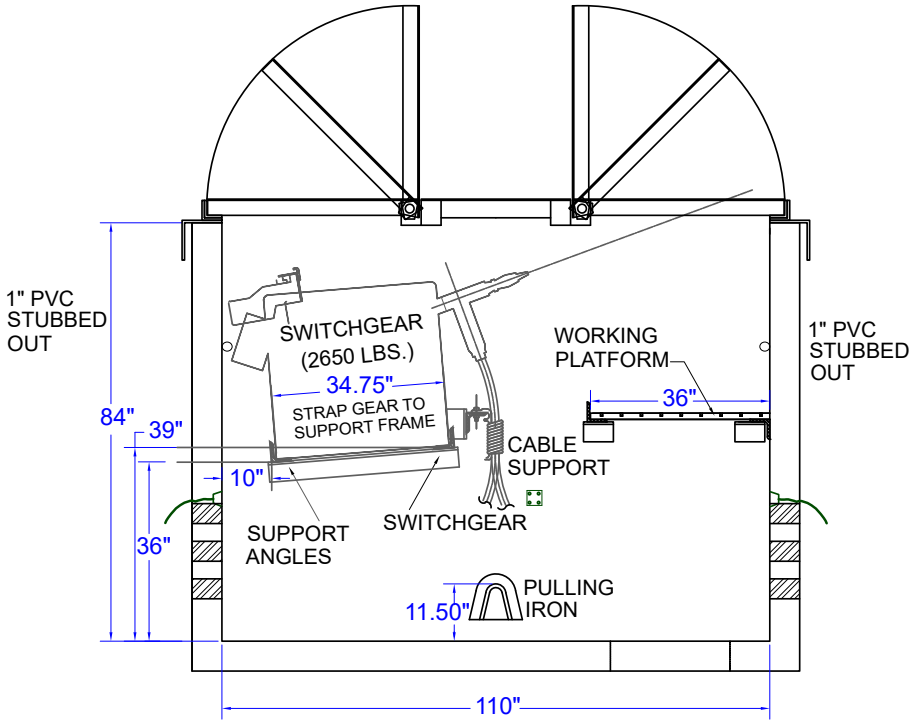
SWITCH VAULT VISTA (6-WAY) COVER & FRAME DETAIL



SIDE VIEW

GROUNDING ITEMS TRUCK STOCK MATERIAL LIST			
QTY	DESCRIPTION	STOCK #	UNIT
50	CABLE CU BSD 4/0 19S	011260000	FT
4	ROD GROUND CW 5/8X8	184380000	EA
8	GRD CONN 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GDN ROD	223490000	EA
2	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	223486000	EA
4	GRD CONN 4/0 TO 4/0 MCM CU. CABLE	223494000	EA

END VIEW



NOTES

1. Provide shop drawings of vault to NES Standards for approval prior to manufacturing. Shop drawings shall be stamped by a Structural PE.
2. Vault and covers shall be designed to support H20 loading.
3. Inside dimensions for vault and cover openings shall be maintained.
4. Vault and all accessories shall be provided and installed per NES requirements.
5. Vault should set 5" to 8" below finished grade so top of vault cover will be at finished grade.
6. Reference the NES Drawing UGS-00032 for more details

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

SWITCH VAULT
VISTA (6-WAY)
CONCRETE DETAILS

RISERS STANDARDS

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

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HOT DIP GALVANIZED RIGID STEEL CONDUIT (RIGID)

RIGID is manufactured from high-strength steel, and produced by the electric resistance welding process. The finished conduit is uniform in OD size, wall thickness, a defect free interior surface and smoothly welded seams. RIGID is produced using an inline galvanizing process. It is hotdipped galvanized inside and outside, so that metal-to-metal contact and galvanic protection against corrosion are provided. Additionally, it is top-coated with a compatible organic layer to inhibit white rust and increase corrosion resistance. The good interior surface quality provides smooth continuous raceways for easy and fast writing pulling. Its excellent ductility provides easy bending, cutting and joining to prevent waste of time and materials. You do not need to worry about damage to the conduit system, even through multiple 90° bends. RIGID is threaded on both ends, with a coupling applied to one end and a thread protector to the other. The pitch of the threads conforms to the American National Standard for pipe threads, general purpose (Inch), ANSI/AMSE B1.20.1. Threads are protected after cutting by an application of molten zinc. Galvanized Rigid Steel Conduit can be installed indoors or outdoors, exposed or concealed, in all kinds of atmospheric conditions, and in hazardous locations, when in accordance with NEC® 2002 Article 344. Also, it provides mechanical protection for the conductors while reducing Electro-Magnetic Field (EMF) exposure and shielding against Electro-Magnetic Interference (EMI). Galvanized Steel Rigid Conduit is an approved equipment grounding conductor under the 2002 NEC® Section 250.118.

SCHEDULE 40 AND 80 PVC

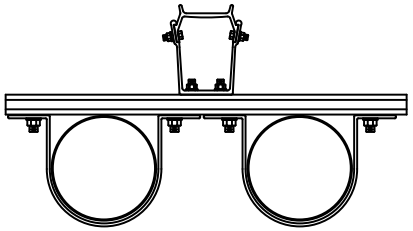
PVC conduit must be manufactured to NEMA TC-2 specifications and must be UL listed
PVC is resistant to most chemicals and is not affected by corrosive soils or salts. PVC electrical conduit is rated for use with 90˚C conductors in under and above ground applications.
PVC is fire resistant and self extinguishing.

CONDUIT DETAILED INFORMATION						
RISER COMPATIBLE UNITS		DESCRIPTION	STOCK # (ISSUED PER FT)	WEIGHT LBS PER 10’	OUTSIDE DIAMETER (IN)	WALL THICKNESS (IN)
PRIMARY	SECONDARY					
UGAL2		CONDUIT GALV 2	101200000	35	2.375	.146
UGAL2.5		CONDUIT GALV 2 1/2	101220000	56	2.875	.193
UGAL3		CONDUIT GALV 3	101240000	73	3.500	.205
UGAL4		CONDUIT GALV 4	101280000	104	4.500	.225
UGAL5		CONDUIT GALV 5	101300000	140	5.563	.245
UGAL6		CONDUIT GALV 6	101310000	184	6.625	.266
UPVC80-2	UVPVC80-2	CONDUIT, PVC SCH 80, 2”	103272000	9	2.375	.218
UPVC80-3	UVPVC80-3	CONDUIT, PVC SCH 80, 3”	103273000	19	3.500	.300
UPVC80-4	UVPVC80-4	CONDUIT, PVC SCH 80, 4”	103274000	23	4.500	.337
SPVC-5-80		CONDUIT, PVC SCH 80, 5”	103275000	32	5.563	.375
SPVC-6-80		CONDUIT, PVC SCH 80, 6”	103276000	41	6.625	.432

CAUTION:
GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)
Galvanized EMT conduit NOT ALLOWED for use for primary, secondary, or lighting conduit installations. Due to Poor corrosion resistance in outdoor environments and poor impact resistance.

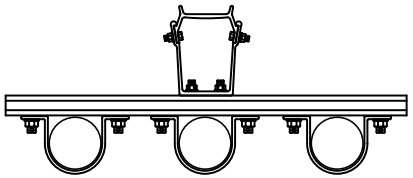
STANDOFF BRACKET DETAIL
DOUBLE CONDUIT

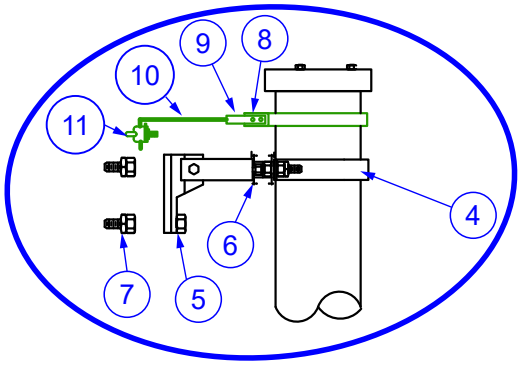
TOP VIEW



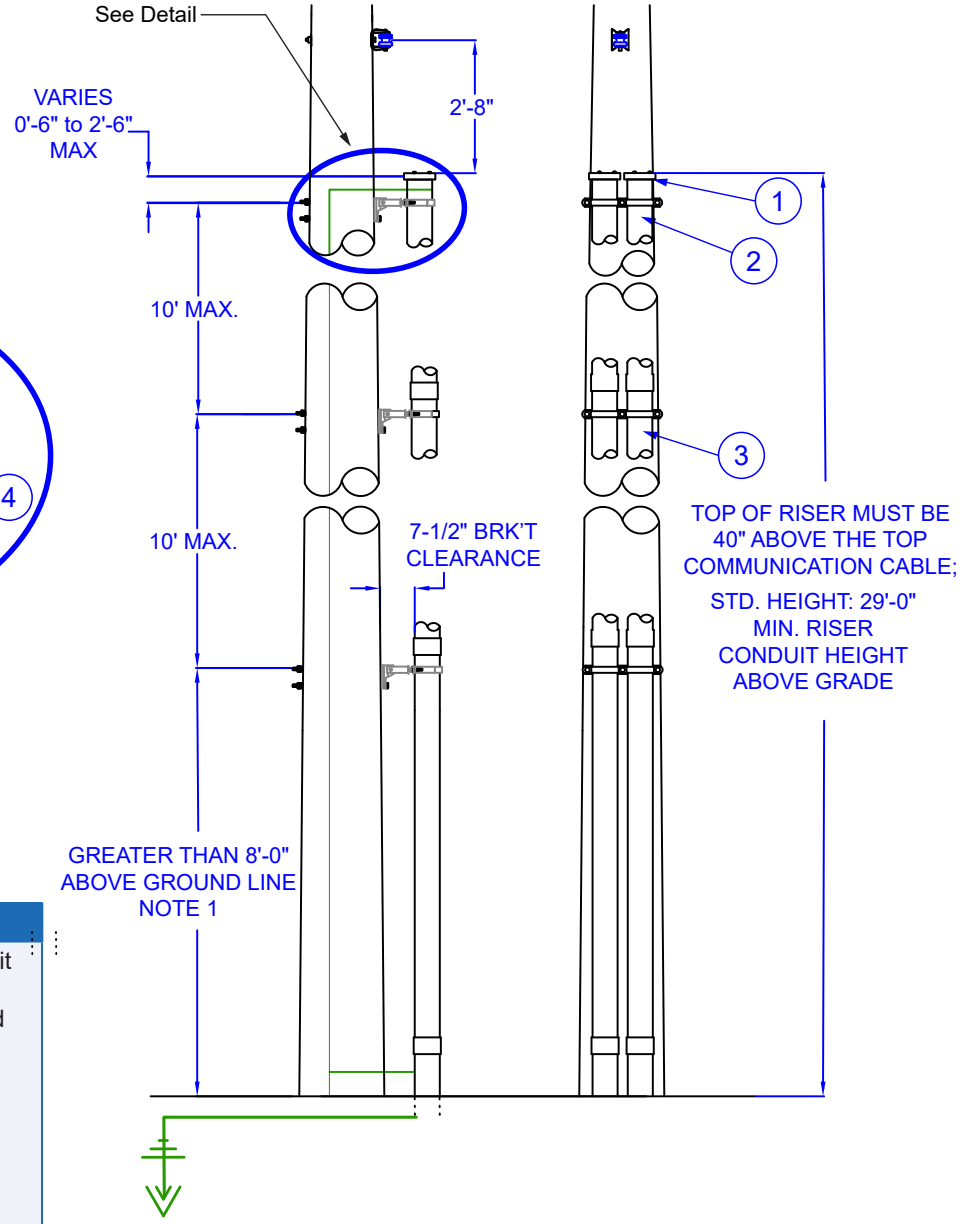
STANDOFF BRACKET DETAIL
TRIPLE CONDUIT

TOP VIEW





STANDOFF BRACKET DETAIL



NOTES

1. Customer to install lowest 10-foot section using Rigid Galvanized Elbow and conduit with 7-1/2 Inch clearance from the pole surface.
2. All Primary conduits to be Rigid Galvanized or Schedule 80 PVC conduits extended from 10-foot section Rigid Galvanized conduit installed at the ground line.
3. Ground each end of metal conduit to pole ground above grade and 6-inches below grade for equal potential grounding.
4. Install 1-inch metal u-guard over any exposed pole ground wire from below grade extending above grade protecting pole ground wire.
5. Engineer to consult UG Crew prior to installing riser terminations above 50-foot bucket truck working height.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY RISER CONDUIT DETAILS

RISER STANDARDS

NOTES

Item 6: Four way channel is furnished in 10’ sections and is cut to length field trim as req’d.

Item 2 & 4: Add conduit and attachments as necessary for poles over 50’ tall.

Item 8: Ground strap for conduit is manufactured by NES Shop from 1/8” x 1” copper plate.

RISER FRAMING CU:	URISERP-2	URISERP-25	URISERP-25D	URISERP-25T	URISERP-3	URISERP-4	URISER-5	URISERP-5D	URISERP-6	URISERP-6D	MAJOR AND MINOR MATERIALS	
ITEM #	QUANTITY										DESCRIPTION AND MATERIAL NOTES	STOCK #
1	1										TERMINATOR 2 #1 1-1.27” HOLE	402485000
		1	2	3							TERMINATOR 2 1/2 #1 1-1.27” HOLE	402495000
					1						TERMINATOR 3 #1 2-1.27” HOLES	402520000
						1					TERMINATOR 4 #1 3-1.125” HOLES	402580000
							1	2			TERMINATOR 5 750-25KV 3-1.92” HOLES 1-0.528” HOLE	402670000
									1	2	TERMINATOR 6 750 25KV 3-2.375” HOLES 1-0.625” HOLE	402675000
2	20'										GALVANIZED CONDUIT 2-1/2"	101220000
		20'									GALVANIZED CONDUIT 3"	101240000
			20’								SCH 80 PVC CONDUIT 4”	103274000
				20’	20’		40’				SCH 80 PVC CONDUIT 5”	103275000
						20’		20’	40’		SCH 80 PVC CONDUIT 6”	103276000
3	1										RISER GRIP 2 X 1.00 - 1.25 DIA (1-#1 AL)	401350000
		1									RISER GRIP 3 X 1.75 - 2.00 DIA (2-#1 AL)	401370000
			1								RISER GRIP 4 X 2.00 - 2.50 DIA (3-#1 AL)	401420000
				1							RISER GRIP 5 X 3.00 - 3.50 DIA (3-4/0 AL/CU)	401460000
					1		2				RISER GRIP 5 X 3.50 - 4.00 DIA (3-500 AL/CU)	401470000
						1		1	2		RISER GRIP 6 X 3.50 - 4.00 DIA (3-750 CU)	401475000
4	3										STRAP 2 INCH KIT/STANDOFF BRKT	062800000
		3	6	9							STRAP 2 1/2 INCH/STANDOFF BRKT	062810000
					3						STRAP 3 INCH KIT/STANDOFF BRKT	062820000
						3					STRAP 4 INCH KIT/STANDOFF BRKT	062840000
							3	6			STRAP 5" KIT/STANDOFF BRKT	062850000
									3	6	STRAP 6" KIT/STANDOFF BRKT	062860000
5	3	3	3	3	3	3	3	3	3	3	BRACKET CONDUIT STANDOFF	060050000
6	10’	10’	10’	10’	10’	10’	10’	10’	10’	10’	CHANNEL 4 WAY T-SLOT/10 FT	060070000
7	6	6	6	6	6	6	6	6	6	6	5/8" DBL COIL SPRING WASHER	206570000
8	2’	2’	4’	6’	2’	2’	2’	4’	2’	4’	BAR CU BUS 1/8 X 1 IN	320120000
9	2	2	4	6	2	2	2	4	2	4	TERM COMP 2-1 AL/CU 2H	231760000
10	4’	4’	4’	6’	4’	4’	4’	4’	4’	4’	CABLE CU BSD 2 7S	011210000
11	2	2	2	2	2	2	2	2	2	2	CONN GRD 4-2 TO 4-2 CU	223480000

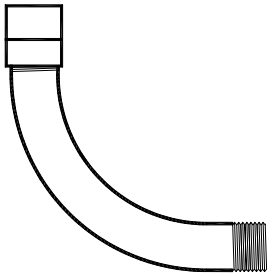
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY RISER CONDUIT COMPATIBLE UNITS

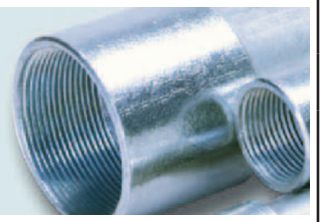
CONDUIT STOCK ITEMS

COMPATIBLE UNIT	DESCRIPTION	STOCK #
UPVCL2-STDR	CONDUIT ELBOW,PVC 2" STD 9.5" RADIUS	103548000
UPVCL2.5-24R	CONDUIT ELBOW,PVC 2.5" 24" RADIUS	103600000
UPVCL2.5-STD	CONDUIT ELBOW,PVC 2.5" STD 10.5" RADIUS	103598000
UPVCL3-80-18	CONDUIT ELBOW,PVC 3" SCH 80 18" RADIUS	103703000
UPVCL3-STDR	CONDUIT ELBOW,PVC 3" STD 13" RADIUS	103628000
UPVCL4-24R	CONDUIT ELBOW,PVC 4" 24" RADIUS	103640000
UPVCL5-36R	CONDUIT ELBOW,PVC 5" 36" RADIUS	103650000
	CONDUIT ELBOW,PVC 6" 36" RADIUS	103655000
UGALL2-STDR	CONDUIT ELBOW GALV2" DIA STD 9.5" RADIUS	102280000
UGALL2.5-18R	CONDUIT ELBOW GALV2.5" DIA STD 10.5" RADIUS	102300000
UGALL3-24R	CONDUIT ELBOW GALV3"DIA 24" RADIUS	102330000
UGALL3-STDR	CONDUIT ELBOW GALV3"DIA STD 13" RADIUS	102320000
UGALL4-16R	CONDUIT ELBOW GALV4"DIA 16" RADIUS	102400000
UGALL4-24R	CONDUIT ELBOW GALV4"DIA 24" RADIUS	102410000
	CONDUIT ELBOW GALV5"DIA 30" RADIUS	102460000
UGALL5-36R	CONDUIT ELBOW GALV5"DIA 36" RADIUS	102480000
UGALL6-36R	CONDUIT ELBOW GALV6"DIA 36" RADIUS	102490000



NOTE:
MINIMUM 24-INCH RADIUS ELBOWS FOR 2 THRU 4-INCH CONDUITS. REQUIRES 36-INCH RADIUS ELBOWS FOR 5 AND 6-INCH CONDUITS.

