



City of Mora
Kanabec County, Minnesota
Meeting Agenda
Public Utilities Commission

Mora City Hall
101 Lake St. S
Mora, MN 55051

Monday, October 19, 2020

3:00 PM

Mora City Hall

- 1. Call to Order**
- 2. Roll Call**
- 3. Adopt Agenda** *(No item of business shall be considered unless it appears on the agenda for the meeting. Council members may add items to the agenda prior to adoption of the agenda.)*
- 4. Consent Agenda** *(Those items listed under Consent Agenda are considered to be routine by the City Council and will be acted upon by one motion under this agenda item. There will be no separate discussion of these items, unless a Council Member so requests, in which event, the item will be removed from the consent agenda and considered immediately after the adoption of the consent agenda.)*
 - a. Regular Meeting Minutes – September 14, 2020
 - b. Special Meeting Minutes – October 2, 2020
 - c. September 2020 Claims
- 5. Open Forum** *(Individuals may address the council about any item not contained on the regular agenda. There is a maximum of fifteen (15) minutes set aside for open forum. A maximum of three (3) minutes is allotted per person. The City Council will take no official action on items discussed at the forum, with the exception of referral to staff for future report.)*
- 6. Special Business**

None
- 7. New Business**
 - a. Sanitary Sewer and Well Exemption Request – 1860 Snake River Trail
 - b. Sanitary Sewer and Well Exemption Request – 1870 Snake River Trail
 - c. Overhead and Underground Construction Specifications Policy
- 8. Old Business**

None
- 9. Communications**
 - a. Utility Billing Monthly Report – September 2020
 - b. Utility Billing Adjustments Report – September 2020
 - c. Quarterly Sanitary Sewer Response Report
- 10. Reports**
 - a. Public Utilities General Manager
 - b. Public Works Director
 - c. Commissioner Baldwin
 - d. Commissioner Christianson
 - e. Chair Ardner
- 11. Adjournment**

Pursuant to due call and notice thereof, Commissioner Ardner called to order the regular meeting of the Mora Public Utilities Commission at 3:00 PM on Monday, September 14, 2020 in the city hall council chambers.

2. **Roll Call:** Present: Commissioners Greg Ardner, Brett Baldwin, and Ryan Christianson
Absent: none
Staff Present: Utilities General Manager Crawford, Public Works Director Kohlgraf, Utility Billing Clerk Bliss, City Accountant King and Deputy City Clerk Yoder
3. **Adopt Agenda:** MOTION made by Christianson, seconded by Baldwin, and unanimously carried to approve the agenda as presented.
4. **Consent Agenda:** MOTION made by Baldwin, seconded by Christianson, and unanimously carried to approve the consent agenda as presented.
 - a. Regular Meeting Minutes – August 17, 2020
 - b. Special Meeting Minutes – August 26, 2020
 - c. August 2020 Claims
 - d. Approve Hire of Utility Billing Clerk II
5. **Open Forum:** No one spoke at open forum.
6. **Special Business:**
 - a. **2019 Comprehensive Annual Financial Report:** Nancy Schulzentenberg, of BerganKDV, virtually presented the financial report, with focus on the enterprise funds portion of the audit. Schulzentenberg explained the scope of the 2019 audit was only the balance sheet and the statement of net position, because BerganKDV could not rely on the work of the previous audit firm. Nonetheless, BerganKDV was able to issue an “unmodified opinion”, meaning the City's financial position was fairly stated in all material aspects. The PUC had no questions for Schulzentenberg.

Crawford explained the PUC was given a recap of the audit but was not required to accept or approve the audit; the consensus of the PUC was to continue receiving the reports and presentation for future audits.
7. **New Business:**
 - a. **Proposed 2021 Budget and utility Rates:** Crawford presented the proposed 2021 utility budgets and rate increases of 4.25% for electric, 0% for water, and 0% for sewer; it was explained the increase for electric was to cover the \$225,000 in expenses for overhead tree maintenance and pole replacement programs.

Crawford disclosed the 2021 budget included the hire of a non-union position of a plant/line manager who would fall under Kohlgraf and supervise the electric staff in addition to assisting Crawford in building a line crew. Crawford expounded the hire of another staff member would add additional tools, clothing expenses, benefits, workers' compensation insurance, and another truck to the 2021 budget.

Discussion ensued regarding the three existing electric plant staff being trained with the requirement of 800 working apprenticeship hours under a certified lineman to obtain certification, SMMPA's recommendation to have three linemen for a utility the size of Mora, and how having a lineman on staff would support and accelerate existing staff's training process. The consensus of the PUC was to move forward with the non-union position as proposed in the budget.

Crawford discussed significant revenue changes for 2021: interest, dividends and penalties continued to generate less revenue, and there was a slight increase in antenna lease revenue. Crawford also reviewed the Capital Improvement Plan (CIP) and recommended an electric rate study be completed in 2021.

Crawford suggested using reserve funds to keep the utility rate increases low in the amounts of \$263,700 from the electric fund, \$180,820 from the water fund, and \$330,075 from the sewer fund.

8. Old Business: There were no old business items to discuss.

9. Communications: The following communications were reviewed.

- a. Utility Billing Monthly Report – August 2020: Bliss explained four accounts were disconnected and all others either have made attempts or have payment plans in place.
- b. Utility Billing Adjustments Report – August 2020

10. Reports:

- a. Public Utilities General Manager: Crawford reported the consideration of joining a regional safety group (RSG) to save approximately \$10,000, rather than renew the safety training contract with Minnesota Municipal Utilities Association (MMUA). The League of Minnesota Cities organized the RSG and MMUA would still be the trainer/facilitator; Mora would join the participating cities of Milaca, Cambridge, and Isanti. Crawford explained travel time would increase for training because of the rotation of hosting cities however, including expenses this would still be a savings to the city and MMU.
- b. Public Works Director: Kohlgraf reported materials for the Mora Marine project were on order and the intent was to complete the project this week or next week; the RV Dump station was reopened, the electric vehicle chargers project had started and staff were waiting on electrical contractors with a projected completion time of the end of October beginning of November; the Highway 65 electrical project was moving forward and staff was working on the permitting process.
- c. Commissioner Baldwin: Nothing new to report.
- d. Commissioner Christianson: Nothing new to report.
- e. Chairperson Ardner: Nothing new to report.

11. Adjournment: MOTION made by Christianson, seconded by Baldwin, and unanimously carried to adjourn at 3:49 PM.

Chair

Secretary

Pursuant to due call and notice thereof, Commissioner Ardner called to order the special meeting of the Mora Public Utilities Commission at 3:00 PM on Friday, October 2, 2020 in the city hall council chambers.

2. **Roll Call:** Present: Commissioners Greg Ardner, Brett Baldwin, and Ryan Christianson
Absent: none
Staff Present: Utilities General Manager Crawford and Public Works Director Kohlgraf
3. **Adopt Agenda:** MOTION made by Christianson, seconded by Baldwin, and unanimously carried to approve the agenda as presented.
4. **Special Business:**
 - a. **Transmission & Distribution Pole Replacement Project – Hwy 65/ Mora Lake – Award Contract:** Kohlgraf shared that three bids were received for the distribution line replacement near Mora Lake. Due to COVID-19 related issues this summer the quotes came in above the engineer's estimate. Although the quotes were higher than expected, staff recommended awarding the contract, and by doing so, construction could begin in approximately 30-45 days. MOTION made by Christianson, seconded by Baldwin, and unanimously carried to accept the quote from Anderson Underground in the amount not to exceed \$170,486.95 and award the distribution underbuild project contract to them.
5. **Reports:**
 - a. Public Utilities General Manager: Nothing new to report
 - b. Public Works Director: Kohlgraf shared staff is currently working on hydrant projects; the Mora Marine lift station project will be completed soon alleviating current inflow and infiltration issues.
 - c. Commissioner Baldwin: Nothing new to report.
 - d. Commissioner Christianson: Nothing new to report.
 - e. Chairperson Ardner: Ardner inquired about the proposed third addition to Fox Run creating new single family homes and whether or not there were utilities currently in that area. Crawford and Kohlgraf stated streets and utilities will need to be extended and that could be done through a development agreement.
6. **Adjournment:** MOTION made by Baldwin, seconded by Christianson, and unanimously carried to adjourn at 3:04 PM.

Chair

Secretary

**CITY OF MORA
CHECK LIST-PUC**

CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 000495 ONLINE UTILITY EXCHANGE						
000495	ONLINE UTILITY EXCHA	ELECTRIC FUN	ELECTRIC ADMINIST	Cust UB/Collection	NEW UB CUSTOMER CREDIT C	\$97.50
CHECK # 000495 ONLINE UTILITY EXCHANGE						
\$97.50						
CHECK # 000497 NEIGHBORHOOD NATIONAL BANK						
000497	NEIGHBORHOOD NATIO	ELECTRIC FUN	ELECTRIC ADMINIST	Payment Processing E	MONTHLY UB ACH FILE FEE	\$30.00
000497	NEIGHBORHOOD NATIO	ELECTRIC FUN	ELECTRIC ADMINIST	Payment Processing E	MONTHLY BUSINESS ONLINE	\$10.00
000497	NEIGHBORHOOD NATIO	ELECTRIC FUN	ELECTRIC ADMINIST	Bad Debts/NSF Check	MONTHLY RETURNED CHECK	\$10.00
CHECK # 000497 NEIGHBORHOOD NATIONAL BANK						
\$50.00						
CHECK # 000499 MN DEPT OF REVENUE						
000499	MN DEPT OF REVENUE	ELECTRIC FUN		Sales Tax Payable	SALES & USE TAX PYMT - AUG	\$23,773.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN		Fixed Assets	SALES & USE TAX PYMT - AUG	\$7.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	GENERATION & PO	Miscellaneous	SALES & USE TAX PYMT - AUG	\$4.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	GENERATION & PO	Landfill Gen Exp	SALES & USE TAX PYMT - AUG	\$1.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	GENERATION & PO	Garbage Removal	SALES & USE TAX PYMT - AUG	\$6.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	GENERATION & PO	Repair/Maint - Bldg &	SALES & USE TAX PYMT - AUG	\$2.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	GENERATION & PO	Other Operating Suppl	SALES & USE TAX PYMT - AUG	\$1.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Substation E	SALES & USE TAX PYMT - AUG	\$3.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	ELECTRIC DISTRIBU	Line Transformer Exp	SALES & USE TAX PYMT - AUG	\$18.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	SALES & USE TAX PYMT - AUG	\$5.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	ELECTRIC ADMINIST	Other Operating Suppl	SALES & USE TAX PYMT - AUG	\$4.00
000499	MN DEPT OF REVENUE	ELECTRIC FUN	ELECTRIC ADMINIST	Office Supplies	SALES & USE TAX PYMT - AUG	\$19.00
000499	MN DEPT OF REVENUE	WATER FUND		Sales Tax Payable	SALES & USE TAX PYMT - AUG	\$1,075.00
CHECK # 000499 MN DEPT OF REVENUE						
\$24,918.00						
CHECK # 000501 PAYLIANCE						
000501	PAYLIANCE	ELECTRIC FUN	ELECTRIC ADMINIST	Payment Processing E	E-CHECK PYMT PROCESSING F	\$32.64
000501	PAYLIANCE	WATER FUND	WATER ADMINISTR	Payment Processing E	E-CHECK PYMT PROCESSING F	\$16.33
000501	PAYLIANCE	SEWER FUND	SEWER ADMINISTR	Payment Processing E	E-CHECK PYMT PROCESSING F	\$16.33
CHECK # 000501 PAYLIANCE						
\$65.30						
CHECK # 000502 COMPLETE MERCHANT SOLUTIONS						
000502	COMPLETE MERCHANT	ELECTRIC FUN	ELECTRIC ADMINIST	Payment Processing E	CREDIT CARD PYMT PROCESSI	\$318.00
000502	COMPLETE MERCHANT	WATER FUND	WATER ADMINISTR	Payment Processing E	CREDIT CARD PYMT PROCESSI	\$159.00
000502	COMPLETE MERCHANT	SEWER FUND	SEWER ADMINISTR	Payment Processing E	CREDIT CARD PYMT PROCESSI	\$159.00
CHECK # 000502 COMPLETE MERCHANT SOLUTIONS						
\$636.00						
CHECK # 000503 SMMPA						
000503	SMMPA	ELECTRIC FUN		Accounts Payable	POWER PURCHASED	\$353,893.56
CHECK # 000503 SMMPA						
\$353,893.56						
CHECK # 055129 BLACKS EXCAVATING						
055129	BLACKS EXCAVATING	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	BLACK DIRT FOR STORM DAM	\$720.00
CHECK # 055129 BLACKS EXCAVATING						
\$720.00						
CHECK # 055130 CARDMEMBER SERVICE						
055130	CARDMEMBER SERVICE	ELECTRIC FUN	ELECTRIC ADMINIST	Meetings, Training, &	AUG-MMUA CONF REFUND-CR	-\$934.36
CHECK # 055130 CARDMEMBER SERVICE						
-\$934.36						
CHECK # 055140 MN DEPT OF COMMERCE-IND ASSMTS						
055140	MN DEPT OF COMMERC	ELECTRIC FUN	GENERATION & PO	Miscellaneous	2ND QTR FY 2021 IND ASSMT-	\$361.37
055140	MN DEPT OF COMMERC	ELECTRIC FUN	ELECTRIC ADMINIST	Energy Conservation	2ND QTR FY 2021 IND ASSMT-	\$621.30
CHECK # 055140 MN DEPT OF COMMERCE-IND ASSMTS						
\$982.67						

**CITY OF MORA
CHECK LIST-PUC**

CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 055143 NEONLINK LLC						
055143	NEONLINK LLC	ELECTRIC FUN	ELECTRIC ADMINIST	Payment Processing E	SEPT PAYMENT PROCESSING	\$110.80
055143	NEONLINK LLC	WATER FUND	WATER ADMINISTR	Payment Processing E	SEPT PAYMENT PROCESSING	\$55.40
055143	NEONLINK LLC	SEWER FUND	SEWER ADMINISTR	Payment Processing E	SEPT PAYMENT PROCESSING	\$55.40
CHECK # 055143 NEONLINK LLC						\$221.60
CHECK # 055145 STULC, JEREMY						
055145	STULC, JEREMY	ELECTRIC FUN	GENERATION & PO	Uniforms	BOOTS, INSOLES	\$344.01
CHECK # 055145 STULC, JEREMY						\$344.01
CHECK # 055148 VERIZON WIRELESS						
055148	VERIZON WIRELESS	ELECTRIC FUN	ELECTRIC ADMINIST	Telephone	CELL PHONES	\$200.50
055148	VERIZON WIRELESS	WATER FUND	WATER ADMINISTR	Telephone	CELL PHONES	\$79.78
055148	VERIZON WIRELESS	SEWER FUND	SEWER ADMINISTR	Telephone	CELL PHONES	\$117.71
CHECK # 055148 VERIZON WIRELESS						\$397.99
CHECK # 055149 WINDSTREAM						
055149	WINDSTREAM	SEWER FUND	SEWER ADMINISTR	Telephone	JULY & AUG PHONE	\$218.64
CHECK # 055149 WINDSTREAM						\$218.64
CHECK # 055152 BERGANKDV						
055152	BERGANKDV	ELECTRIC FUN	ELECTRIC ADMINIST	Auditing	2019 AUDIT - FINAL PYMT	\$819.00
055152	BERGANKDV	WATER FUND	WATER ADMINISTR	Auditing	2019 AUDIT - FINAL PYMT	\$409.00
055152	BERGANKDV	SEWER FUND	SEWER ADMINISTR	Auditing	2019 AUDIT - FINAL PYMT	\$410.00
CHECK # 055152 BERGANKDV						\$1,638.00
CHECK # 055153 BERGSTADT, GARY						
055153	BERGSTADT, GARY	ELECTRIC FUN	GENERATION & PO	Uniforms	UNIFORM	\$153.96
CHECK # 055153 BERGSTADT, GARY						\$153.96
CHECK # 055158 CITY OF MORA						
055158	CITY OF MORA	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	FIRE CALL-SPARKING XFRM BE	\$500.00
CHECK # 055158 CITY OF MORA						\$500.00
CHECK # 055161 EAST CENTRAL ENERGY						
055161	EAST CENTRAL ENERGY	SEWER FUND	SEWER LIFT STATIO	Electricity	ELECT	\$109.90
CHECK # 055161 EAST CENTRAL ENERGY						\$109.90
CHECK # 055162 EAST CENTRAL ENERGY						
055162	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH POLE CHANGE OUT - OSLI	\$668.25
055162	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH STORM DAMAGE RPRS BY I	\$11,806.53
055162	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	ECE Services	AUG LABOR & EQ	\$7,065.07
055162	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	ECE Services	AUG DISPATCH SERVICES	\$425.45
055162	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH STORM DAMAGE RPRS	\$2,241.68
CHECK # 055162 EAST CENTRAL ENERGY						\$22,206.98
CHECK # 055168 KOHLGRAF, JOE						
055168	KOHLGRAF, JOE	ELECTRIC FUN	ELECTRIC ADMINIST	Uniforms	CLOTHING	\$22.01
055168	KOHLGRAF, JOE	WATER FUND	WATER ADMINISTR	Uniforms	CLOTHING	\$11.00
055168	KOHLGRAF, JOE	SEWER FUND	SEWER ADMINISTR	Uniforms	CLOTHING	\$11.01
CHECK # 055168 KOHLGRAF, JOE						\$44.02
CHECK # 055171 MIDCO						
055171	MIDCO	ELECTRIC FUN	ELECTRIC ADMINIST	Telephone	PHONE & INTERNET	\$127.25
055171	MIDCO	WATER FUND	WATER ADMINISTR	Telephone	PHONE & INTERNET	\$181.44

**CITY OF MORA
CHECK LIST-PUC**

CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 055171 MIDCO						\$308.69
CHECK # 055187 AMAZON CAPITAL SERVICES						
055187	AMAZON CAPITAL SERV	ELECTRIC FUN		Fixed Assets	PAVEMENT STENCILS-ELECTRI	\$97.51
CHECK # 055187 AMAZON CAPITAL SERVICES						\$97.51
CHECK # 055189 BERGSTADT, GARY						
055189	BERGSTADT, GARY	ELECTRIC FUN	GENERATION & PO	Other Operating Suppl	WORK GLOVES	\$35.76
055189	BERGSTADT, GARY	ELECTRIC FUN	ELECTRIC DISTRIBU	Meetings, Training, &	OH SCHOOLING MEALS	\$88.28
CHECK # 055189 BERGSTADT, GARY						\$124.04
CHECK # 055193 HOLMES, JACOB						
055193	HOLMES, JACOB	WATER FUND	WATER ADMINISTR	Miscellaneous	WATER LICENSE RENEWAL	\$23.00
055193	HOLMES, JACOB	SEWER FUND	SEWER ADMINISTR	Miscellaneous	WASTEWATER LICENSE RENE	\$23.00
CHECK # 055193 HOLMES, JACOB						\$46.00
CHECK # 055196 AMMANN, TIFFANY						
055196	AMMANN, TIFFANY	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-306	\$181.24
CHECK # 055196 AMMANN, TIFFANY						\$181.24
CHECK # 055201 DARWIN, MELISSA						
055201	DARWIN, MELISSA	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-107	\$189.42
CHECK # 055201 DARWIN, MELISSA						\$189.42
CHECK # 055204 HINKS, ERICA						
055204	HINKS, ERICA	ELECTRIC FUN		Undistributed Receipts	METER DEPOSIT REFUND-620	\$90.71
CHECK # 055204 HINKS, ERICA						\$90.71
CHECK # 055206 JOHNSON, DIANE						
055206	JOHNSON, DIANE	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-200	\$189.29
CHECK # 055206 JOHNSON, DIANE						\$189.29
CHECK # 055207 MANUEL, SHELBY						
055207	MANUEL, SHELBY	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-431	\$174.63
CHECK # 055207 MANUEL, SHELBY						\$174.63
CHECK # 055209 MN DEPT OF HEALTH						
055209	MN DEPT OF HEALTH	WATER FUND		State Water Fee	3RD QTR WATER CONNECTIO	\$2,904.00
CHECK # 055209 MN DEPT OF HEALTH						\$2,904.00
CHECK # 055210 MN DEPT OF TRANS - MS 678						
055210	MN DEPT OF TRANS - M	ELECTRIC FUN	ELECTRIC DISTRIBU	Miscellaneous	DEPOSIT FOR INSTALLATION	\$5,000.00
CHECK # 055210 MN DEPT OF TRANS - MS 678						\$5,000.00
CHECK # 055211 MORA MUNICIPAL UTILITIES						
055211	MORA MUNICIPAL UTILI	ELECTRIC FUN	GENERATION & PO	Water	UTILITIES	\$75.55
055211	MORA MUNICIPAL UTILI	ELECTRIC FUN	GENERATION & PO	Sewer	UTILITIES	\$28.77
055211	MORA MUNICIPAL UTILI	ELECTRIC FUN	GENERATION & PO	Storm Water	UTILITIES	\$15.96
055211	MORA MUNICIPAL UTILI	WATER FUND	WATER SUPPLY	Electricity	UTILITIES	\$701.72
055211	MORA MUNICIPAL UTILI	WATER FUND	WATER SUPPLY	Storm Water	UTILITIES	\$20.10
055211	MORA MUNICIPAL UTILI	WATER FUND	WATER TREATMENT	Storm Water	UTILITIES	\$10.05
055211	MORA MUNICIPAL UTILI	WATER FUND	WATER TREATMENT	Electricity	UTILITIES	\$720.25
055211	MORA MUNICIPAL UTILI	WATER FUND	WATER DISTRIBUTI	Electricity	UTILITIES	\$39.46
055211	MORA MUNICIPAL UTILI	WATER FUND	WATER DISTRIBUTI	Storm Water	UTILITIES	\$11.23
055211	MORA MUNICIPAL UTILI	SEWER FUND	SEWER LIFT STATIO	Electricity	UTILITIES	\$729.19
055211	MORA MUNICIPAL UTILI	SEWER FUND	SEWER LIFT STATIO	Storm Water	UTILITIES	\$10.05

**CITY OF MORA
CHECK LIST-PUC**

10/16/20 11:27 AM

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CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
055211	MORA MUNICIPAL UTILI	SEWER FUND	WASTEWATER TREA	Storm Water	UTILITIES	\$20.69
055211	MORA MUNICIPAL UTILI	SEWER FUND	WASTEWATER TREA	Electricity	UTILITIES	\$3,045.10
055211	MORA MUNICIPAL UTILI	SEWER FUND	WASTEWATER TREA	Water	UTILITIES	\$75.43
CHECK # 055211 MORA MUNICIPAL UTILITIES						\$5,503.55
CHECK # 055212 MORGENWECK, DENNIS						
055212	MORGENWECK, DENNIS	ELECTRIC FUN		Undistributed Receipts	REFUND OVERPYMT-231 STEW	\$115.10
CHECK # 055212 MORGENWECK, DENNIS						\$115.10
CHECK # 055213 OLSON, CHUCK						
055213	OLSON, CHUCK	ELECTRIC FUN		Undistributed Receipts	REFUND OVERPYMT-664 SUM	\$81.43
CHECK # 055213 OLSON, CHUCK						\$81.43
CHECK # 055214 OLSON, LORI & LARRY						
055214	OLSON, LORI & LARRY	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-307	\$10.90
CHECK # 055214 OLSON, LORI & LARRY						\$10.90
CHECK # 055217 PRICE, HALEY & GAEBRIEL BARTLE						
055217	PRICE, HALEY & GAEBRI	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-504	\$262.04
CHECK # 055217 PRICE, HALEY & GAEBRIEL BARTLE						\$262.04
CHECK # 055220 SIMS, TINA FLEMING						
055220	SIMS, TINA FLEMING	ELECTRIC FUN		Undistributed Receipts	REFUND OVERPYMT - 615 BEA	\$64.83
CHECK # 055220 SIMS, TINA FLEMING						\$64.83
CHECK # 055222 THORKELSON, ALICIA						
055222	THORKELSON, ALICIA	ELECTRIC FUN		Undistributed Receipts	REFUND METER DEPOSIT-107	\$185.83
CHECK # 055222 THORKELSON, ALICIA						\$185.83
CHECK # 055236 MIDCO						
055236	MIDCO	SEWER FUND	SEWER ADMINISTR	Telephone	WWTP, GARAGE, TELEWORK C	\$270.00
CHECK # 055236 MIDCO						\$270.00
CHECK # 055251 ACE HARDWARE						
055251	ACE HARDWARE	ELECTRIC FUN		Fixed Assets	EV CHARGER COUPLINGS	\$7.96
055251	ACE HARDWARE	ELECTRIC FUN	GENERATION & PO	Landfill Gen Exp	PAINT	\$35.99
055251	ACE HARDWARE	ELECTRIC FUN	GENERATION & PO	Maint of Gen Equip	PLANT BATTERY WATER	\$4.78
055251	ACE HARDWARE	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	LOCATOR BATTERIES & GRASS	\$36.94
055251	ACE HARDWARE	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Substation E	SUBST LIGHT BULBS	\$19.99
055251	ACE HARDWARE	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	CONDUIT GLUE	\$6.58
055251	ACE HARDWARE	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	HAMMER, GARY PHONE CASE	\$49.98
055251	ACE HARDWARE	ELECTRIC FUN	ELECTRIC ADMINIST	Energy Conservation	PPW PRIZE BASKET SUPPLIES	\$24.48
055251	ACE HARDWARE	WATER FUND	WATER SUPPLY	Repair/Maint - Bldg &	SIDING RPR & ELECT SUPPLIE	\$46.64
055251	ACE HARDWARE	WATER FUND	WATER TREATMENT	Repair/Maint - Bldg &	CHLORINE ROOM HEATER	\$64.99
055251	ACE HARDWARE	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	DRILL & BATTERY ADAPTER	\$224.98
055251	ACE HARDWARE	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	MISC BATTERIES & SHOVEL	\$105.53
055251	ACE HARDWARE	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	TEMP WATER RPR PARTS & D	\$19.42
055251	ACE HARDWARE	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	WATER SERVICE RISER SUPPL	\$39.96
055251	ACE HARDWARE	SEWER FUND	WASTEWATER TREA	Repair/Maint - Bldg &	BAGS, TAPE FOR PACKAGING	\$21.35
CHECK # 055251 ACE HARDWARE						\$709.57
CHECK # 055255 AMERIPRIDE LINEN						
055255	AMERIPRIDE LINEN	SEWER FUND	WASTEWATER TREA	Other Operating Suppl	RUGS	\$86.22
CHECK # 055255 AMERIPRIDE LINEN						\$86.22
CHECK # 055257 AUTO VALUE MORA						

CITY OF MORA
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CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
055257	AUTO VALUE MORA	ELECTRIC FUN	ELECTRIC DISTRIBU	Truck Expense	BUCKET TRUCK LIGHT RPR	\$4.99
055257	AUTO VALUE MORA	ELECTRIC FUN	ELECTRIC DISTRIBU	Truck Expense	WIPER RPR PARTS	\$64.95
055257	AUTO VALUE MORA	ELECTRIC FUN	ELECTRIC DISTRIBU	Truck Expense	FILTERS	\$125.62
055257	AUTO VALUE MORA	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	WIPER RPR PARTS	\$64.95
055257	AUTO VALUE MORA	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	FILTERS	\$86.79
055257	AUTO VALUE MORA	SEWER FUND	WASTEWATER TREA	Repair/Maint - Bldg &	FILTERS	\$86.79
055257	AUTO VALUE MORA	SEWER FUND	WASTEWATER TREA	Repair/Maint - Bldg &	WIPER RPR PARTS	\$64.95
055257	AUTO VALUE MORA	SEWER FUND	WASTEWATER TREA	Repair/Maint - Bldg &	PORTABLE GENERATOR PARTS	\$58.98
CHECK # 055257 AUTO VALUE MORA						\$558.02
CHECK # 055258 BERGSTADT, GARY						
055258	BERGSTADT, GARY	ELECTRIC FUN	GENERATION & PO	Uniforms	JEANS	\$89.97
CHECK # 055258 BERGSTADT, GARY						\$89.97
CHECK # 055262 BORDER STATES ELECTRIC						
055262	BORDER STATES ELECT	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH FUSE LINKS	\$232.72
CHECK # 055262 BORDER STATES ELECTRIC						\$232.72
CHECK # 055266 CAMPBELL KNUTSON, P.A.						
055266	CAMPBELL KNUTSON, P.	ELECTRIC FUN	ELECTRIC ADMINIST	Legal Services	LEGAL SERVICES-CUST BANKR	\$347.00
CHECK # 055266 CAMPBELL KNUTSON, P.A.						\$347.00
CHECK # 055268 CINTAS						
055268	CINTAS	ELECTRIC FUN	GENERATION & PO	Other Operating Suppl	MATS, MOPS	\$105.64
CHECK # 055268 CINTAS						\$105.64
CHECK # 055270 DGR ENGINEERING						
055270	DGR ENGINEERING	ELECTRIC FUN	ELECTRIC DISTRIBU	Engineering	ELECT DISTR UNDERBUILD RE	\$4,434.00
CHECK # 055270 DGR ENGINEERING						\$4,434.00
CHECK # 055271 DM STAMP & SPECIALTIES						
055271	DM STAMP & SPECIALTI	ELECTRIC FUN	ELECTRIC ADMINIST	Office Supplies	CHECK BANK STAMP	\$29.85
055271	DM STAMP & SPECIALTI	WATER FUND	WATER ADMINISTR	Office Supplies	CHECK BANK STAMP	\$14.94
055271	DM STAMP & SPECIALTI	SEWER FUND	SEWER ADMINISTR	Office Supplies	CHECK BANK STAMP	\$14.94
CHECK # 055271 DM STAMP & SPECIALTIES						\$59.73
CHECK # 055272 EAST CENTRAL ENERGY						
055272	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH POLE CHANGE OUT- W FO	\$656.23
055272	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	ECE Services	SEPT DISPATCH SERVICES	\$250.64
055272	EAST CENTRAL ENERGY	ELECTRIC FUN	ELECTRIC DISTRIBU	ECE Services	SEPT LABOR & EQ	\$2,908.51
CHECK # 055272 EAST CENTRAL ENERGY						\$3,815.38
CHECK # 055274 FLOW MEASUREMENT AND CONTROL						
055274	FLOW MEASUREMENT A	SEWER FUND	WASTEWATER TREA	Professional Services -	WWTP METER CALIBRATION	\$510.00
CHECK # 055274 FLOW MEASUREMENT AND CONTROL						\$510.00
CHECK # 055275 FREEDOM MAILING SERVICES INC						
055275	FREEDOM MAILING SER	ELECTRIC FUN	ELECTRIC ADMINIST	Professional Services -	NEWSLETTER	\$6.64
055275	FREEDOM MAILING SER	ELECTRIC FUN	ELECTRIC ADMINIST	Energy Conservation	BE BRIGHT INSERTS	\$23.65
055275	FREEDOM MAILING SER	ELECTRIC FUN	ELECTRIC ADMINIST	Cust UB/Collection	BILL PROCESSING	\$458.88
055275	FREEDOM MAILING SER	WATER FUND	WATER ADMINISTR	Professional Services -	NEWSLETTER	\$3.33
055275	FREEDOM MAILING SER	WATER FUND	WATER ADMINISTR	Cust UB/Collection	BILL PROCESSING	\$229.45
055275	FREEDOM MAILING SER	SEWER FUND	SEWER ADMINISTR	Cust UB/Collection	BILL PROCESSING	\$229.45
055275	FREEDOM MAILING SER	SEWER FUND	SEWER ADMINISTR	Professional Services -	NEWSLETTE	\$3.33
CHECK # 055275 FREEDOM MAILING SERVICES INC						\$954.73

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CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 055276 GLENS TIRE OPERATIONS INC						
055276	GLENS TIRE OPERATIO	SEWER FUND	SEWER COLLECTION	Tires	1 TON TIRE	\$30.00
CHECK # 055276 GLENS TIRE OPERATIONS INC						
						\$30.00
CHECK # 055277 GOPHER STATE ONE-CALL INC						
055277	GOPHER STATE ONE-CA	ELECTRIC FUN	ELECTRIC DISTRIBU	Professional Services -	SEPT LOCATES	\$45.90
055277	GOPHER STATE ONE-CA	WATER FUND	WATER DISTRIBUTI	Professional Services -	SEPT LOCATES	\$45.90
055277	GOPHER STATE ONE-CA	SEWER FUND	SEWER COLLECTION	Professional Services -	SEPT LOCATES	\$45.90
CHECK # 055277 GOPHER STATE ONE-CALL INC						
						\$137.70
CHECK # 055278 GRAINGER, INC						
055278	GRAINGER, INC	ELECTRIC FUN	GENERATION & PO	Small Tools & Equipm	FLASHLIGHT	\$96.47
055278	GRAINGER, INC	ELECTRIC FUN	GENERATION & PO	Other Operating Suppl	BULBS	\$107.58
055278	GRAINGER, INC	ELECTRIC FUN	GENERATION & PO	Office Supplies	LABEL CARTRIDGE	\$33.47
055278	GRAINGER, INC	WATER FUND	WATER DISTRIBUTI	Small Tools & Equipm	FLASHLIGHT	\$96.47
CHECK # 055278 GRAINGER, INC						
						\$333.99
CHECK # 055280 GRANITE WATER WORKS INC						
055280	GRANITE WATER WORK	WATER FUND	WATER SUPPLY	Repair/Maint - Bldg &	DRIVEWAY RPR	\$253.00
055280	GRANITE WATER WORK	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	HYDRANT RPR PARTS	\$11,762.64
055280	GRANITE WATER WORK	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	WATER SHUT OFF RPRS	\$135.48
055280	GRANITE WATER WORK	SEWER FUND	SEWER COLLECTION	Repair/Maint - Bldg &	MORA MARINE SEWER RPR	\$6,066.59
CHECK # 055280 GRANITE WATER WORKS INC						
						\$18,217.71
CHECK # 055281 GREAT NORTHERN ENVIRONMENTAL						
055281	GREAT NORTHERN ENV	SEWER FUND	WASTEWATER TREA	Repair/Maint - Bldg &	BLOWER MAINT	\$743.60
CHECK # 055281 GREAT NORTHERN ENVIRONMENTAL						
						\$743.60
CHECK # 055282 HAWKINS, INC						
055282	HAWKINS, INC	WATER FUND	WATER TREATMENT	Chemicals	CHEMICALS	\$3,545.59
055282	HAWKINS, INC	WATER FUND	WATER TREATMENT	Chemicals	CHEMICALS	\$288.21
055282	HAWKINS, INC	SEWER FUND	WASTEWATER TREA	Chemicals	CHEMICALS	\$944.74
CHECK # 055282 HAWKINS, INC						
						\$4,778.54
CHECK # 055284 IRBY TOOL & SAFETY						
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Small Tools & Equipm	OVER/UNDER GROUNDING EQ	\$149.00
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH DIST PARTS	\$618.20
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	ELECT SHIELD	\$373.69
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH MATERIALS	\$1,230.71
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	LINEMAN KNIVES	\$106.49
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Line Transformer Exp	XFRMR/J BOX MARKERS	\$29.00
055284	IRBY TOOL & SAFETY	ELECTRIC FUN	ELECTRIC DISTRIBU	Small Tools & Equipm	TRUCK GROUNDING EQ	\$1,570.00
CHECK # 055284 IRBY TOOL & SAFETY						
						\$4,077.09
CHECK # 055285 JOHNSONS HARDWARE & RENTAL						
055285	JOHNSONS HARDWARE	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	CURB STOP RPRS	\$74.89
CHECK # 055285 JOHNSONS HARDWARE & RENTAL						
						\$74.89
CHECK # 055286 KANABEC CO AUDITOR/TREASURER						
055286	KANABEC CO AUDITOR/	ELECTRIC FUN		Accounts Payable	JAIL ENERGY MGMT PROGRAM	\$545.00
CHECK # 055286 KANABEC CO AUDITOR/TREASURER						
						\$545.00
CHECK # 055288 KNUDSEN, RODNEY						
055288	KNUDSEN, RODNEY	WATER FUND	WATER ADMINISTR	Uniforms	BOOTS, CLOTHING	\$269.37
055288	KNUDSEN, RODNEY	SEWER FUND	SEWER ADMINISTR	Uniforms	BOOTS, CLOTHING	\$439.50

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CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 055288 KNUDSEN, RODNEY						\$708.87
CHECK # 055289 KWIK TRIP - GAS PURCHASES						
055289	KWIK TRIP - GAS PURC	ELECTRIC FUN	ELECTRIC DISTRIBU	Truck Expense	GAS	\$474.02
055289	KWIK TRIP - GAS PURC	WATER FUND	WATER DISTRIBUTI	Motor Fuels	GAS	\$174.72
055289	KWIK TRIP - GAS PURC	SEWER FUND	SEWER COLLECTION	Motor Fuels	GAS	\$250.10
CHECK # 055289 KWIK TRIP - GAS PURCHASES						\$898.84
CHECK # 055290 MACQUEEN EMERGENCY						
055290	MACQUEEN EMERGENC	ELECTRIC FUN	ELECTRIC DISTRIBU	Small Tools & Equipm	HYDRO EXCAVATOR ATTACHM	\$614.12
055290	MACQUEEN EMERGENC	WATER FUND	WATER DISTRIBUTI	Small Tools & Equipm	HYDRO EXCAVATOR ATTACHM	\$614.12
055290	MACQUEEN EMERGENC	SEWER FUND	SEWER COLLECTION	Repair/Maint - Bldg &	VACTOR RPR PARTS	\$726.24
055290	MACQUEEN EMERGENC	SEWER FUND	SEWER COLLECTION	Small Tools & Equipm	HYDRO EXCAVATOR ATTACHM	\$614.12
CHECK # 055290 MACQUEEN EMERGENCY						\$2,568.60
CHECK # 055292 MATTSON, KEN						
055292	MATTSON, KEN	WATER FUND	WATER ADMINISTR	Uniforms	WORK SHIRTS	\$56.98
055292	MATTSON, KEN	SEWER FUND	SEWER ADMINISTR	Uniforms	WORK SHIRTS	\$92.97
CHECK # 055292 MATTSON, KEN						\$149.95
CHECK # 055296 MN ENERGY RESOURCES CORP						
055296	MN ENERGY RESOURCE	ELECTRIC FUN	GENERATION & PO	Natural Gas - Heat	NATURAL GAS	\$406.09
055296	MN ENERGY RESOURCE	ELECTRIC FUN	GENERATION & PO	Generation Exp	NATURAL GAS	\$1,010.21
055296	MN ENERGY RESOURCE	WATER FUND	WATER SUPPLY	Natural Gas - Heat	NATURAL GAS	\$25.67
055296	MN ENERGY RESOURCE	WATER FUND	WATER TREATMENT	Natural Gas - Heat	NATURAL GAS	\$52.75
055296	MN ENERGY RESOURCE	SEWER FUND	WASTEWATER TREA	Natural Gas - Heat	NATURAL GAS	\$56.90
CHECK # 055296 MN ENERGY RESOURCES CORP						\$1,551.62
CHECK # 055298 MORA PUBLIC SCHOOLS						
055298	MORA PUBLIC SCHOOLS	ELECTRIC FUN	ELECTRIC ADMINIST	Office Supplies	COPY PAPER	\$256.00
CHECK # 055298 MORA PUBLIC SCHOOLS						\$256.00
CHECK # 055300 NORTHERN SAFETY & INDUSTRIAL						
055300	NORTHERN SAFETY & I	ELECTRIC FUN	GENERATION & PO	Other Operating Suppl	EAR PLUGS	\$52.20
CHECK # 055300 NORTHERN SAFETY & INDUSTRIAL						\$52.20
CHECK # 055302 NORTHERN STATES SUPPLY						
055302	NORTHERN STATES SUP	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Substation E	MARKING PAINT	\$127.13
CHECK # 055302 NORTHERN STATES SUPPLY						\$127.13
CHECK # 055304 OWENS AUTO PARTS						
055304	OWENS AUTO PARTS	SEWER FUND	SEWER COLLECTION	Repair/Maint - Bldg &	TRUCK RPR PARTS	\$17.98
CHECK # 055304 OWENS AUTO PARTS						\$17.98
CHECK # 055305 OXYGEN SERVICE CO, INC						
055305	OXYGEN SERVICE CO, I	ELECTRIC FUN	GENERATION & PO	Landfill Gen Exp	CYLINDER RENTAL	\$10.80
055305	OXYGEN SERVICE CO, I	ELECTRIC FUN	GENERATION & PO	Repair/Maint - Bldg &	CYLINDER RENTAL	\$25.20
055305	OXYGEN SERVICE CO, I	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Substation E	CYLINDER RENTAL	\$43.80
055305	OXYGEN SERVICE CO, I	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	CYLINDER RENTAL	\$9.90
CHECK # 055305 OXYGEN SERVICE CO, INC						\$89.70
CHECK # 055307 QUALITY DISPOSAL						
055307	QUALITY DISPOSAL	ELECTRIC FUN	GENERATION & PO	Garbage Removal	GARBAGE	\$75.00
055307	QUALITY DISPOSAL	SEWER FUND	WASTEWATER TREA	Garbage Removal	GARBAGE	\$163.80
CHECK # 055307 QUALITY DISPOSAL						\$238.80

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CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 055308 R & G WALDHALM CONTRACTORS INC						
055308	R & G WALDHALM CONT	ELECTRIC FUN		Fixed Assets	DIG POWER TO ELECT VEHICL	\$3,711.00
CHECK # 055308 R & G WALDHALM CONTRACTORS INC						\$3,711.00
CHECK # 055310 RESCO						
055310	RESCO	ELECTRIC FUN		Distribution Inventory	POWER POLES	\$9,813.48
055310	RESCO	ELECTRIC FUN	ELECTRIC DISTRIBU	Line Transformer Exp	XFRMR PADS	\$5,560.70
055310	RESCO	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	RISER PROTECTORS	\$353.76
055310	RESCO	ELECTRIC FUN	ELECTRIC DISTRIBU	Misc Distribution Exp	HOT STICKS	\$330.06
055310	RESCO	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH DISTR PARTS	\$841.75
055310	RESCO	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of Overhead Lin	OH DISTR PARTS	\$1,972.49
CHECK # 055310 RESCO						\$18,872.24
CHECK # 055311 RITEWAY BUSINESS FORMS						
055311	RITEWAY BUSINESS FO	ELECTRIC FUN	ELECTRIC ADMINIST	Office Supplies	CHECKS	\$117.47
CHECK # 055311 RITEWAY BUSINESS FORMS						\$117.47
CHECK # 055313 RMB ENVIRONMENTAL LABS INC						
055313	RMB ENVIRONMENTAL	SEWER FUND	SEWER COLLECTION	Professional Services -	LAB TESTING	\$247.98
055313	RMB ENVIRONMENTAL	SEWER FUND	WASTEWATER TREA	Professional Services -	LAB TESTING	\$127.00
CHECK # 055313 RMB ENVIRONMENTAL LABS INC						\$374.98
CHECK # 055314 ROCON PAVING						
055314	ROCON PAVING	WATER FUND	WATER DISTRIBUTI	Repair/Maint - Bldg &	WATER RPR PATCHING	\$3,300.00
CHECK # 055314 ROCON PAVING						\$3,300.00
CHECK # 055316 SEH						
055316	SEH	SEWER FUND	WASTEWATER TREA	Professional Services -	JERRYS BAIT WELL ISSUE	\$103.76
055316	SEH	SEWER FUND	WASTEWATER TREA	Professional Services -	REED BED VISIT MEMO	\$401.23
CHECK # 055316 SEH						\$504.99
CHECK # 055320 THUL SPECIALTY CONTRACTING INC						
055320	THUL SPECIALTY CONT	SEWER FUND	SEWER COLLECTION	Repair/Maint - Bldg &	MANHOLE REHAB - S UNION	\$21,150.00
CHECK # 055320 THUL SPECIALTY CONTRACTING INC						\$21,150.00
CHECK # 055321 TOTAL CONTROL SYSTEMS, INC.						
055321	TOTAL CONTROL SYSTE	SEWER FUND	WASTEWATER TREA	Professional Services -	COMMUNICATION REPAIR	\$704.40
CHECK # 055321 TOTAL CONTROL SYSTEMS, INC.						\$704.40
CHECK # 055324 TRUEMAN WELTERS INC						
055324	TRUEMAN WELTERS IN	SEWER FUND	WASTEWATER TREA	Repair/Maint - Bldg &	TRACTOR RPR PARTS	\$469.50
CHECK # 055324 TRUEMAN WELTERS INC						\$469.50
CHECK # 055325 UPPER CASE PRINTING INK						
055325	UPPER CASE PRINTING	ELECTRIC FUN	ELECTRIC ADMINIST	Energy Conservation	BE BRIGHT FLYERS	\$117.86
055325	UPPER CASE PRINTING	ELECTRIC FUN	ELECTRIC ADMINIST	Professional Services -	NEWSLETTER	\$93.79
055325	UPPER CASE PRINTING	WATER FUND	WATER ADMINISTR	Professional Services -	NEWSLETTER	\$46.90
055325	UPPER CASE PRINTING	SEWER FUND	SEWER ADMINISTR	Professional Services -	NEWSLETTER	\$46.90
CHECK # 055325 UPPER CASE PRINTING INK						\$305.45
CHECK # 055327 VIKING ELECTRIC SUPPLY						
055327	VIKING ELECTRIC SUPP	ELECTRIC FUN	ELECTRIC DISTRIBU	Maint of St. Lights & S	STREET LIGHT BULBS	\$435.00
CHECK # 055327 VIKING ELECTRIC SUPPLY						\$435.00
CHECK # 055328 WATER CONSERVATION SERVICE INC						
055328	WATER CONSERVATION	WATER FUND	WATER DISTRIBUTI	Professional Services -	AUG 2020 ANNL WATER LEAK	\$2,300.00

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CHECK #	Search Name	Fund Descr	Dept Descr	Last Dim Descr	Comments	Amount
CHECK # 055328 WATER CONSERVATION SERVICE INC						\$2,300.00
CHECK # 055330 WINDSTREAM						
055330	WINDSTREAM	SEWER FUND	SEWER ADMINISTR	Telephone	SEPT PHONE	\$127.60
CHECK # 055330 WINDSTREAM						\$127.60
						\$521,936.80



MORA MUNICIPAL UTILITIES
PUBLIC UTILITIES COMMISSION CHECK LIST

THE SEPTEMBER 2020 CLAIMS HAVE BEEN APPROVED FOR PAYMENT BY:

CHAIRMAN

COMMISSION MEMBER

COMMISSION MEMBER

SECRETARY



MEMORANDUM

Date: October 19, 2020
 To: Public Utilities Commission
 From: Joseph Kohlgraf, Public Works Director
 Lindy Crawford, Public Utilities General Manager
 RE: Sanitary Sewer and Well Exemption Request – 1860 Snake River Trail

ITEM SUMMARY

The PUC will consider a request for sanitary sewer and well exemption from the owner of property located at 1860 Snake River Trail.

BACKGROUND INFORMATION

Lynelle Parker has requested a sanitary sewer and well exemption for a vacant parcel located on Snake River Trail, near Dala Lane, with the intention of developing the site with a single family residence. Parker’s options are to either connect to the municipal sanitary sewer system and water distribution system or install a new private sewer system and new private well. The site is not currently served by either municipal services or private systems.

In order for a property owner to install a private sewer system and private well, per Code of Ordinances, Title V Public Works, §50.12 Exemptions, a hardship must exist making it unfeasible to obtain public sanitary sewer and public water and an exemption permit is required. §50.12 defines a hardship as one or more of the following:

- (1) The public sanitary sewer system is not within a reasonable distance of the subject property.
- (2) The public water system is not able to provide adequate volume or pressure to the subject parcel.

The closest existing municipal water and sewer service to Parker’s property is located at the intersection of Dala Lane and North Country Trail (slightly east of North Country Bottle Shop). Staff has determined that municipal service is not within a reasonable distance of Parker’s property, which constitutes a hardship per §50.12 (B) (1), and recommends approval of a sewer and well exemption for property at 1860 Snake River Trail.

OPTIONS & IMPACTS

- 1. Make a determination that a hardship, as defined by City Code §50.12, exists and **approve** the request for exemption.
- 2. Make a determination that a hardship, as defined by City Code §50.12, does not exist and **deny** the request for exemption. The property owner will be required to extend and connect to municipal sewer and water services.

Memorandum

RECOMMENDATIONS

Motion to recommend approval of the sanitary sewer and well exemption requests to the City Council.

Attachments

Location Map



22.08100.00

02.01770.00

22.08060.00

22.08110.00

22.08095.00

22.08130.00

02.01770.10

22.08060.10

22.08105.00

22.08085.00

22.08260.00

22.08255.00

22.08225.00

22.08235.00

22.08250.00

22.08540.00

02.01765.40

02.01765.30

02.01815.00

22.08245.00

02.01800.00

22.08240.00

02.01765.10

02.01795.00

hwy 63

22.08530.00

02.01765.20

02.01840.00

02.01790.00

22.08280.00

22.08545.00

22.08550.00

02.01785.00

22.08230.00

22.08275.00

1860 Snake River Trail

22.0855.00

02.01835.00

22.08270.00

22.08520.00

22.08525.00

22.08585.00

22.08560.00

02.01845.00

22.08265.00

North Country Bottle Shop

hwy 23

Dala lane

22.08565.00

22.08053.00

22.08050.00

22.08195.00

22.08535.00

22.08575.00

22.08590.00

22.085

22.08054.00

22.08055.00

22.08340.00

22.08350.00

22.08360.00

22.08190.00

22.08570.00

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MEMORANDUM

Date: October 19, 2020
To: Public Utilities Commission
From: Joseph Kohlgraf, Public Works Director
Lindy Crawford, Public Utilities General Manager
RE: Sanitary Sewer and Well Exemption Request – 1870 Snake River Trail

ITEM SUMMARY

The PUC will consider a request for sanitary sewer and well exemption from the owner of property located at 1870 Snake River Trail.

BACKGROUND INFORMATION

Lynelle Parker has requested a sanitary sewer and well exemption for a vacant parcel located on Snake River Trail, near Dala Lane, with the intention of developing the site with a single family residence. Parker's options are to either connect to the municipal sanitary sewer system and water distribution system or install a new private sewer system and new private well. The site is not currently served by either municipal services or private systems.

In order for a property owner to install a private sewer system and private well, per Code of Ordinances, Title V Public Works, §50.12 Exemptions, a hardship must exist making it unfeasible to obtain public sanitary sewer and public water and an exemption permit is required. §50.12 defines a hardship as one or more of the following:

- (1) The public sanitary sewer system is not within a reasonable distance of the subject property.
- (2) The public water system is not able to provide adequate volume or pressure to the subject parcel.

The closest existing municipal water and sewer service to Parker's property is located at the intersection of Dala Lane and North Country Trail (slightly east of North Country Bottle Shop). Staff has determined that municipal service is not within a reasonable distance of Parker's property, which constitutes a hardship per §50.12 (B) (1), and recommends approval of a sewer and well exemption for property at 1870 Snake River Trail.

OPTIONS & IMPACTS

1. Make a determination that a hardship, as defined by City Code §50.12, exists and **approve** the request for exemption.
2. Make a determination that a hardship, as defined by City Code §50.12, does not exist and **deny** the request for exemption. The property owner will be required to extend and connect to municipal sewer and water services.

Memorandum

RECOMMENDATIONS

Motion to recommend approval of the sanitary sewer and well exemption requests to the City Council.

Attachments

Location Map



22.08100.00

02.01770.00

22.08060.00

22.08110.00

22.08095.00

22.08130.00

02.01770.10

22.08085.00

22.08105.00

22.08255.00

22.08225.00

22.08235.00

22.08250.00

22.08540.00

02.01765.40

02.01765.30

22.08060.10

22.08260.00

02.01815.00

22.08240.00

22.08245.00

02.01800.00

02.01795.00

02.01790.00

02.01840.00

22.08280.00

22.08530.00

02.01765.10

02.01765.20

1870 Snake River Trl

22.08545.00

22.08550.00

02.01785.00

22.08230.00

22.08275.00

North Country Blvd

22.08520.00

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22.08560.00

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hwy 23

Dala Lane

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MEMORANDUM

Date October 19, 2020
To Public Utilities Commission
From Joseph Kohlgraf, Public Works Director
 Lindy Crawford, Public Utilities General Manager
RE Overhead and Underground Construction Specifications Policy

SUMMARY

The PUC will consider adopting an overhead and underground construction specifications policy as written by MMUA (Minnesota Municipal Utilities Association). This policy would be used when updating, repairing and constructing the MMU electrical distribution system.

BACKGROUND INFORMATION

Our electrical distribution system has been “built as needed” after initial installations by following a general standard of word of mouth specification, which worked for years until the phasing out of lineman positions occurred. We have seen many changes since ECE has taken over maintenance and have found that their parameters are not necessarily the same as what may be recommended in the municipal utility sector, and areas that have had maintenance work done have been built differently than what has been done in the past.

Being that staff is now able to conduct more field work, we believe we need a written policy to follow for repairs and new construction into the future. MMUA, through their training program, has provided a specifications manual that covers what the electric utility needs moving forward. Adopting this manual as a policy will open the door for mutual aid from our MMUA partners from around the state and create a standard that can be easily followed well into the future.

OPTIONS & IMPACTS

1. Adopt MMUA’s Overhead and Underground Construction Specifications Manual as a policy improving uniformity and mutual aid needs with familiarity.
2. Do nothing. Sub-contractors completing work for MMU may not follow the uniform construction processes that we wish to follow at all times, increasing confusion and furthering a piecemeal system design.

RECOMMENDATIONS

Motion to adopt the MMUA Overhead and Underground Construction Specifications Manual as a policy for the electric utility.

Attachments

MMUA Overhead and Underground Construction Specifications Manual



Minnesota Municipal Utilities Association

Overhead and Underground Construction Specifications



Foreword

MMUA's new Overhead and Underground Construction Specifications book is the result of several years of effort on the part of a dedicated group of volunteers. The members of the MMUA Job Training and Safety Specifications Book Committee put in many hours of thought and discussion and this book would not exist without their efforts. Many thanks to the committee members for their efforts:

Doug Ensted, Watertown Municipal Utilities
John Egan, Sauk Center P.U.C.
Joe Moore, Moorhead Public Service
Carl Henning, Minnesota Rural Electric Association
Don Krumwiede, Missouri River Energy Services
Roger Moltzan, City of Detroit Lakes
Tom St.Marie, Rochester Public Utilities

Jeff Olson, East Grand Forks Water & Light Dept.
Marty Meixell, City of Fairmont
Russ Nelson, Austin Municipal Utilities
Mark Fuchs, Elk River Municipal Utilities
Kevin Thompson, MMUA
Gary Greenwald, MMUA
Vernell Roberts, MMUA

We particularly want to recognize the efforts of Richard Wagner of Elk River Municipal Utilities for the many hours he put in developing the many CAD drawings that are the heart of the spec book.

We hope that our spec book will become the benchmark for municipal utilities in Minnesota and help all of us to develop and maintain our systems to a well-developed and consistent set of standards. We will be updating the spec book periodically to add additional detail and keep it up to date. Please let us know if you have any suggestions that could be incorporated into future editions.

Work Safe!

Mike Willetts
Director of Safety and Training

Jack Kegel
Executive Director

MMUA Training Center Mission Statement

To promote, perform, and enhance safe work environments in our municipal utilities, with the willingness to learn and pass on the passion of the craft.

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Distribution Design & Construction Standards



Basic Impulse Level (B.I.L.)

Distribution Structure Insulation Coordination

An often overlooked but very important aspect of transmission and distribution structure design is insulation coordination. Insulation coordination is very important for reliability of the system as well as effective lightning protection for our equipment. To provide for effective insulation coordination, the BIL (Basic Impulse Level) of the pole top assembly must be considered and adequate to insure reduction in flashovers due to overvoltage conditions.

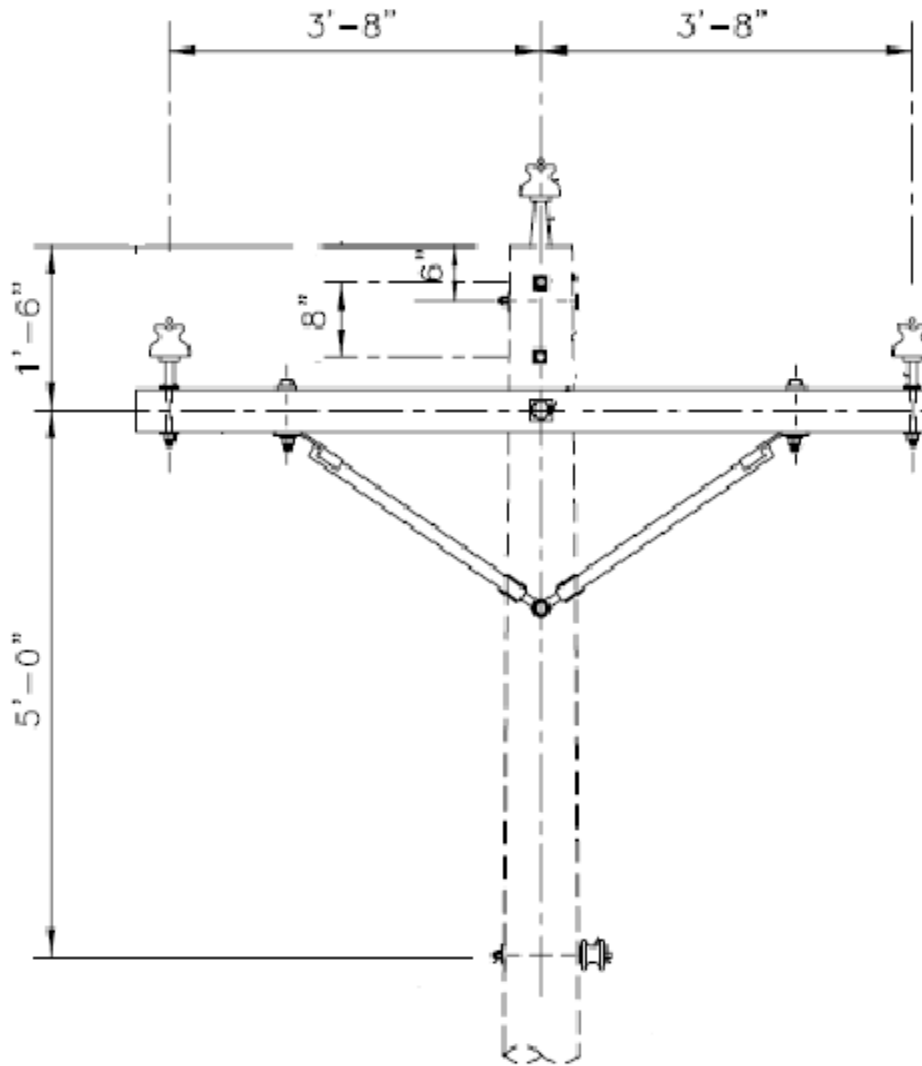
Lines supported in air and the supporting structures are usually weaker in dielectric strength than the air itself. To maximize the insulation strength, porcelain or polymer insulators are used often times in conjunction with wood, whether it be wood cross arms, wood poles or a combination of both. It must be noted that the use of metal hardware including metal arms and poles dramatically reduce the effective BIL level of the structure.

The need for adequate BIL levels on the structures is necessary to prevent flashover from overvoltages due to lightning strikes and transient voltages during switching or fault current events. When lightning strikes, we must limit flashover to prevent structure damage and allow the lightning arrestors at the equipment location to turn on and protect the equipment. While switching (energizing or de-energizing a load), transients are generated and the system is stressed. As the circuit is built up upon closing of a switch, resistance, and inductance, capacitance (lines, cables, and transformers) and because re-distribution of energy in the circuit cannot happen instantaneously, transients occur. These transients can cause flashover if there is not sufficient BIL on the structures assemblies.

The voltage level at which flashovers will occur on distribution structures is a function of the BIL on the structure. A direct lightning strike on a conductor will always strike no more than one half (1/2) span from a structure. For distribution lines, this means the strike point will generally not be more than 200 feet from a structure. A flashover will generally occur at the structure closest to the strike. Flashovers of multiple structures on both sides of the strike points are also common.

While accurate BIL for structures is obtained by testing structures with a surge generator, estimates for BIL can be made. For distribution lines, wet flashover values for negative impulses are used and added directly to the impulse flashover for wood. BIL values for wood varies with type of wood and treatment, but generally can be assumed to be 100kV per foot dry, and 75kV per foot wet. This wet value equals 6kV per inch of wood. The exception to these values are green treated poles which are usually treated with a salt based preservative and render the value of the BIL to next to zero. For structures with a 100kV BIL insulator and a 3 foot spacing the BIL would be approximately 320kV.

The primary concern when designing structures is to attain a 300kV or greater BIL level to ensure that only a direct strike to the line will cause a flashover. This is normally accomplished by utilizing the wood of the structure itself to aid in reaching a level of BIL to prevent the flashover. A standard 15kV structure shown here has a BIL level of approximately 300kV BIL. This structure uses an 8' wooden cross arm, wooden cross arm braces and insulators with a BIL rating of 35kV (wet). It is important to understand and verify the BIL of the insulators used to properly calculate the BIL of the assembly as a whole. The wood cross arms are also an important factor in attaining the proper BIL level. If steel braces are used, the steel short circuits the wood and results in a much lower BIL level. (Note: if a ground is attached to the cross arm it renders the value of the wood in the arm to zero as it also shorts the cross arm.)



Arrestors on distribution lines are intended to protect equipment but have a modest effect on the flashover of the line itself. Shield wires in itself for distribution protection has limited effect, due to the fact that often times one cannot place the neutral high enough on the structure to offer an adequate zone of protection below it. A shielding angle of 30° is required below the shield wire to offer protection. This is called the shielding angle. This angle is measured from vertical from the ground wire to the phase conductor. Anything outside of this 30° angle of protection is susceptible to a lightning strike. Shielding is also ineffective where high resistance to earth connections exist.

How BIL Works.

Basically as the impulse voltage between the 2 conductors (ground and nearest phase) enters the breakdown range, a sheet of breakdown current erupts between the two conductors. The total current reaches thousands of amperes if the conductors are of sufficient length, and causes pronounced delay in the breakdown by reducing the voltage somewhat in the same manner as a lightning arrester limits voltage by drawing a heavy current. Breakdown can still take place, but because of the voltage reduction by these pre-breakdown corona currents, this breakdown may occur at 5 micro seconds or more, rather than at 1 or 2 micro seconds, which might be the classical value. In the meantime, because of the long delay in breakdown, reflections have the opportunity to arrive from nearby grounded poles and reduce the voltage between the conductors. A sufficient reduction in voltage within the breakdown time will prevent a flashover at the stricken location.

Grounding is an important factor for effective lightning and overvoltage protection. Testing pole grounds and insuring pole ground earth resistance is below 25 ohms is critical. Poles with lightning arrestors should be lower than 25 ohms resistance for best protection. (25 ohms or less on equipment structures is a NESC requirement. NESC rule 96D)

Hardware and support equipment can severely reduce BIL; consideration must be given to guy wires that can be a major factor in reducing structures BIL. For mechanical advantage, guys are generally attached as high on the pole as possible and are close to the phase wires. These guys and attachments provide a path to ground and the BIL will be reduced. Care should be exercised in proper attachment selection and hardware utilized. A porcelain insulator (Johnny Ball) has very little to no BIL rating, where as a guy strain insulator of sufficient length can have a BIL level as high as 300kV.

Pole Setting Depths

The minimum depth for setting poles must be as follows:

<u>Length of Pole (Feet)</u>	<u>Setting in Soil (Feet)</u>	<u>Setting in All Solid Rock (Feet)</u>
20	4.0	3.0
25	5.0	3.5
30	5.5	3.5
35	6.0	4.0
40	6.0	4.0
45	6.5	4.5
50	7.0	4.5
55	7.5	5.0
60	8.0	5.0

“Setting in Soil” depths must apply:

- Where poles are to be set in soil:
- Where there is a layer of soil or more than two (2) feet in depth over solid rock;
- Where the hole in solid rock is not substantially vertical or the diameter of the hole at the surface of the rock exceeds approximately twice the diameter of the pole at the same level.

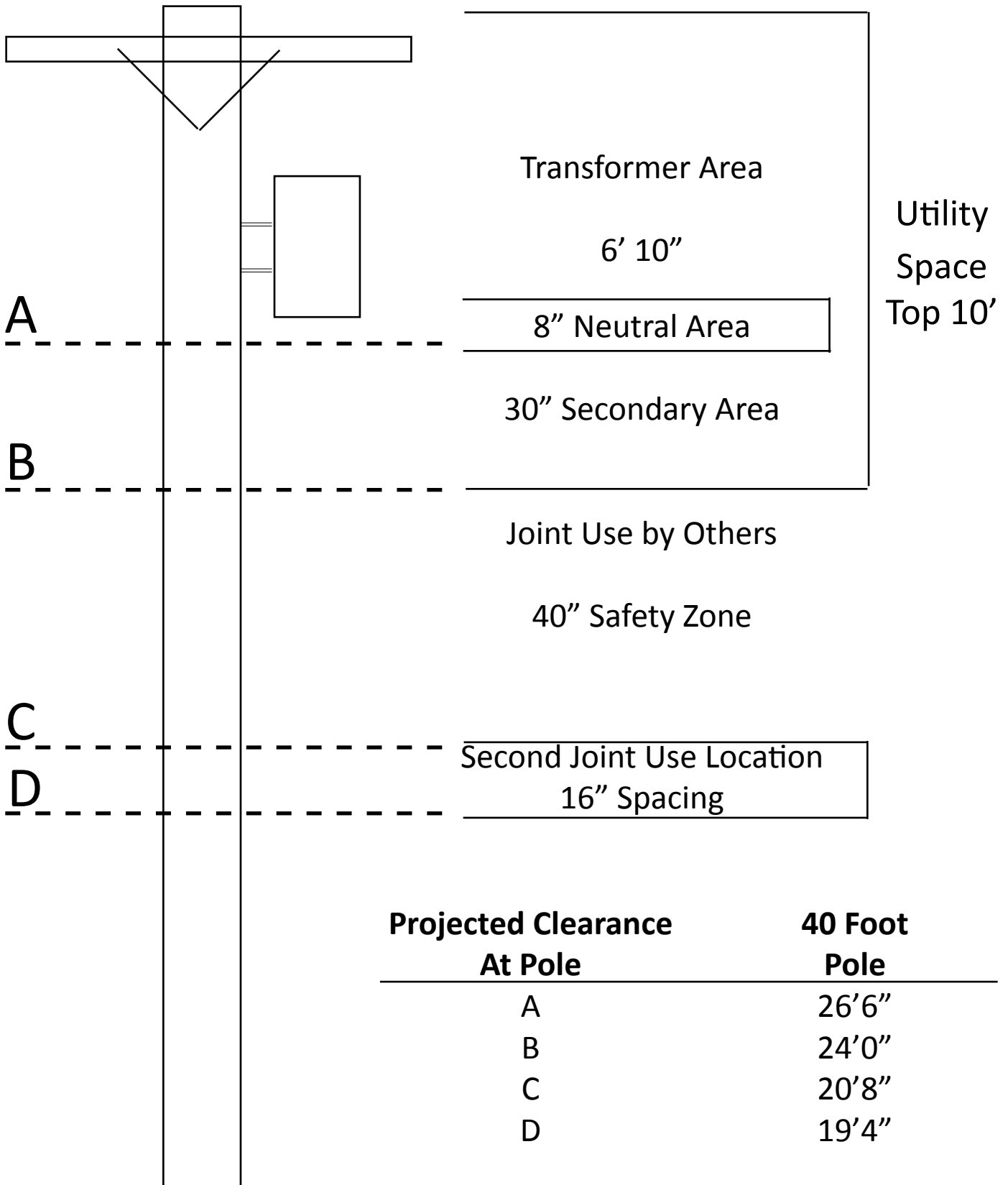
“Setting in All Solid Rock” depths must apply where poles are to be set in solid rock and where the hole is substantially vertical, approximately uniform in diameter and large enough to permit the use of tamping bars the full depth of the hole.

Where there is a layer of soil two (2) feet or less in depth over solid rock, the depth of the hole must be the depth of the soil in addition to the depth specified under “Setting in All Solid Rock” provided, however, that such depth must not exceed the depth specified under “Setting in Soil.”

On sloping ground, the depth of the hole must be measured from the low side of the hole.