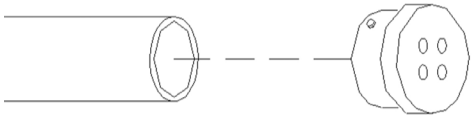
COMPATIBLE UNIT	DESCRIPTION	STOCK #
UGCPL2	CONDUIT GALV CPL 2	102000000
UGCPL2.5	CONDUIT GALV CPL 2 1/2	102020000
UGCPL3	CONDUIT GALV CPL 3	102040000
UGCPL4	CONDUIT GALV CPL 4	102080000
UGCPL5	CONDUIT GALV CPL 5	102100000
UGCPL6	CONDUIT GALV CPL 6	102110000
UR-PSTRAP2	STRAP 2 INCH KIT/STANDOFF BRKT	062800000
UR-PSTRAP2.5	STRAP 2 1/2 INCH/STANDOFF BRKT	062810000
UR-PSTRAP3	STRAP 3 INCH KIT/STANDOFF BRKT	062820000
UR-PSTRAP4	STRAP 4 INCH KIT/STANDOFF BRKT	062840000
UR-PSTRAP5	STRAP 5" KIT/STANDOFF BRKT	062850000
UR-PSTRAP6	STRAP 6" KIT/STANDOFF BRKT	062860000
UINERDUCT-RED	MAXCELL INNERDUCT—RED	105782000
UINERDUCT-BLACK	MAXCELL INNERDUCT—BLACK	105783000
UPCPL3.5	DUCT PLASTIC COUPLING 3.5" THINWALL	105812000
UPCPL4	DUCT PLASTIC COUPLING 4" THINWALL	105814000
UPCPL5	DUCT PLASTIC COUPLING 5" THINWALL	105815000
UPCPL6	DUCT PLASTIC COUPLING 6" THINWALL	105816000



REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

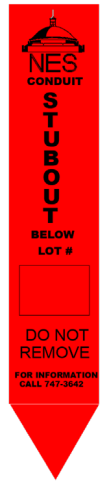
PRIMARY RISER CONDUIT ACCESSORIES COMPATIBLE UNITS

CONDUIT STOCK ITEMS			
COMPATIBLE UNIT	**DESCRIPTION**	**STOCK #**	
SEE RISER CU'S	TERMINATOR 2 #1 1-1.27" HOLE	402485000	
	TERMINATOR 2 1/2 #1 1-1.27" HOLE	402495000	
	TERMINATOR 3 #1 2-1.27" HOLES	402520000	
	TERMINATOR 4 #1 3-1.125" HOLES	402580000	
	TERMINATOR 5 750-25KV 3-1.92" HOLES 1-0.528" HOLE	402670000	
	TERMINATOR 6 750 25KV 3-2.375" HOLES 1-0.625" HOLE	402675000	
SEE RISER CU'S	GRIP RISER 2 X 1.0 - 1.24	401350000	
	GRIP RISER 3 X 1 1/2-1 3/4	401360000	
	GRIP RISER 3 X 1 3/4-2	401370000	
	GRIP RISER 4 X 1 1/2-1 3/4	401400000	
	GRIP RISER 4 X 2-2 1/2	401420000	
	GRIP RISER 4 X 2 1/2-3	401440000	
	GRIP RISER 5 X 3-3 1/2	401460000	
	GRIP RISER 5 X 3 1/2-4	401470000	
	GRIP RISER 6 X 3 1/2 - 4	401475000	
TRUCK STOCK	CHANNEL 4 WAY T-SLOT/10 FT	060070000	
UR-STANDOFF	BRACKET CONDUIT STANDOFF	060050000	

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY RISER CONDUIT ACCESSORIES COMPATIBLE UNIT (CONT.)

CONDUIT STOCK ITEMS			
COMPATIBLE UNIT	**DESCRIPTION**	**STOCK #**	
UDUTA6	DUCT PLASTIC TERMINATOR ADAPTER 6”	105835000	
USTUBMARKER	SIGN STUBOUT MARKER	465337000	
N/A	RED WARNING TAPE (1,000 FT PER ROLL)	465760000	

NOTES

1. STUBOUT MARKER STANDARD DRAWING UGS0012.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

PRIMARY RISER CONDUIT ACCESSORIES COMPATIBLE UNIT (CONT’D*)

SECONDARY STANDARDS

APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

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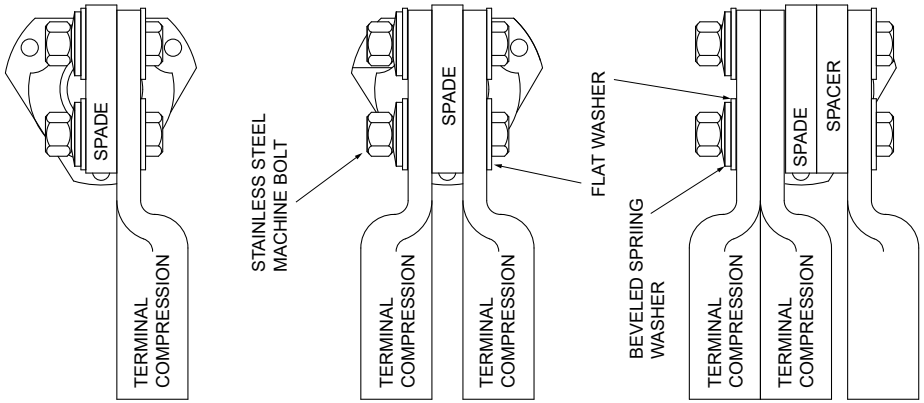
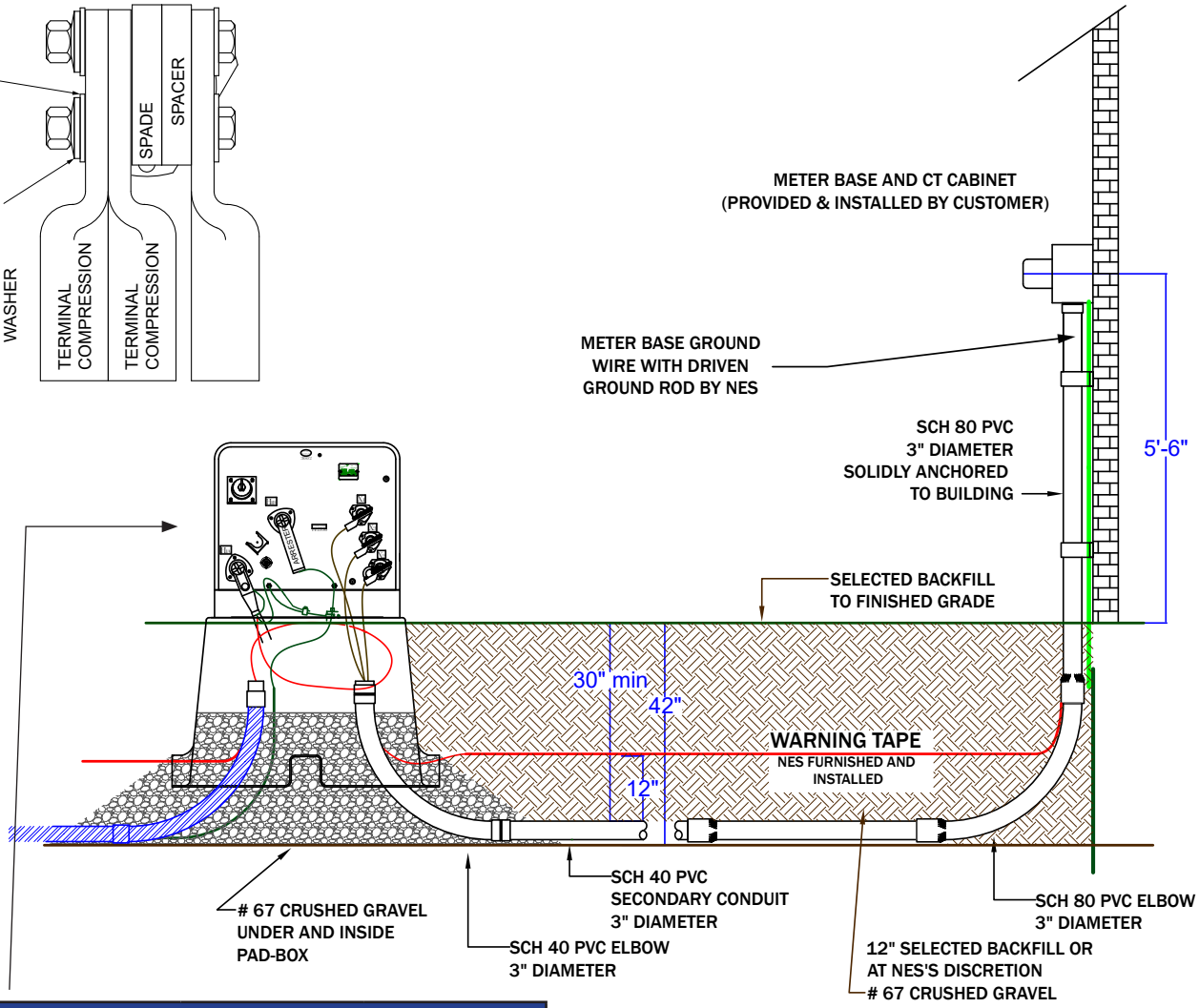


TRANSFORMER SECONDARY CONNECTIONS

NOTE:
BEVELED SPRING WASHERS ARE REQUIRED TO MAINTAIN PRESSURE ON LUGS DURING HEATING AND COOLING CYCLES.

TRUCK STOCK	
DESCRIPTION	**STOCK #**
SPACER COMP TERM AL 2H	230500000
TERM COMP 2-1 AL/CU 2H	231760000
TERM COMP 2/0 AL/CU 2H	231780000
TERM COMP 4/0 AL/CU 2H	231800000
TERM COMP 350 AL/CU 2H	231840000
TERM COMP 500 AL/CU 2H	231860000
WASHER SS BVL SPG 1/2H	209700000
BOLT MACHINE SS 1/2X3/4	204330000
BOLT MACHINE SS 1/2X1	204340000
BOLT MACHINE SS 1/2X1 1/2	204360000
BOLT MACHINE SS 1/2X1 3/4	204370000
BOLT MACHINE SS 1/2X2	204372000
BOLT MACHINE SS 1/2X3	204380000
BOLT MACHINE SS 1/2X3 1/2	204384000
BOLT MACHINE SS 1/2X4 1/2	204440000
WASHER SS FLAT ROUND SS 1/2	209740000



UG SECONDARY CABLE		
SIZE	**CU**	**STOCK #**
2/0	UVAT-20	020350000
4/0	UVAT-40	020381000
350MCM	UVAT-350	020395000
500MCM	UVAT-500	020410000

STANDARD ESTIMATES	
ESTIMATE	**DESCRIPTION**
UPSD-1P	UG SERVICE DROP SINGLE PHASE, 2/0-500AT
UPSD-1P-225A	UG SERVICE DROP SINGLE PHASE, 2/0-500AT

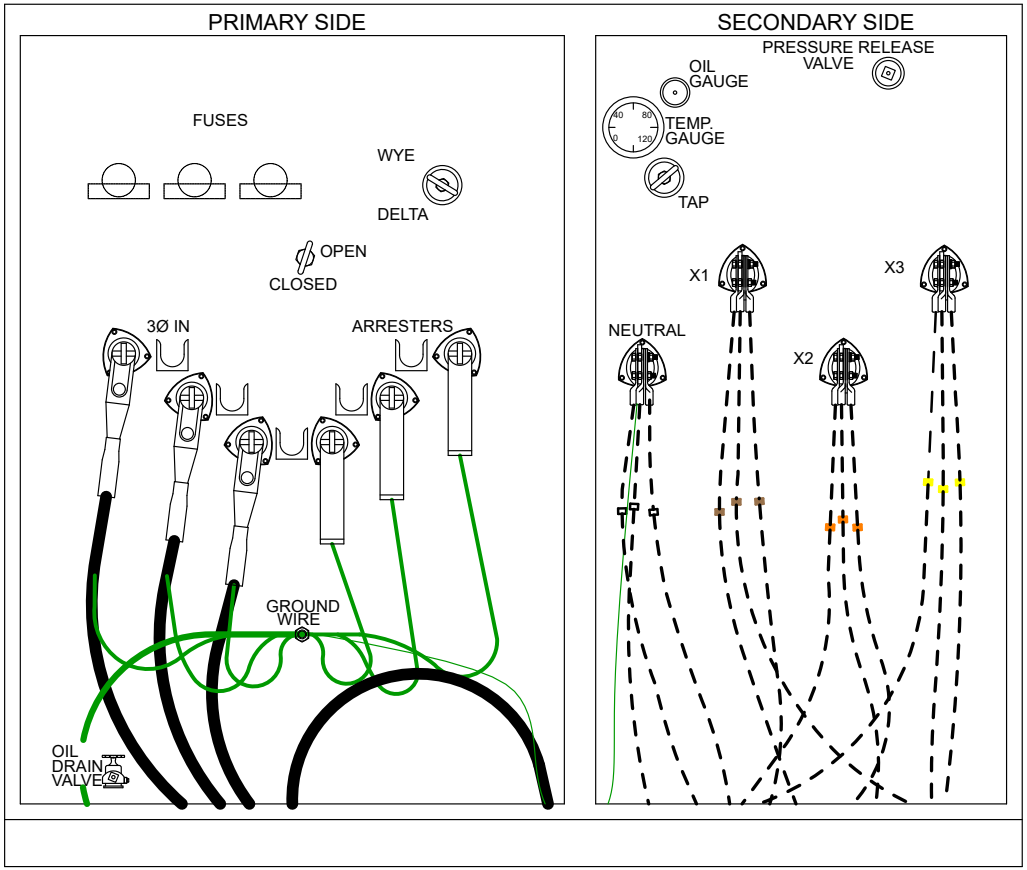
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SECONDARY STANDARDS

NES

UNDERGROUND SECONDARY 1 PHASE PAD DETAILS

TRUCK STOCK	
DESCRIPTION	**STOCK #**
SPACER COMP TERM AL 2H	230500000
SLEEVE COMP 3/0-4/0 AL/CU	227275000
SLEEVE COMP 4/0-4/0 AL/CU	227280000
SLEEVE COMP 350-350 MCM AL/CU	227300000
SLEEVE COMP 500-500 MCM AL/CU	227310000
SLEEVE COMP 600-600 CU	227320000
TERM COMP 2-1 AL/CU 2H	231760000
TERM COMP 1/0 AL/CU 2H	231770000
TERM COMP 2/0 AL/CU 2H	231780000
TERM COMP 4/0 AL/CU 2H	231800000
TERM COMP 300 AL/CU 2H	231830000
TERM COMP 350 AL/CU 2H	231840000
TERM COMP 400 AL/CU 2H	231850000
TERM COMP 500 AL/CU 2H	231860000
TERM COMP 600 AL/CU 2H	231870000
TERM COMP 750 AL/CU 2H	231890000
WASHER SS BVL SPG 1/2H	209700000
BOLT MACHINE SS 1/2X3/4	204330000
BOLT MACHINE SS 1/2X1	204340000
BOLT MACHINE SS 1/2X1 1/2	204360000
BOLT MACHINE SS 1/2X1 3/4	204370000
BOLT MACHINE SS 1/2X2	204372000
BOLT MACHINE SS 1/2X3	204380000
BOLT MACHINE SS 1/2X3 1/2	204384000
BOLT MACHINE SS 1/2X4 1/2	204440000
WASHER SS FLAT ROUND SS 1/2	209740000



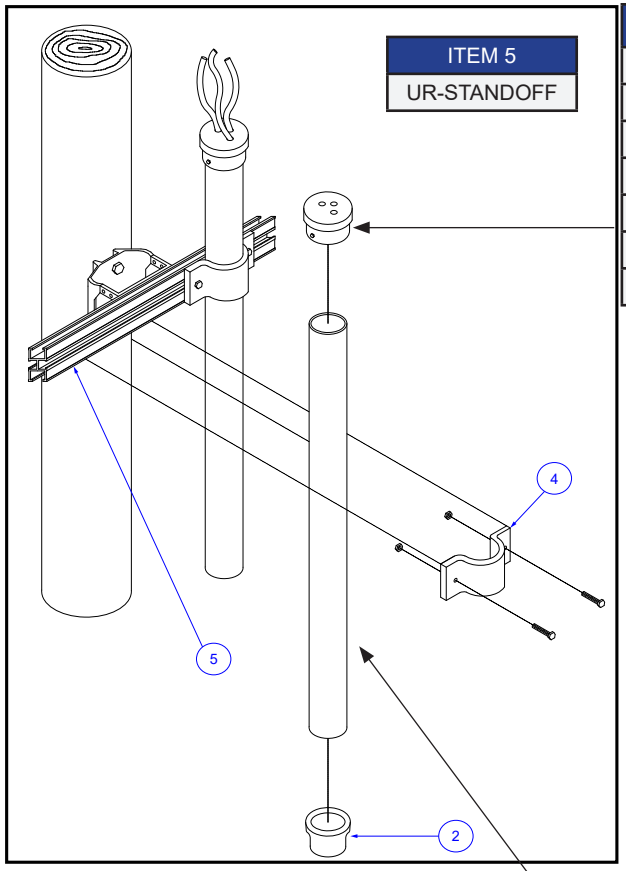
NOTES

1. **Secondary cables are installed, owned and maintained by the customer.**
Always mark the phase rotation on the inside of the transformer secondary bay.
C for clockwise
CC for counter clockwise
Always check the phase rotation before having the customer close in their main breaker.
Customers are informed that secondary wires must match the terminal lugs listed in the table on this page. They must to supply lugs if they choose to use a different wire size.
2. **Transformer Replacement Note:**
Copper bus plate drilled to match the spade should be used to compensate for changes in bushing elevation when replacing a transformer. The plate must match or exceed the spade's thickness and depth. Apply bolts in each hole when attaching spade connector to bus plate.
3. **Standard Voltages as Designated by Tape:**
Tape: Grey, Brown, Orange and Yellow for 480y/277
Tape: White, Blue, Black and Red for 208y/120

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

UNDERGROUND SECONDARY 3 PHASE PAD DETAILS



ITEM 5
UR-STANDOFF

ITEM 1
UVTERM2-20T
UVTERM3-20T
UVTERM3-350T
UVTERM3-40T
UVTERM3-500T
UVTERM4-40Q
UVTERM4-500Q

ITEMS 2 & 4	
UVRISER-2	RISER, SERVICE, PVC80, 2"
UVRISER-3	RISER, SERVICE, PVC80, 3"
UVRISER-4	RISER, SERVICE, PVC80, 4"

ITEM 3
UVPVC80-2
UVPVC80-3
UVPVC80-4

MAJOR AND MINOR MATERIAL ITEM LIST

RISER CU	UVRISER-2	UVRISER-3	UVRISER-4	DESCRIPTION	STOCK #	C.U.
1				TERMINATIONS, SERV, UGRD, 2" COND, 2/0AT	402490000	UVTERM2-20T
				TERMINATIONS, SERV, UGRD, 3" COND, 2/0AT	402530000	UVTERM3-20T
				TERMINATIONS, SERV, UGRD, 3" COND, 350AT	402540000	UVTERM3-350T
				TERMINATIONS, SERV, UGRD, 3" COND, 4/0AT	402530000	UVTERM3-40T
				TERMINATIONS, SERV, UGRD, 3" COND, 500AT	402540000	UVTERM3-500T
				TERMINATIONS, SERV, UGRD, 4" COND, 4/0AQ	402570000	UVTERM4-40Q
				TERMINATIONS, SERV, UGRD, 4" COND, 500AQ	402570000	UVTERM4-500Q
2	1			COND PLAS ADAP FEM 2	103290000	N/A
		1		COND PLAS ADAP FEM 3	103310000	N/A
			1	COND PLAS ADAP FEM 4	103315000	N/A
3	20’			CONDUIT PVC SCH 80 2’	103272000	UVPVC80-2
		20’		CONDUIT PVC SCH 80 3’	103273000	UVPVC80-3
			20’	CONDUIT PVC SCH 80 4’	103274000	UVPVC80-4
4	3			STRAP 2 INCH KIT/STANDOFF BRKT	062800000	N/A
		3		STRAP 3 INCH KIT/STANDOFF BRKT	062820000	N/A
			3	STRAP 4 INCH KIT/STANDOFF BRKT	062840000	N/A
5	3	3	3	BRACKET CONDUIT STANDOFF	060050000	UR-STANDOFF
TRUCK STOCK ITEMS THAT ARE NOT INCLUDED IN UVRISER CU’S						
6	10’	10’	10’	CHANNEL 4 WAY T-SLOT/10 FT	060070000	Truck Stock
7	6	6	6	5/8” DBL COIL SPRING WASHER	206570000	Truck Stock
8	2’	2’	4’	BAR CU BUS 1/8 X 1 IN	320120000	Truck Stock
9	2	2	4	TERM COMP 2-1 AL/CU 2H	231760000	Truck Stock
10	4’	4’	4’	CABLE CU BSD 2 7S	011210000	Truck Stock
11	2	2	2	CONN GRD 4-2 TO 4-2 CU	223480000	Truck Stock

NOTES

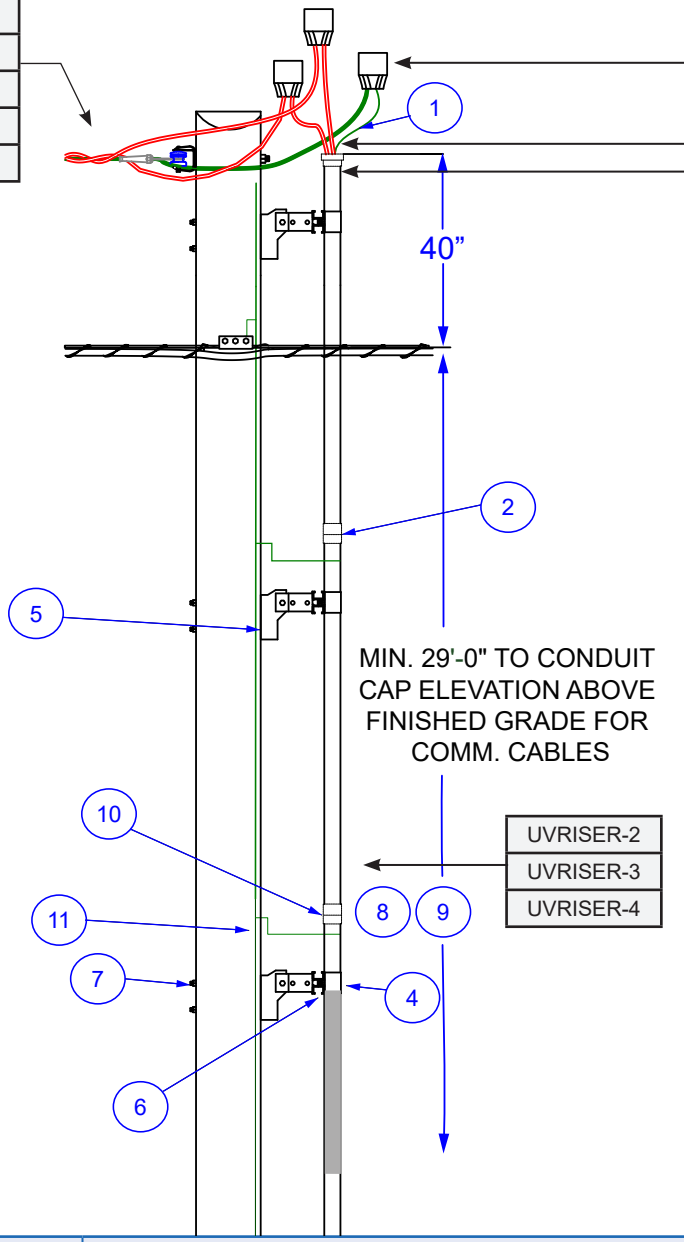
1. Secondary conduit terminator materials listed are size dependant as listed and are not included in the UVRISER compatible units.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

UNDERGROUND SECONDARY RISER CONDUIT MATERIALS

OCAT-2
OCAT-10
OCAT-40
OCAQ-2
OCAQ-20
OCAQ-40
OCAQ-336



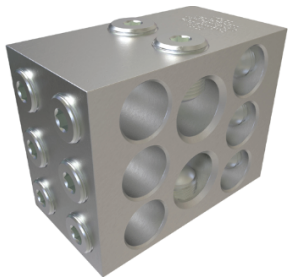
UVRISER-2
UVRISER-3
UVRISER-4

UVTERM2-20T
UVTERM3-20T
UVTERM3-350T
UVTERM3-40T
UVTERM3-500T
UVTERM4-40Q
UVTERM4-500Q

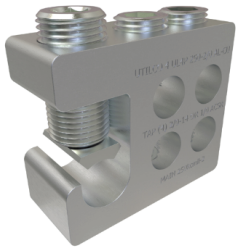
UVAT-20
UVAT-40
UVAT-350
UVAT-500
UVAQ-40
UVAQ-500

SECONDARY CONNECTION	
DESCRIPTION	STOCK #
CONN 5 HOLE (1) 1/0-750 (4) #2-500	223306000
CONN 8 HOLE (2) 1/0-750 (6) #2-500	223308000
CONN TRANSF SLOT 4 H 3/0 - 250 MCM	224165500

STK# 223306000



STK# 223308000



STK# 224165500

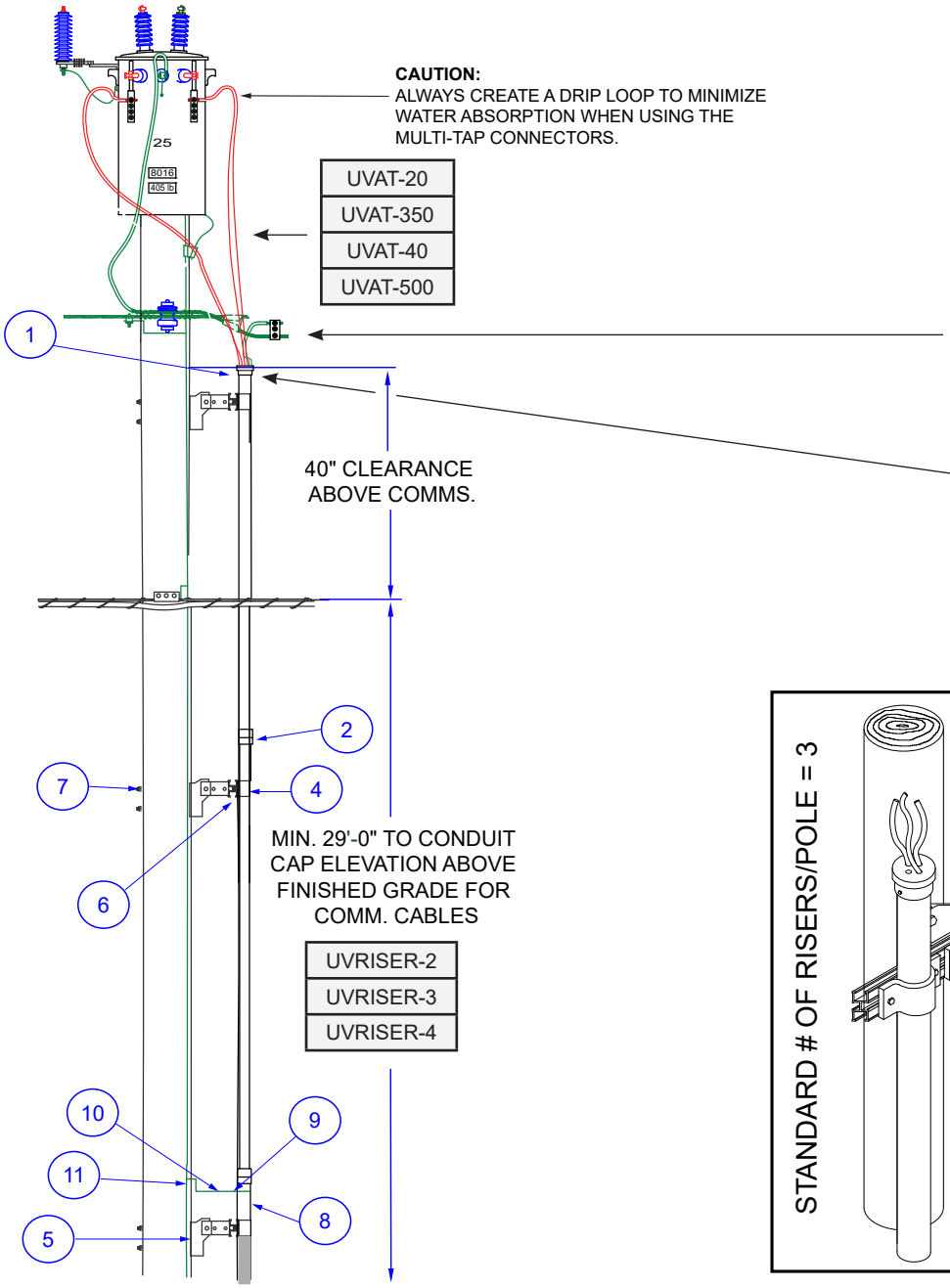
STANDARD ESTIMATES	
ESTIMATE	DESCRIPTION
USD-1P-100A	RISER & SERVICE DROP TO 100A METER
USD-1P-200A	RISER & SERVICE DROP TO 200A METER
USD-1P-225A	RISER & SERVICE DROP TO 200A METER
USD-1P-400A	RISER & SERVICE DROP TO 300-400A METER
USD-1P-600A	RISER & SERVICE DROP TO 600A METER
USD-1P-800A	RISER & SERVICE DROP TO 800A METER
USD-1P-WPOLE	UG SERVICE DROP SINGLE PHASE W/POLE
USD-3P	UG SERVICE DROP THREE PHASE, 4/0-500AQ
USD-3P-WPOLE	UG SERVICE DROP THREE PHASE W/POLE

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SECONDARY STANDARDS

NES

UNDERGROUND SECONDARY SERVICE POLE RISER MATERIALS



CAUTION:
ALWAYS CREATE A DRIP LOOP TO MINIMIZE WATER ABSORPTION WHEN USING THE MULTI-TAP CONNECTORS.

UVAT-20
UVAT-350
UVAT-40
UVAT-500

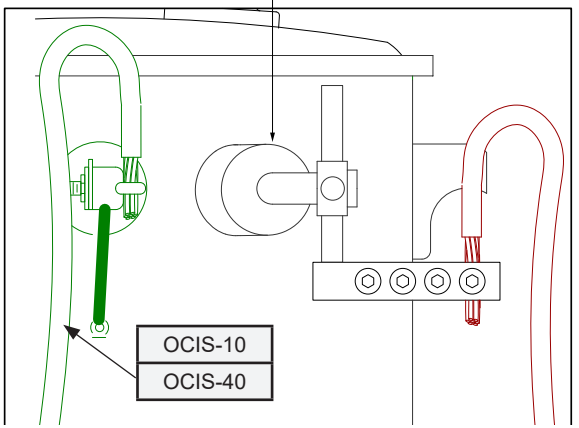
UVRISER-2
UVRISER-3
UVRISER-4

UVTERM2-20T
UVTERM3-20T
UVTERM3-350T
UVTERM3-40T
UVTERM3-500T

SECONDARY CONNECTION	
DESCRIPTION	STOCK #
CONN TRANSF SPADE 3C ;TRANSFORMER SPADE	224163000
CONN TRANSF STUD 6 H #6-250 MCM	224166000
CONN TRANSF STUD 4 H 1/0-500 MCM	224167000
CONN TRANSF STUD 8 H #6- 250 MCM	224168000

NEUTRAL CONNECTION	
224165500	CONN TRANSF SLOT 4 H 3/0 - 250 MCM
223306000	CONN 5 HOLE 750-1/0

CAUTION:
NEVER INSTALL ALUMINUM CONDUCTORS IN TRANSFORMER BUSHING CONNECTORS.