**From Austin (MN) Utilities Specifications Book*

Standard Pole Configuration



Projected Clearance At Pole	40 Foot Pole
A	26'6"
B	24'0"
C	20'8"
D	19'4"

*From Austin (MN) Utilities Specifications Book

Stringing Sag Table Using Final		Sag	Ruling Span: 150.0 Feet	
Conductor PENGUIN		#4/0 AWG 6/1 Stranding ACSR		
NESC Heavy Load Zone		Max Tension = 2623 Lb		
Design: 25.0% Ult. @ 0. Deg F, .00 In Ice, .00 Psf Wing, Final				

H Tens	2538.	2312.	2087.	1866.	1648.	1437.	1235.	1048.	882.	742.	632.	547.	508.	483.	460.
LBS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Temp F>	-20.	-10.	0.	10.	20.	30.	40.	50.	60.	70.	80.	90.	100.	110.	120.
Sag	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In	Ft - In
Span	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
100.0	0 - 2	0 - 2	0 - 3	0 - 3	0 - 3	0 - 4	0 - 4	0 - 5	0 - 5	0 - 6	0 - 7	0 - 8	0 - 9	0 - 10	0 - 10
110.0	0 - 3	0 - 3	0 - 3	0 - 3	0 - 4	0 - 4	0 - 5	0 - 6	0 - 6	0 - 8	0 - 9	0 - 10	0 - 11	0 - 11	1 - 0
120.0	0 - 3	0 - 3	0 - 4	0 - 4	0 - 4	0 - 5	0 - 6	0 - 6	0 - 8	0 - 9	0 - 10	1 - 0	1 - 1	1 - 2	1 - 2
130.0	0 - 3	0 - 4	0 - 4	0 - 4	0 - 5	0 - 6	0 - 6	0 - 8	0 - 9	0 - 10	1 - 0	1 - 2	1 - 3	1 - 4	1 - 5
140.0	0 - 4	0 - 4	0 - 5	0 - 5	0 - 6	0 - 6	0 - 7	0 - 9	0 - 10	1 - 0	1 - 2	1 - 4	1 - 5	1 - 6	1 - 7
150.0	0 - 4	0 - 5	0 - 5	0 - 6	0 - 6	0 - 7	0 - 8	0 - 10	1 - 0	1 - 2	1 - 4	1 - 6	1 - 8	1 - 9	1 - 10
160.0	0 - 5	0 - 5	0 - 6	0 - 6	0 - 7	0 - 8	0 - 10	0 - 11	1 - 1	1 - 4	1 - 6	1 - 9	1 - 11	2 - 0	2 - 1
170.0	0 - 5	0 - 6	0 - 7	0 - 7	0 - 8	0 - 9	0 - 11	1 - 1	1 - 3	1 - 5	1 - 8	2 - 0	2 - 1	2 - 3	2 - 4
180.0	0 - 6	0 - 7	0 - 7	0 - 8	0 - 9	0 - 10	1 - 0	1 - 2	1 - 5	1 - 8	1 - 11	2 - 2	2 - 4	2 - 6	2 - 7
190.0	0 - 7	0 - 7	0 - 8	0 - 9	0 - 10	0 - 11	1 - 1	1 - 4	1 - 6	1 - 10	2 - 1	2 - 5	2 - 8	2 - 9	2 - 11
200.0	0 - 7	0 - 8	0 - 9	0 - 10	0 - 11	1 - 1	1 - 3	1 - 5	1 - 8	2 - 0	2 - 4	2 - 8	2 - 11	3 - 1	3 - 2

*From Austin (MN) Utilities Specifications Book

Aluminum Company of America Sag and Tension Data

Conductor PENGUIN #4/0 AWG 6/1 Stranding ACSR

Area = .1939 Sq. In Dia = .563 In Wt = .291 Lb/F RTS = 8350 Lb

Data from Chart No 1 - 938

English Units

Span = 150.0 Feet NESC Heavy Load Zone

Creep is NOT a Factor

		Design Points					Final			Initial		
Temp F	Ice In	Wind Psf	K Lb/F	Weight Lb/F	Sag Ft	Tension Lb	Sag Ft	Tension Lb	Sag Ft	Tension Lb		
0.	.50	4.00	.30	1.385	1.49	2623.	1.49	2623.	1.49	2623.		
32.	.50	4.00	.00	.952	1.45	1852.	1.31	2041.	1.31	2041.		
-20.	.00	.00	.00	.291	.32	2538.	.32	2539.	.32	2539.		
0.	.00	.00	.00	.291	.39	2088.*	.36	2243.	.36	2243.		
30.	.00	.00	.00	.291	.57	1437.	.46	1778.	.46	1778.		
60.	.00	.00	.00	.291	.93	882.	.63	1301.	.63	1301.		
90.	.00	.00	.00	.291	1.50	547.	.95	861.	.95	861.		
120.	.00	.00	.00	.291	1.78	460.	1.46	560.	1.46	560.		
167.	.00	.00	.00	.291	2.19	375.	2.13	384.	2.13	384.		
212.	.00	.00	.00	.291	2.57	319.	2.52	326.	2.52	326.		

* Design Condition

*From Austin (MN) Utilities Specifications Book

Standards you must follow when constructing an Electrical System

IEEE - National Electrical Safety Code

Part - 1 Rules for the Installation and Maintenance of Electrical Supply Stations and Equipment

Part - 2 Safety Rules for the Installation and Maintenance of Overhead Electric Supply and Communication Lines

Part - 3 Safety Rules for the Installation and Maintenance of Underground Electric Supply and Communication Lines

Part - 4 Rules for the Operation of Electric Supply and Communication Lines and Equipment

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Overhead Construction



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Single upset bolt	bs
Sockets, meter	gb
Spacer, pipe	dl
Special crossarm braces	em
Splice cover, plastic	es
Splice for steel strand	cz
Splice, automatic	bx
compression	cy
formed type	ex
oval tube	cx
Spool Insulator	cm
Spring washer	aw
Staple, ground wire	al
Steel strand	y
Structure assembly (small angle - 161 & 230 kV)	gw
Structure assembly (tangent - 161 & 230 kV)	gy
Substation grounding conductor, coated steel	sr
Support, overhead ground wire	ed
Surge arresters	ae
Suspension clamp	m
Suspension clamp with socket eye	ei
Suspension insulator	k
Swinging angle bracket	fu
Switch, capacitor oil	bz
combination power fuse and disconnect	sl
hook operated disconnect	sb
pole top air break	cg
recloser, by-pass	sj
regulator by-pass	sk

-T-

Thimble clevises	ci
Thimble eye bolt, angle	ba
Thimble eye bolt, straight	ao
Thimble eye nut	ab
Tie, insulator, formed type	ah
Transformer bracket	dm
Transformer grounding connector	bu
Transformer secondary bracket, insulated	fo
Transformers, current	sd
pole and power	an
voltage	se

-V-

Vacuum circuit reclosers be
Voltage regulators sc
Voltage transformers se

-W-

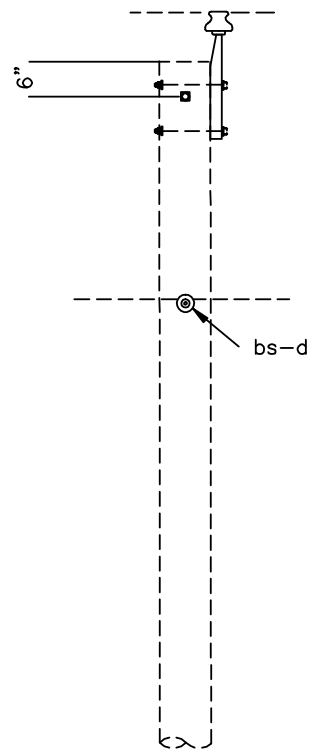
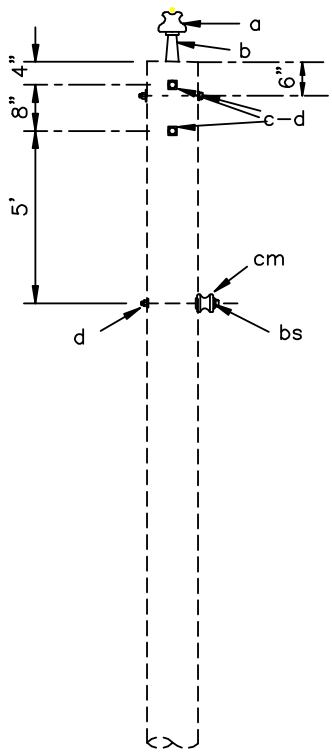
Washer, spring aw
Washers d
Watt-hour meters ga
Wildlife guards rp
Wire guard, plastic er
Wire, guy y
Wireholder ar
Wireholder, clevis type bt
 conduit ds
Wood crossarm brace cu

-Y-

Y- clevis ball ft

-Z-

"Z" type (wishbone) crossarm assembly gz



ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	1	Insulator, pin type			
b	1	Pin, pole top			
c	3	Bolt, machine, 5/8"x req'd length			
d	5	Washer			
cm	1	Spool insulator			
bs	1	Bolt, single upset			

DESIGN LIMITS

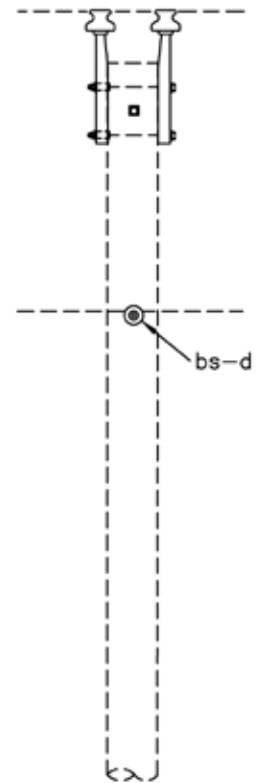
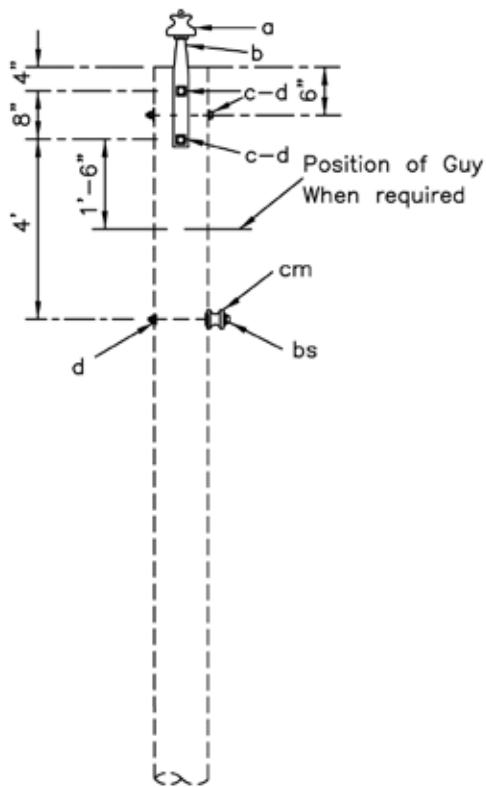
Max. transverse load: 500 lbs.
per conductor
Max. line angle within load limits: 5°

12.5/7.2 kV PRIMARY, 1-PHASE,
SINGLE PRIMARY SUPPORT



OCTOBER 2009

A1



ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	2	Insulator, pin type	bs	1	Bolt, single upset
b	2	Pin, pole top	cm	1	Spool insulator
c	3	Bolt, machine, 5/8"x req'd length			
d	3	Washer			

DESIGN LIMITS

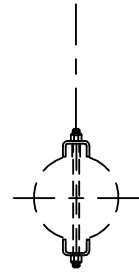
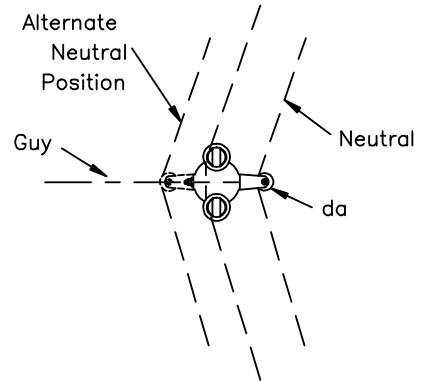
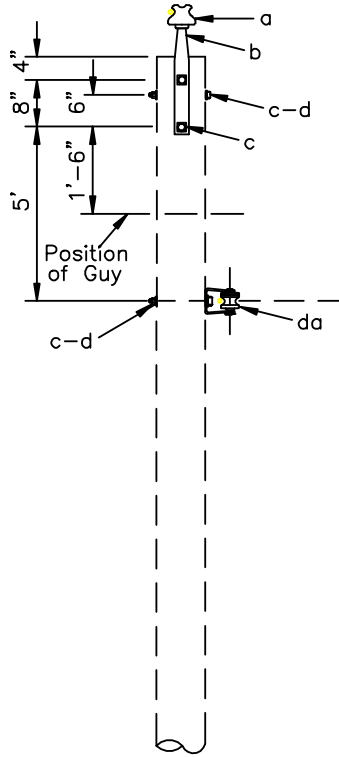
Max. transverse load: 500 lbs.
per conductor
Max. line angle within load limits: 5°

12.5/7.2 kV PRIMARY, 1-PHASE,
DOUBLE PRIMARY SUPPORT

DECEMBER 2010



A1-1



NOTE: REFER TO E1-2
DRAWING ASSEMBLY FOR GUY

POLE TOP PIN
ASSEMBLY

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	2	Insulator, pin type			
b	2	Pin, pole top			
c	4	Bolt, machine, 5/8"x req'd length			
d	3	Washer			
da	1	Clevis, spool assembly			

DESIGN LIMITS

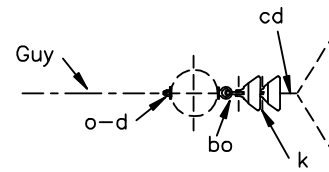
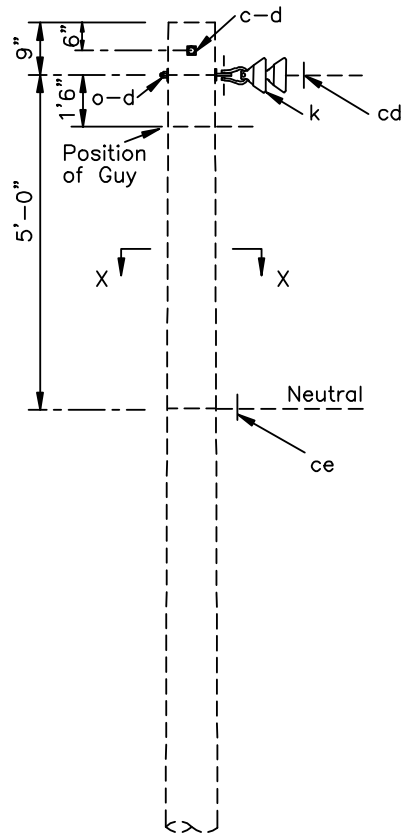
Max. transverse load: 1000 lbs.
per conductor
Max. line angle within load limits: 20'

12.5/7.2 kV 1-PHASE
DOUBLE PRIMARY SUPPORT

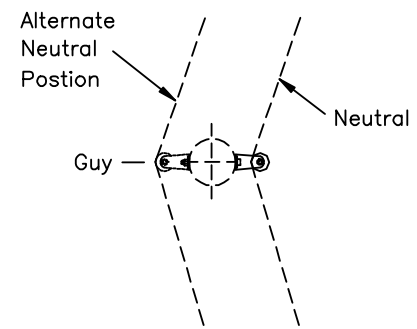


OCTOBER 2009

A2



PLAN



SECTION X-X

NOTE: REFER TO E1-2
DRAWING ASSEMBLY FOR GUY

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	1	Washer	c	1	Bolt, machine, 5/8" x req'd length
bo	1	Shackle, anchor			
k	2	Insulator, suspension			
o	1	Bolt, eye, 5/8" x req'd length			
ce	1	Angle assembly, neutral			
cd	1	Angle assembly, primary			

DESIGN LIMITS

Max. transverse load: 4000 lbs. per conductor

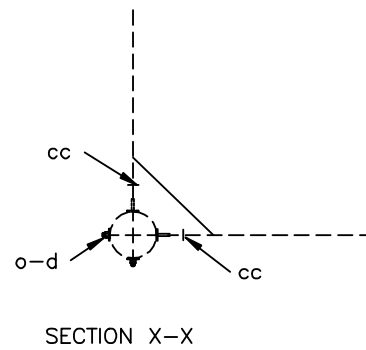
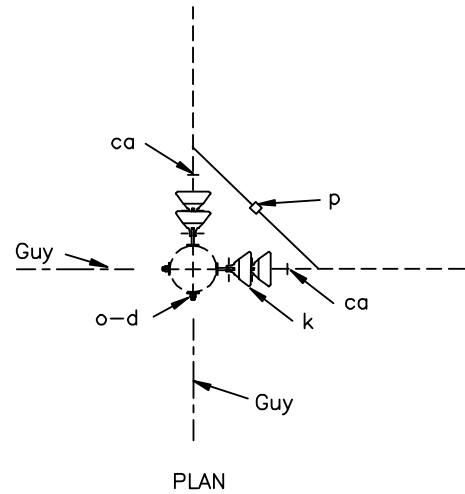
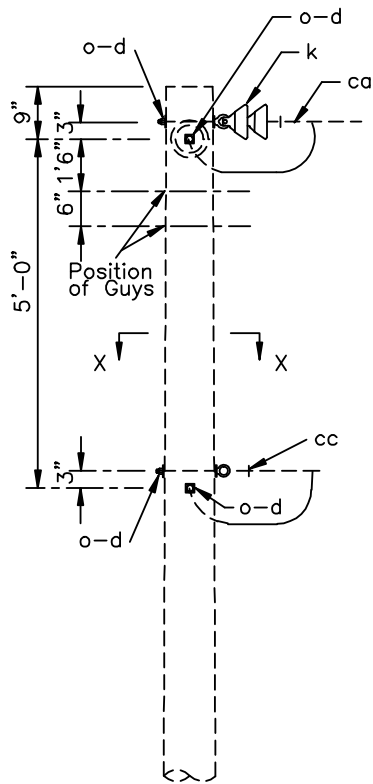
Angle: 20°-60°

12.5/7.2 kV, PRIMARY 1-PHASE



OCTOBER 2009

A3



NOTE: REFER TO E1-2
DRAWING ASSEMBLY FOR GUY

NOTE: REFER TO M3-4 DRAWING
FOR CUTOUT DISCONNECT

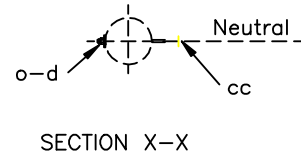
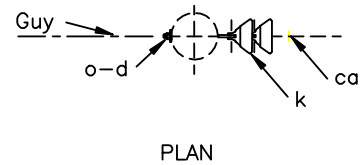
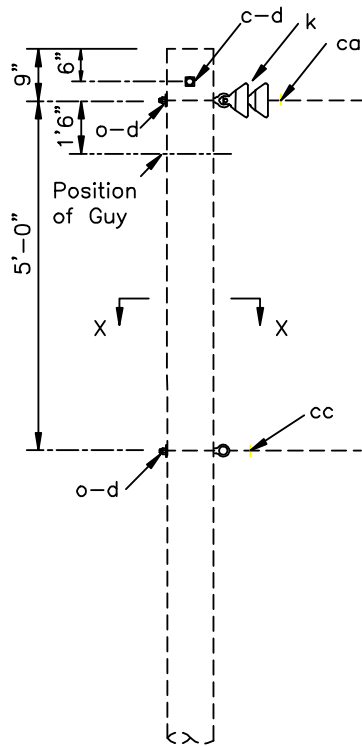
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	4	Washer			
cc	2	Deadend assembly, neutral			
k	4	Insulator, suspension			
o	4	Bolt, eye, 5/8"x req'd length			
p		Connectors, as req'd			
ca	2	Deadend assembly, primary			

12.5/7.2 kV PRIMARY, 1-PHASE
60° TO 90° ANGLE



OCTOBER 2009

A4



NOTE: REFER TO E1-2
DRAWING ASSEMBLY FOR GUY

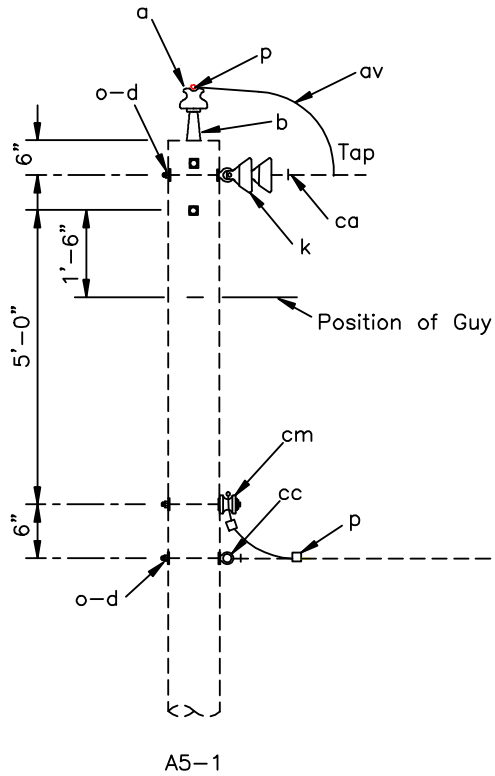
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	4	Washer			
c	1	Bolt, machine, 5/8" x req'd length			
k	2	Insulator, suspension			
o	2	Bolt, eye, 5/8"x req'd length			
ca	1	Deadend assembly, primary			
cc	1	Deadend assembly, neutral			

12.5/7.2 kV PRIMARY, 1-PHASE
DEADEND (SINGLE)



OCTOBER 2009

A5



Notes:

A5-1 and assemblies may be used with drawings such as: A1, A1-1, A2.

REFER TO E1-2
DRAWING ASSEMBLY
FOR GUY

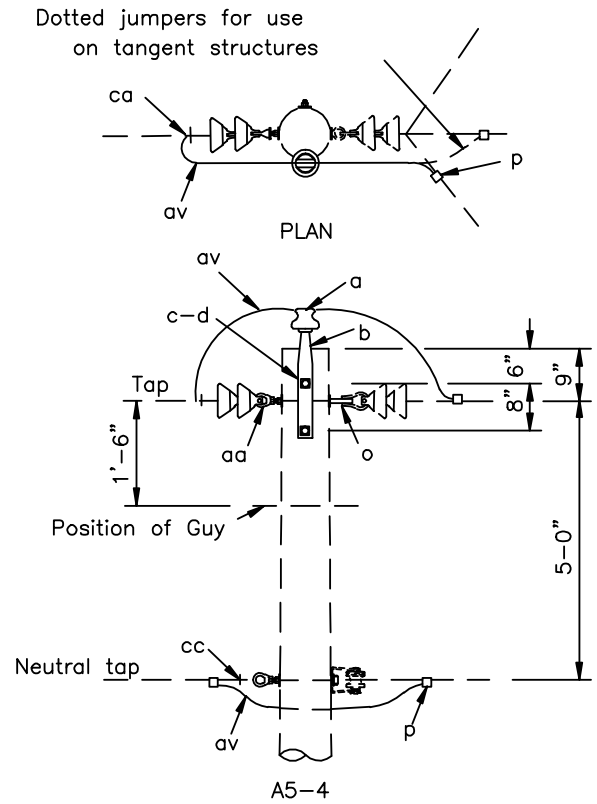
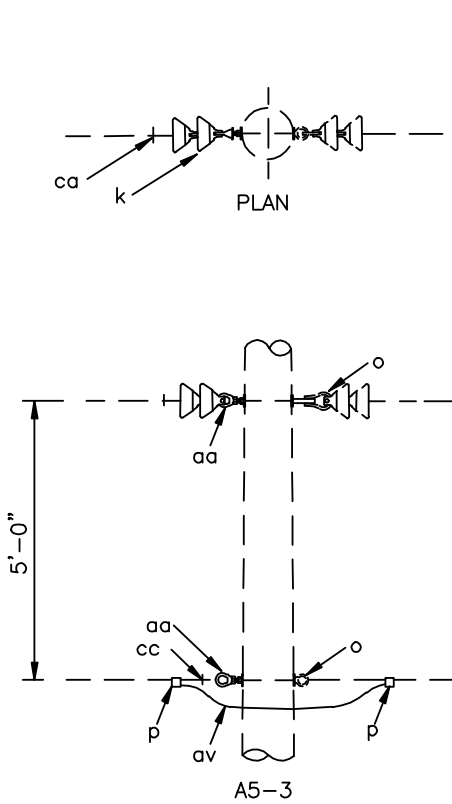
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	2	Washer	ca	1	Deadend assembly, primary
k	2	Insulator, suspension	cm	1	Spool insulator
o	2	Bolt, eye, 5/8"x required length, as required	a	1	Insulator, pin type
p		Connectors, as required	b	1	Pin, pole top
av		Jumpers and leads, as required			
cc		Deadend assembly, neutral, as required			

12.5/7.2 kV PRIMARY, SINGLE PHASE TAP



OCTOBER 2009

A5-1



NOTE: REFER TO E1-2
DRAWING ASSEMBLY FOR GUY

NOTE: REFER TO DRAWING
M3-4 FOR FUSED DISCONNECT

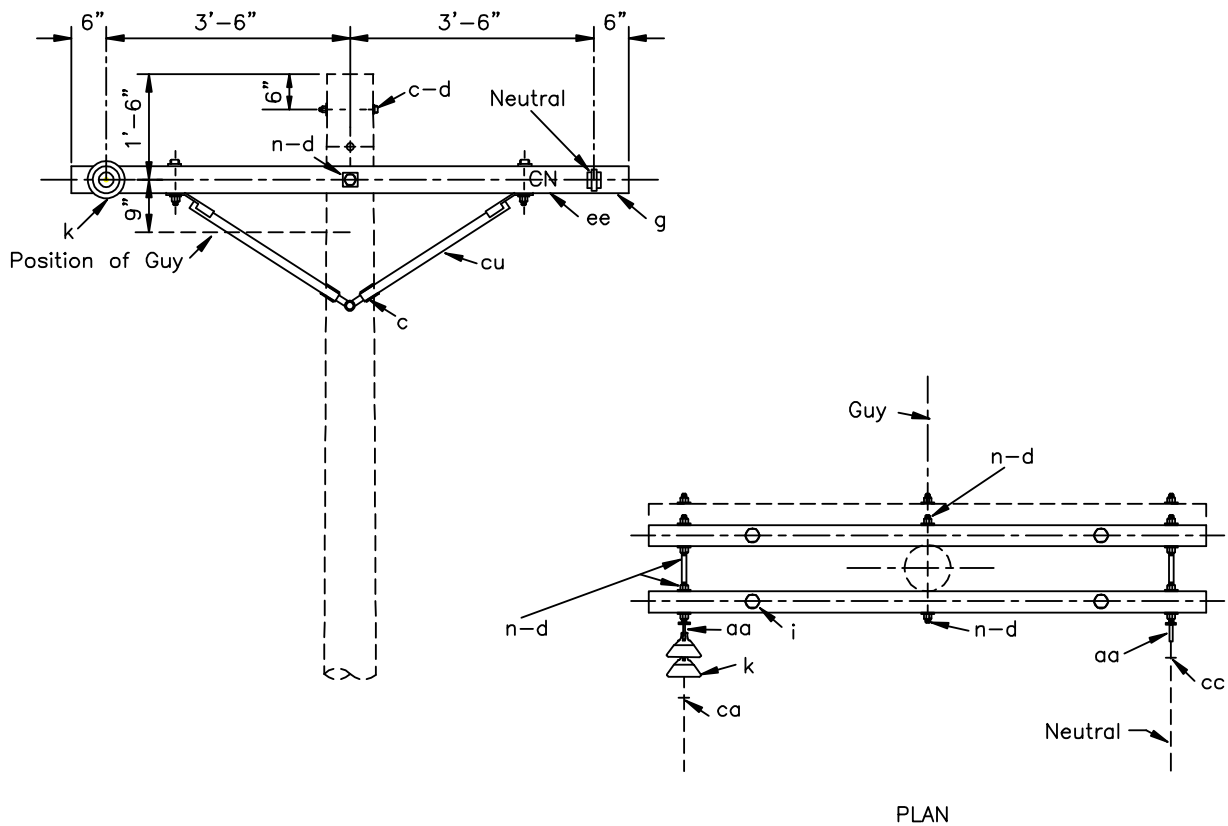
ITEM	MATERIAL	ASSEMBLY UNIT	
		A5-3	A5-4
		NO. REQ'D	NO. REQ'D
a	Insulator, pin type		1
b	Pin, pole top		1
c	Bolt, machine, 5/8"x req'd length		2
d	Washer	4	6
k	Insulator, suspension	4	4
p	Connectors	as req'd	as req'd
aa	Nut, eye, 5/8"	2	2
av	Jumpers	as req'd	as req'd
ca	Deadend assembly, primary	2	1
cc	Deadend assembly, neutral	2	1
o	Bolt, eye, 5/8" x req'd length	2	2

12.5/7.2 kV PRIMARY, SINGLE PHASE TAP



OCTOBER 2009

A5-3, A5-4



Notes:

1. See drawing E5-1 for Crossarm loading limitations.
2. Designate as A7-1 for assembly with three crossarms.
3. Refer to E1-2 drawing assembly for guy.

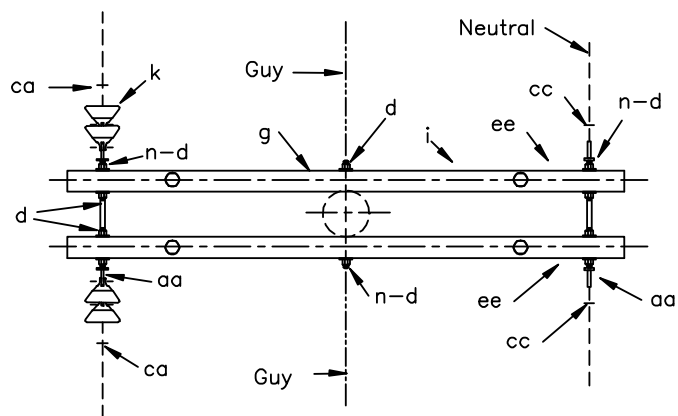
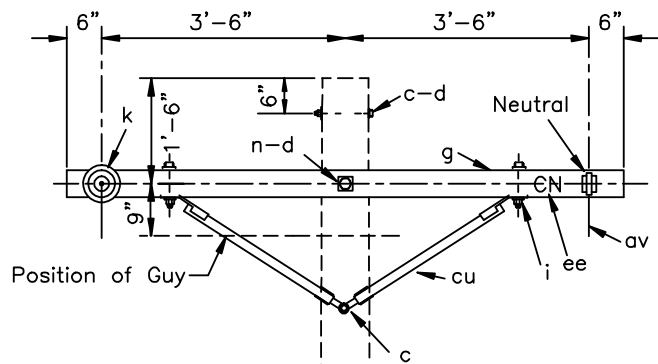
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	12	Washer	n	3	Bolt, double arming, 5/8" x req'd length
g	2	Crossarm	aa	2	Nut, eye, 5/8"
cu	4	Brace, wood, heavy duty	ca	1	Deadend assembly, primary
i	4	Bolt, carriage, 1/2" x 6"	cc	1	Deadend assembly, neutral
c	1	Bolt, machine, 5/8 x req'd length	ee	2	Letters, "C", "N"
k	2	Insulator, suspension			

12.5/7.2 kV, 1- PHASE, CROSSARM
CONSTRUCTION DEADEND (SINGLE)



OCTOBER 2009

A7, A7-1



PLAN

Note: Refer to E1-2 drawing assembly for guy.

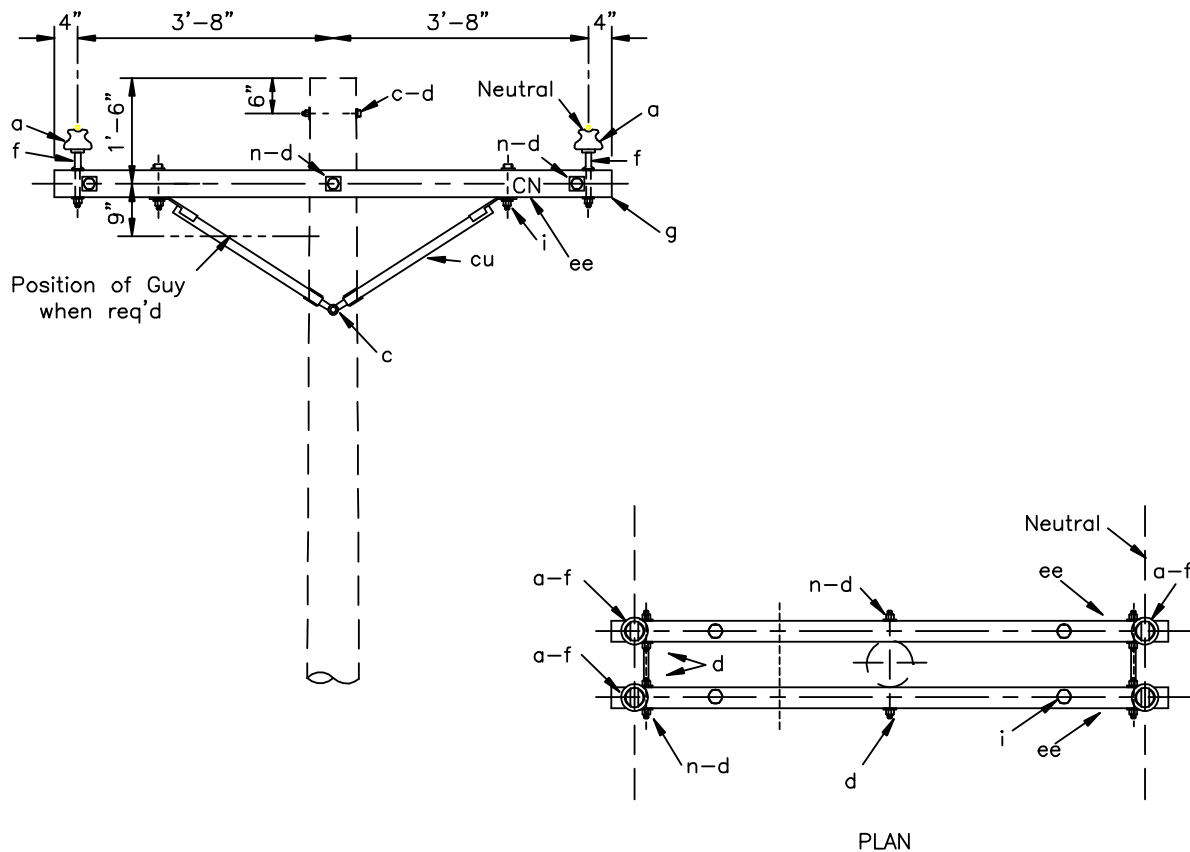
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	12	Washer	p		Connectors. as req'd
g	2	Crossarm	aa	4	Nut, eye, 5/8"
cu	4	Brace, wood, heavy duty	av		Jumpers
i	4	Bolt, carriage, 1/2" x 6"	ca	2	Deadend assembly, primary
c	2	Bolt, machine, 5/8 x required length	cc	2	Deadend assembly, neutral
k	4	Insulator, suspension	ee	4	Letters, 2 "C", 2 "N"
n	3	Bolt, double arming, 5/8" x req'd length			

12.5/7.2 kV, 1-PHASE
CROSSARM CONSTRUCTION-DEADEND DOUBLE



OCTOBER 2009

A8



Note: Refer to E1-2 drawing assembly for guy.