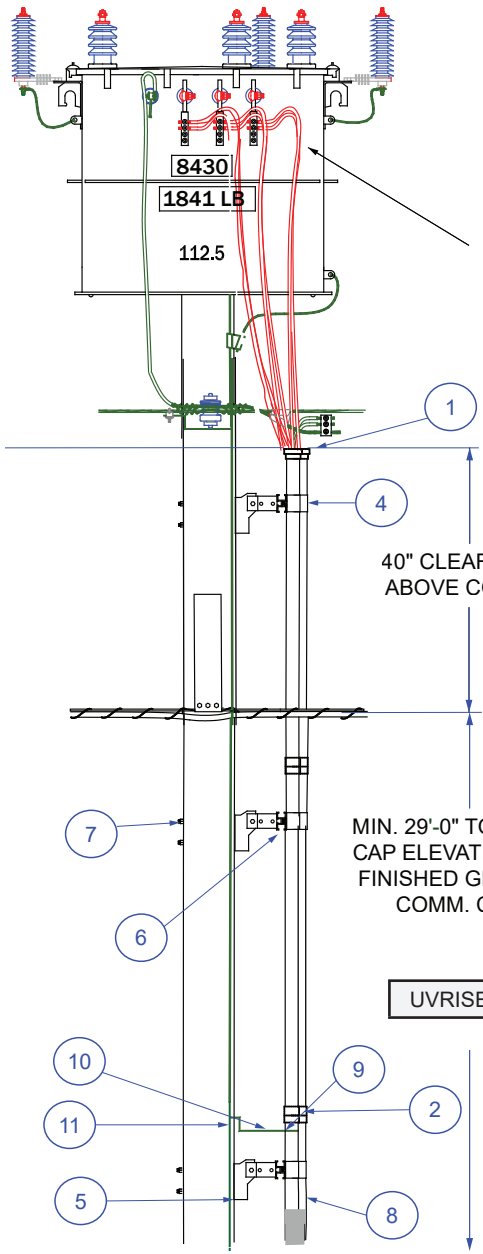
STANDARD ESTIMATES	
ESTIMATE	DESCRIPTION
USD-1P-100A	RISER & SERVICE DROP TO 100A METER
USD-1P-200A	RISER & SERVICE DROP TO 200A METER
USD-1P-225A	RISER & SERVICE DROP TO 200A METER
USD-1P-400A	RISER & SERVICE DROP TO 300-400A METER
USD-1P-600A	RISER & SERVICE DROP TO 600A METER
USD-1P-800A	RISER & SERVICE DROP TO 800A METER
USD-1P-WPOLE	UG SERVICE DROP SINGLE PHASE W/POLE

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SECONDARY STANDARDS

NES

UNDERGROUND SECONDARY 1 PHASE RISER MATERIALS



CAUTION:
ALWAYS CREATE A DRIP LOOP TO MINIMIZE WATER ABSORPTION WHEN USING THE MULTI-TAP CONNECTORS

UVAQ-40
UVAQ-500

UVTERM4-40Q
UVTERM4-500Q

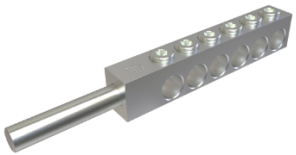
40" CLEARANCE ABOVE COMMS.

MIN. 29'-0" TO CONDUIT CAP ELEVATION ABOVE FINISHED GRADE FOR COMM. CABLES

UVRISER-4

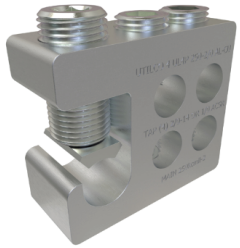
SECONDARY CONNECTION	
DESCRIPTION	STOCK #
CONN TRANSF SPADE 3C ;TRANSFORMER SPADE	224163000
CONN TRANSF STUD 6 H #6-250 MCM	224166000
CONN TRANSF STUD 4 H 1/0-500 MCM	224167000
CONN TRANSF STUD 8 H #6- 250 MCM	224168000

TRANSFORMER SPADE CONNECTOR

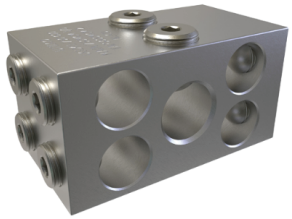


MULTI-TAP TRANSFORMER CONNECTOR

NEUTRAL CONNECTION	
224165500	CONN TRANSF SLOT 4 H 3/0 - 250 MCM
223306000	CONN 5 HOLE 750-1/0



STK# 224165500



STK# 223306000

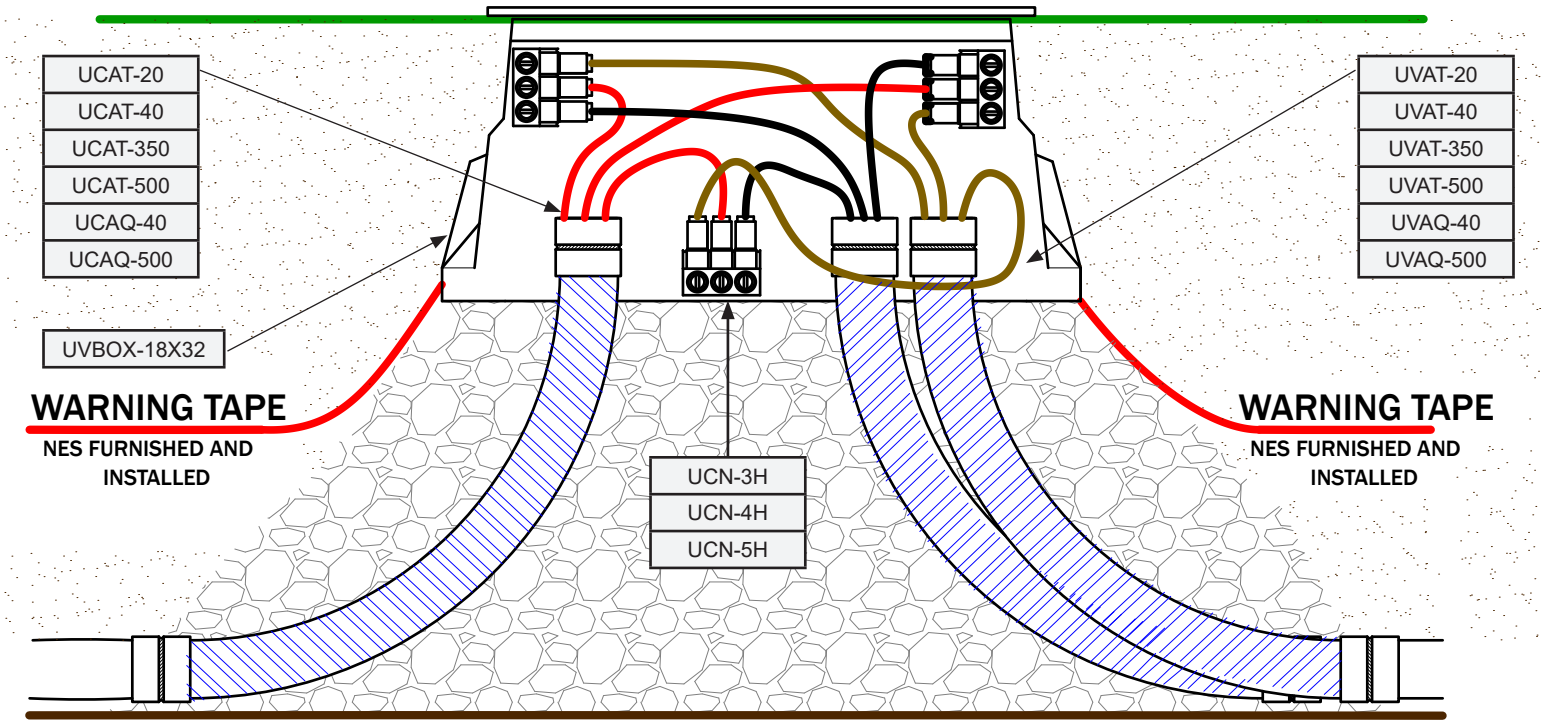
STANDARD ESTIMATES	
ESTIMATE	DESCRIPTION
USD-3P	UG SERVICE DROP THREE PHASE, 4/0-500AQ
USD-3P-WPOLE	UG SERVICE DROP THREE PHASE W/POLE

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SECONDARY STANDARDS

NES

UNDERGROUND SECONDARY 3 PHASE RISER MATERIALS



SECONDARY CONNECTION						
STOCK #	CU	DESCRIPTION	QUANTITY REQUIRED PER SERVICE VOLTAGE			
			120/240	216y/125	480y/277	240Δ OR 480Δ
401000000	UCN-3H	URD CONNECTOR 3 HOLE	3	4	4	3
401002000	UCN-4H	URD CONNECTOR 4 HOLE	3	4	4	3
401004000	UCN-5H	URD CONNECTOR 5 HOLE	3	4	4	3

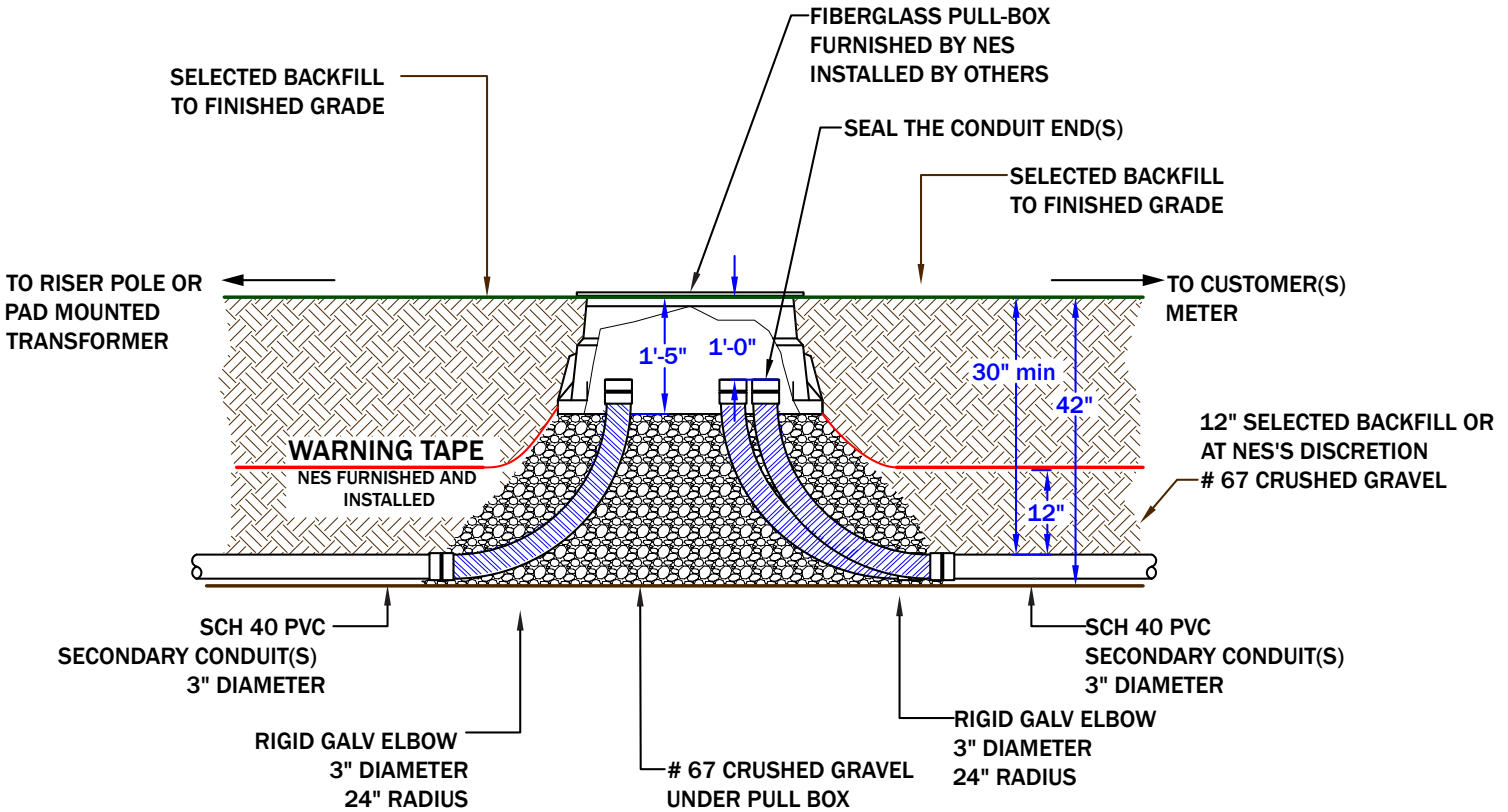
NOTES

1. It is critical that the wire be properly seated inside of the connector. Always mark the wire's position when fully seated. This indicates if the wire backed out of the connector when the set screw was tightened. The set screw can be removed to see if the wire is seated.
2. Strip gauge is on the back of the connector.
3. The source wire must be installed in the center position on the connector. This minimizes connector heating during peak loads.

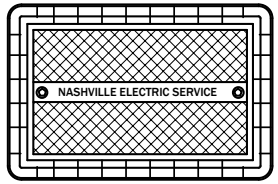
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

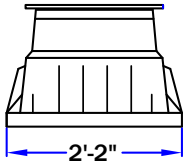
UNDERGROUND SECONDARY PULL BOX CONNECTOR MATERIALS



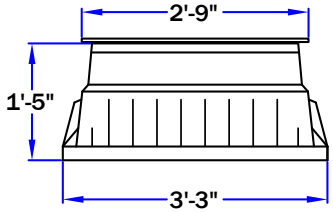
Top View



End View



Side View



NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE(S) HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

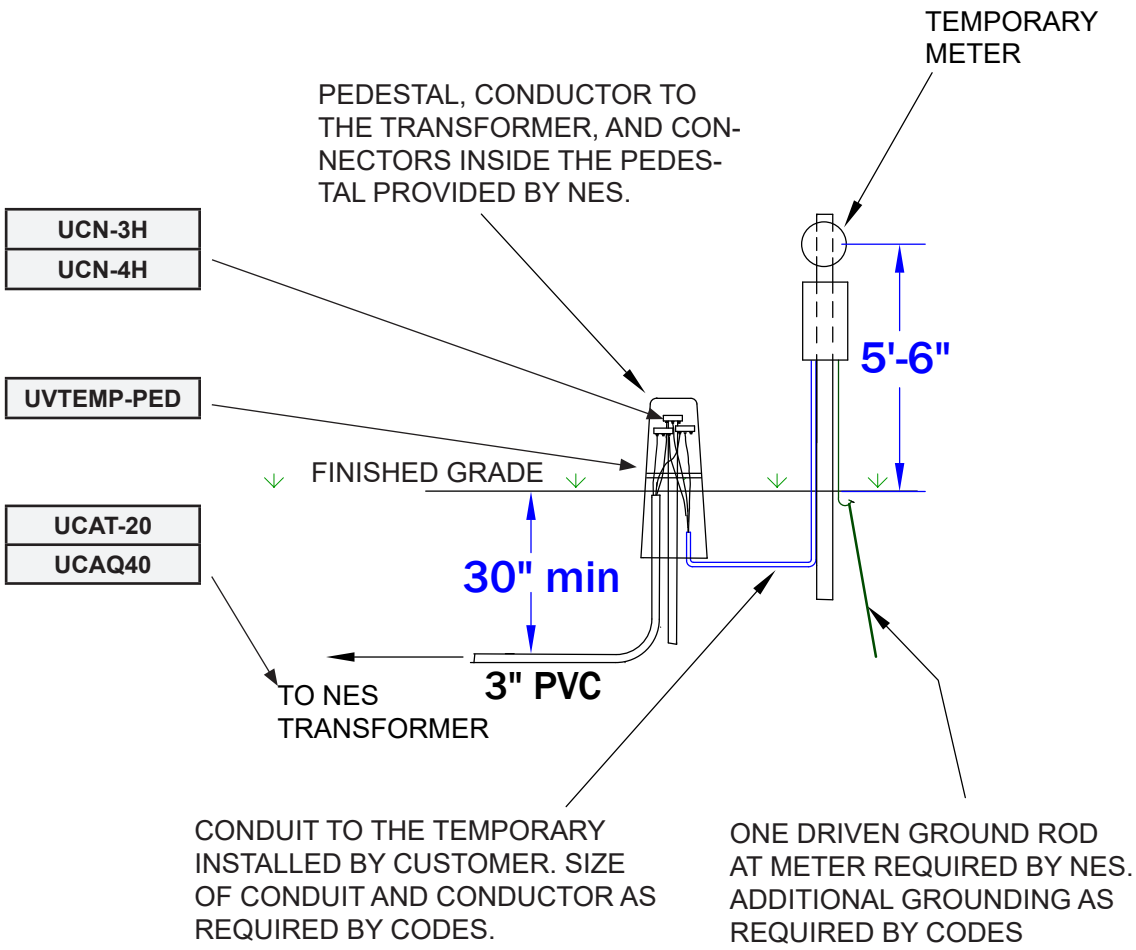
SECONDARY TERMINATING PEDESTAL				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UVBOX-18X32	060034000	BOX URD SERVICE 20"W X 32"L X 18"D ;POLY	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

SECONDARY STANDARDS

NES

UNDERGROUND SECONDARY PULL BOX DETAILS

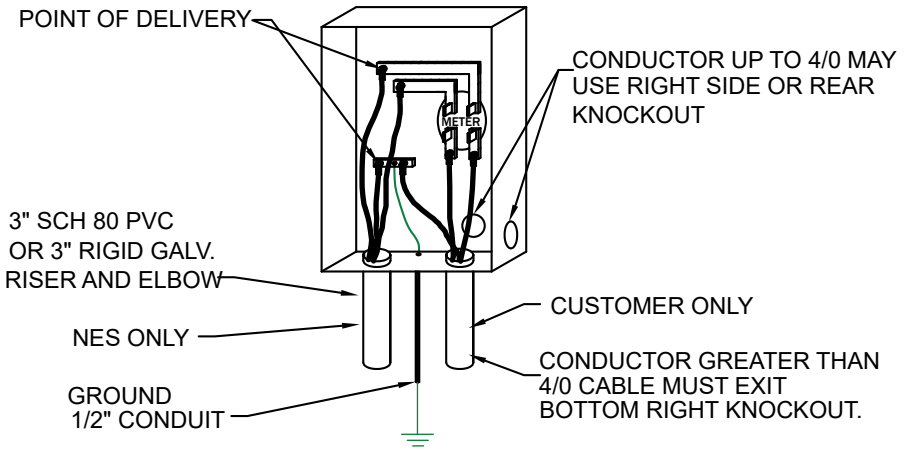


SECONDARY TERMINATING PEDESTAL				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UVTEMP-PED	060395000	FIBERGLASS TEMPORARY SERVICE PEDESTAL	1	EA

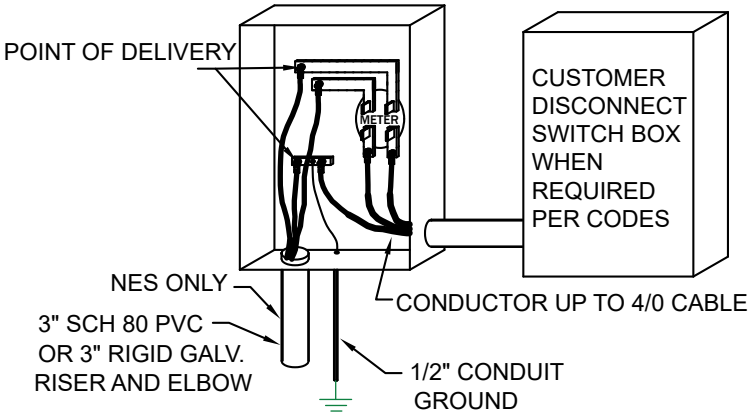
REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

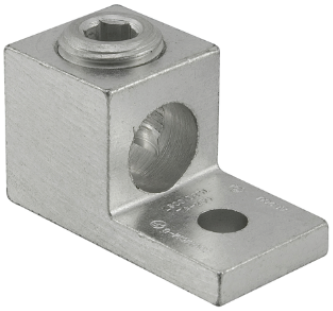
UNDERGROUND SECONDARY TEMPORARY PULL BOX DETAILS



Standard 200A and 400A Underground Meter Installation

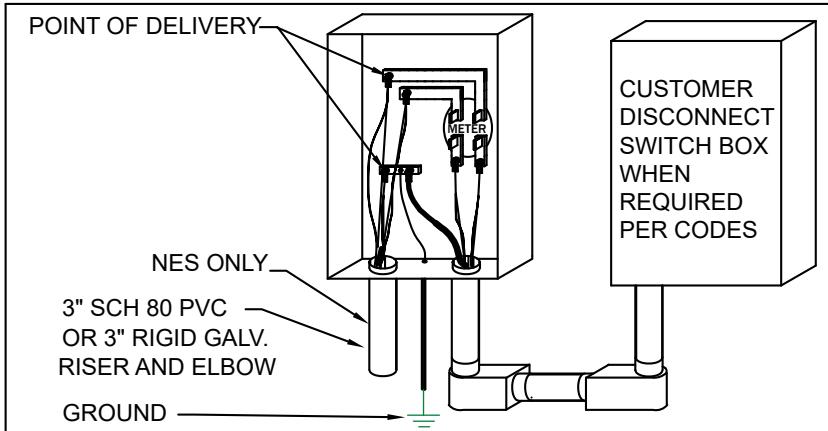


Meter Installation Using Disconnect Switch with Conductor up to 4/0



STK# 400900000

STK# 400809000



Meter Installation Using Disconnect Switch with Conductor larger than 4/0

TRUCK STOCK	
DESCRIPTION	**STOCK #**
CONN 500 MCM 1 COND AL/CU	400900000
CONN 350 MCM 2 COND AL/CU	400809000
INHIBITING COMPOUND	400800000

NOTES

1. These drawings are instructions for the customer on how to bring their service wires into the meter base.
2. The wire size limits refer to the customer's wire.
3. Reference NES Standard drawing UGS0003

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

NES

UNDERGROUND SECONDARY METER BASE CONNECTOR DETAILS

UNDERGROUND SECONDARY CABLE INFORMATION TABLE											
SINGLE PHASE INSTALLATIONS - TRIPLEX CONDUCTOR (600V INSULATION)										AMPACITY	
STOCK #	CU TRANS OR PULL BOX TO METER	CU TRANS TO PULL BOX	SIZE (AWG/ KCMIL)	NO. OF STRANDS	NEUTRAL WIRES AWG	INSULATION TICKNESS (MILS)	CABLE WEIGHT (LBS./KFT)	FT / FULL REEL (42" DIA)	FT / FULL REEL (68" DIA)	DIRECT BURIAL (AMPS)	PVC CONDUIT (AMPS)
020350000	UVAT-20	UCAT-20	2/0	19	1	80	501	1,500	5,000	245	180
020381000	UVAT-40	UCAT-40	4/0	19	2/0	80	737	1,000	3,000	315	240
020395000	UVAT-350	UCAT-350	350	37	4/0	80	1,157	N/A	1,000	415	320
020410000	UVAT-500	UCAT-500	500	37	350	95	1,646	N/A	1,000	495	395
THREE PHASE INSTALLATIONS - QUADRUPLEX CONDUCTOR (600V INSULATION)										AMPACITY	
NES STOCK #	CU TRANS OR PULL BOX TO METER	CU TRANS TO PULL BOX	SIZE (AWG/ KCMIL)	NO. OF STRANDS	NEUTRAL WIRES AWG	INSULATION TICKNESS (MILS)	CABLE WEIGHT (LBS./KFT)	FT / FULL REEL (42" DIA)	FT / FULL REEL (68" DIA)	DIRECT BURIAL (AMPS)	PVC CONDUIT (AMPS)
020382000	UVAQ-40	UCAQ-40	4/0	19	2/0	80	974	N/A	1,000	290	225
020430000	UVAQ-500	UCAQ-500	500	37	350	90	2,163	N/A	750	465	370

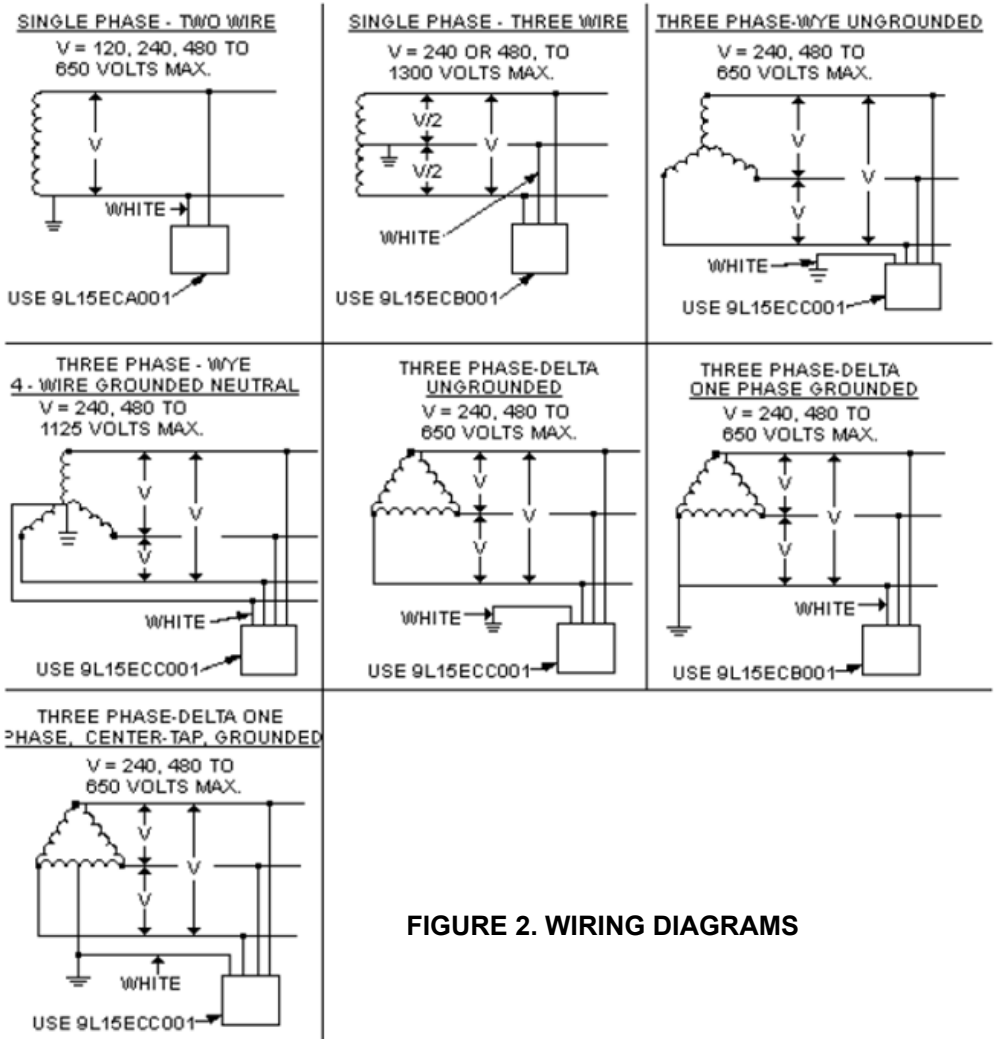


FIGURE 2. WIRING DIAGRAMS

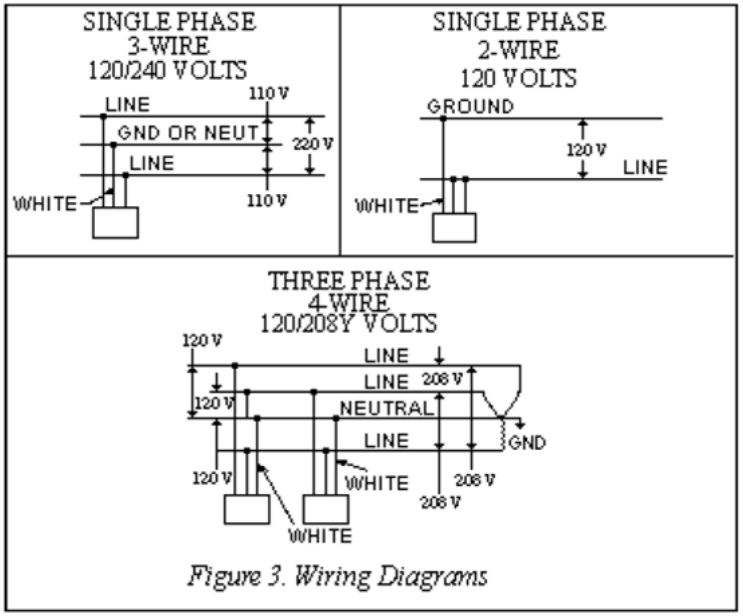


Figure 3. Wiring Diagrams

NOTES

1. Wiring diagram source is General Electric Company. These are for reference only. Schematics may vary from different manufacturers therefore always check the wiring instructions furnished with each arrester.
2. Install secondary arresters on all power sources feeding NES electronic controls.

SECONDARY ARRESTERS				
MATERIAL LIST				
CU CODE	**STOCK #**	**DESCRIPTION**	**QTY**	**UNIT**
UVLA-240	140100000	ARRESTER, SURGE, SECONDARY, 120/240V	1	EA
UVLA-380	140105000	ARRESTER, SURGE, SECONDARY, 380V	1	EA
UVLA-600	140110000	ARRESTER, SURGE, SECONDARY, 650V	1	EA

- 120/240 Single Phase Protection
- 150,000 AMP Total Surge Current
- Diagnostic Light

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

DITCH DETAIL STANDARDS

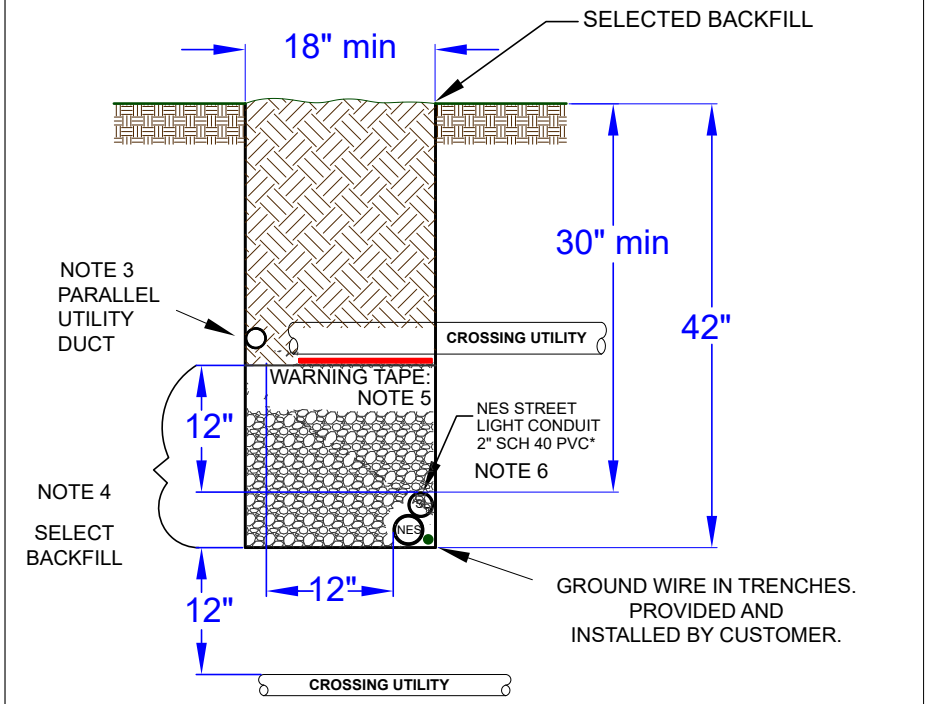
APPROVALS

ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
4/1/25	Cedric Short	Ronald Reasonover	Leonard Leech

TABLE OF CONTENTS

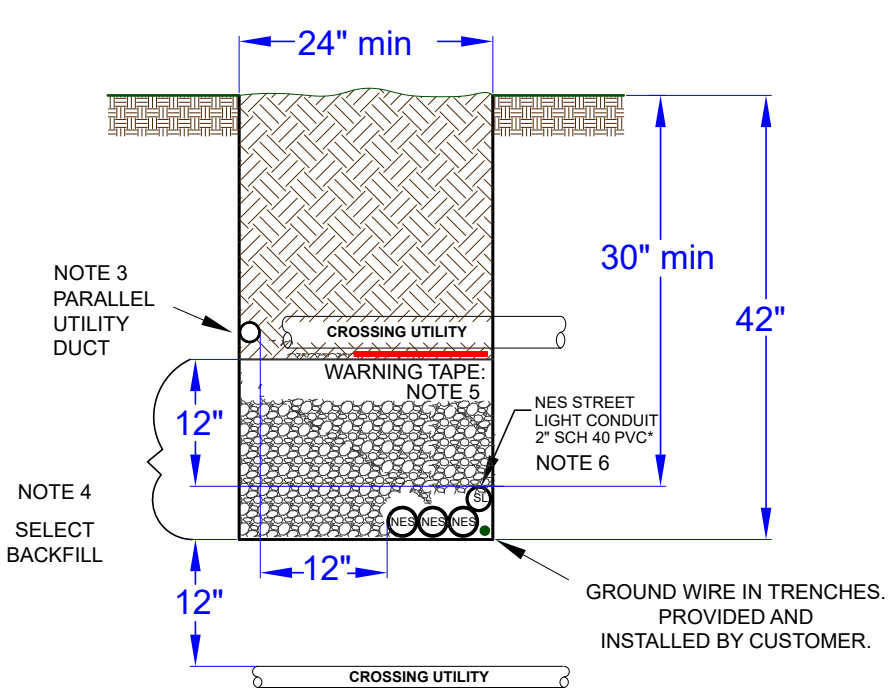
SINGLE RESIDENTIAL CONDUIT DITCH DETAIL

PRIMARY or SECONDARY
(1 or 2) 2-1/2" OR 3" DIA. SCH 40 PVC CONDUITS



RESIDENTIAL SUBDIVISION CONDUIT DITCH DETAIL

PRIMARY or SECONDARY
(1) 4", (1) 3" OR (1,2 or 3) 2-1/2" OR 3" DIA. SCH 40 PVC CONDUITS



NOTES

1. Reference NES Standard Drawing (UG0051)
2. NES Standard Electrical conduit plus spares provided & installed by customer as specified.
3. Separate ditch recommended for natural gas pipelines & waterlines.
4. Select backfill to consist of # 67 Crushed Gravel 12-inches above conduit to warning tape.
5. NES Furnished Warning Tape to be installed above electrical conduits.
6. NES Lighting conduit may be positioned adjacent or above Primary conduits. It may not be installed below Primary conduits.
7. Utility Red Dye Concrete encasement is required for stream crossing or when installing 5" main feeder conduits.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