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	4	Insulator, pin type	i	4	Bolt, carriage, 1/2"x 6"
d	16	Washer	c	2	Bolt, machine, 5/8 x req'd length
f	4	Pin, crossarm, steel	n	3	Bolt, double arming 5/8 x req'd length
g	2	Crossarm	ee	4	Letters, 2 "C", 2 "N"
cu	4	Brace, wood 28"			

DESIGN LIMITS

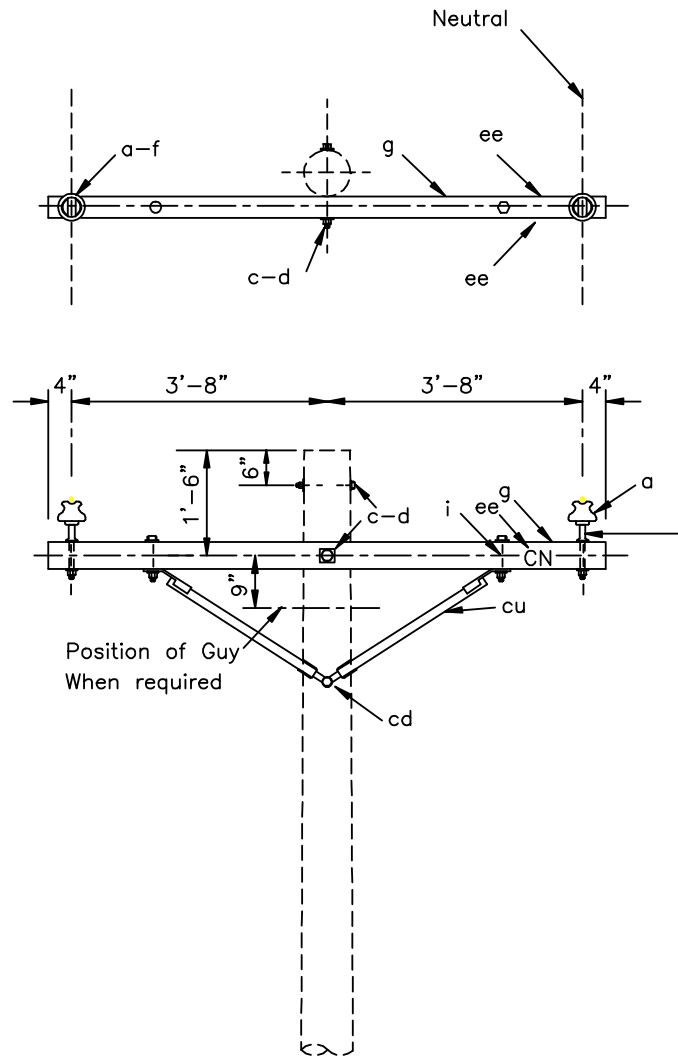
Max. transverse load: 1000 lbs. per conductor
 Max. line angle within load limits: 20'

12.5/7.2 kv, 1-PHASE
 CROSSARM CONSTRUCTION-DOUBLE LINE ARM



OCTOBER 2009

A9



Note: Refer to E1-2 drawing assembly for guy.

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	2	Insulator, pin type	cu	2	Brace, wood, heavy duty
c	2	Bolt, machine, 5/8"x req'd length	i	2	Bolt, carriage, 1/2"x 6"
d	7	Washer,	ee	4	Letters, 2 "C", 2 "N"
f	2	Pin, crossarm, steel			
g	1	Crossarm			

DESIGN LIMITS

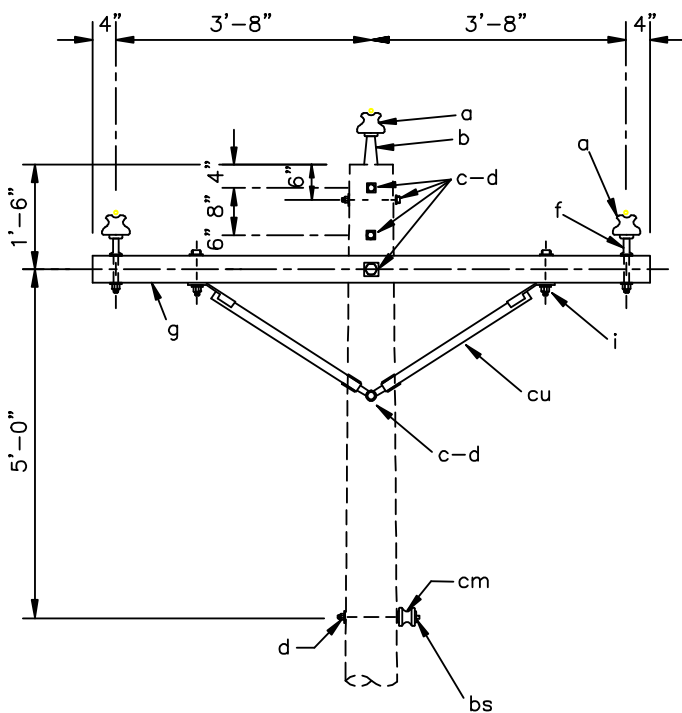
Max. transverse load: 500 lbs. per conductor
 Max. line angle within load limits: 5'

12.5/7.2 kV, 1-PHASE
 CROSSARM CONSTRUCTION-SINGLE LINE ARM



OCTOBER 2009

A9-1



ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	3	Insulator, pin type			
b	1	Pin, pole top	bs	1	Bolt, single upset
c	5	Bolt, machine, 5/8"x req'd length	cm	1	Spool insulator
d	10	Washer	cu	2	Brace, wood, 28"
f	2	Pin, crossarm, steel			
g	1	Crossarm			
i	2	Bolt, carriage, 1/2"x 6"			

DESIGN LIMITS
 Max. transverse load: 500 lbs.
 per conductor
 Max. line angle within load limits: 5'

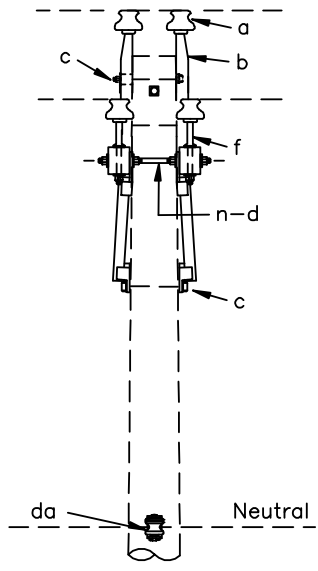
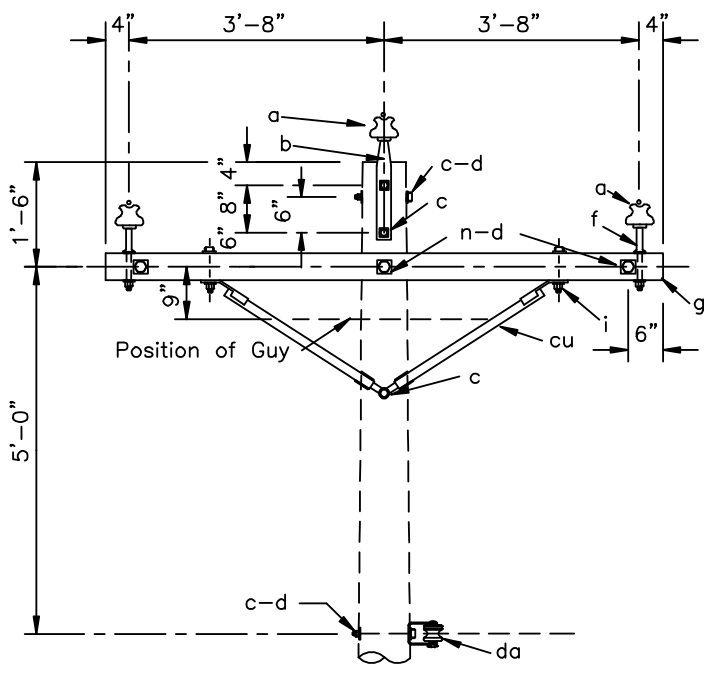
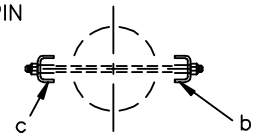
12.5/7.2 kV
 3-PHASE CROSSARM CONSTRUCTION
 SINGLE PRIMARY SUPPORT



OCTOBER 2009

C1

POLE TOP PIN ASSEMBLY



Note: Refer to E1-2 drawing assembly for guy.

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	i	4	Bolt, carriage, 1/2" x 6"
b	2	Pin, pole top	n	3	Bolt, double arming, 5/8"x req'd length
c	5	Bolt, machine, 5/8"x req'd length	da	1	Clevis, spool assembly
d	18	Washer			
f	4	Pin, crossarm, steel			
g	2	Crossarm			
cu	4	Brace, wood, 28"			

DESIGN LIMITS

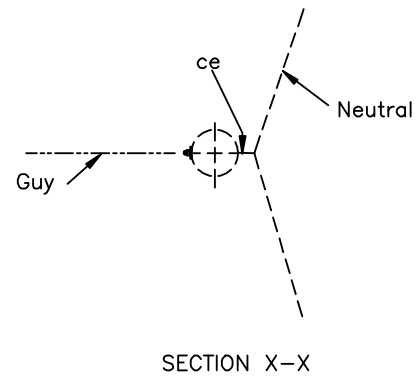
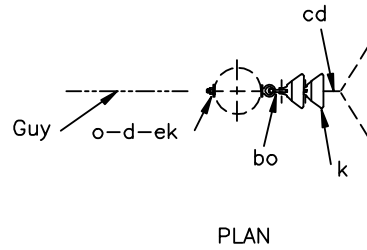
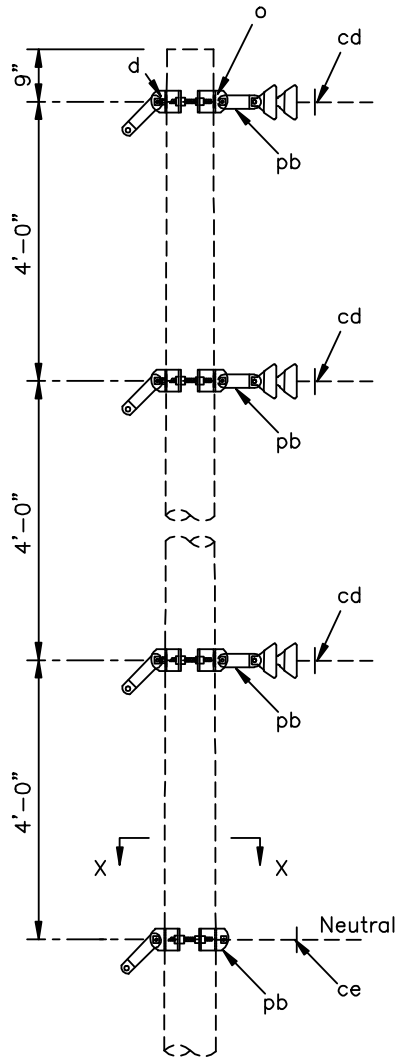
Max. transverse load: 1000 lbs. per conductor
 Max. line angle within load limits: 20'

12.5/7.2 kv, 3-PHASE
 CROSSARM CONSTR. DOUBLE PRIMARY SUPPORT



OCTOBER 2009

C2



NOTE: Refer to E7-2 drawing assembly for guy

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	3	Washer	ce	1	Angle assembly, neutral
k	6	Insulator, suspension	pb	4	Pole band
o	3	Bolt, eye, 5/8"x req'd length			
bo	3	Shackle, anchor			
cd	3	Angle assembly, primary			

DESIGN LIMITS

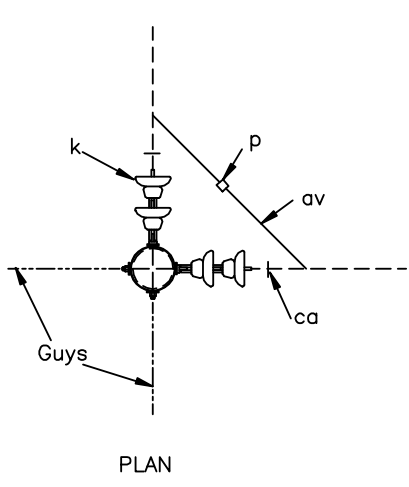
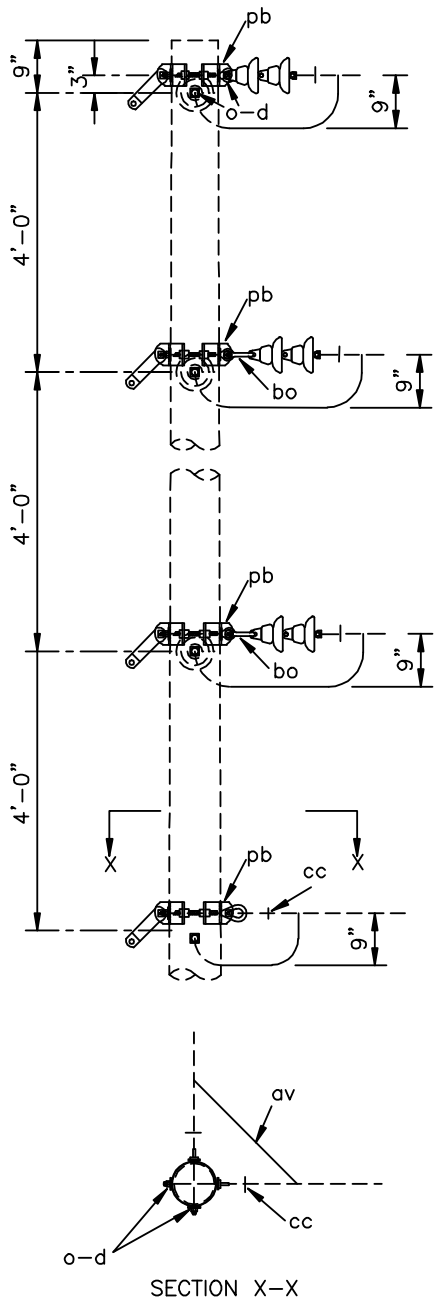
Max. transverse load: 4000 lbs. per conductor
 Angle: 20°-60°

12.5/7.2 kV, 3- PHASE
 VERTICAL CONSTRUCTION



OCTOBER 2009

C3



NOTE: REFER TO E7-2 DRAWING ASSEMBLY FOR GUY

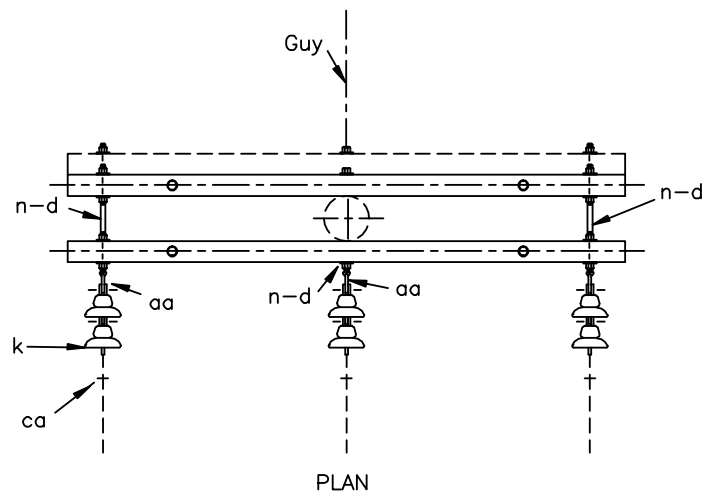
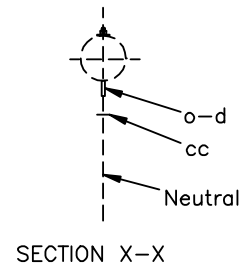
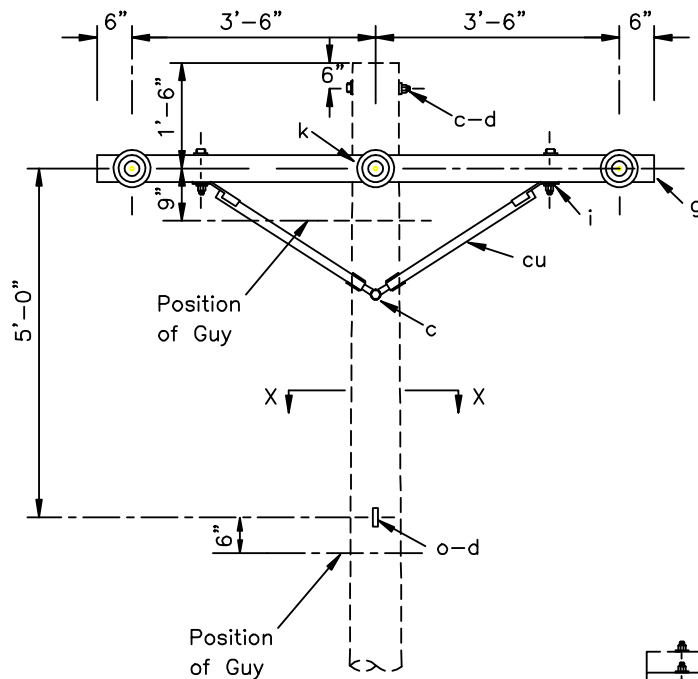
ITEM NO.	MATERIAL	ITEM NO.	MATERIAL
d	8 Washers, square	av	Jumpers, as required
k	12 Insulator, suspension	bo	8 Shackle, anchor
o	8 Bolt, eye, 5/8"x required length	ca	6 Deadend assembly primary
p	Connectors, as required	cc	2 Deadend assembly neutral
aa	8 Nut, eye, 5/8"	pb	4 Pole band

DESIGN LIMITS
 Angle: 60'-90'
 MAX. TRANSVERSE LOAD:
 4000 LBS. PER CONDUCTOR

12.5/7.2 kV, 3-PHASE
 VERTICAL CONSTRUCTION



OCTOBER 2009
 C4-1



*4/0 & LARGER—TRIPLE ARM
 3/4" HARDWARE
 2 POLE BANDS LOCATED
 2" BELOW ARM, 2" APART

*1/0 & SMALLER—USE THIS SPEC.

*USE 3/4 BOLT FOR GUY ATT.

NOTE: REFER TO E1-2
 DRAWING ASSEMBLY FOR GUY

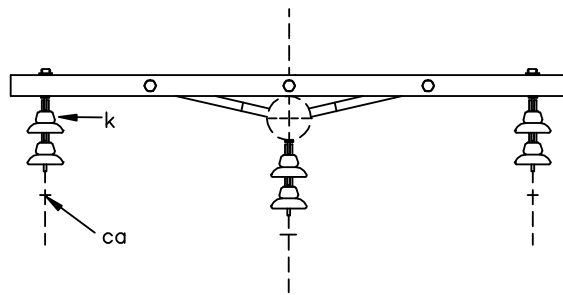
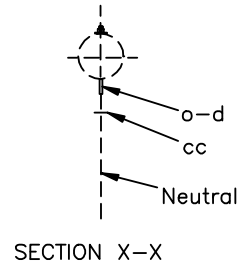
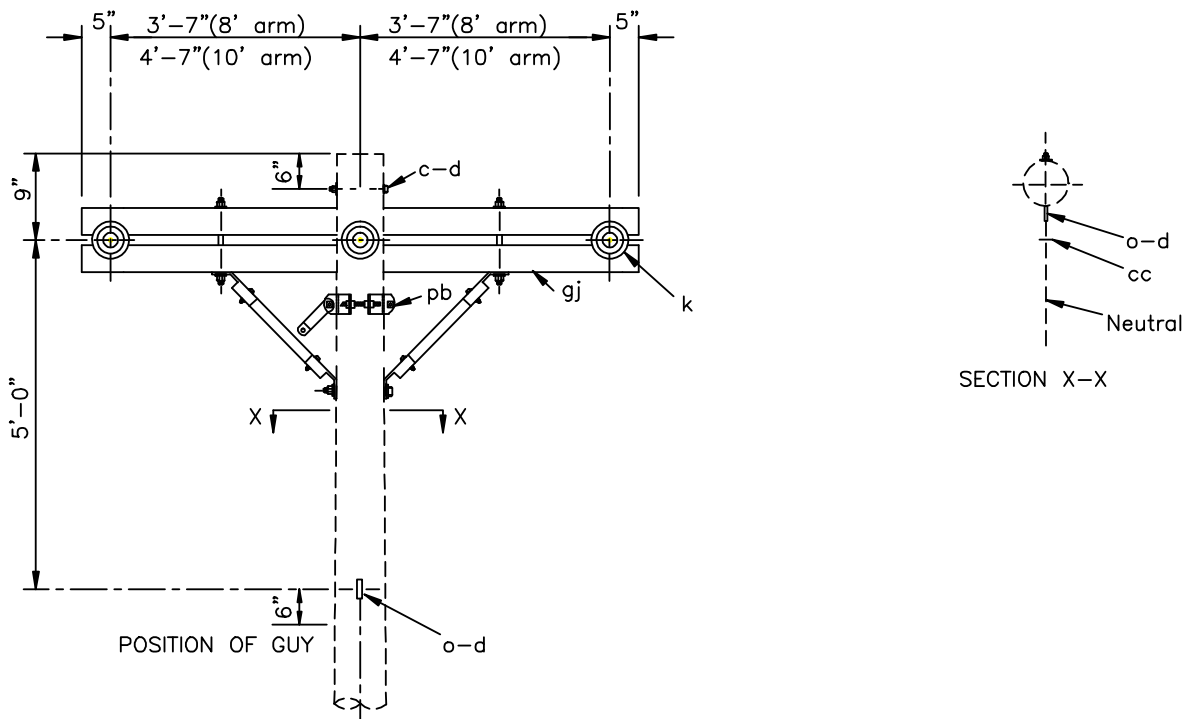
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	13	Washer	n	3	Bolt, double arming, 3/4"x req'd length or 5/8" x req'd length
c	2	Bolt, machine	o	1	Bolt, eye, 5/8"x req'd length
g	2	Crossarm	aa	3	Nut, eye, 3/4" or 5/8" as required
cu	4	Brace, wood, 28"	ca	3	Deadend assembly, Primary
i	4	Bolt, carriage, 1/2" x 6"	cc	1	Deadend assembly, Neutral
k	6	Insulator, suspension			

12.5/7.2 kV,
 3- PHASE CROSSARM CONSTRUCTION
 DEADEND (SINGLE)



OCTOBER 2009

C7, C7-1



PLAN

NOTE: REFER TO E1-2 DRAWING ASSEMBLY FOR GUY

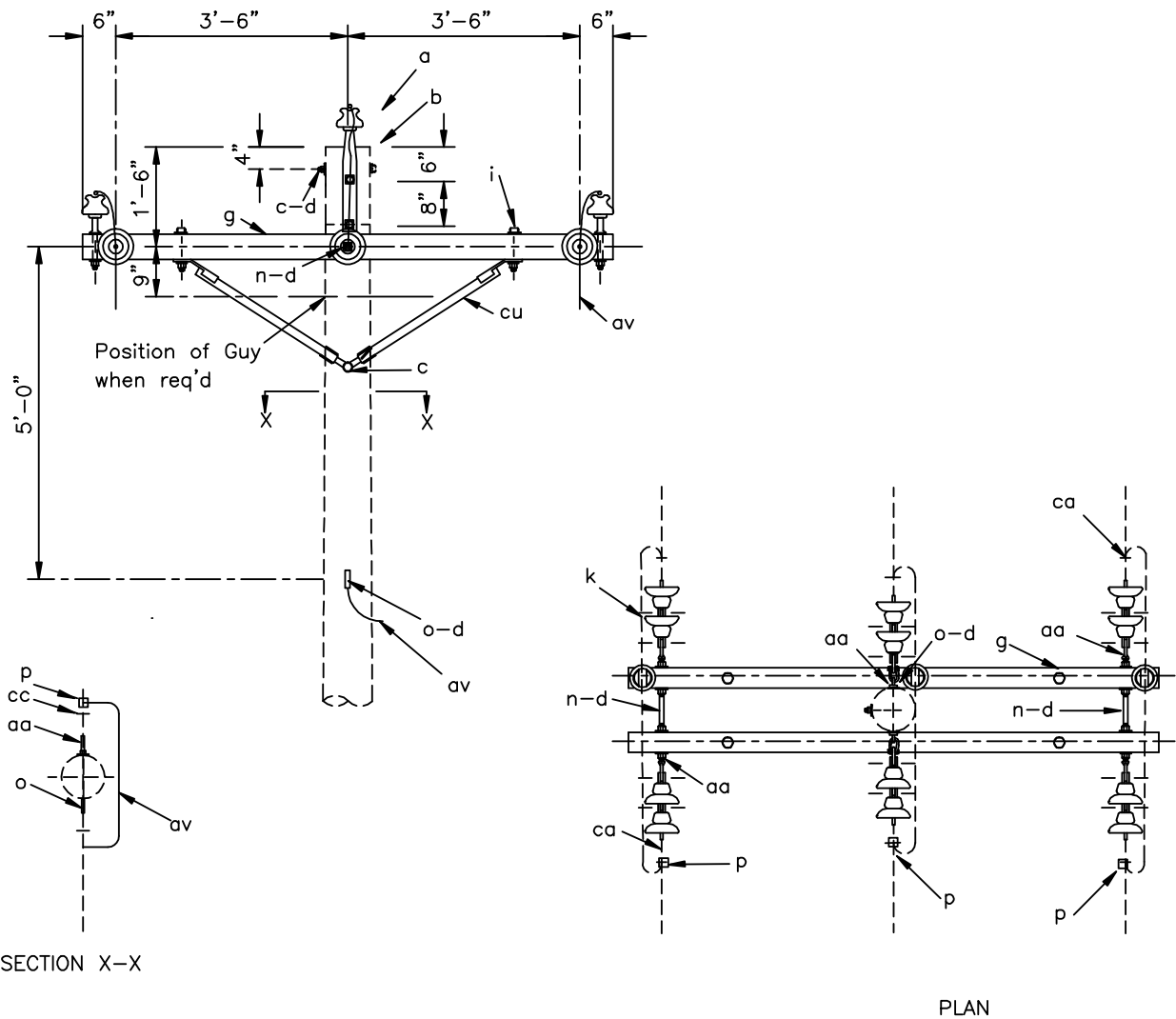
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	3	Washer	gj	1	Crossarm assembly
k	6	Insulator, suspension	pb	1	Pole band
o	1	Bolt, eye, 5/8"x req'd length	c	1	Bolt, machine, 5/8 x req'd length
ca	3	Deadend assembly, Primary			
cc	1	Deadend assembly, Neutral			

12.5/7.2 kV,
3- PHASE CROSSARM CONSTRUCTION
DEADEND (SINGLE) (HUGHES)



OCTOBER 2009

C7A



Note:

4/0 AND LARGER USE 3/4" DOUBLE ARMING BOLTS
 Refer to E1-2 drawing assembly for guy

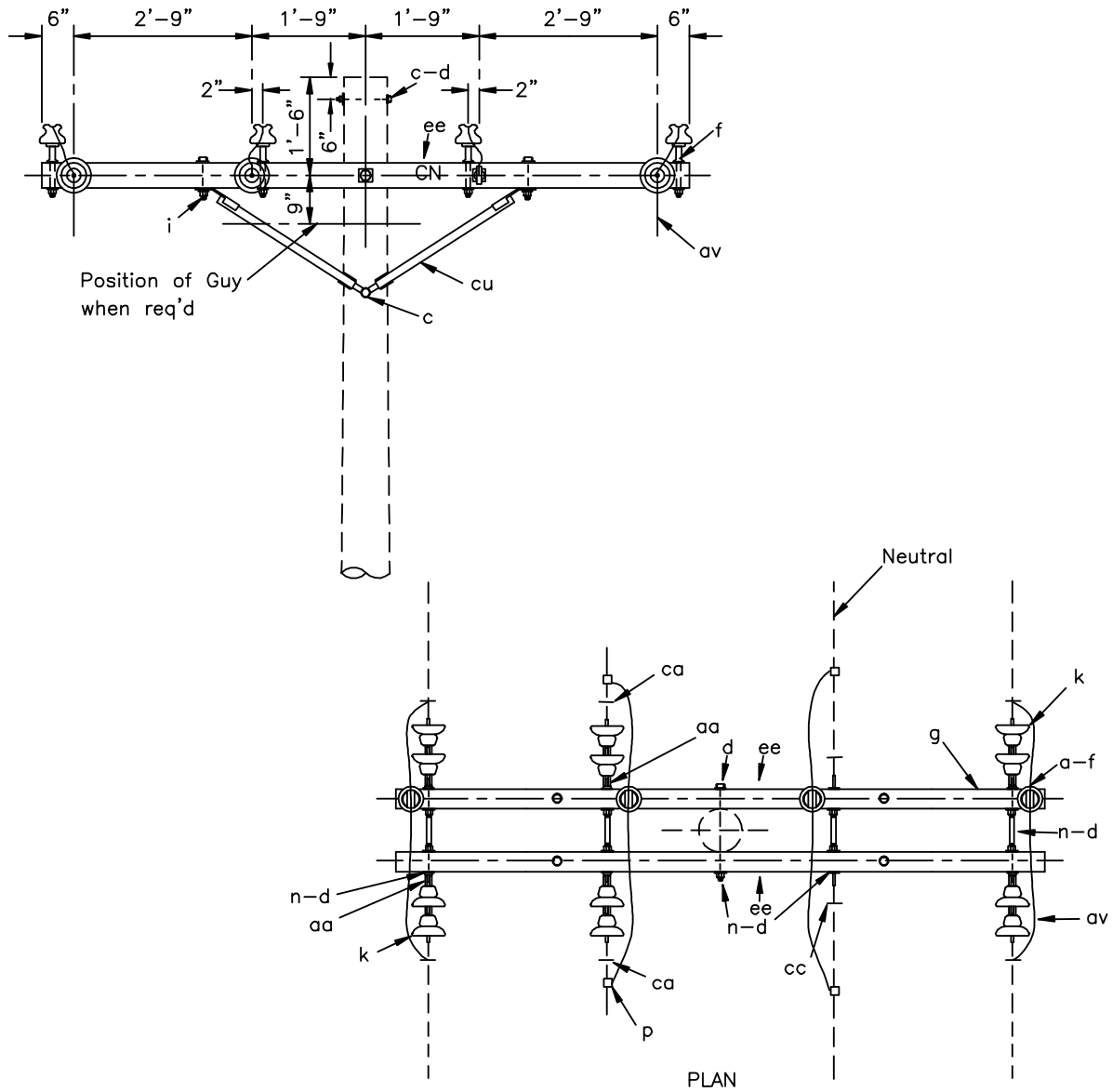
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
c	5	Bolt, machine, 5/8"x req'd length	o	5	Bolt, eye, 5/8"x req'd length
d	20	Washer	p		Connectors, as req'd
g	2	Crossarm	aa	8	Nut, eye, 5/8"
k	12	Insulators, suspension	av		Jumpers and leads as req'd
n	3	Bolt, double arming, 5/8"x req'd length	ca	6	Deadend assembly, primary
i	4	Carriage bolt, 1/2" x 6"	cc	2	Deadend assembly, neutral
a	3	Insulators, pin type	cu	4	Brace, wood 28"
f	2	Pin, cross arm			
b	1	Pin, pole top			

12.5/7.2 kV, 3-PHASE
 CROSSARM CONSTRUCTION, DEADEND (DOUBLE)



OCTOBER 2009

C8



Note: Refer to E1-2 drawing assembly for guy.