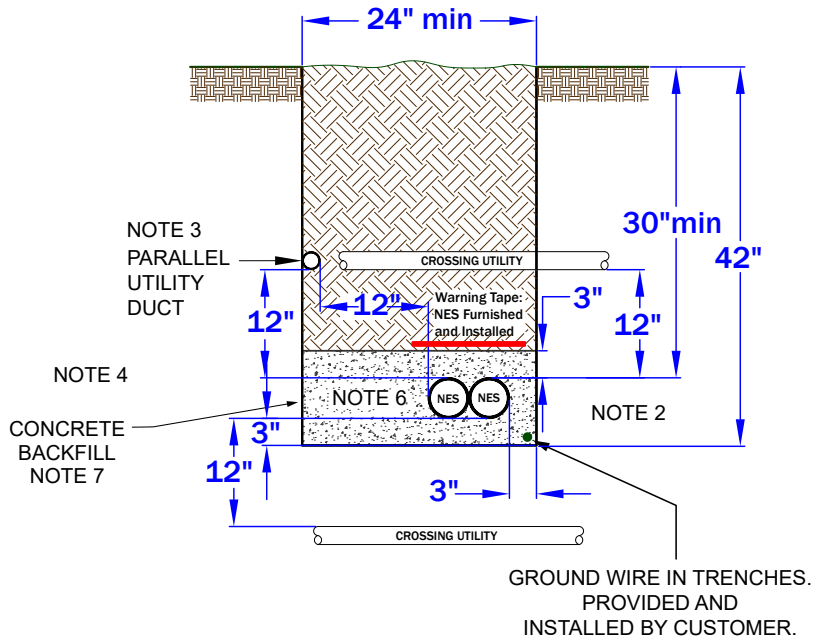
DITCH DETAIL STANDARDS

NES

RESIDENTIAL PRIMARY CONDUIT DITCH DETAILS

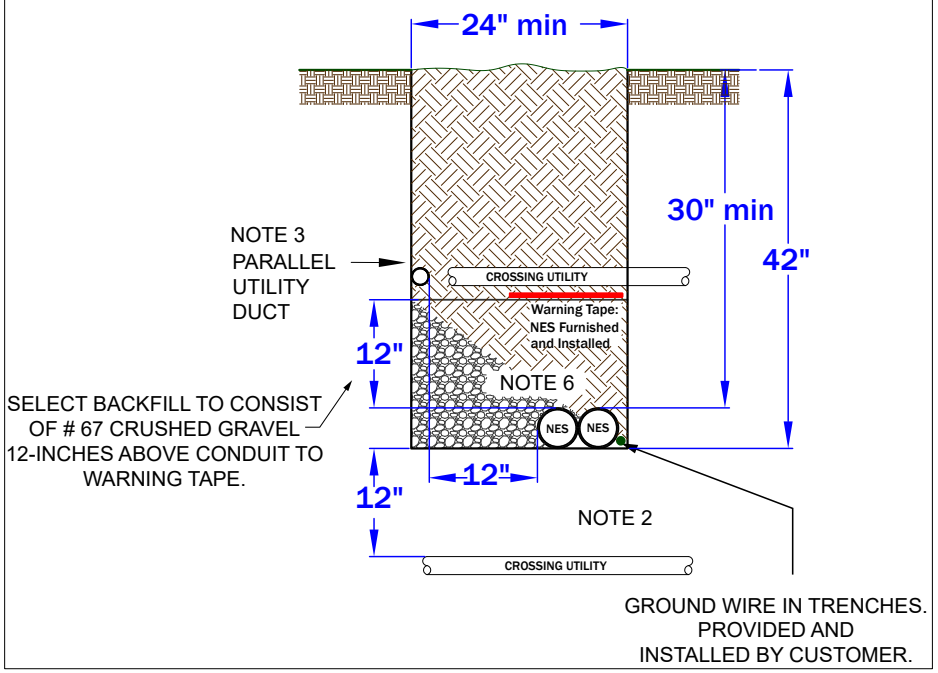
COMMERCIAL
CONCRETE ENCASED CONDUIT
DITCH DETAIL

PRIMARY or SECONDARY CONDUIT
(2) 4, 5 OR 6" DIA. SCH 40 PVC CONDUITS
CONCRETE ENCASED



COMMERCIAL CUSTOMER
RIGID CONDUIT
DITCH DETAIL

PRIMARY or SECONDARY CONDUIT
(2) 4, 5 OR 6" DIA. RIGID
GALVANIZED CONDUITS



NOTES

1. Reference NES Standard Drawing (UG0051)
2. NES Standard Electrical conduit plus spares provided & installed by customer as specified.
3. Separate ditch recommended for natural gas pipelines & waterlines.
4. Select backfill to consist of 3-inch concrete encasemet & fill with # 67 Crushed Gravel 12-inches above conduit to warning tape.
5. NES Furnished Warning Tape to be installed above electrical conduits.
6. NES Lighting conduit may be positioned adjacent or above Primary conduits. It may not be installed below Primary conduits.
7. Utility Red Dyed Concrete encasement backfill shall be required in commercial & industrial sites.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

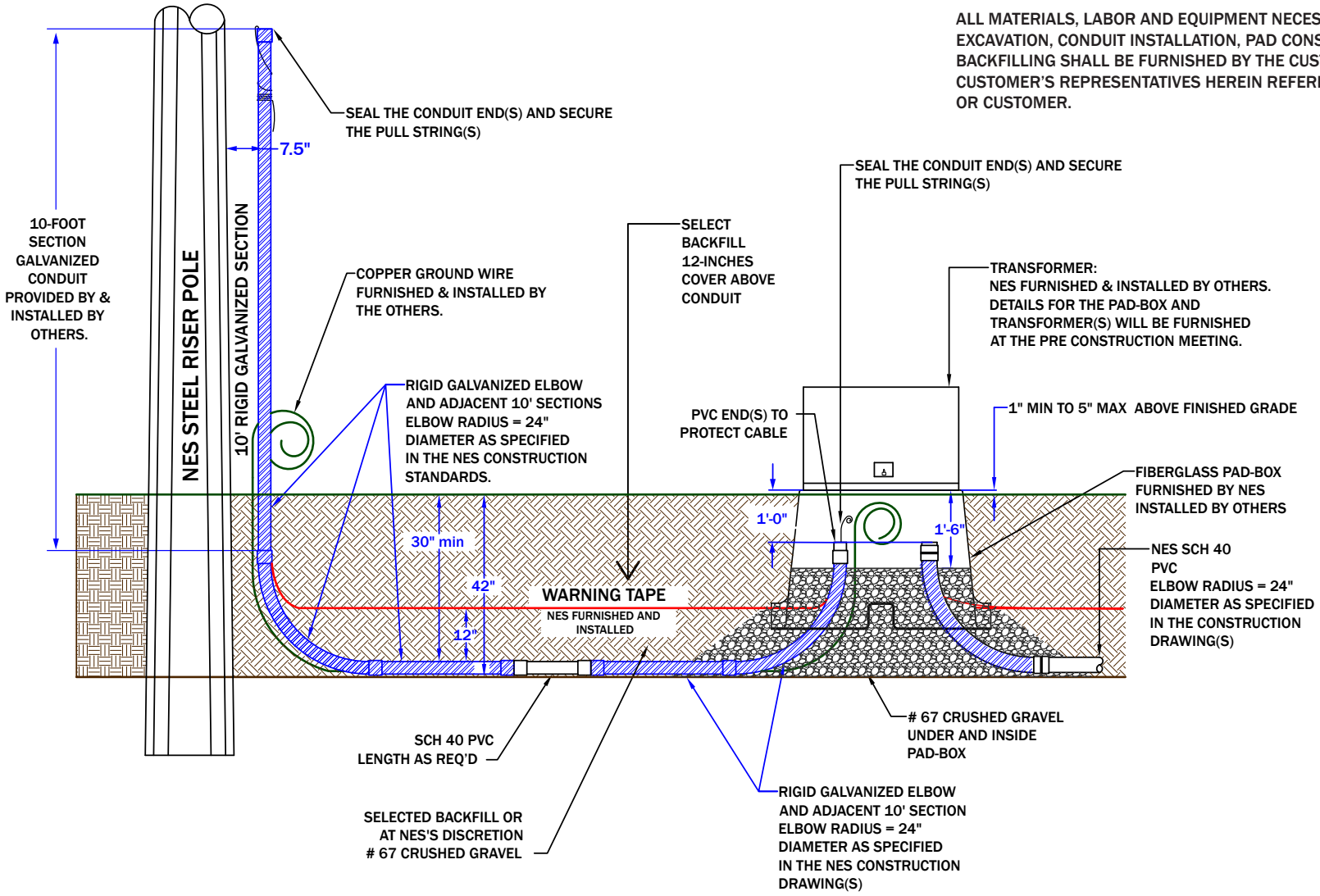
DITCH DETAIL STANDARDS

NES

COMMERCIAL PRIMARY & SECONDARY CONDUIT DITCH DETAIL

SINGLE PHASE RESIDENTIAL DITCH DETAIL (SCH 40 PVC)

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

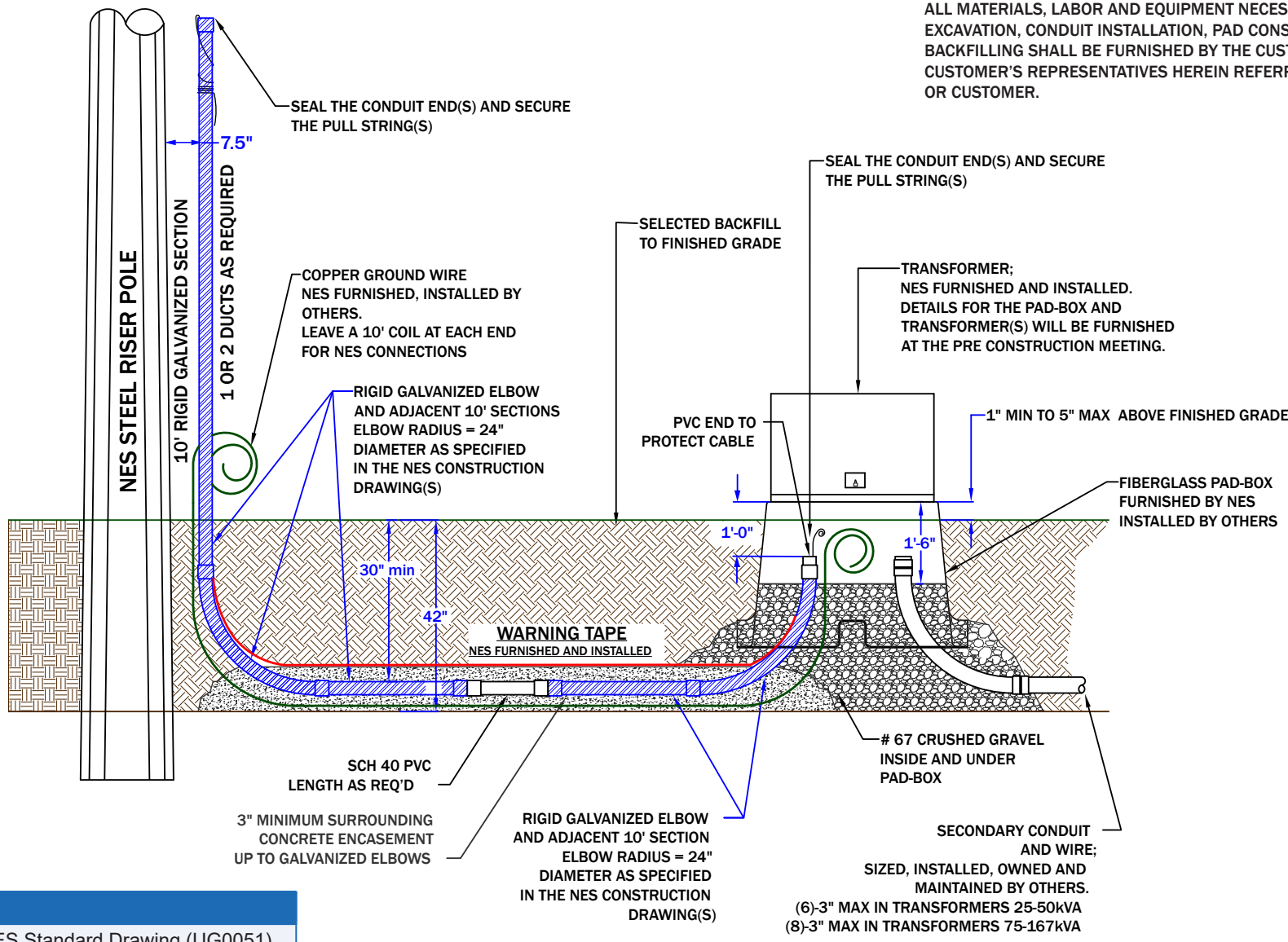
DITCH DETAIL STANDARDS

NES

SINGLE PHASE RESIDENTIAL RISER - TRANSFORMER CONDUIT DETAIL (PVC)

SINGLE PHASE COMMERCIAL DITCH DETAIL (SCH 40 PVC)

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

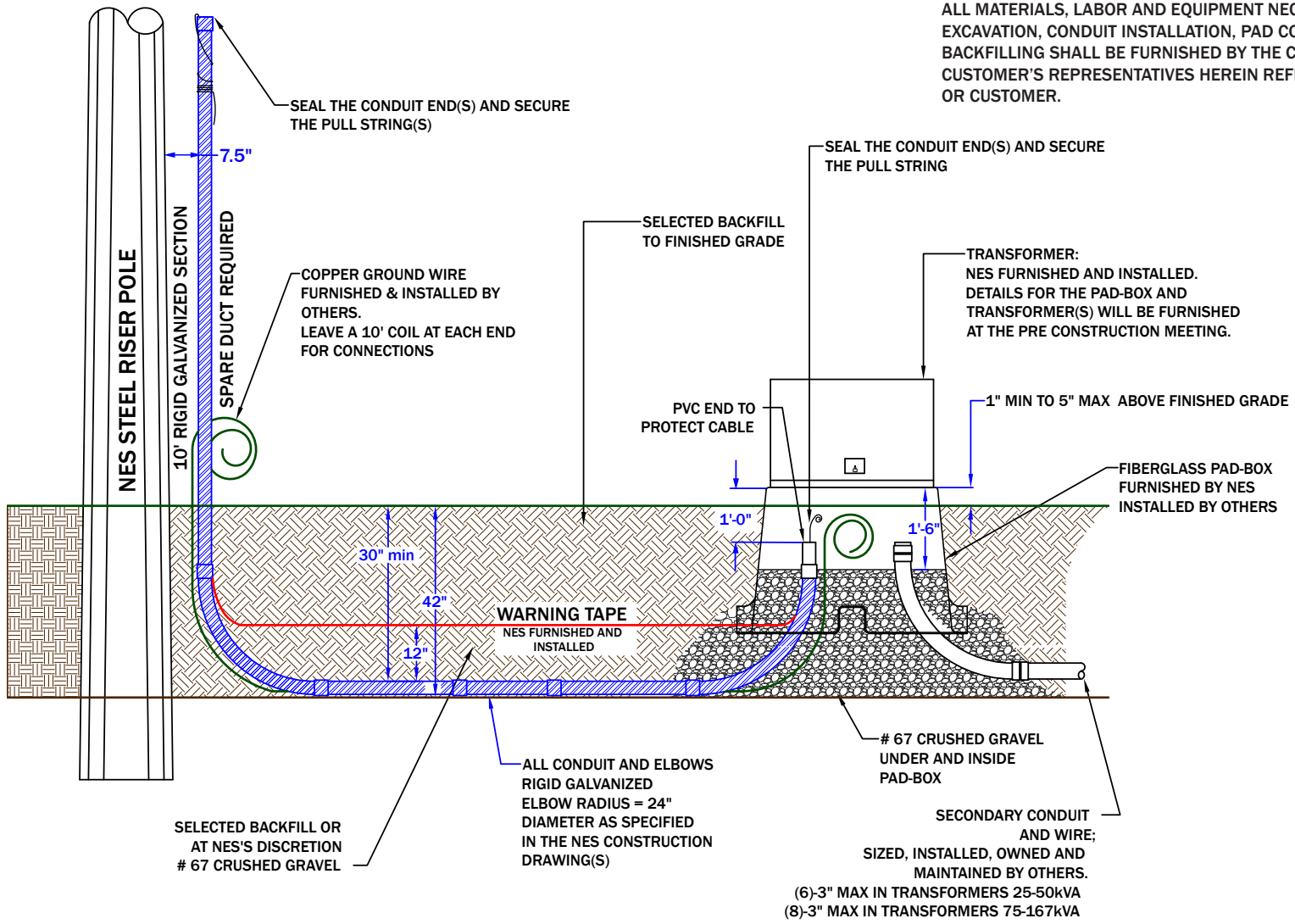
DITCH DETAIL STANDARDS

NES

SINGLE PHASE COMMERCIAL RISER - TRANSFORMER CONDUIT DETAIL (PVC)