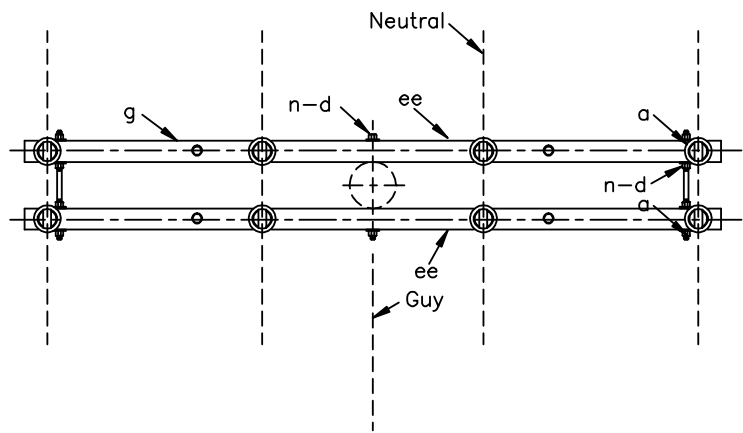
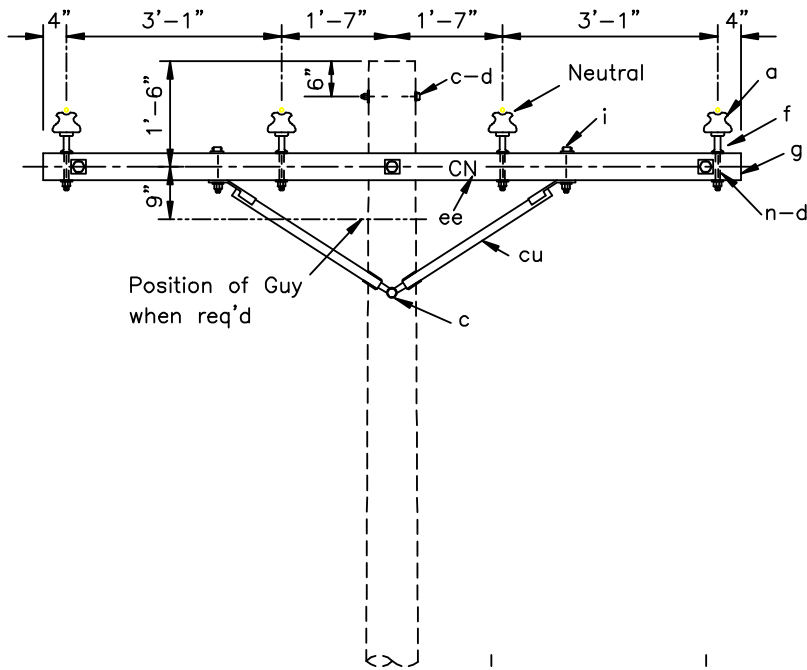
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	4	Insulator, pin type	p		Connectors, as req'd
i	4	Bolt, carriage, 1/2"x 6"	c	2	Bolt, machine, 5/8"x req'd length
d	24	Washer	aa	8	Nut, eye, 5/8"
f	4	Pin, crossarm	av		Jumpers and leads as req'd
g	2	Crossarm	ee	4	Letters 2 "C" and 2 "N"
k	12	Insulator, suspension	ca	6	Deadend assembly, primary
n	5	Bolt, double arming, 5/8"x req'd length	cc	2	Deadend assembly, neutral
			cu	4	Brace, wood 28"

12.5/7.2 kV, 3-PHASE
CROSSARM CONSTRUCTION- DEADEND (DOUBLE)



OCTOBER 2009

C8-1



Note: Refer to E1-2 drawing assembly for guy
For 4/0 ACSR or larger use 5 double arming bolts

PLAN

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	8	Insulator, pin type	f	8	Pin, crossarm, steel
i	4	Bolt, carriage, 1/2"x 6"	g	2	Crossarm
d	20	Washer	n	3	Bolt, double arming, 5/8"x req'd length
c	2	Bolt, machine, 5/8" x req'd length	cu	4	Brace, wood, 28"
			ee	4	Letters, 2 "C", 2 "N"

DESIGN LIMITS

Max. transverse load: 1000 lbs. per conductor

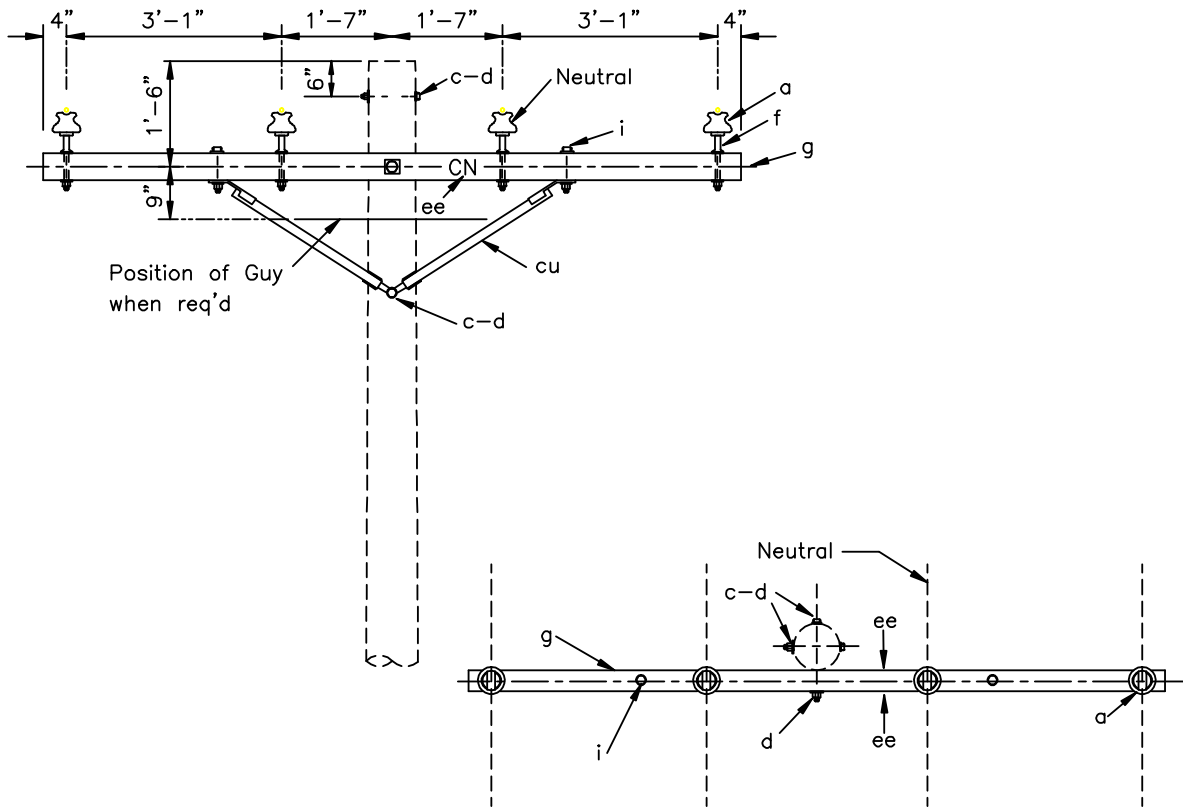
Max. line angle within load limits: 20'

12.5/7.2 kV, 3-PHASE
CROSSARM CONSTRUCTION-DOUBLE LINE ARM



OCTOBER 2009

C9



PLAN

Note: refer to E1-2 drawing assembly for guy

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	4	Insulator, pin type	f	4	Pin, crossarm, steel
c	3	Bolt, machine, 5/8"x req'd length	g	1	Crossarm
i	2	Bolt, carriage, 1/2"x 6"	cu	2	Brace, wood, 28"
d	9	Washer			
ee	4	Letters, 2 "C", 2 "N"			

DESIGN LIMITS

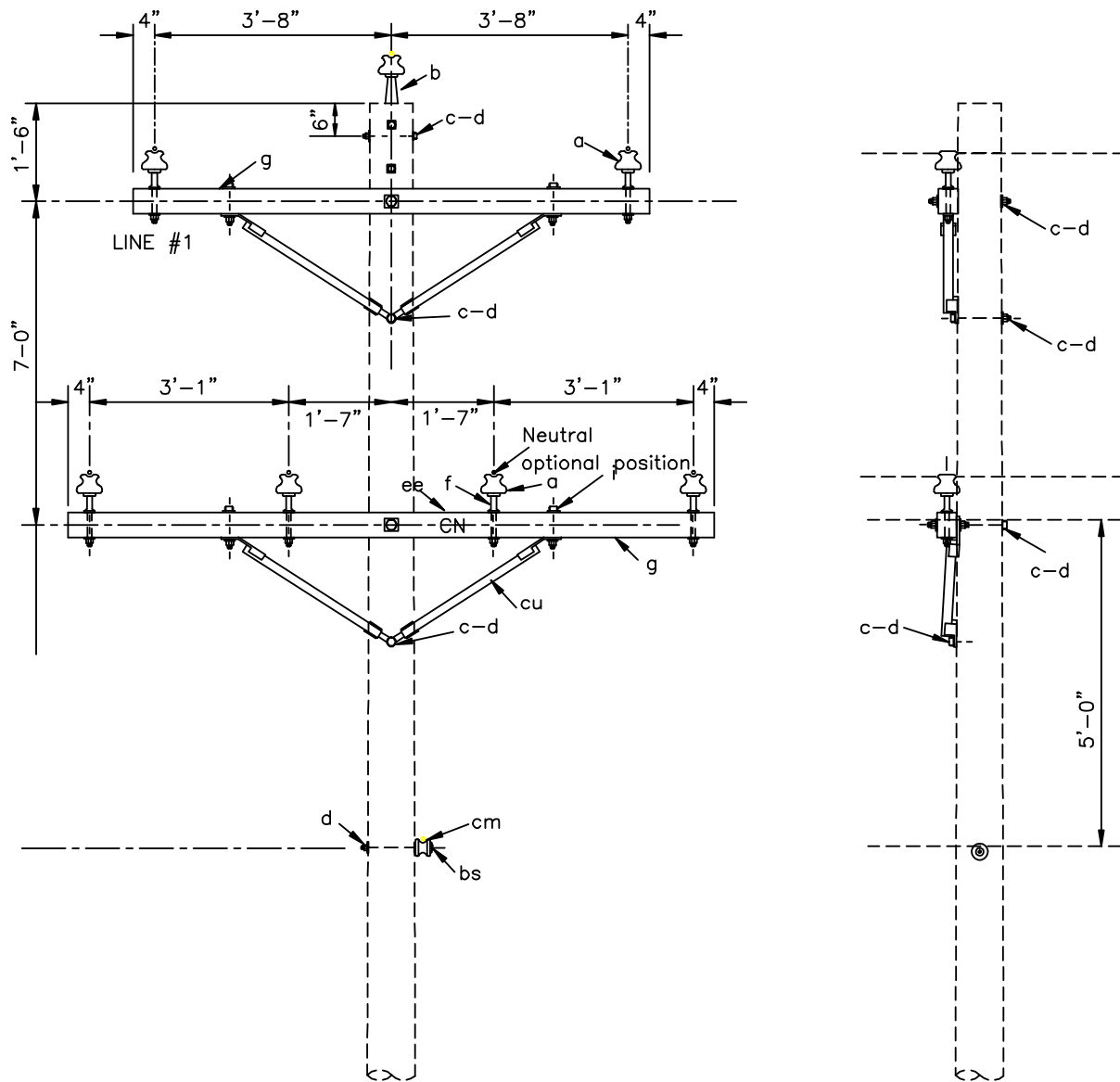
Max. transverse load: 500 lbs. per conductor
 Max. line angle within load limits: 5'

12.5/7.2 kV,
 3-PHASE CROSSARM CONSTRUCTION
 SINGLE LINE ARM



OCTOBER 2009

C9-1



Option to put neutral on lower crossarm.

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	g	1	Crossarm, 8'
c	7	Bolt, machine, 5/8"x req'd length	i	4	Bolt, carriage, 1/2"x 6"
b	1	Pin, pole top	bs	1	Bolt, single upset
d	17	Washer	cu	4	Brace, wood, 28"
f	7	Pin, crossarm, steel	ee	4	Letters 2 "C" , 2 "N"
g	1	Crossarm, 10'			
cm	1	Spool insulator			

DESIGN LIMITS

Max. transverse load: 500 lbs. per conductor

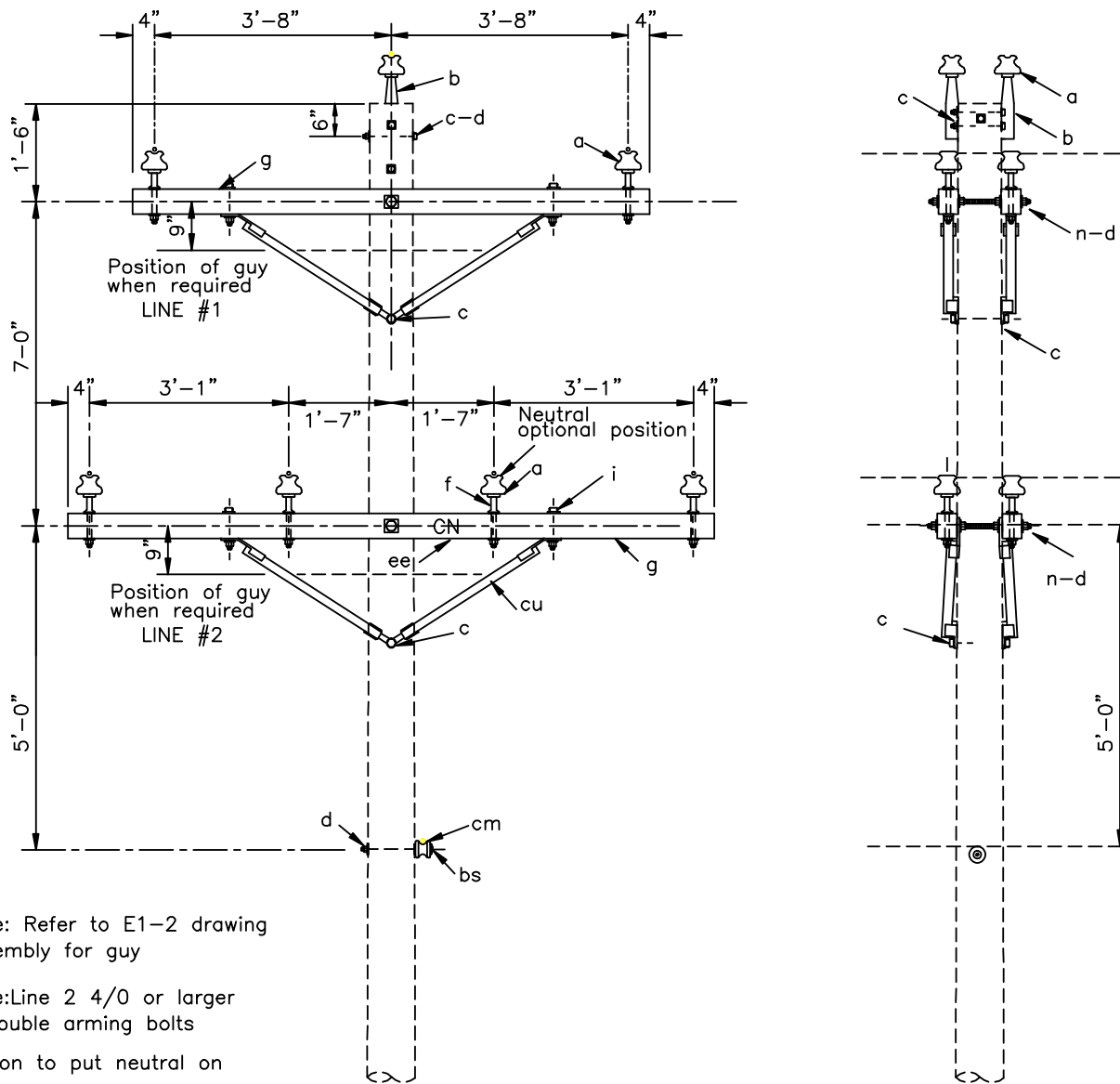
Max. line angle within load limits: 5'

12.5/7.2 kV, 3-PHASE
CROSSARM CONSTRUCTION-DOUBLE CIRCUIT
SINGLE PRIMARY SUPPORT, 2 CROSSARM TYPE



OCTOBER 2009

DC-C1



Note: Refer to E1-2 drawing assembly for guy

Note: Line 2 4/0 or larger
5 double arming bolts

Option to put neutral on lower cross arm.

ITEM NO.	MATERIAL	ITEM NO.	MATERIAL
a	14 Insulator, pin type	g	2 Crossarm, 8' 0"
c	5 Bolt, machine, 5/8"x req'd length	i	8 Bolt, carriage, 1/2"x 6"
b	2 Pin, pole top	bs	1 Bolt, single upset
d	38 Washer	cu	8 Brace, wood, 28"
ee	4 Letters, 2"C", 2"N"	n	8 Bolt, double arming, 5/8" x req'd length
f	12 Pin, crossarm, steel		
g	2 Crossarm, 10'-0"		
cm	1 Spool insulator		

12.5/7.2 kV, 3-PHASE
CROSSARM CONSTRUCTION-DOUBLE CIRCUIT
SINGLE PRIMARY SUPPORT, 2 CROSSARM TYPE

DESIGN LIMITS

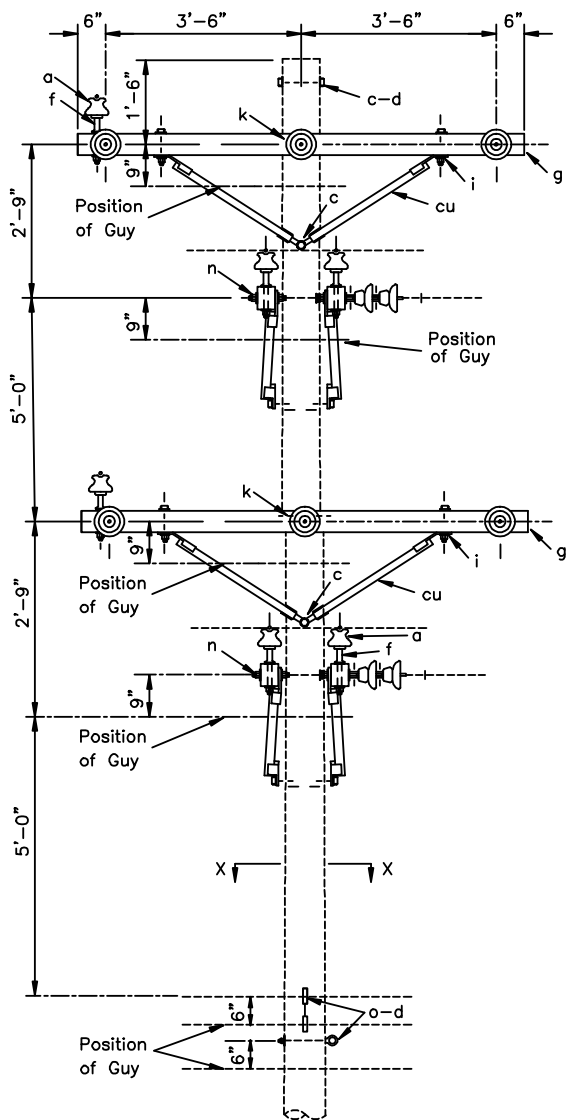
Max. transverse load: 500 lbs. per conductor

Max. line angle within load limits: 5'



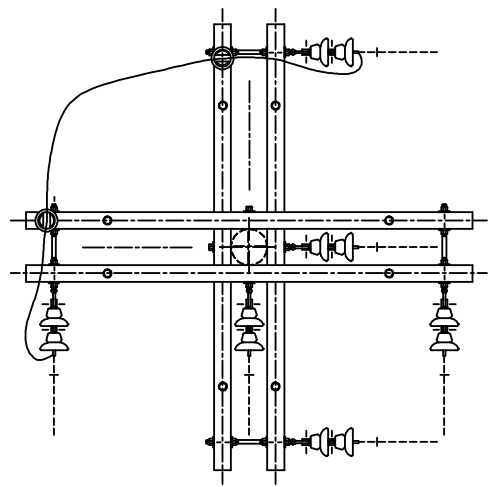
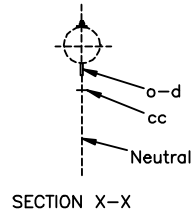
OCTOBER 2009

DC-C2



Line #1

Line #2



Note: refer to E1-2 drawing assembly for guy.
 4/0 or larger wire refer to drawing C7, C7-1, or C7A

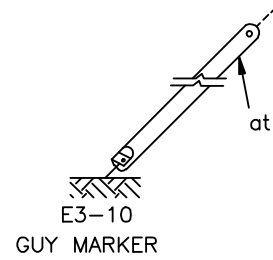
ITEM NO.	MATERIAL	ITEM NO.	MATERIAL
d 48	Washer	n 12	Bolt, double arming, 5/8" x req'd length
c 5	Bolt, machine	o 2	Bolt, eye, 5/8" x req'd length
g 8	Crossarm	aa 12	Nut, eye, 5/8"
cu 16	Brace, wood, 28"	ca 12	Deadend assembly, Primary
i 16	Bolt, carriage, 1/2" x 6"	cc 2	Deadend assembly, Neutral
k 24	Insulator, suspension	a 4	Insulator, pin type
f 4	Pin, crossarm, steel		

12.5/7.2 kV,
 DOUBLE DEADEND THREE PHASE
 90° CORNER



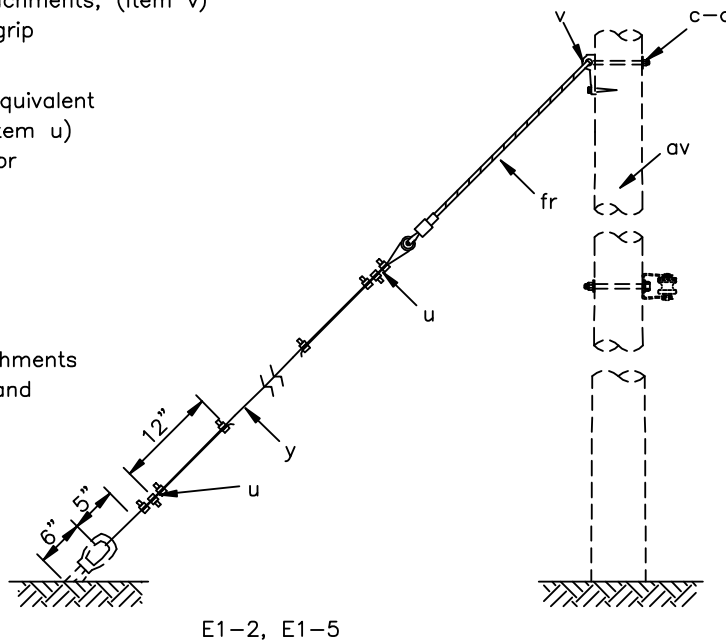
OCTOBER 2009

DC-C7A



NOTES:

1. Formed type grips may be used only with suitable attachments, (item v) as recommended by grip manufacturer.
2. Other accepted and equivalent dead-end material (item u) may be substituted for the ones shown.
3. Lag screw should be used when guy attachment has provision for it.
4. Pole bands guy attachments to be used on 4/0 and larger conductor.



E1-2, E1-5

		ASSEMBLY UNIT		
		E1-5	E1-2	
		SECONDARY	PRIMARY	
ITEM	MATERIAL	No. REQ'D.	No. REQ'D.	
c	Bolt, machine, 3/4"x req'd length	1	1	
d	Washer, curved	(1)-3"x 3"	(1)-3"x 3"	
j	Screw, lag, 1/2"x 4"			
at	Guy guard	as req'd	as req'd	
u	Deadend for guy strand	2	2	
v	Guy attachment (rating)	(1)-8300 lbs.	(1)-8300 lbs.	
y	Guy wire, req'd length	3/8"	3/8"	
fr	Fiber rod, req'd length	36"	54" or longer	

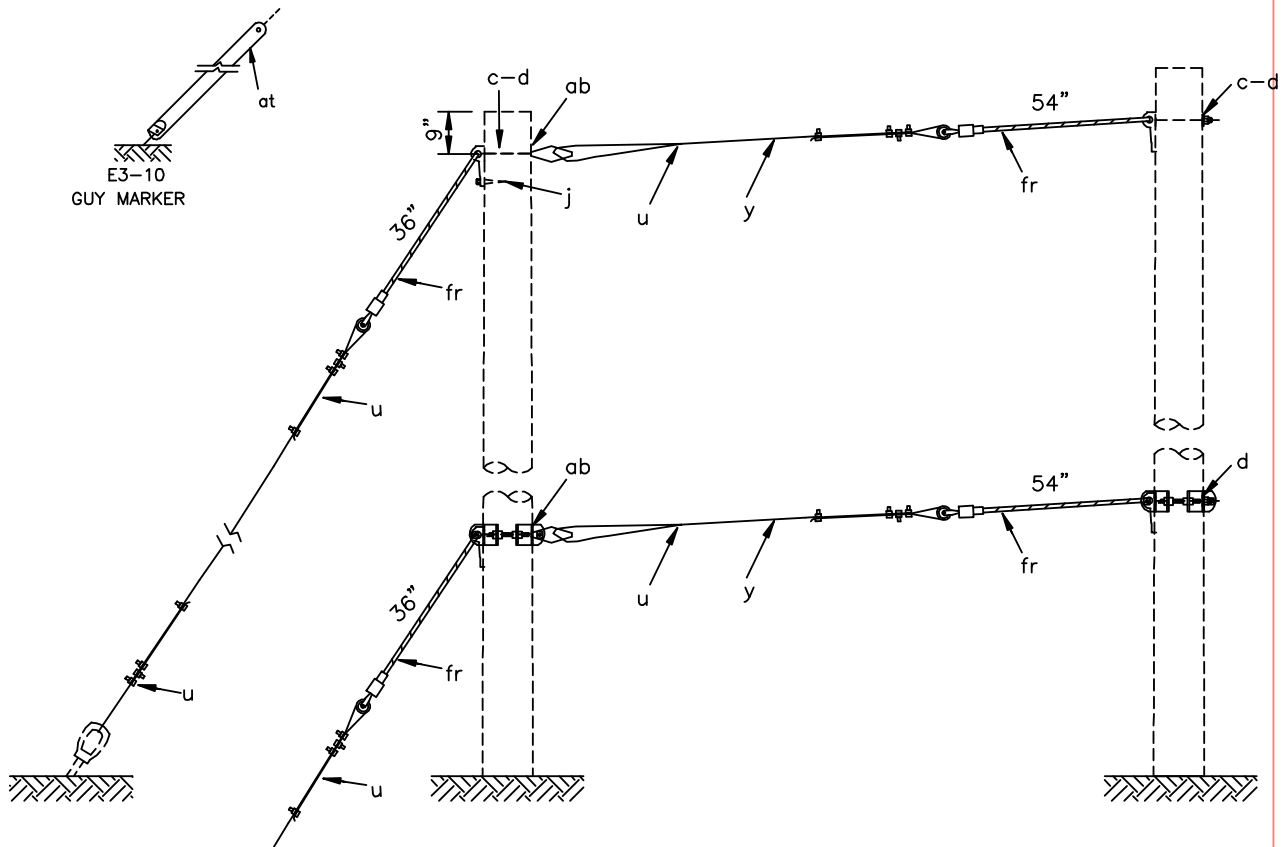
Note: refer to F2-6, F2-8, F2-10, F2-12

12.5/7.2 kV
SINGLE DOWN GUY, FIBER ROD TYPE



OCTOBER 2009

E1-2, E1-5



ASSEMBLY UNIT

	E2-1	E2-2	E2-3	
	LIGHT DUTY	HEAVY DUTY	HEAVY DUTY	
ITEM	MATERIAL	No. REQ'D.	No. REQ'D.	No. REQ'D.
d	Washer, curved 2-1/4"	1	(1)-3"x 3"	
d	Washer, curved		(1)-3"x 3"	(1)-4"x 4"
u	Deadend for guy strand	3/8"	3/8"	heavy duty(2)
y	Guy wire, req'd length	3/8"	3/8"	7/16"
ab	Nut, thimble type eye, 5/8"	1	1	1
ao	Bolt, thimbleye, 5/8"x req'd length by	1	1	1
fr	Fiber rod, req'd length	36"	54" or longer	54" or longer
at	Guy Marker	As Req'd	As Req'd	As Req'd
pb	Pole Band		4	4
j	Screw, Lag, 1/2"x4"	2		
c	Bolt, machine, 5/8" x req'd length	2		

Note: Refer to F2-6, F2-8, F2-10, F2-12

12.5/7.2kV,
SINGLE OVERHEAD GUY, THROUGH BOLT TYPE
NEXT PAGE FOR 4/0 & LARGER

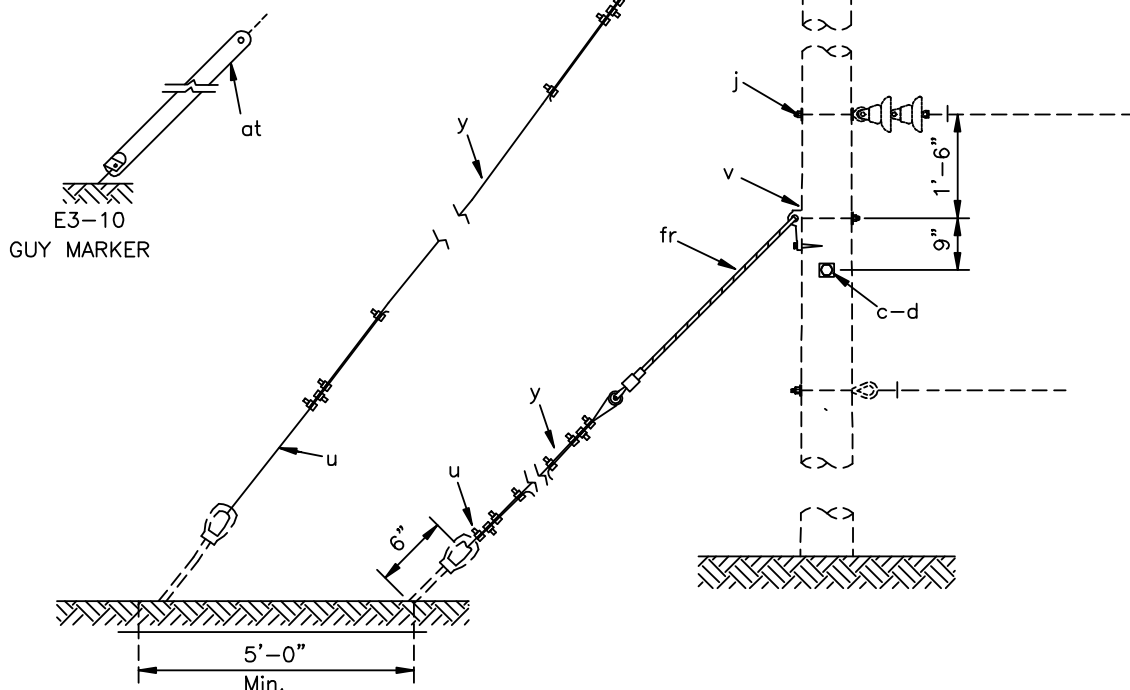


OCTOBER 2009

E2-1, E2-2, E2-3

Notes:

1. When two guys are attached to one anchor rod, use F1-1 or larger anchor.
2. Spacing between anchors shall be sufficient to provide maximum holding power of each anchor.
3. For loose soils, concrete or other pole footings are recommended.
4. Other accepted and equivalent (item u) deadend material may be substituted for automatic deadend shown.



		ASSEMBLY UNIT	
ITEM	MATERIAL	No. REQ'D.	
c	Bolt, machine, 3/4"x req'd. length	2	
d	Washer, 3"x 3" curved	2	
j	Screw, lag, 1/2"x 4"	2	
fr	Fiber rod, req'd length	54" or longer	
u	Deadend, for guy strand	4	
v	Guy attachment, fiber rod	2	
y	Guy wire,	3/8"	
a	Guy Marker	2	

Note: Refer to F2-6, F2-8, F2-10, F2-12

12.5/7.2 kV
DOUBLE DOWN GUY
FOR 1/0 & SMALLER

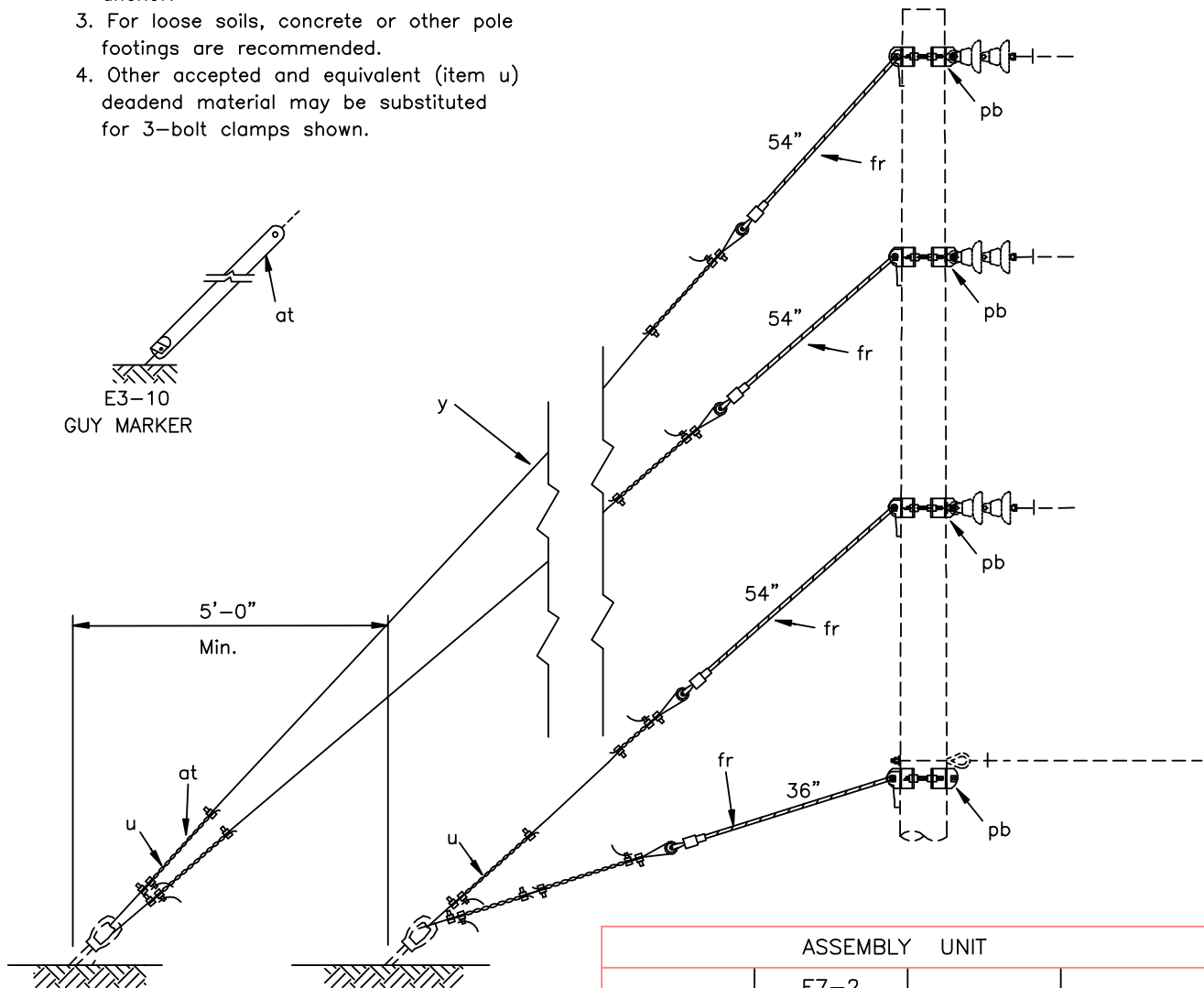


OCTOBER 2009

E6-2, E6-3

Notes:

1. Where three separate anchors are installed the minimum separation shall be five feet.
2. Spacing between anchors shall be sufficient to provide maximum holding power of each anchor.
3. For loose soils, concrete or other pole footings are recommended.
4. Other accepted and equivalent (item u) deadend material may be substituted for 3-bolt clamps shown.



ITEM	MATERIAL
at	Guy marker
fr	Fiber rod 54" or longer
fr	Fiber rod 36"
u	Deadend for guy strand
pb	Pole band
y	Guy Wire, req'd length

ASSEMBLY UNIT			
	E7-2		
	No. REQ'D.		
	4		
	3		
	1		
	8		
	4		
	3/8"		

Note: Refer to F2-6, F2-8, F2-10, F2-12

12.5/7.2 kV
FOUR DOWN GUYS
(LARGE CONDUCTORS)

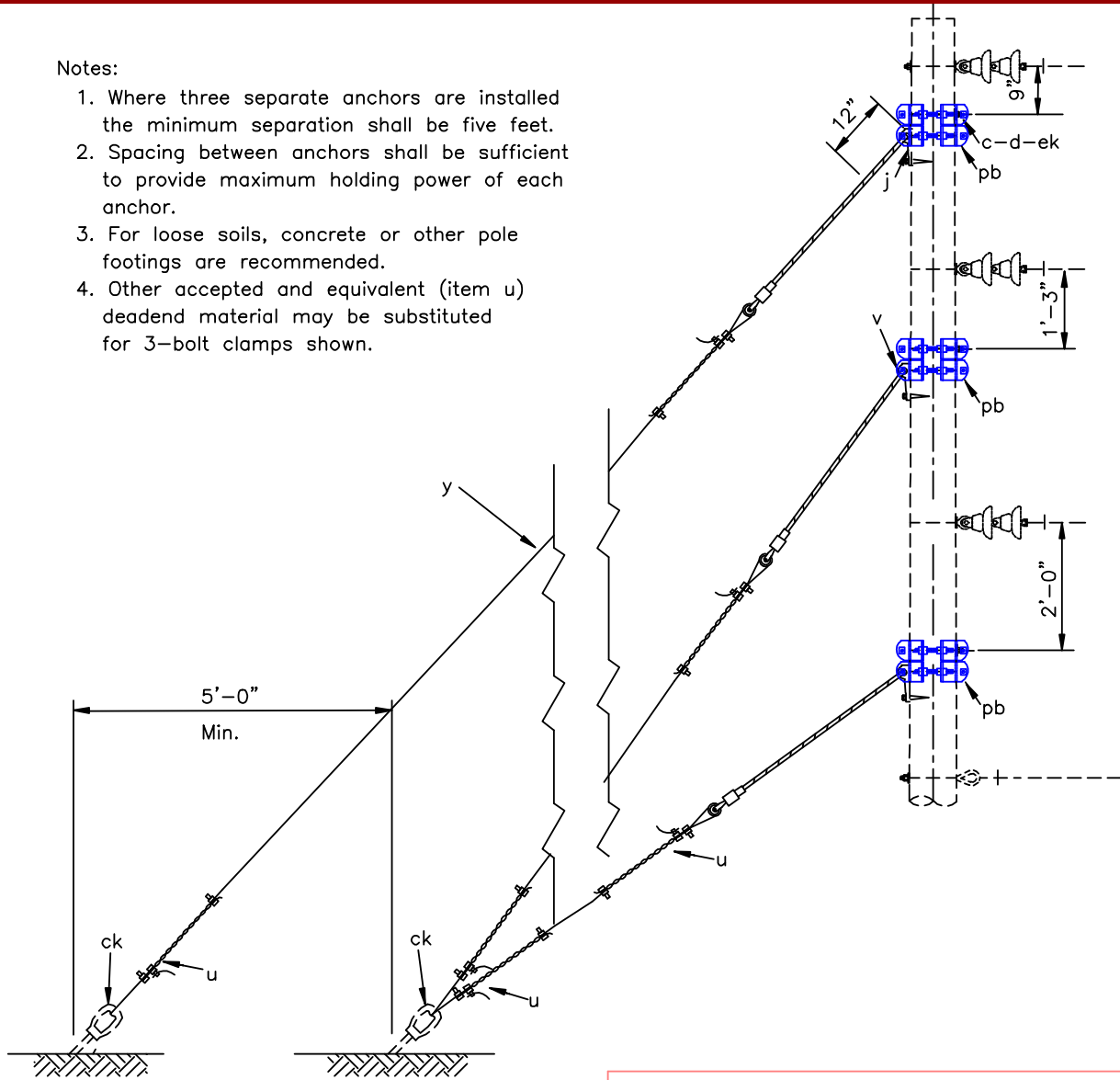


OCTOBER 2009

E7-2

Notes:

1. Where three separate anchors are installed the minimum separation shall be five feet.
2. Spacing between anchors shall be sufficient to provide maximum holding power of each anchor.
3. For loose soils, concrete or other pole footings are recommended.
4. Other accepted and equivalent (item u) deadend material may be substituted for 3-bolt clamps shown.



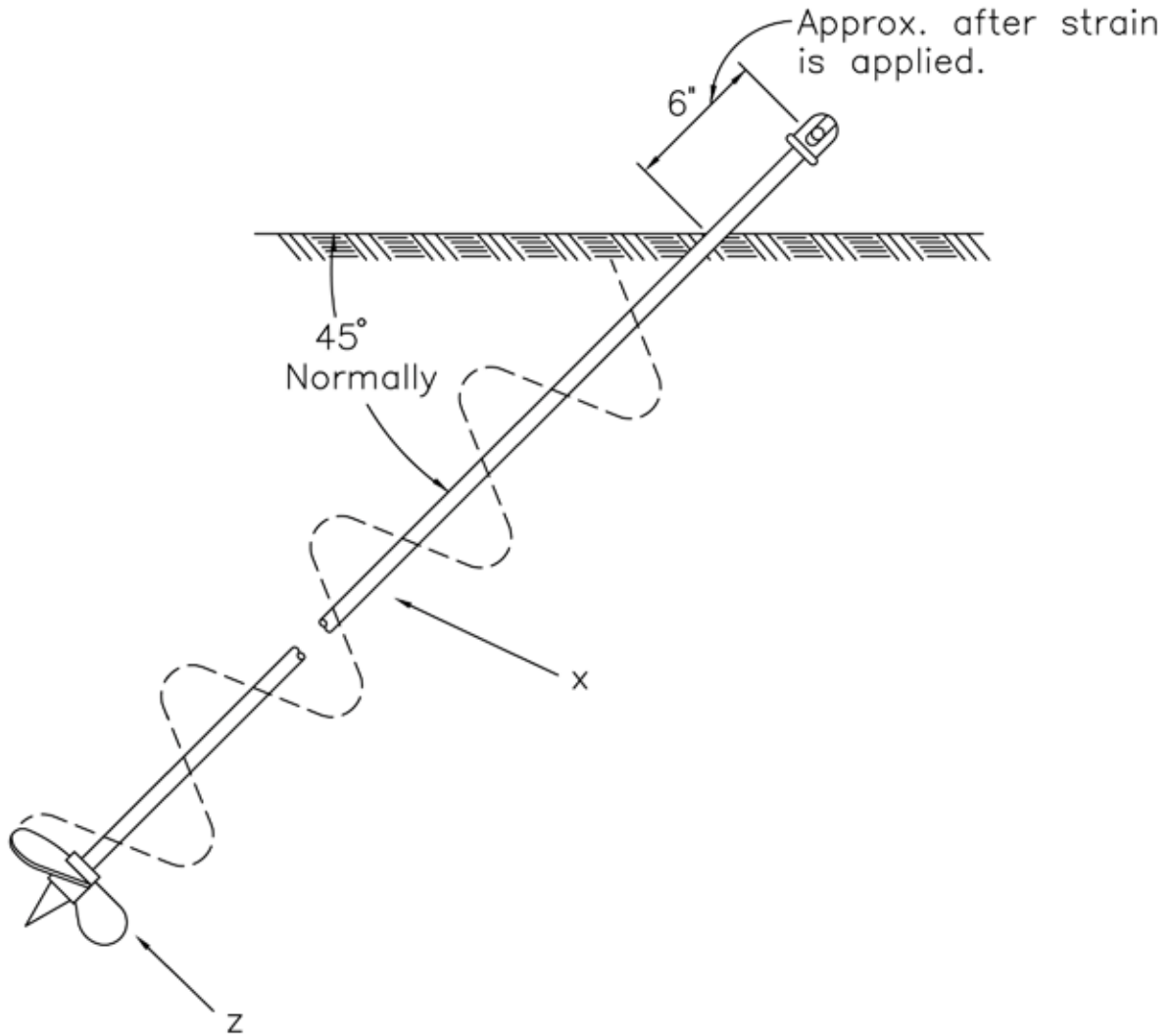
		ASSEMBLY UNIT	
		E7-3	
		No. REQ'D.	
c	Bolt, machine, 5/8"x req'd length		3
d	Washer, curved, 3"x 3"x 5/16"		3
j	Screw, lag, 1/2"x 4"		3
p	Connectors		as req'd.
u	Deadend for guy strand		6
v	Guy attachment		(3)-8500 lbs.
y	Guy Wire, S.M., 7-strand req'd length by		7/16"
av	Jumpers, #4 stranded Al. alloy or equiv.		as req'd.
ck	Clamp, guy bond, as required		
at	Guy Guard (as required)		

12.5/7.2 kV
THREE DOWN GUYS
(LARGE CONDUCTORS)



FEBRUARY 2008

E7-3



NOTE: Designated maximum holding power rating assumes proper installation in class 5 soil.

		ASSEMBLY: F2				ASSEMBLY NUMBERS	
		.6	.8	.10	.12	NEW	(OLD)
	Minimum Area (sq. in.)	90	100	120	135		
ITEM	MATERIAL	QTY	QTY	QTY	QTY		
x	Rod, anchor, thimble eye, 5/8" x 7'0"	1	1			F2.6	(F1-1S)
x	Rod, anchor, twin eye, 3/4 X 8'0"			1	1	F2.8	(F1-2S)
z	Anchor, screw type, power installed	1	1	1	1	F2.10	(F1-3S)
						F2.12	(F1-4S)

DESIGN PARAMETERS:
DESIGNATED MAXIMUM
HOLDING POWER (lbs.)

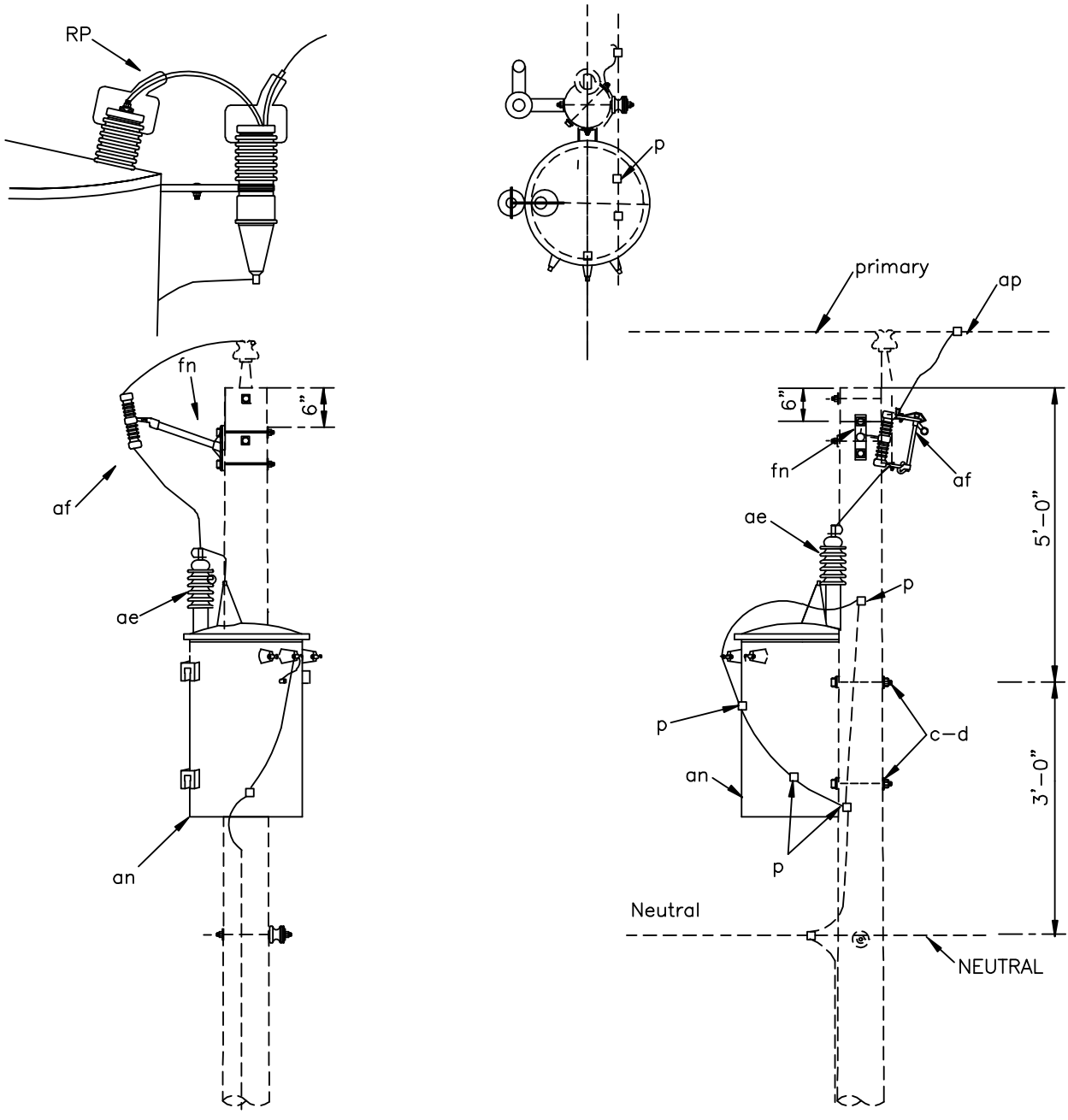
F2.6: 6,000
F2.8: 8,000
F2.10: 10,000
F2.12: 12,000

SCREW ANCHORS, (POWER INSTALLED)



DECEMBER 2010

F2.6, F2.8, F2.10, F2.12



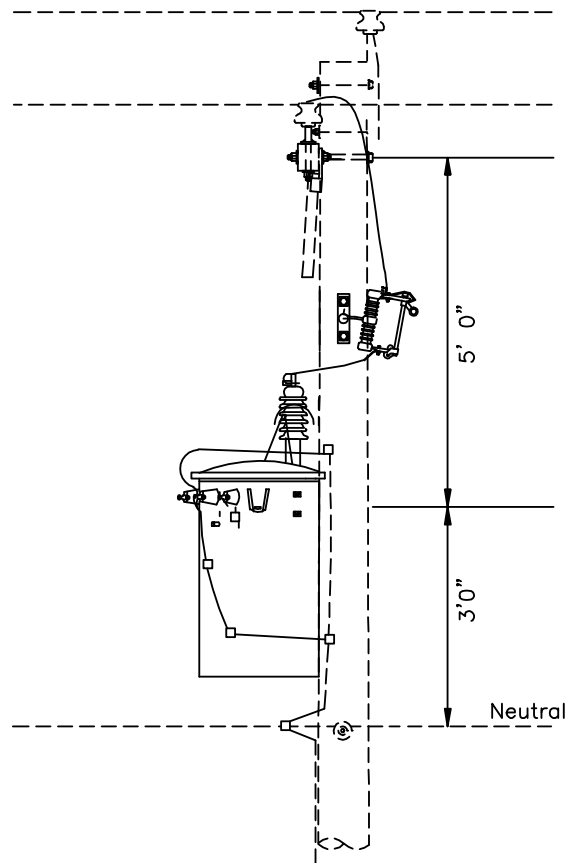
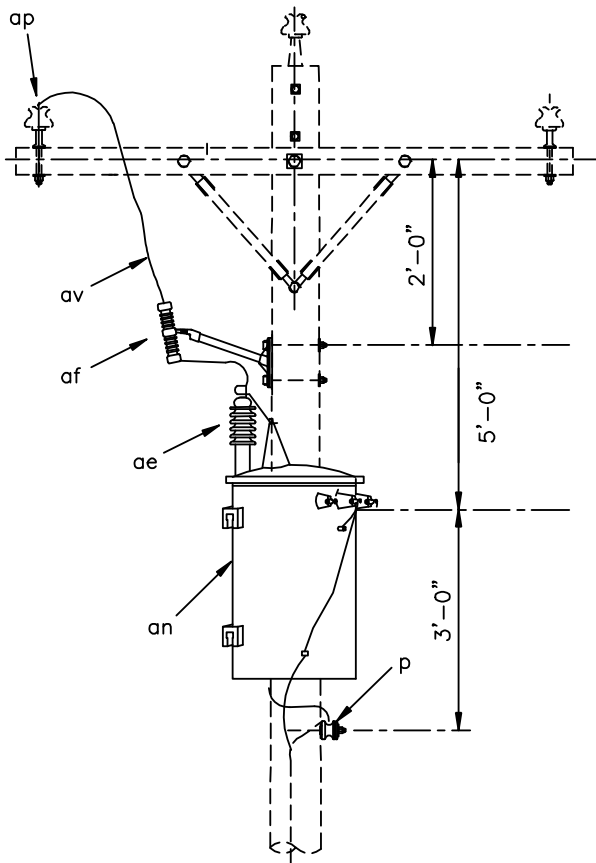
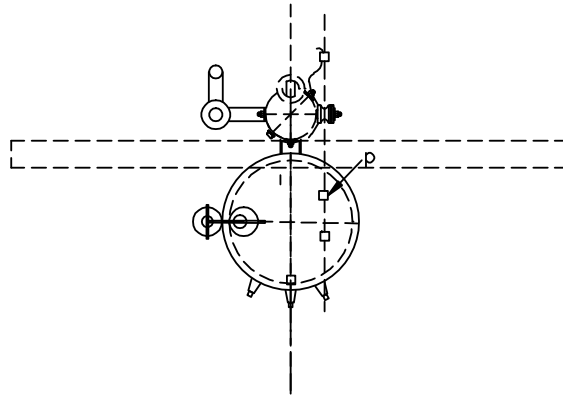
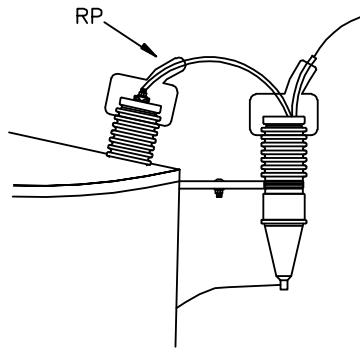
Note: Use split bolt hole for top hole of cutout bracket.

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
c	4	Bolt, machine, 5/8"x req'd length	an	1	Transformer
d	4	Washer	ap	1	Clamp, hot line, tap assembly
fn	1	Bracket, cut-out	av		Jumpers, stranded, as required
p		Connectors, as required	RP		Wildlife Guard, as req'd
ae	1	Surge arrester			
af	1	Cutout, fuse			

12.5/7.2 kV
 SINGLE PHASE TRANSFORMER
 AT 1-PHASE TANGENT



OCTOBER 2009
 G9A



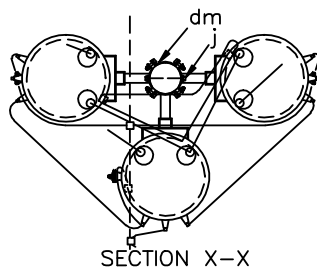
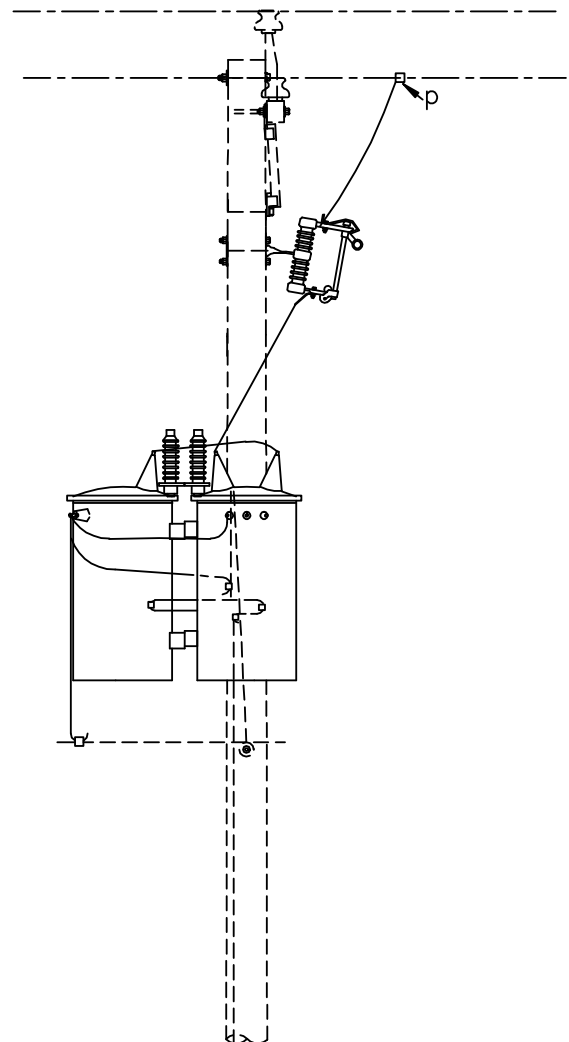
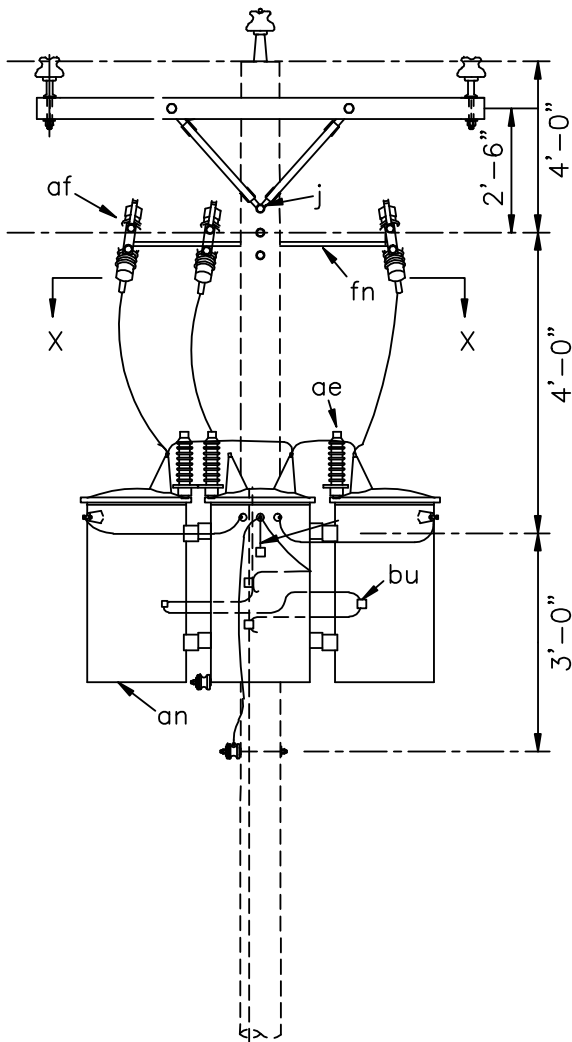
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
c	4	Bolt, machine, 5/8"x req'd length	av		Jumpers, stranded, as required
d	4	Washer	af	1	Cutout, fuse
fn	1	Bracket, Cutout	ae	1	Surge arrester
p		Connectors, as required	rp		Wildlife guard, as req'd
an	1	Transformer			
ap	1	Clamp, hot line, tap assembly			

12.5/7.2 kV
SINGLE PHASE TRANSFORMER
ON THREE PHASE CIRCUIT



OCTOBER 2009

G39-,G39-1



ITEM

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ae
af
p
p
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av
av
bu
dm

fo

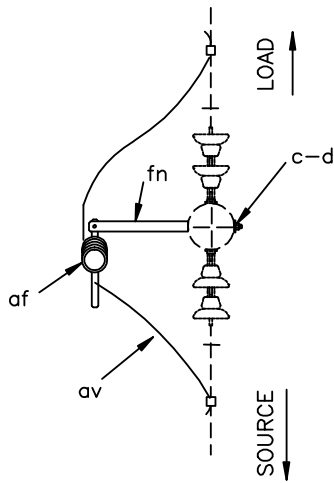
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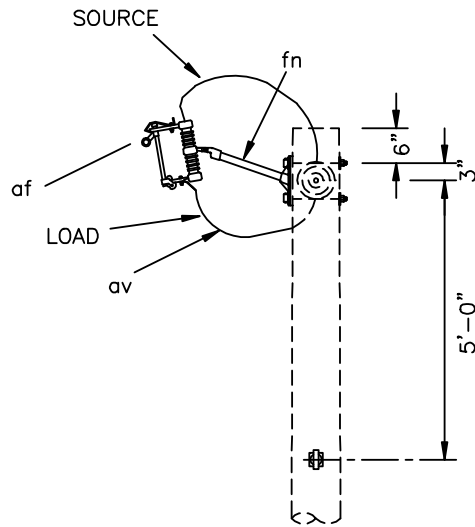
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Note
For





PLAN



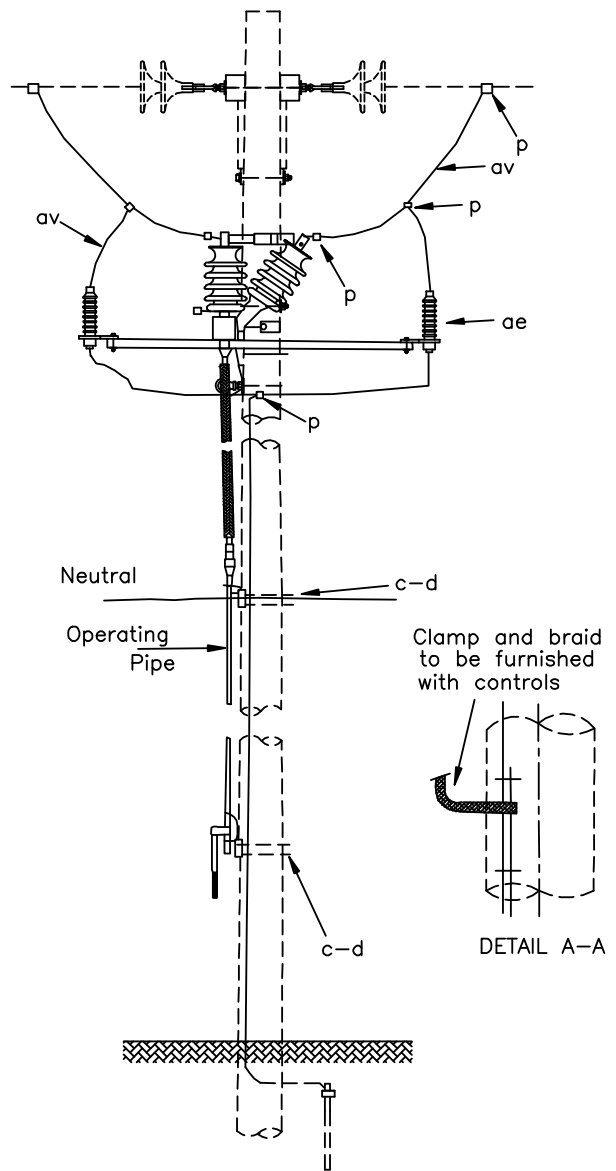
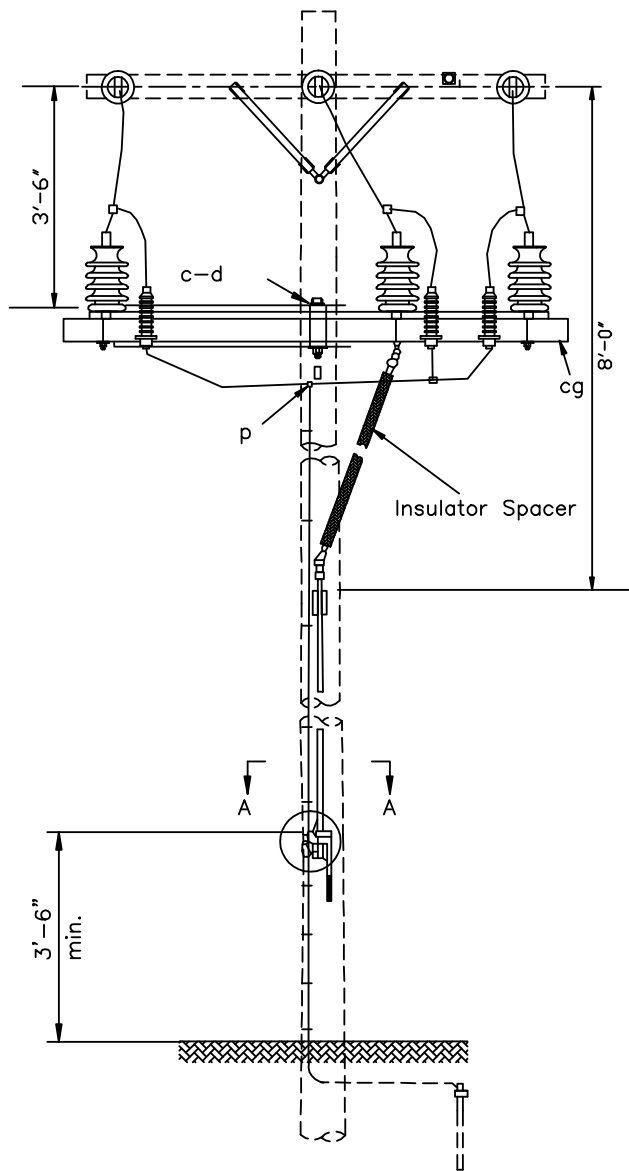
ITEM	MATERIAL	M3-4 NO. REQ'D
c	Bolt, machine, 5/8"x req'd length	2
d	Washer	2
p	Connector, compression type	as req'd
af	Cutout, fuse, single shot	1
av	Leads or jumpers	as req'd
fn	Bracket, cutout	1

12.5/7.2 kV, 1-PHASE
ONE SECTIONALIZING FUSE CUTOUT



OCTOBER 2009

M3-4



ITEM	NO.	MATERIAL
c	6	Bolt, machine 5/8" x Req'd length
d	6	Washer 11/16" hole
d	2	Washer 13/16" hole
cg	1	Switch, 3 ph airbreak
p	6	Connector, as req'd
Uae	6	Arrestor, lightning
c	2	Bolt, machine 3/4" x req'd length
av	-	Jumper, as required

ITEM	NO.	MATERIAL
p	-	Connector, as required

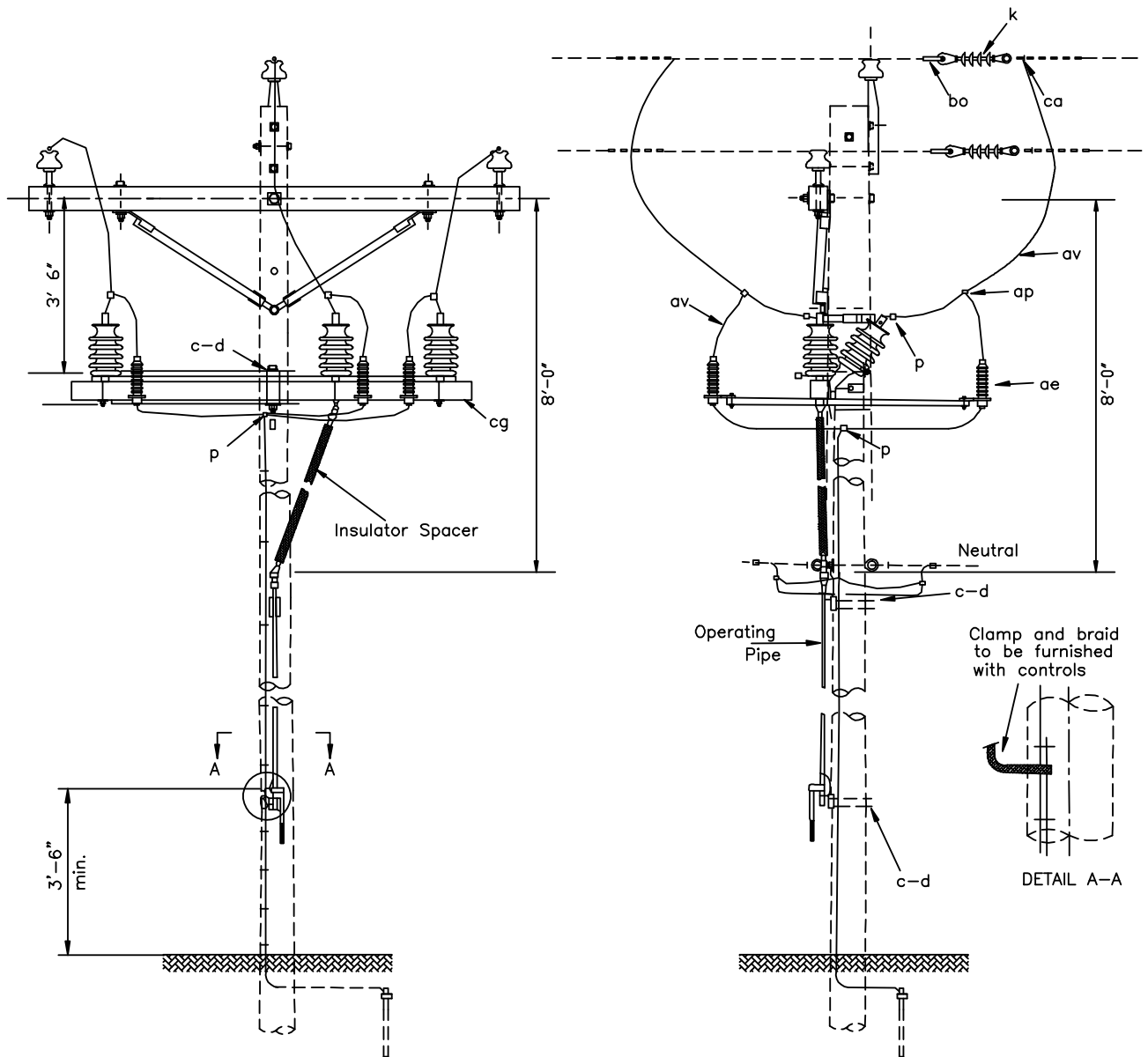
Note: Follow switch installation instructions.