SINGLE PHASE COMMERCIAL DITCH DETAIL (RIGID CONDUIT)

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

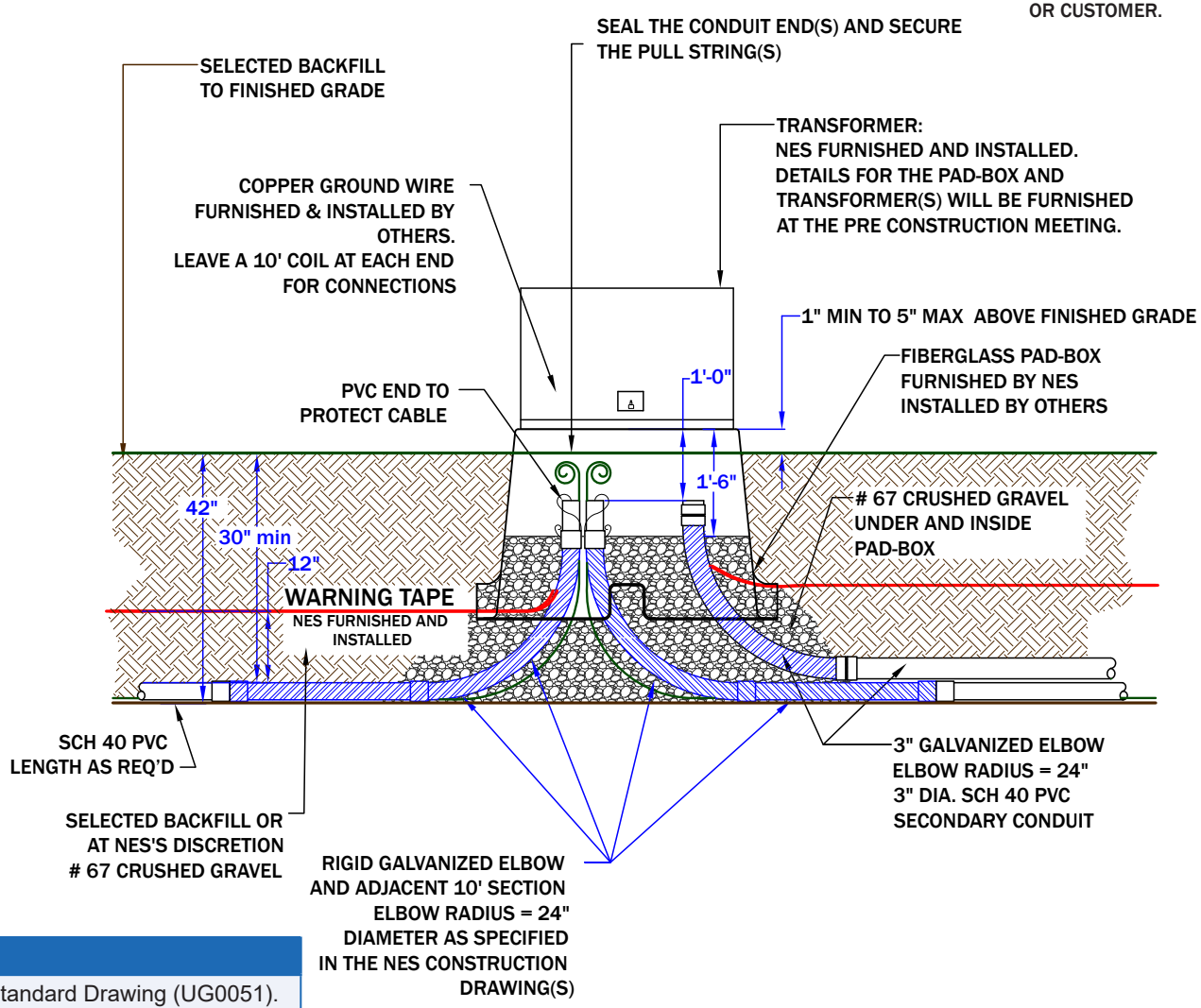
DITCH DETAIL STANDARDS

NES

SINGLE PHASE COMMERCIAL RISER - TRANSFORMER CONDUIT DETAIL (RIGID)

SINGLE PHASE RESIDENTIAL DITCH DETAIL (SCH 40 PVC)
LOOP FEED PRIMARY

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

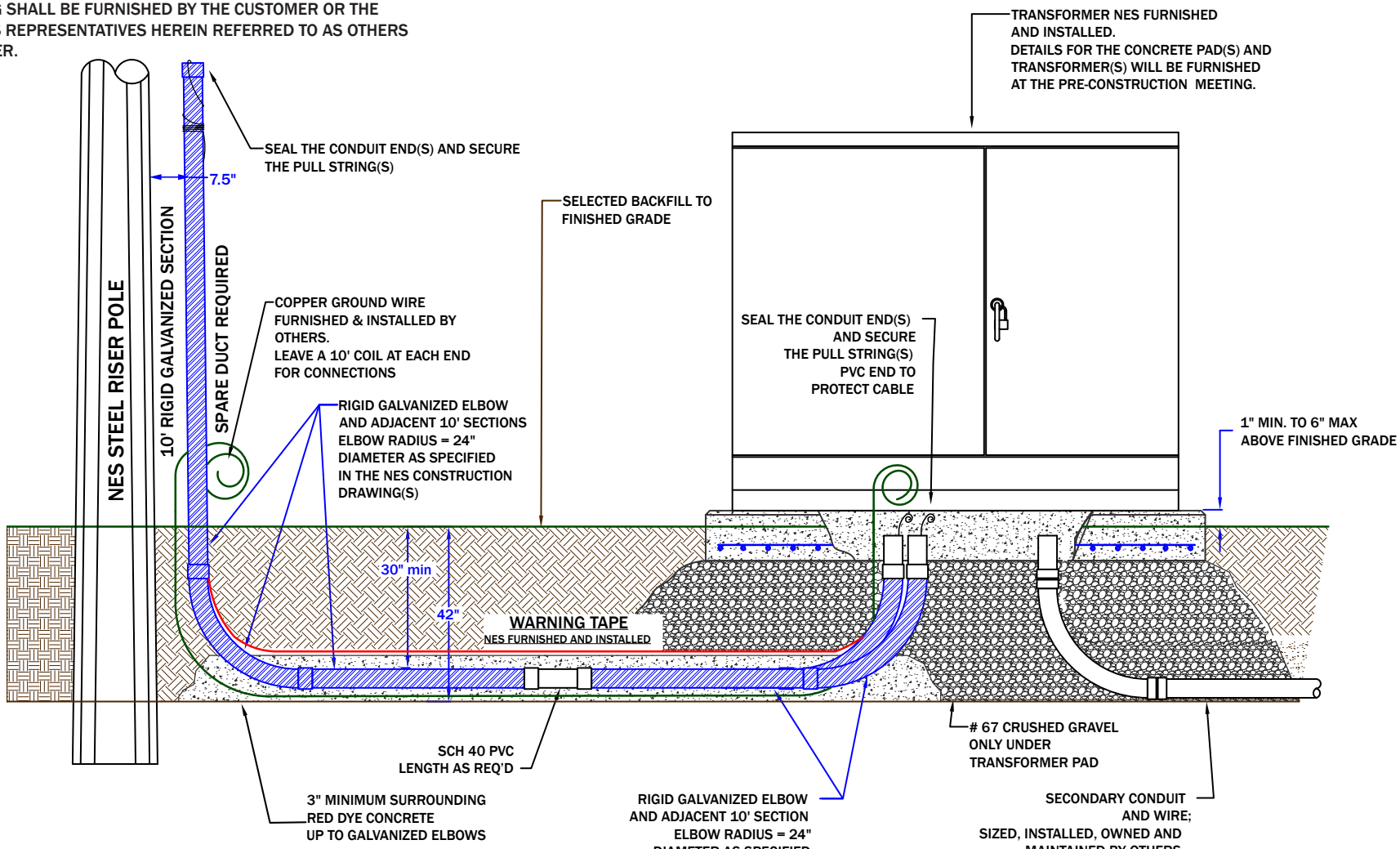
DITCH DETAIL STANDARDS

NES

SINGLE PHASE RESIDENTIAL LOOP FEED TRANSFORMER CONDUIT DETAIL (PVC)

3PHASE COMMERCIAL DITCH DETAIL
(SCH 40 PVC) CONCRETE ENCASED

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

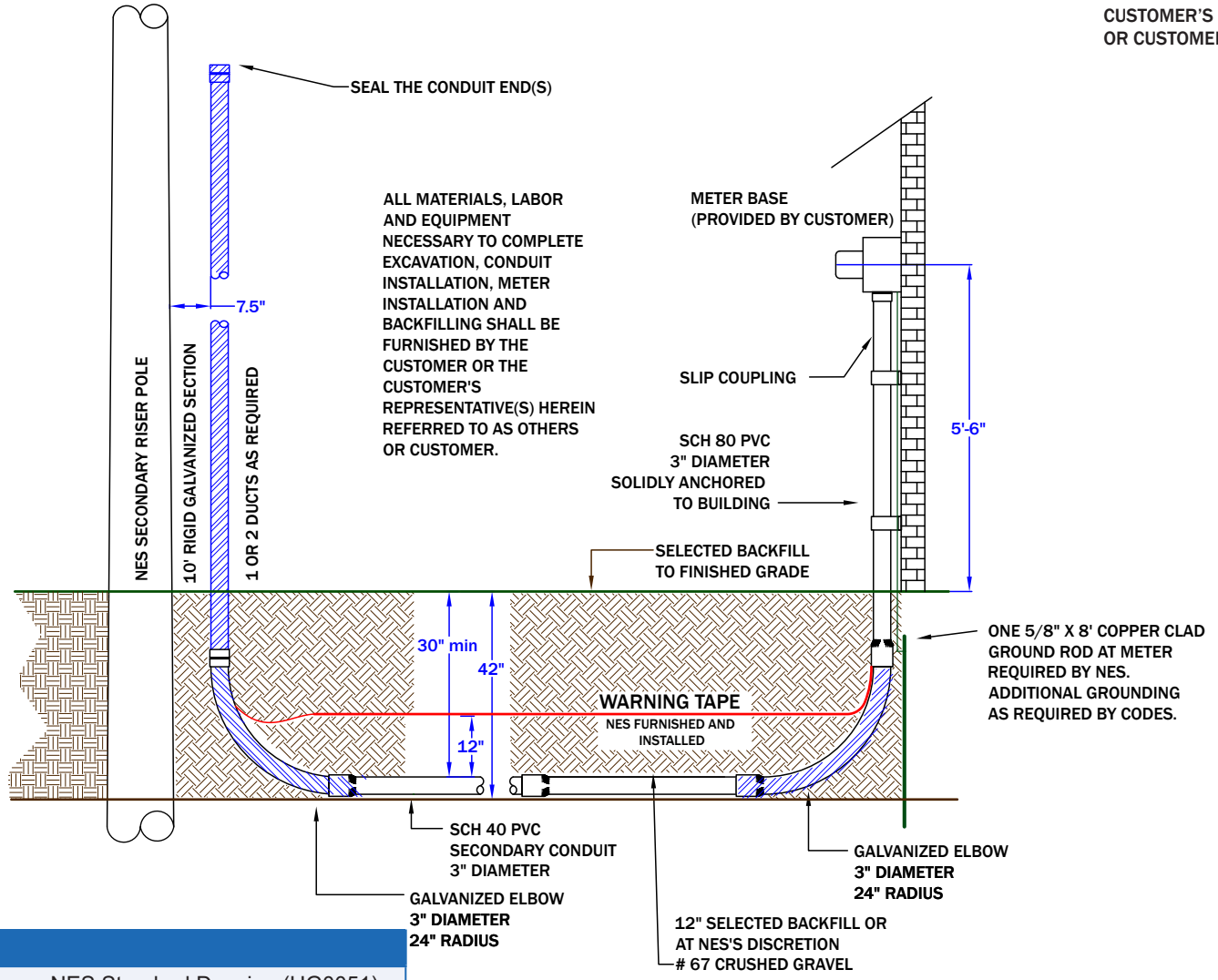
DITCH DETAIL STANDARDS

NES

THREE PHASE COMMERCIAL RISER - TRANSFORMER CONDUIT DETAIL (PVC)

RESIDENTIAL SECONDARY DITCH DETAIL
FOR SERVICES UP TO 400A AND (1) 3" CONDUIT (SCH 40 PVC) AS SHOWN OR RIGID GALVANIZED CONDUIT

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

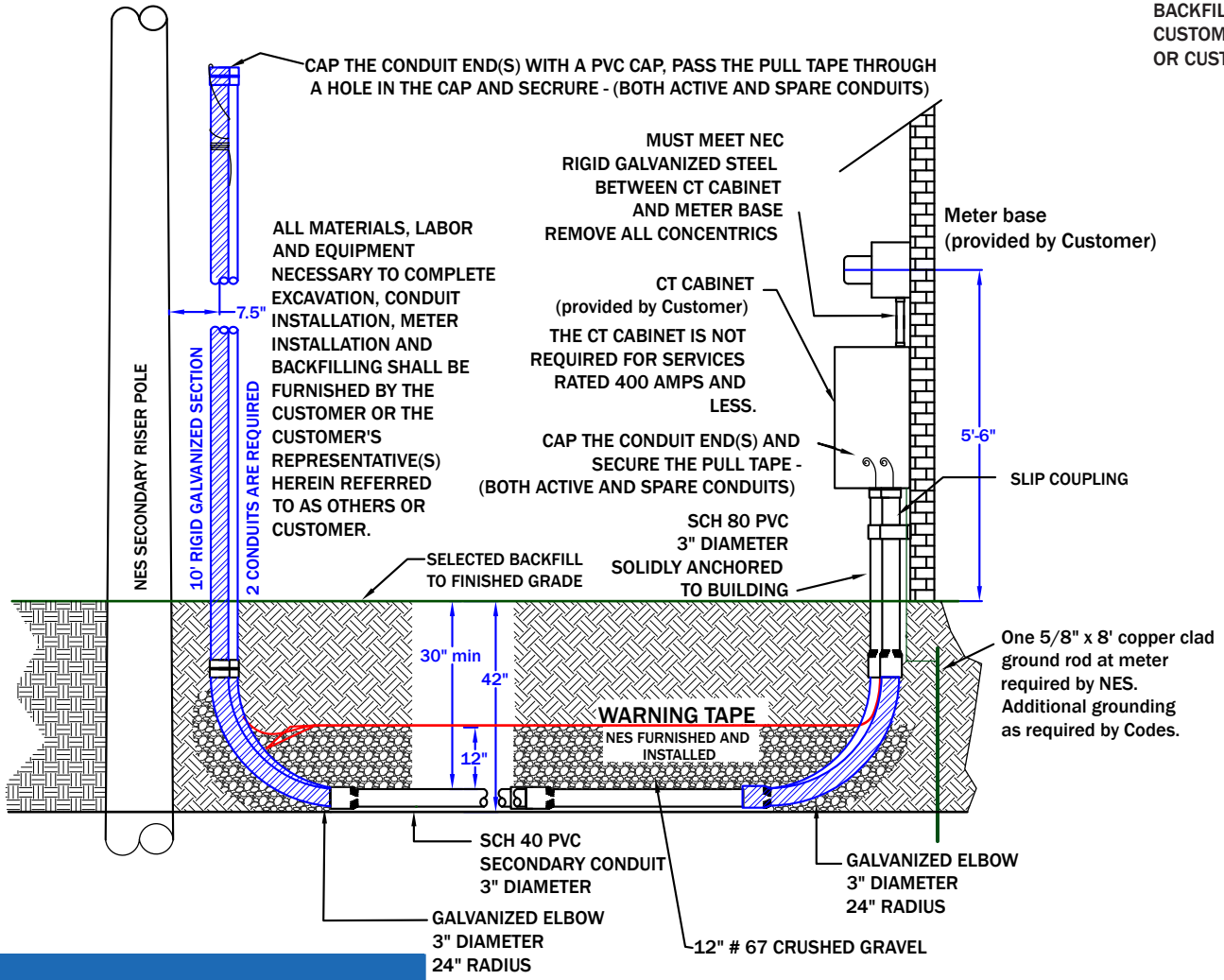
DITCH DETAIL STANDARDS

NES

SECONDARY RESIDENTIAL RISER - METER CONDUIT DETAIL (≤ 400A)

RESIDENTIAL SECONDARY DITCH DETAIL
FOR SERVICES GREATER THAN 400A AND (1) OR (2) 3" CONDUIT(S) PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