SECTIONALIZING AIR BREAK SWITCH



OCTOBER 2009

M3-15X



ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
c	6	Bolt, machine 5/8" x req'd length	k	3	Insulator, suspension
d	6	Washer 11/16" hole	p	-	Connector, as required
d	2	Washer 13/16" hole	bo	3	Shackle, anchor
cg	1	Switch, 3 ph airbreak			
ca	6	Deadend assembly, primary			
Uae	6	Arrestor, lightning			
c	2	Bolt, machine 3/4" x req'd length			
av	-	Jumper, as required			

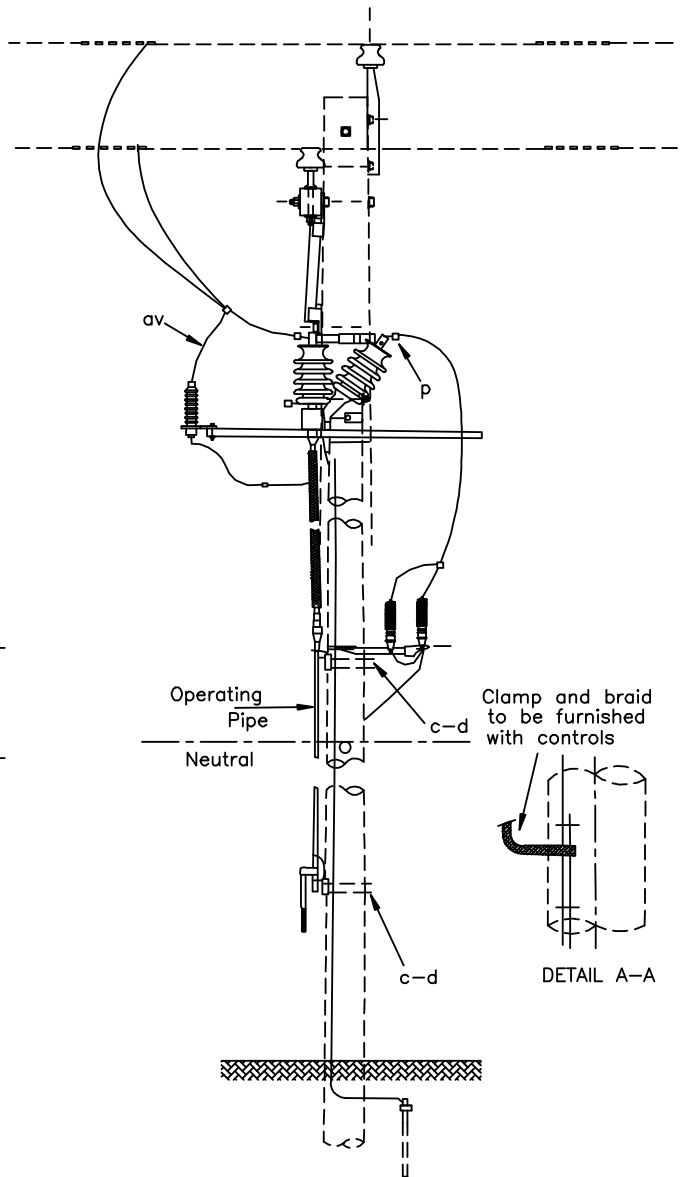
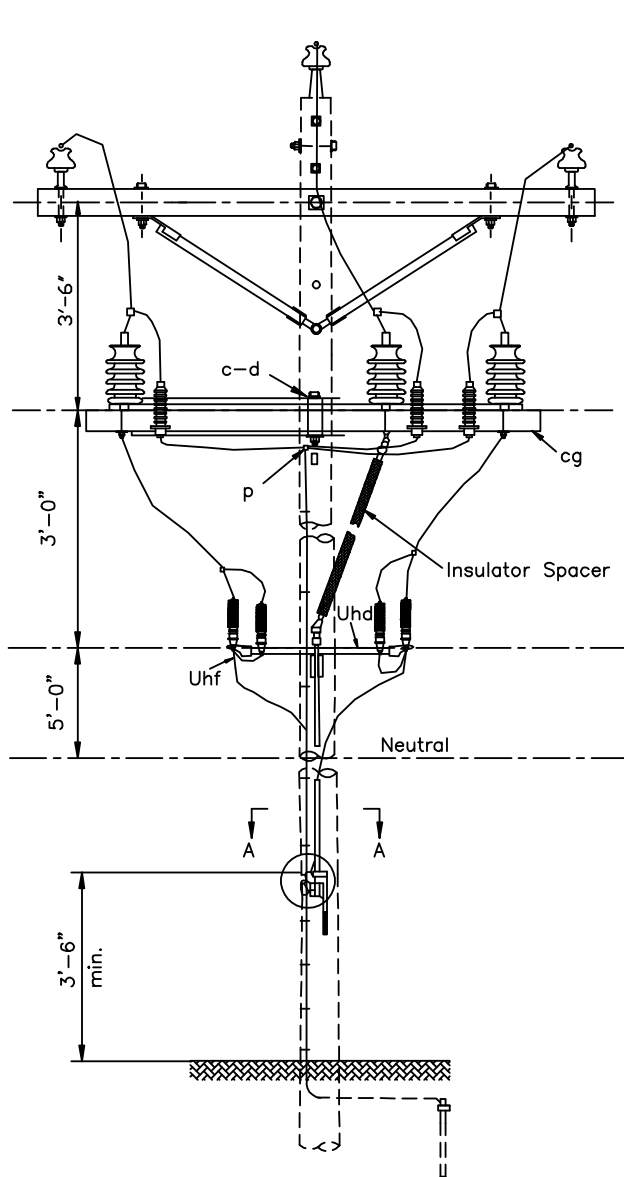
Note: Follow switch installation instructions

SECTIONALIZING IN-LINE AIR BREAK SWITCH



OCTOBER 2009

M3-15X-1



ITEM	NO.	MATERIAL
c	6	Bolt, machine 5/8" x req'd length
d	6	Washer, 11/16" hole
d	2	Washer, 13/16" hole
cg	1	Switch, 3 ph airbreak
p	6	Connector
Uae	6	Arrestor, lightning
c	2	Bolt, machine 3/4" x req'd length
av	-	Jumper, as required

ITEM	NO.	MATERIAL
p	-	Connector, as required

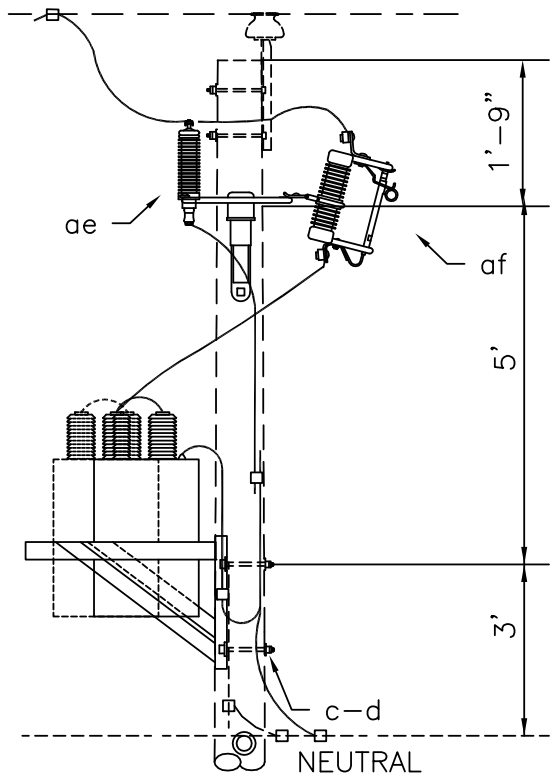
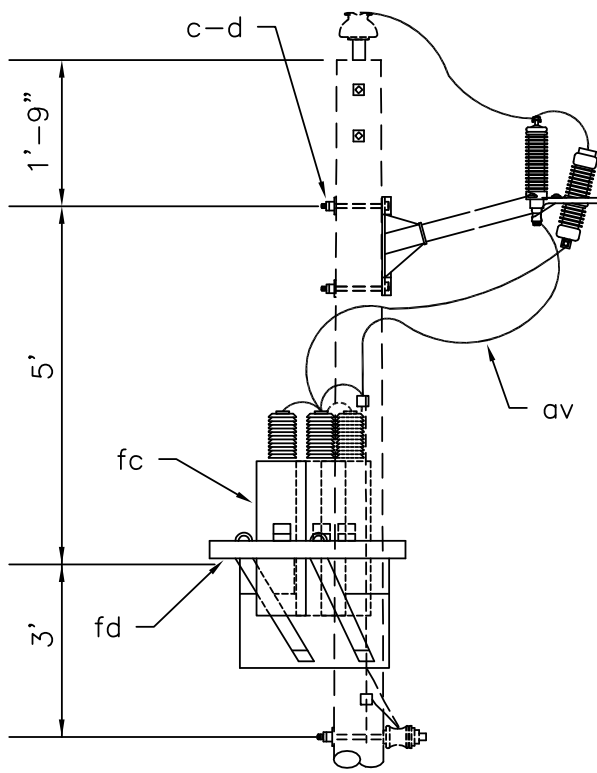
Note: follow switch installation instructions

SECTIONALIZING IN-LINE AIR BREAK SWITCH
500 RISE



OCTOBER 2009

M3-15X-2



NOTES:

1. Specify insulating caps for primary terminal bushings.

ITEM	QTY	MATERIAL
c	4	Bolt, machine, 5/8" x req'd length
d	4	Washer, square "
p		Connectors, as req'd
ae	1	Arrester, surge
af	1	Cutout, dist., loadbreak, (15 kV)
av		Jumpers, bare, stranded, as req'd
av		Jumpers, insulated, as req'd

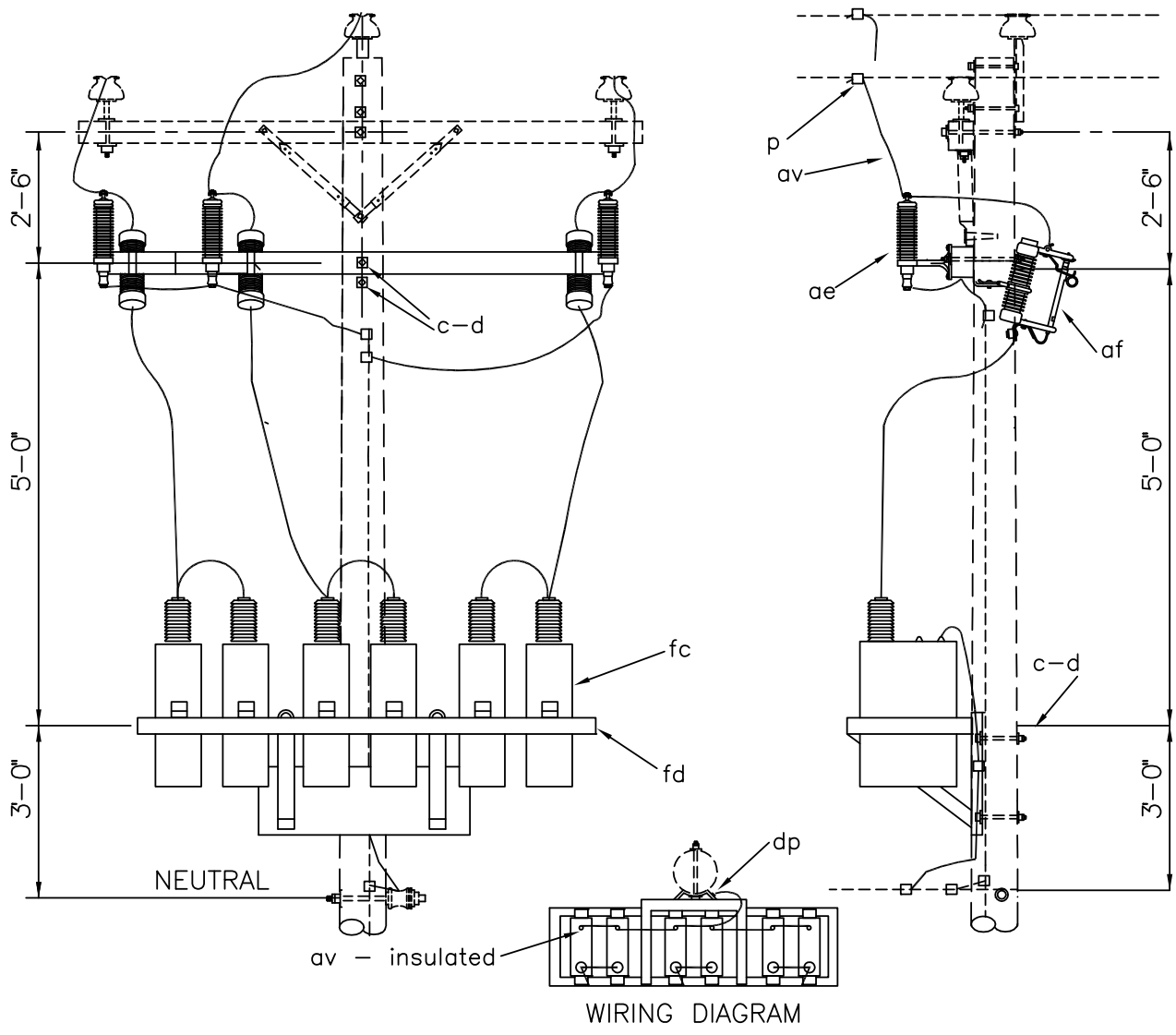
ITEM	QTY	MATERIAL
dp	1	Clamp, ground wire
fd	1	Hanger, capacitor
eq	1	Bracket, insulator/equipment
fc		Capacitor, shunt, 12.47/7.2 kV (specify number and kVAR)

SINGLE PHASE CAPACITOR ASSEMBLY

JAN. 2011


1 - PHASE PRIMARY
 12.47/7.2 kV

Y3.1 (M9-11)



NOTE:

1. Specify insulating caps for primary terminal bushings.

ITEM	QTY	MATERIAL
c	4	Bolt, machine, 5/8" x req'd length
d	4	Washer, square
fn	1	Cutout extension
i	2	Bolt, carriage, 3/8" x 4 1/2"
P		Connectors, as req'd
P		Connectors, compression, as req'd
ae	3	Arrester, surge
af	3	Cutout, dist., loadbreak, (15 kV)

ITEM	QTY	MATERIAL
av		Jumpers, bare, stranded, as req'd
av		Jumpers, insulated, as req'd
dp	1	Clamp, ground wire
fc		Capacitor, shunt, 12.47/7.2 kV (specify number and kVAR)
fd	1	Hanger, capacitor

THREE PHASE CAPACITOR BANK

JAN. 2011

3 - PHASE PRIMARY
 12.47/7.2 kV

Y3.2,Y3.3
 (M9-12),(M9-13)

Underground Construction



INDEX - PART II

-A-

Anodes Usi
Arrester, surge Uae

-B-

Boot, insulated Ugq
Bracket, combination Uhj
 pothead mounting Uhd

-C-

Cable Uhv
Cable accessories Uhb
Cable route marker Uhx
Cable support Uhc
Combination cutout and arrester Uax
Connector block, secondary Ugp
 transformer Ufz
Connector, secondary tap Ufw
Cutout and arrester, combination Uax

-E-

Enclosure, equipment Ugn

-F-

Fault indicator. Ugo

-H-

Heat shrink tubing Uhr

-J-

Jacketed cable restoration kits Uhf

-P-

Pad, equipment Uja
Pedestal, power Ugu
Recloser, pad-mounted Ube
Regulator, voltage, pad-mounted Usc

-S-

Safety signs	Uhw
Secondary tap connector	Ufw
Secondary tap or splice cover	Uhr
Shield, cable riser	Ugc
splice	Ujb
Splice shield	Ujb
Splice, secondary	Ugp
underground	Uhy
Stake, power pedestal	Ugv
Switch, air, group-operated	Ucg
Switchgear, padmounted	Uhe

-T-

Terminations, elbow	U hp
multipoint	U hq
outdoor and indoor	U gk
Terminator sealing kit	U hf
Transformer connector block	U fz
Transformer pad	U ja
Transformer, current	U sd
Transformers	U an
Tubing, heat shrink	U hr

**From Rural Utility Service Book*

!WARNING

Hazardous voltage.

Keep out!

Can shock, burn or cause death.
If found damaged or unlocked call:

MMUA 507-532-7522

!WARNING

Underground power cables
are located in this area.

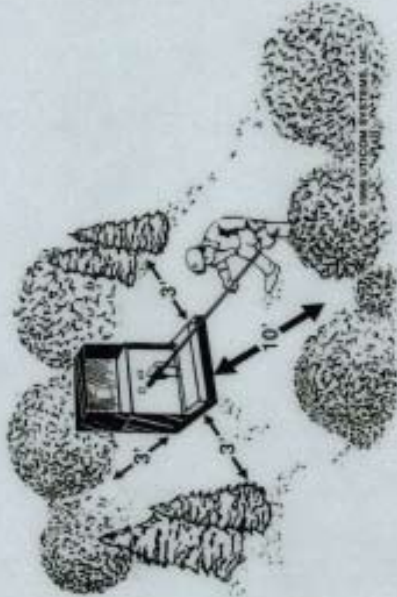
Before digging call:

**800-252-1166 GOPHER STATE
ONE CALL**

Can shock, burn or cause death.



NOTICE



We need room to work safely on this device. Please keep shrubs and structures 10 feet away from the side with doors and 3 feet from other sides. Obstructions may be damaged or removed during service restoration or maintenance.

▲USI
U7010WWN-MMUA-MN

! DANGER



Hazardous voltage.

Keep out!

**Will shock, burn
or cause death.**

**If open or unlocked,
immediately call
electric power
and light company.**

**▲ LUTICOM SYSTEMS, INC.
800-548-5321**

U8845D-G

WARNING

Load-Break Operations Record Tag

After 10 Load-Break Operations, Inspect the Probe and Bushing Insert.

Cross out number and record date below for each Load Break and Make Operation.

Both Elbow and Apparatus Bushing should be changed after 10 200 Amp Operations. Failure to do so could cause failure of Equipment.

Date											
	1	2	3	4	5	6	7	8	9	10	X

Notes

ELECTROMARK

WARNING

Load-Break Operations Record Tag

See Other Side

EQUIP-RECORD

Cable Marking

Primary Riser Colors

Red

A



White

B



Blue

C



Note: Line one ring of color tape
Load two rings of color tape
Tap three rings of color tape
Tap four rings of color tape

CABLE MARKING

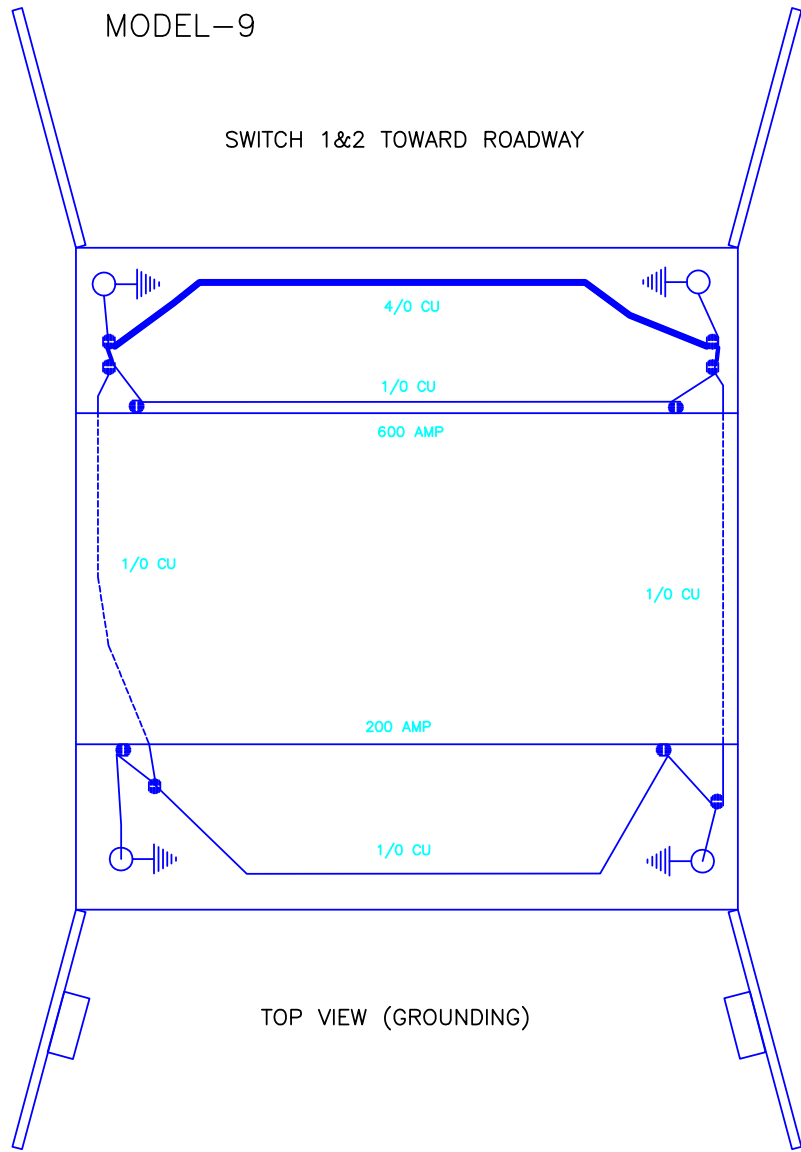


AUGUST 2010

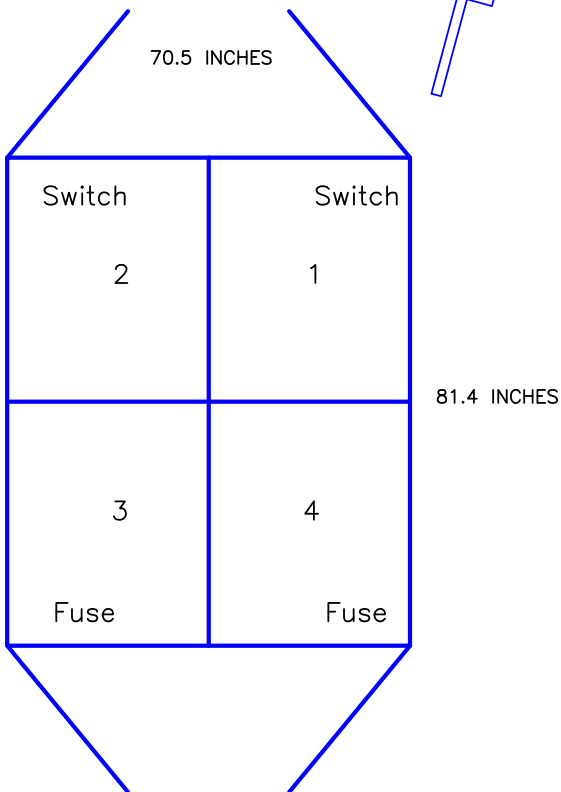
CABLE MARKING

MODEL-9

SWITCH 1&2 TOWARD ROADWAY



TOP VIEW (GROUNDING)



GROUNDING SPEC. FOR MODEL-9
URD OIL-SWITCH GEAR

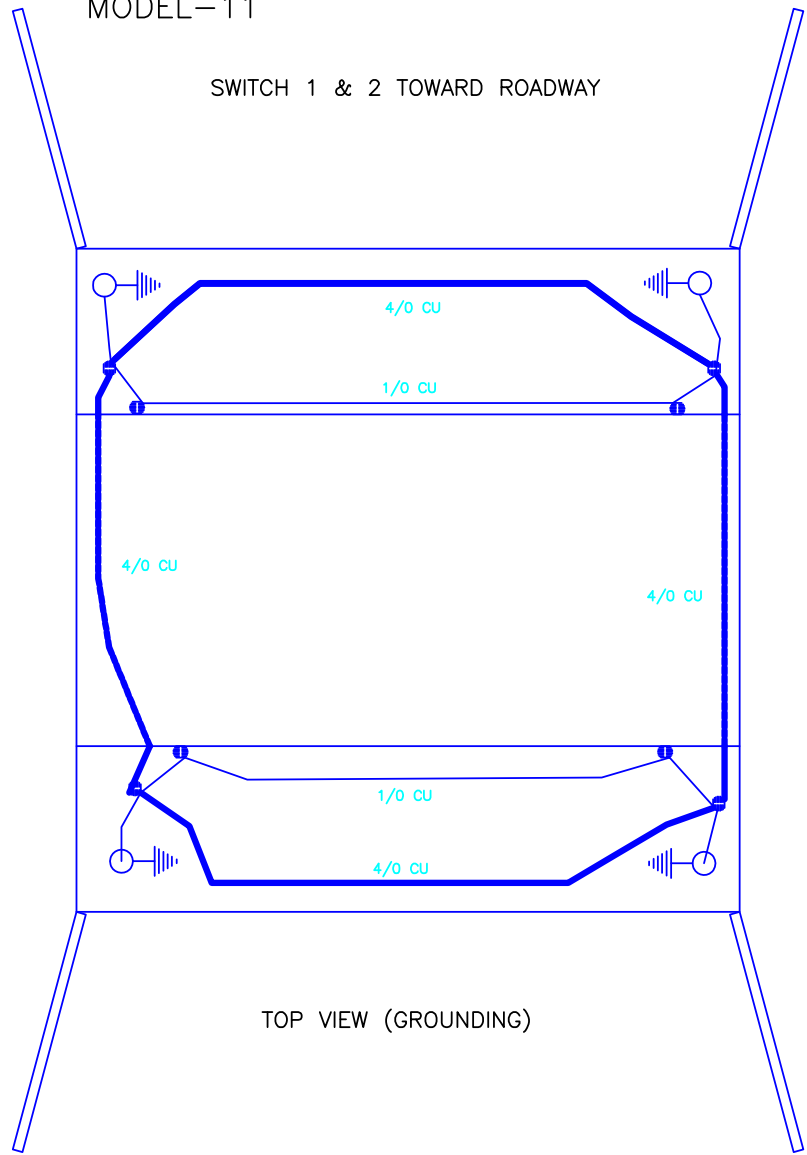
JANUARY 2009

MODEL-9 Grounding

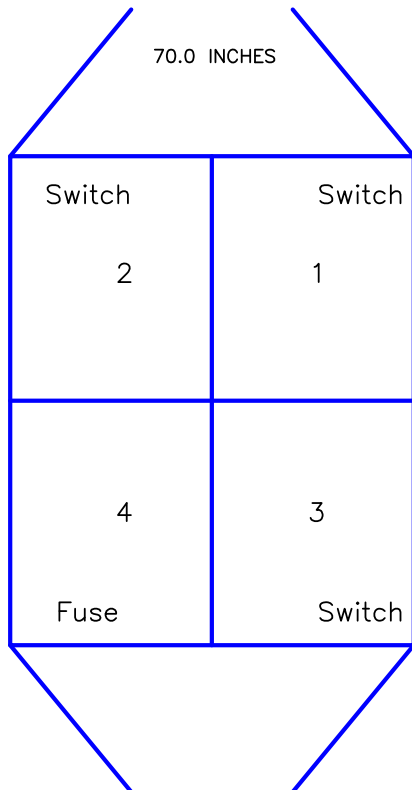


MODEL-11

SWITCH 1 & 2 TOWARD ROADWAY



TOP VIEW (GROUNDING)



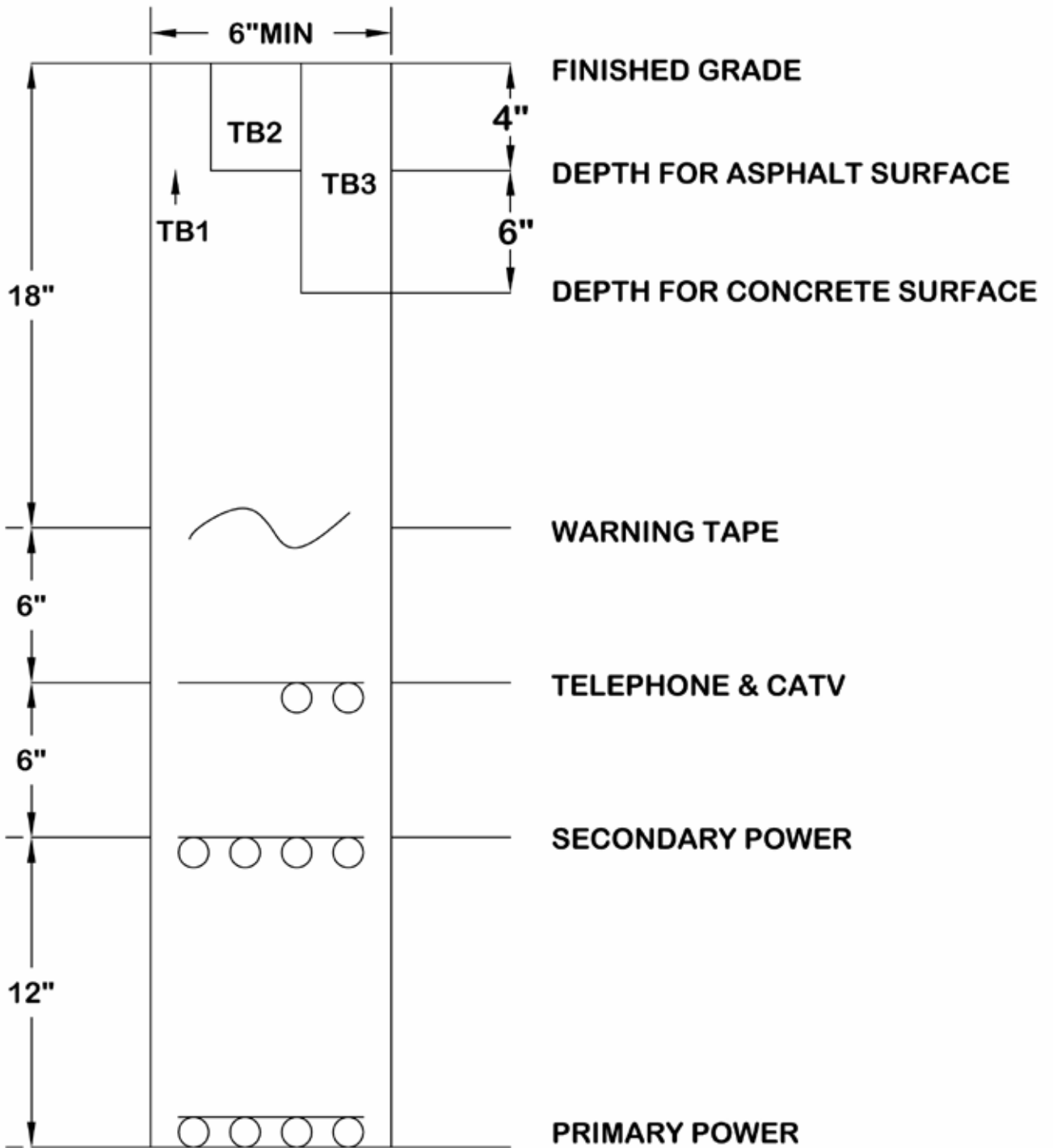
GROUNDING SPEC. FOR MODEL-11
URD OIL-SWITCH GEAR

JANUARY 2011



MODEL-11 Grounding

PRIMARY TRENCH LAYOUT



TB1-TRENCH IN EARTHEN OR GRAVEL SURFACE AREA
TB2-TRENCH IN ASPHALT PAVEMENT SURFACE AREA
TB3-TRENCH IN CONCRETE PAVEMENT SURFACE AREA

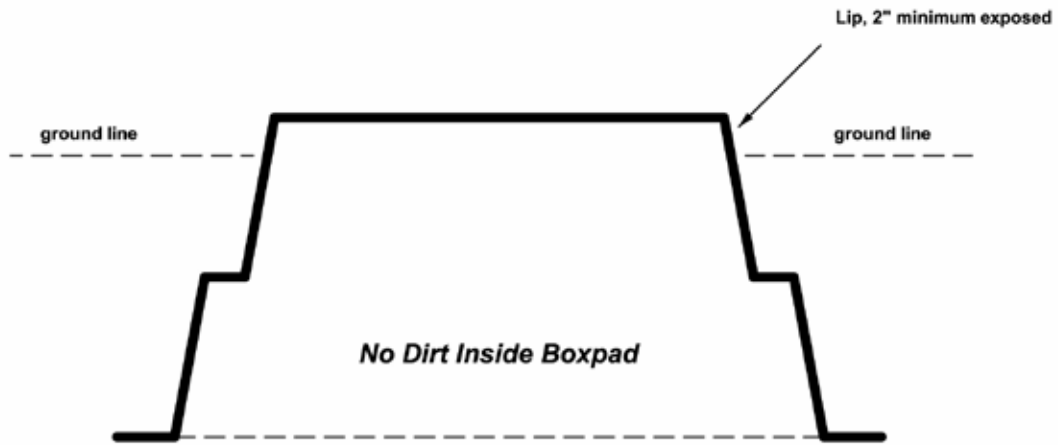
PRIMARY TRENCH LAYOUT



JANUARY 2011

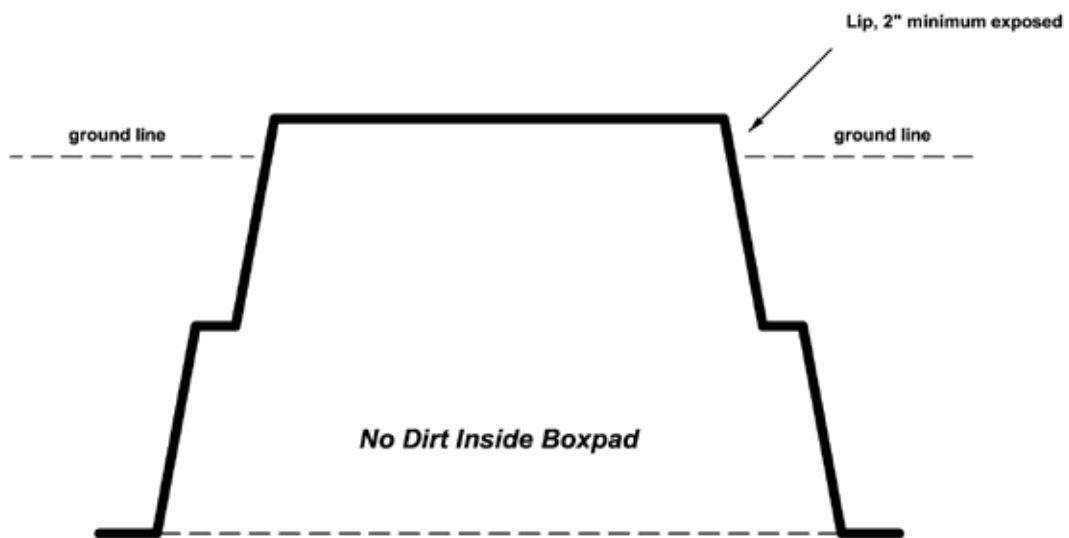
PRIMARY TRENCH LAYOUT

3 Phase Transformer Boxpad



For unfinished grade leave 4-6" of boxpad exposed

PMH Switchgear Boxpad



For unfinished grade leave 4-6" of boxpad exposed

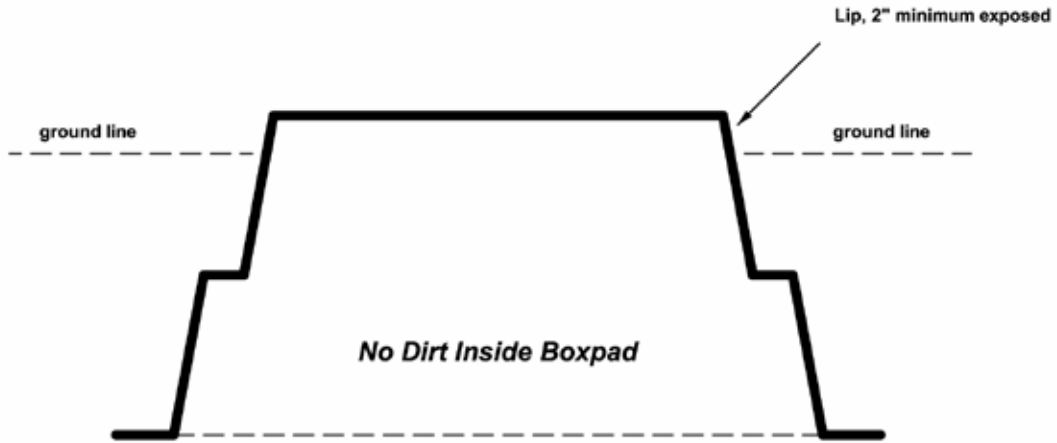
3-PH TRANSFORMER BOXPAD
PMH SWITCHGEAR BOXPAD



AUGUST 2010

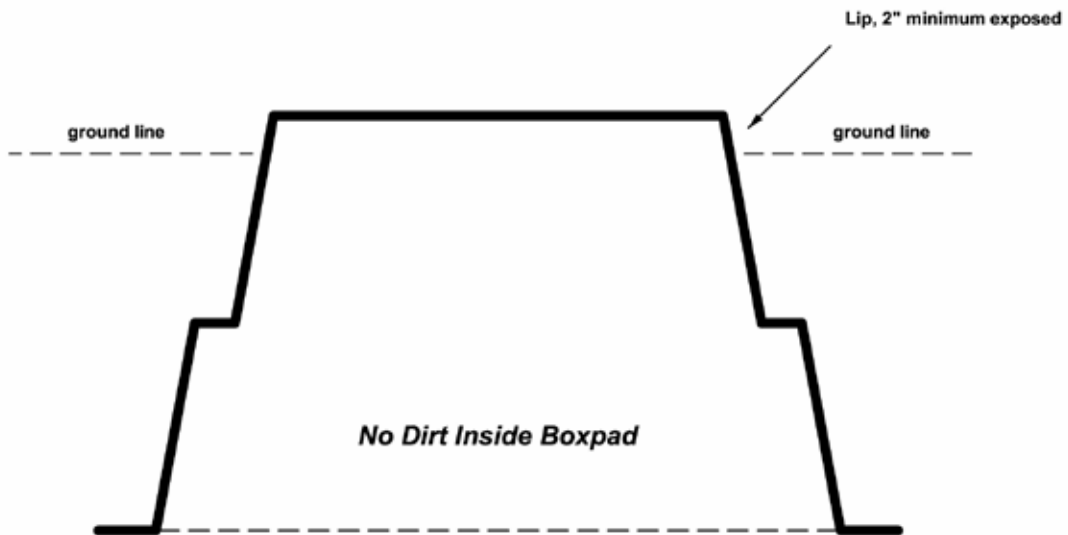
BOXPADS

3 Phase Transformer Boxpad



"For unfinished grade leave 4-6" of boxpad exposed"

PMH9 Boxpad



"For unfinished grade leave 4-6" of boxpad exposed"

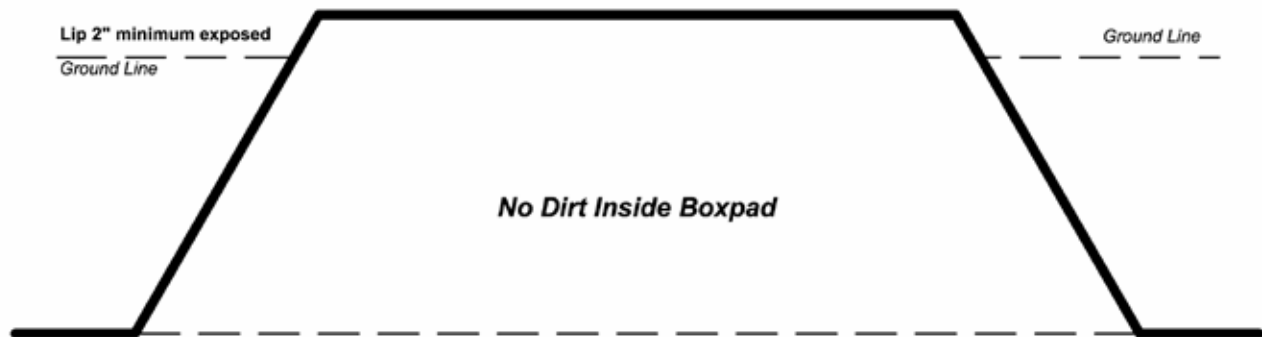
3-PH TRANSFORMER BOXPAD
PMH9 BOXPAD



JUNE 2010

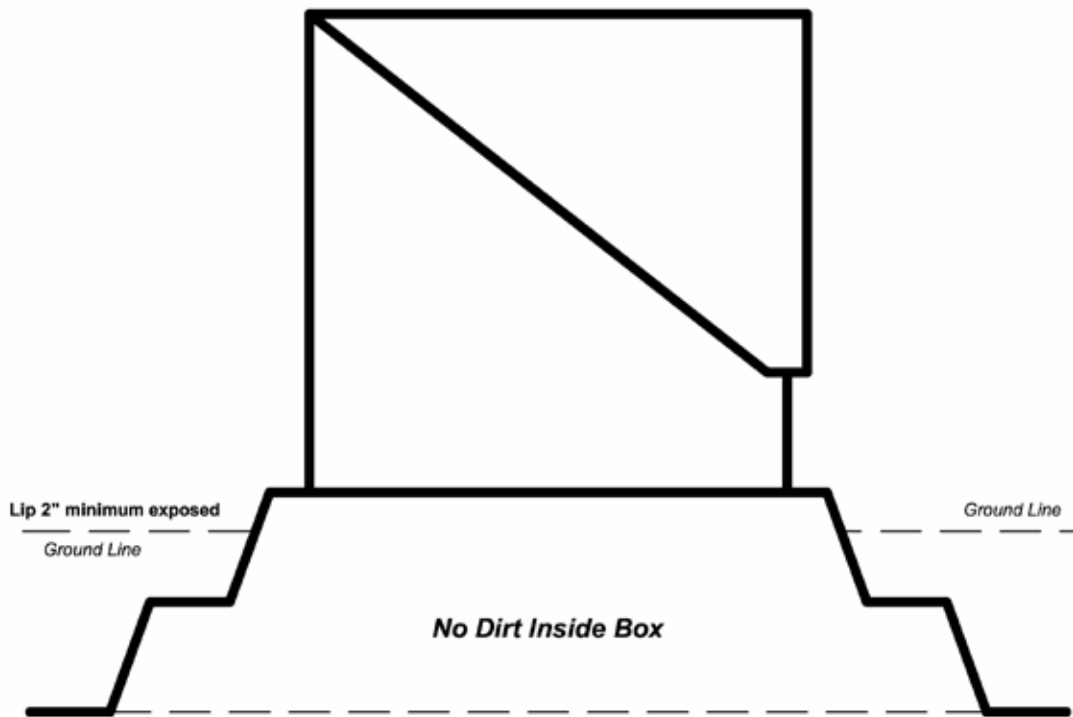
3 PHASE BOXPAD

1 Phase Transformer Boxpad and Fused Pad



For unfinished grade, leave 4-6" of boxpad exposed.