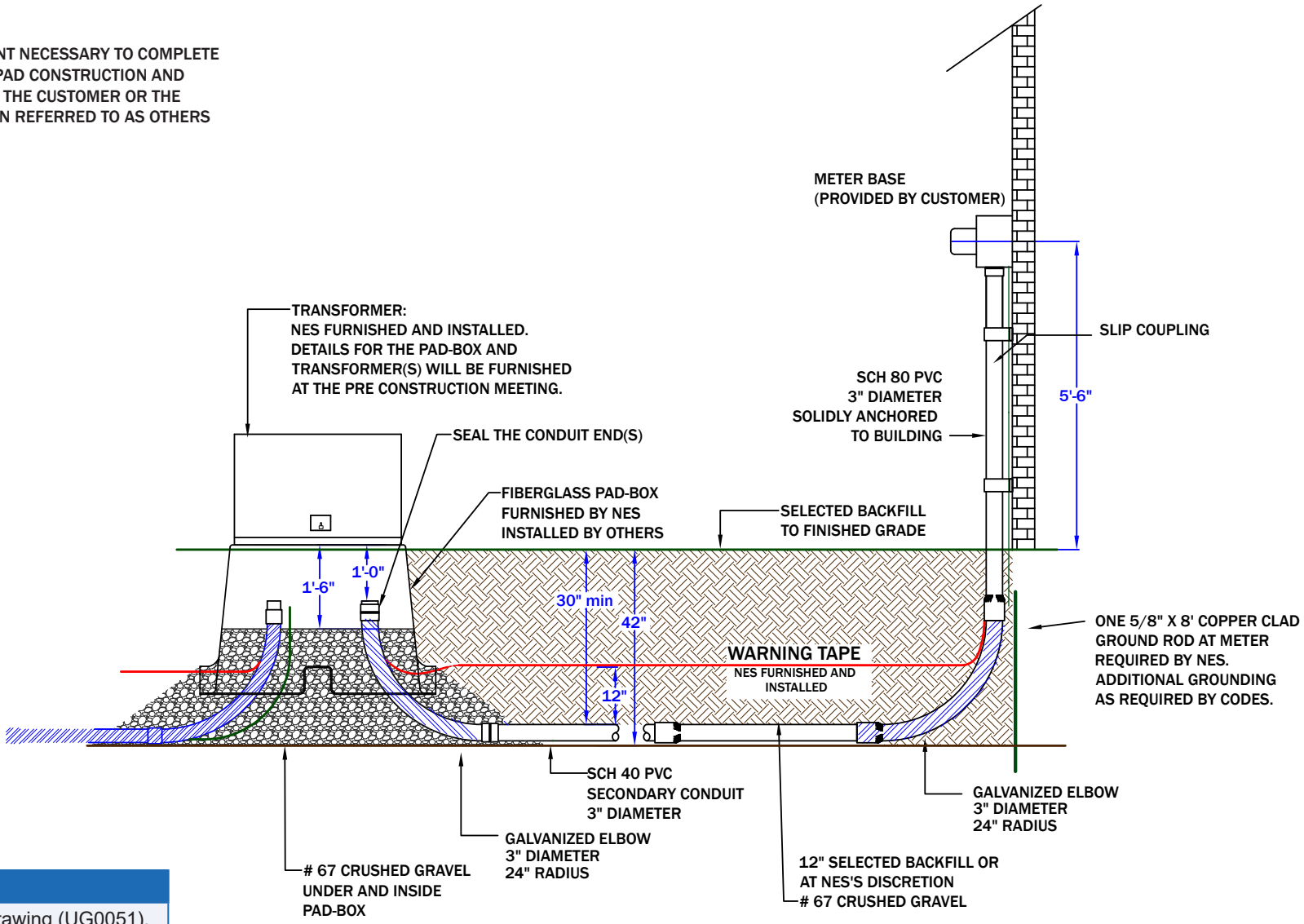
DITCH DETAIL STANDARDS

NES

SECONDARY RESIDENTIAL RISER - METER CONDUIT DETAIL (> 400A)

RESIDENTIAL SECONDARY DITCH DETAIL
(SCH 40 PVC) AS SHOWN OR RIGID GALVANIZED CONDUIT

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

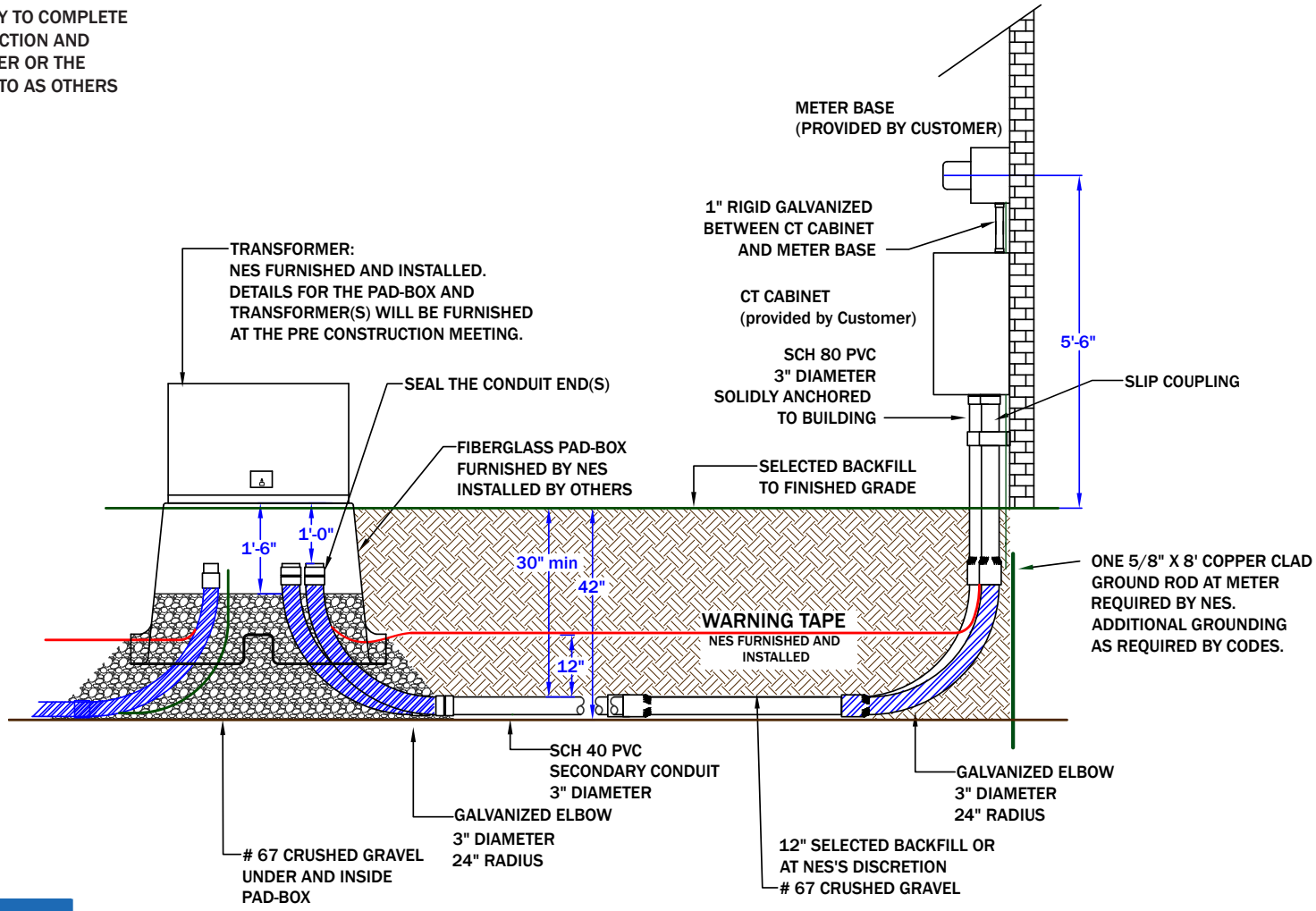
DITCH DETAIL STANDARDS

NES

SECONDARY RESIDENTIAL TRANSFORMER - METER CONDUIT DETAIL (≤ 400A)

RESIDENTIAL SECONDARY DITCH DETAIL
FOR SERVICES GREATER THAN 400A AND (1) OR (2) 3" CONDUITS (SCH 40 PVC) AS SHOWN OR RIGID GALVANIZED CONDUIT

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

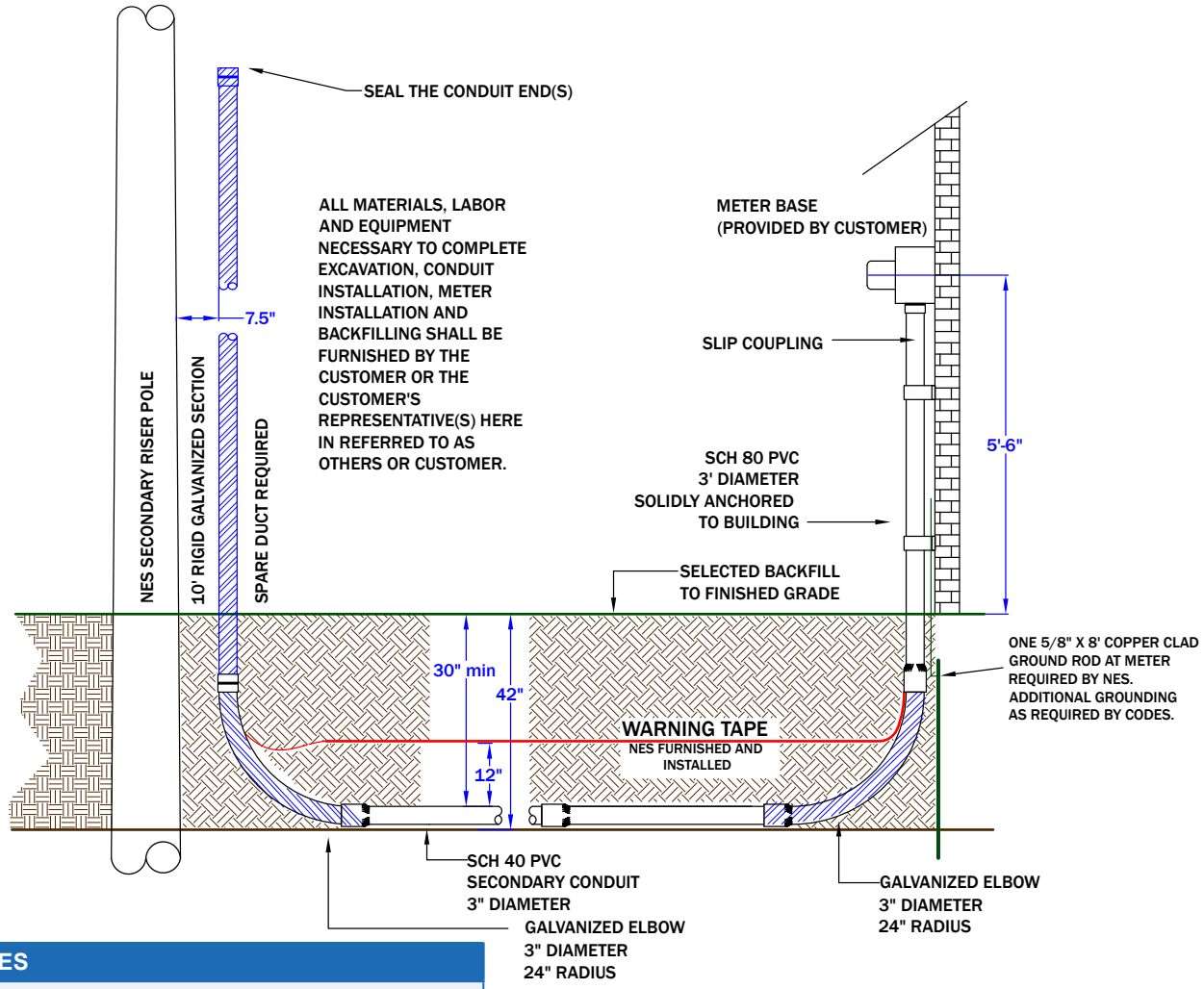
DITCH DETAIL STANDARDS

NES

SECONDARY RESIDENTIAL TRANSFORMER - METER CONDUIT DETAIL (> 400A)

COMMERCIAL OR SUPPLEMENTAL RESIDENTIAL SERVICE FROM SECONDARY RISER 200 AMPS OR LESS

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

DITCH DETAIL STANDARDS

NES

SECONDARY COMMERCIAL RISER - METER CONDUIT DETAIL (≤ 200A)

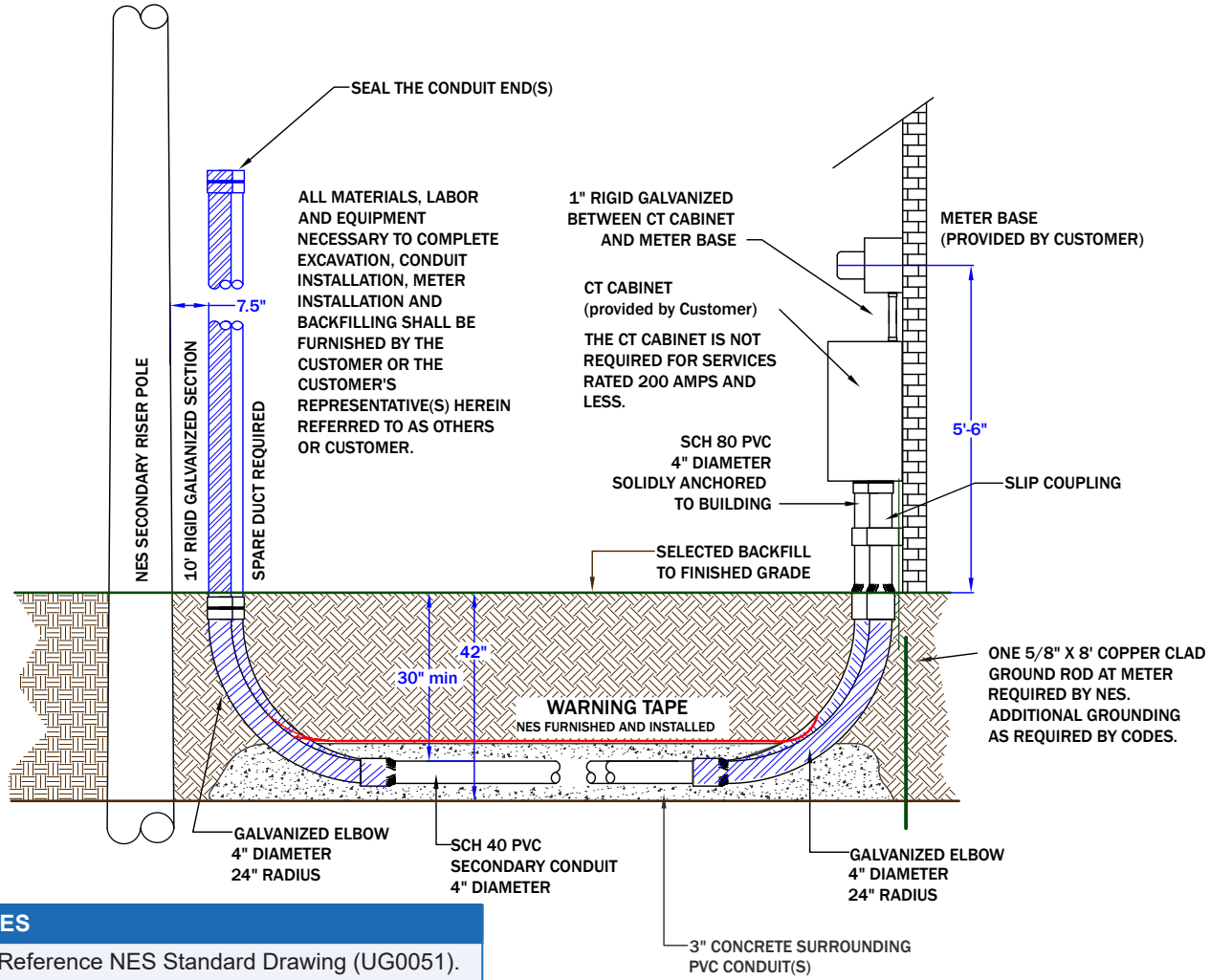
COMMERCIAL BUSINESS SECONDARY DITCH DETAIL FOR SERVICES GREATER THAN 200A UP TO 800A (1) OR (2) 3" OR 4" CONDUIT(S) (SCH 40 PVC) CONCRETE ENCASED AS SHOWN PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, PAD CONSTRUCTION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

CONDUIT SIZES, UNLESS OTHERWISE SPECIFIED:

INSTALL 4-INCH CONDUIT FOR THREE PHASE SERVICES.

INSTALL 3-INCH CONDUIT FOR SINGLE PHASE SERVICES. INCLUDING NON-NETWORK SMALL CELLS.



NOTES

1. Reference NES Standard Drawing (UG0051).

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

DITCH DETAIL STANDARDS

NES

SECONDARY COMMERCIAL RISER - METER CONDUIT DETAIL (> 200A - 800A)