1 Phase or 3 Phase Junction Box



For unfinished grade, leave 4-6" of boxpad exposed.

1-PH BOXPADS
J-BOX



AUGUST 2010

BOXPAD

3 Phase Junction Box

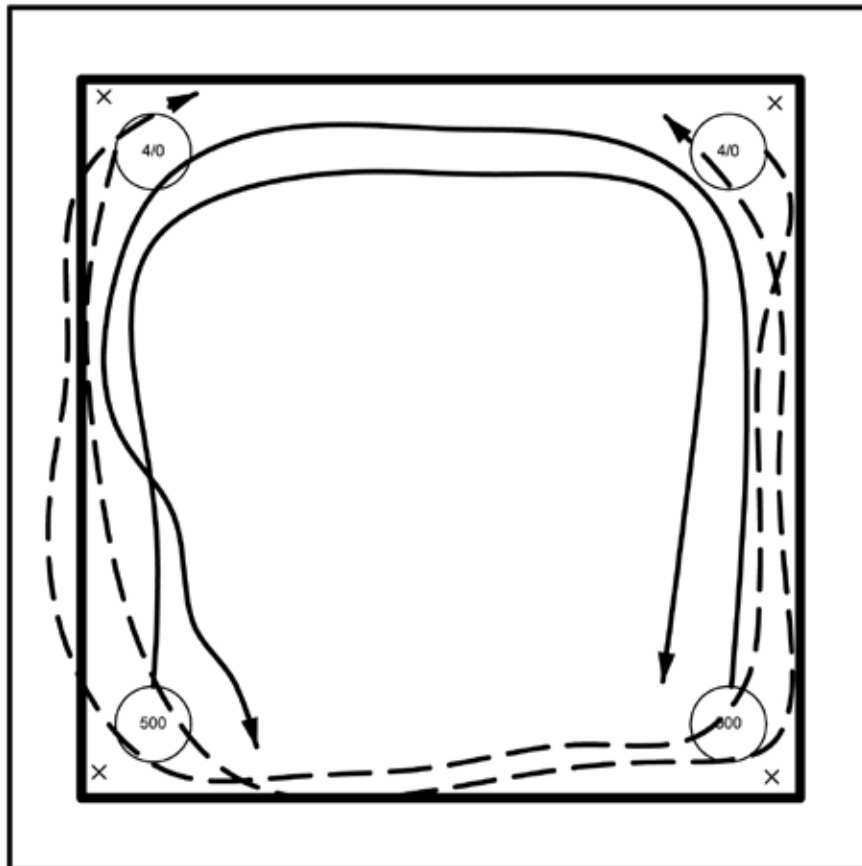
Bring cables in rear left corner, tape together in sets, (incoming, outgoing).
Coil Cables inside box in Clockwise direction, leave 20' of tail



Front

X marks ground rod locations

PMH9



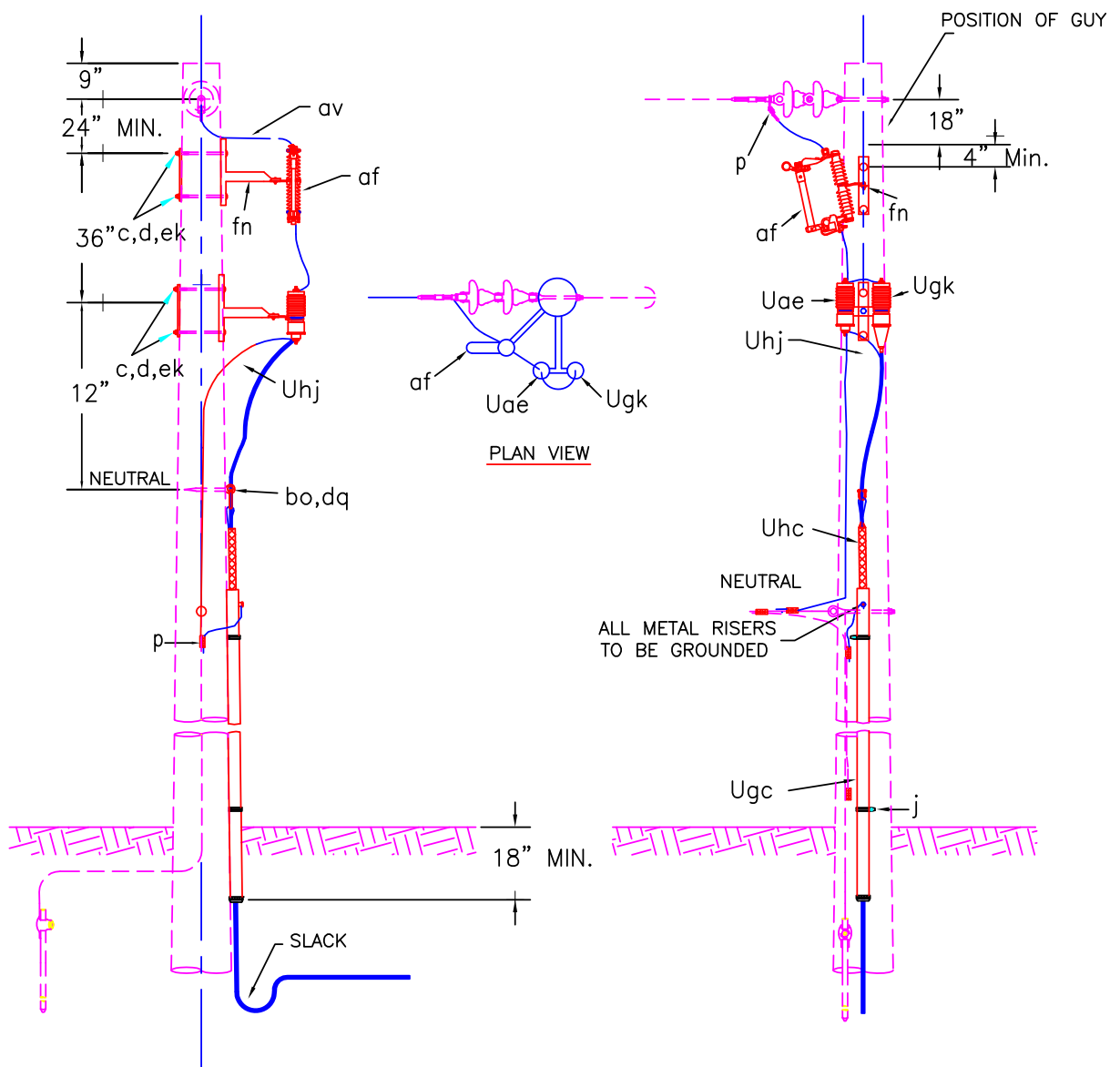
Front

3-PH JUNCTION BOX



JUNE 2010

3 PHASE J-BOX



ITEM	QTY.	MATERIAL
c	4	Bolt, machine, 5/8" x required length.
d	4	Washer, square 2 1/4".
j		Screws, lag 1/2" X 4" as required.
p		Connectors, as required.
af	1	Fuse link.
af	1	Cutout
av		Jumpers, as required.
bo	1	Anchor, shackle. Do not use if drive hook is used.
dq	1	Eye screw, elliptical or drive hook.
ek	4	Locknuts
fn	1	Bracket, cutout extension.
Uae	1	Surge arrester
Ugc	1	Cable riser shield. Length as required.
Ugk	1	Cable termination.
Uhc	1	Cable support.
Uhj	1	Bracket combination.

NOTES:

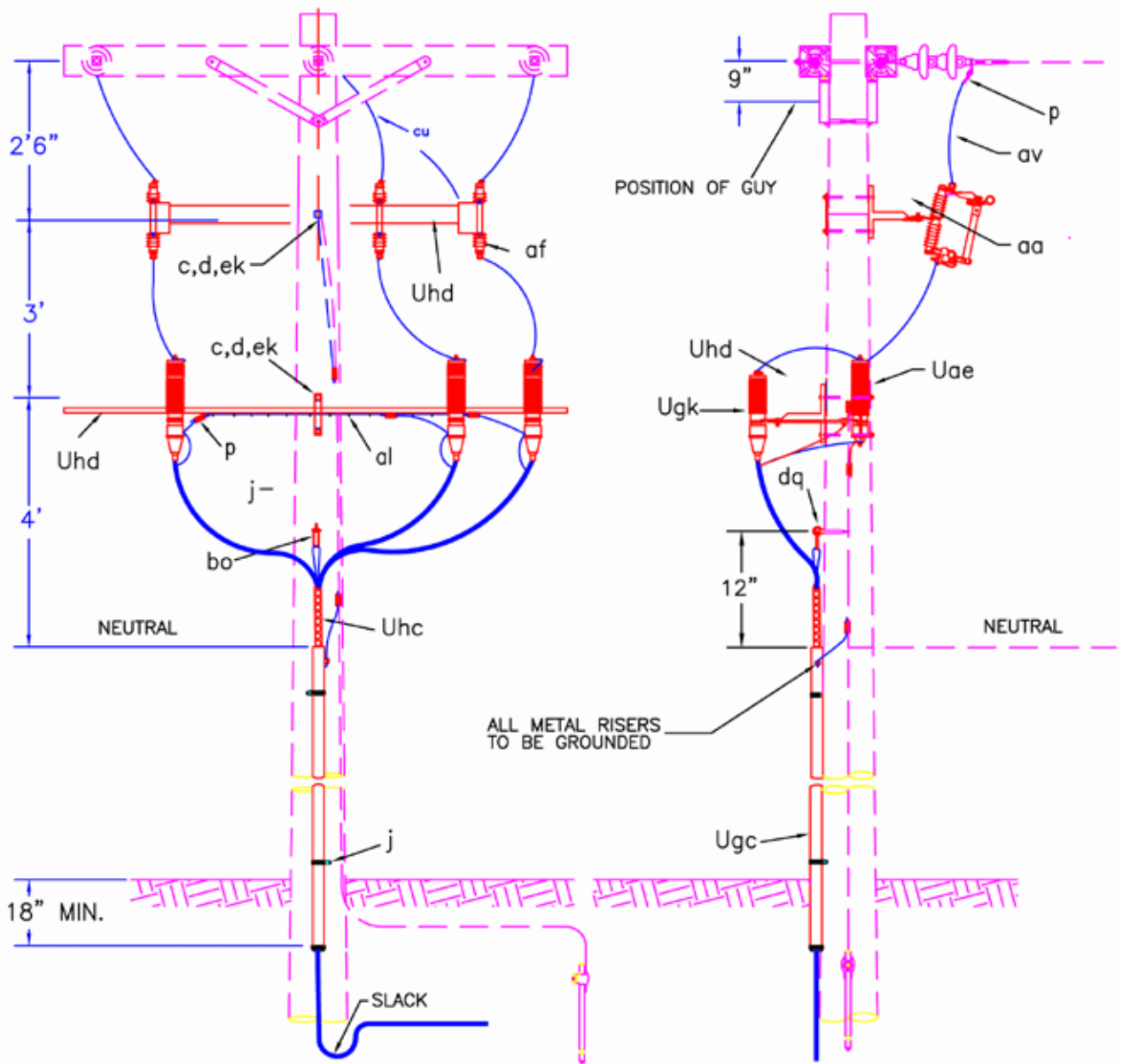
1. TOTAL ARRESTER LEAD LENGTH MUST BE UNDER 3'.
2. NO BENDS PERMITTED WITHIN 6" OF CABLE TERMINAL BASE.
3. ALLOW MINIMUM CABLE SLACK OF 24" AT BOTTOM OF RISER.

SINGLE PHASE CABLE DEADEND
TERMINAL POLE



2010

UA1



ITEM	QTY.	MATERIAL
c	2	Bolt, machine, 5/8" x required length.
d	2	Washer, square 2 1/4".
g	2	Crossarm, 3 5/8" x 4 5/8" x 8'-0"
i	4	Bolt, carriage, 3/8" x 4 1/2"
j		Screw, lag 1/2" x 4" as required.
p		Connectors, as required.
aa	1	Eyenuit, 5/8"
af	3	Cutout
al		Staples, as required.
av		Jumpers, as required.
bo	1	Anchor, shackle.
cu	4	Brace, wood, 28"
dq	1	Eye screw, elliptical or drive hook.
ek	6	Locknuts, as required.
Uae	3	Surge arrester
Ugc	1	Cable riser shield. Length as required.
Ugk	3	Cable termination.
Uhc	3	Cable support.
Uhd	2	Crossarm mounting bracket.

NOTES:

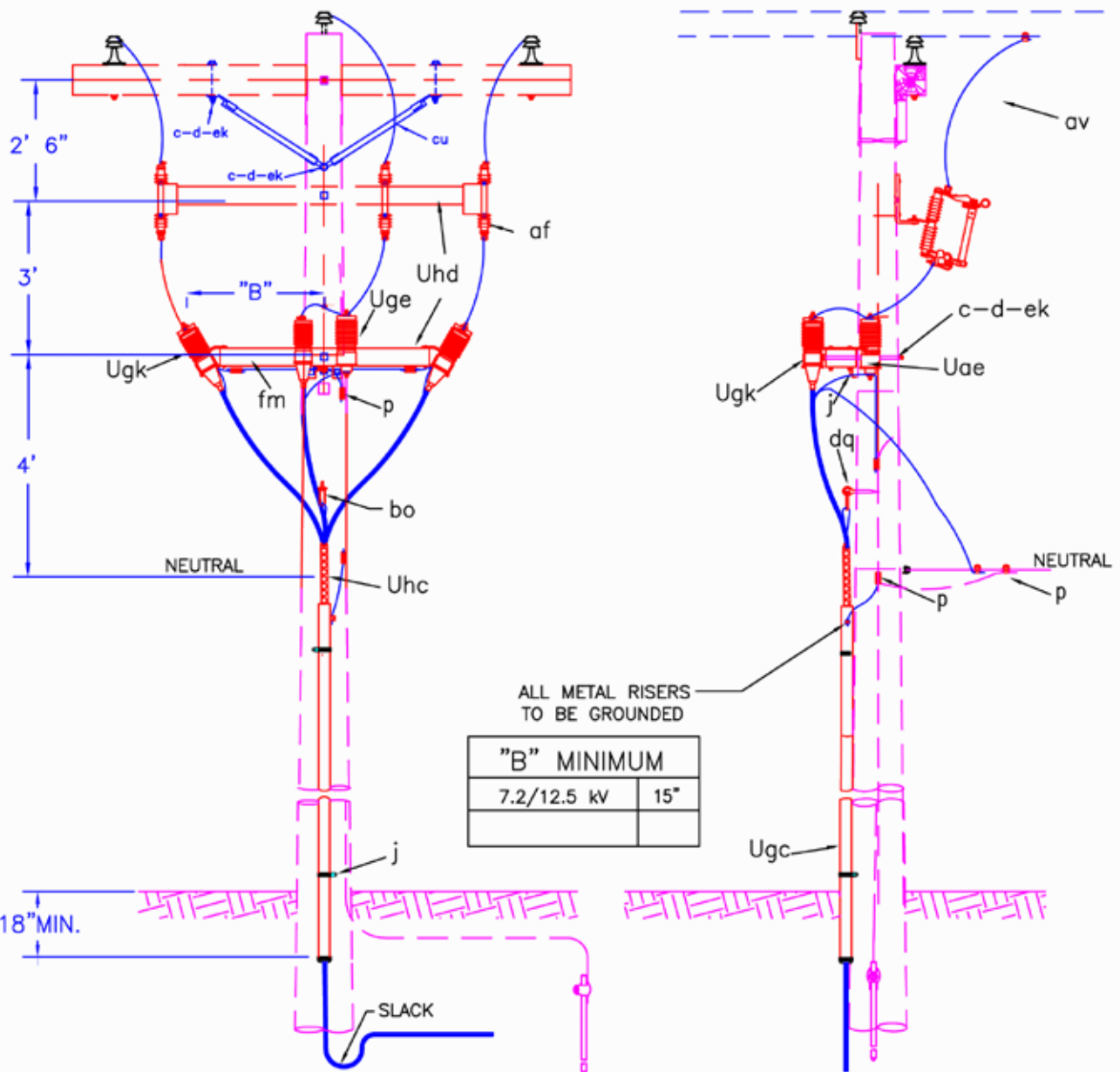
1. TOTAL ARRESTER LEAD LENGTH MUST BE UNDER 3'.
2. NO BENDS PERMITTED WITHIN 6" OF CABLE TERMINAL BASE.
3. ALLOW MINIMUM CABLE SLACK OF 24" AT BOTTOM OF RISER.
4. POSITION OF GUY REFER TO E1-2

THREE PHASE CABLE TERMINAL POLE WITH CUTOUTS AND CROSSARM MOUNTING ARRESTERS



2011

UC1



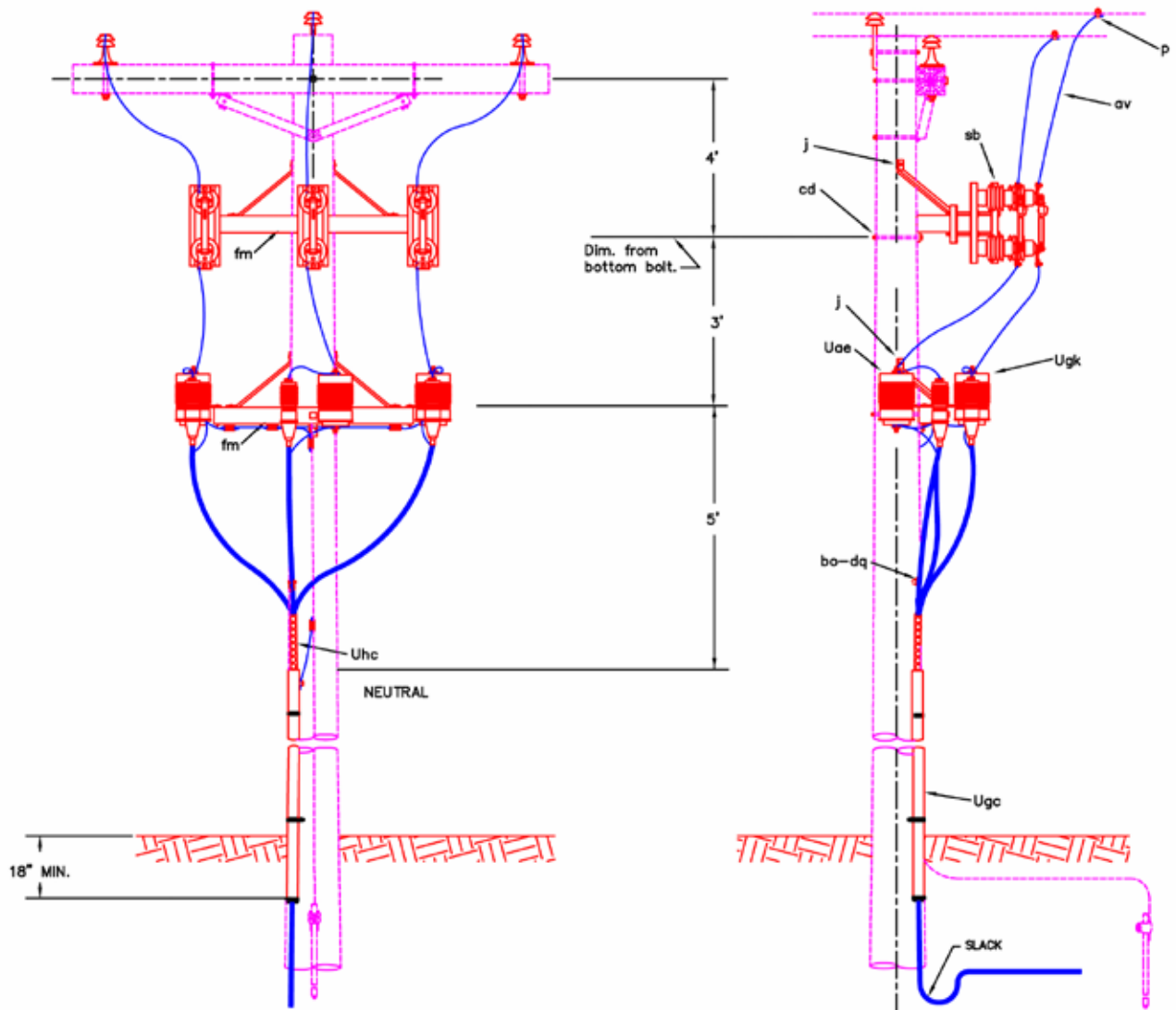
"B" MINIMUM	
7.2/12.5 kV	15"

ITEM	QTY.	MATERIAL
c	1	Bolt, machine, 5/8" x required length.
d	1	Washer, square 2 1/4".
j		Screw, lag 1/2" x 4" as required.
p		Connectors, as required.
aa	1	Eyenuit, 5/8"
af	3	Cutout
av		Jumpers, as required.
bo	1	Anchor, shackle.
dq	1	Eye screw, elliptical or drive hook.
ek		Locknuts, as required.
fm	1	Mounting bracket.
Uhd	2	Equipment Bracket
Uae	3	Surge arrester
Ugc	1	Cable riser shield. Length as required.
Ugk	3	Cable termination.
Uhc	3	Cable support.
cu	1	Braces

- NOTES:
1. TOTAL ARRESTER LEAD LENGTH MUST BE UNDER 3'.
 2. NO BENDS PERMITTED WITHIN 6" OF CABLE TERMINAL BASE.
 3. ALLOW MINIMUM CABLE SLACK OF 24" AT BOTTOM OF RISER.



THREE PHASE CABLE TANGENT TERMINAL POLE	
2010	UC2



ITEM	QTY.	MATERIAL
c	4	Bolt, machine, 5/8" x required length.
d	5	Washer, square 2 1/4".
l	6	Bolt, carriage 3/8" x required length.
j	4	Screw, lag 1/2" x 4" as required.
o	1	Bolt, eye
p		Connectors, as required.
av		Jumpers, as required.
bo	1	Anchor, shackle.
dq	1	Eye screw, elliptical or drive hook.
fm	2	Mounting bracket.
sb	3	Switches, Disconnect, Hook-operated
Uae	3	Surge arrester, intermediate.
Ugc		Cable riser shield. Length as required.
Ugk	3	Cable termination.
Uhc	3	Cable support.

NOTES:

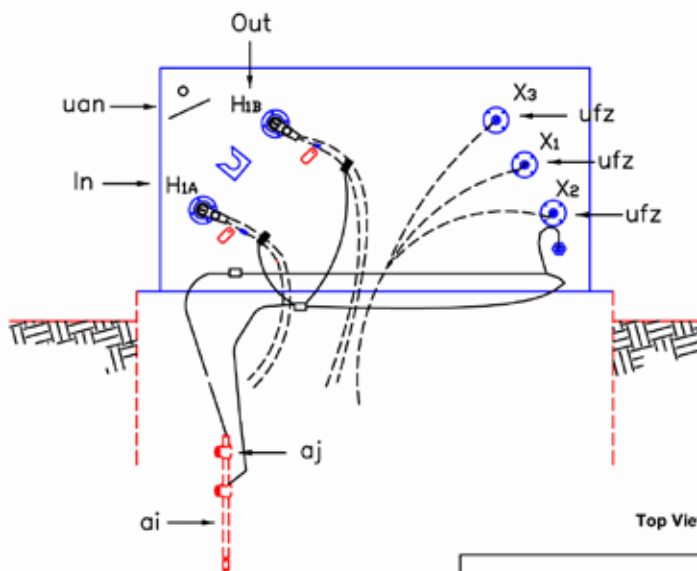
1. TOTAL ARRESTER LEAD LENGTH MUST BE UNDER 3'.
2. NO BENDS PERMITTED WITHIN 6" OF CABLE TERMINAL BASE.
3. ALLOW MINIMUM CABLE SLACK OF 24" AT BOTTOM OF RISER.
4. ALL LIVE PARTS MUST HAVE AN 18 FOOT CLEARANCE ABOVE GROUND AND MUST BE INSTALLED A MINIMUM OF 6 INCHES ABOVE THE NEUTRAL CONDUCTOR.



THREE PHASE CABLE TERMINAL POLE WITH INTERMEDIATE ARRESTERS AND HOOK-OPERATED DISCONNECT SWITCHES

APRIL 2010

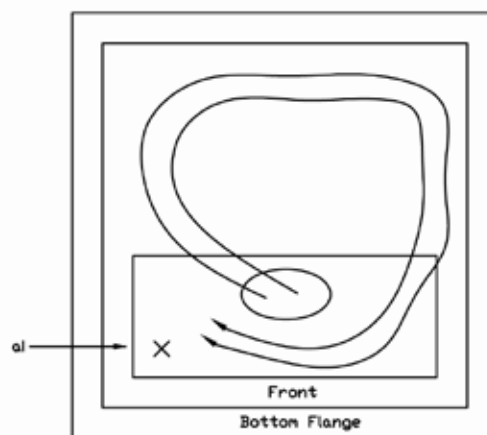
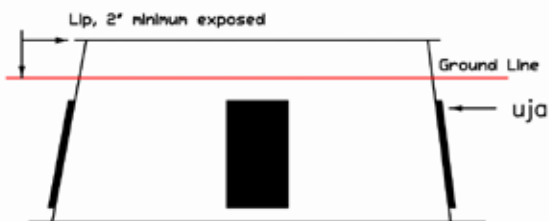
UC6



Top View

Transformer Boxpad Depth

For unfinished grade leave 4-6' of boxpad exposed



Primary and Secondary Cables Coiled Clockwise

INSTALLATION NOTES:

1. PROVIDE SUFFICIENT PRIMARY NEUTRAL PIGTAIL AND CABLE SLACK TO PERMIT READY DISCONNECTION OF ELBOW AND MOUNTING ON PARKING STAND.
2. H1A IN, H1B OUT
3. VENT BEFORE REMOVAL OF BAYONET FUSE

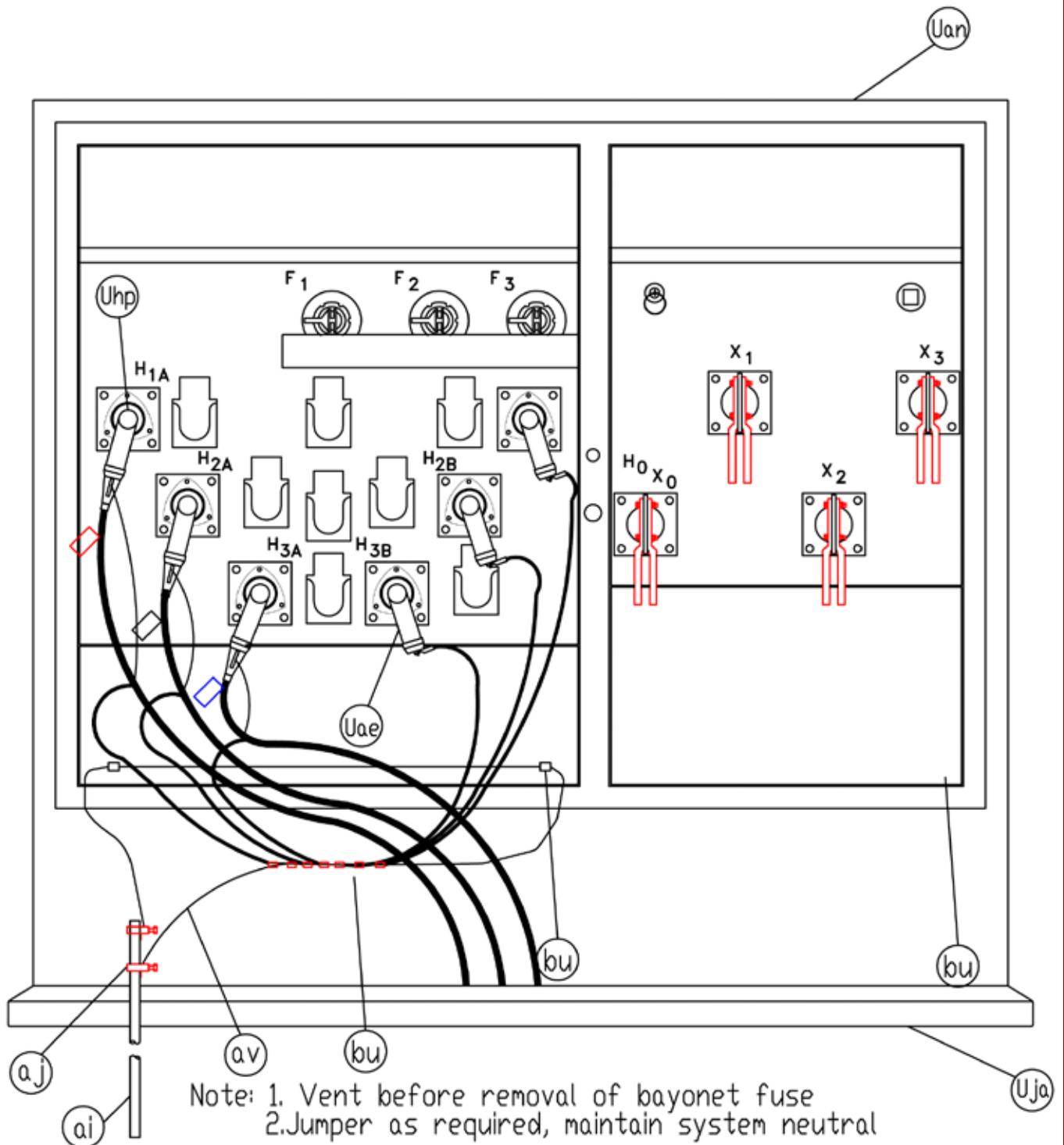
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
uja	1	Box pad	uae		Elbow arrestor, as required
EI		Elbows, as required	uan	1	transformer
ufz	3	Secondary connectors	uhw		safety signs, as required
GW		Ground Wire, Req'd Length			
ai	1	Ground Rod			
aj	2	Ground Rod Clamp			

1-PHASE TRANSFORMER
LOW PROFILE

NOVEMBER 2010

UG-7





Note: 1. Vent before removal of bayonet fuse
 2. Jumper as required, maintain system neutral

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
ai	1	Ground rod	Uhp		Elbow termination, as required
aj	2	Ground rod clamp	Uhw		Safety signs
av		Jumper, as required	Uja	1	Pad, equipment, incl. box pad
bu		Grounding connector(s)			
Uae	3	Arrestor, surge			
Uan	1	Transformer, pad mounted, three phase			

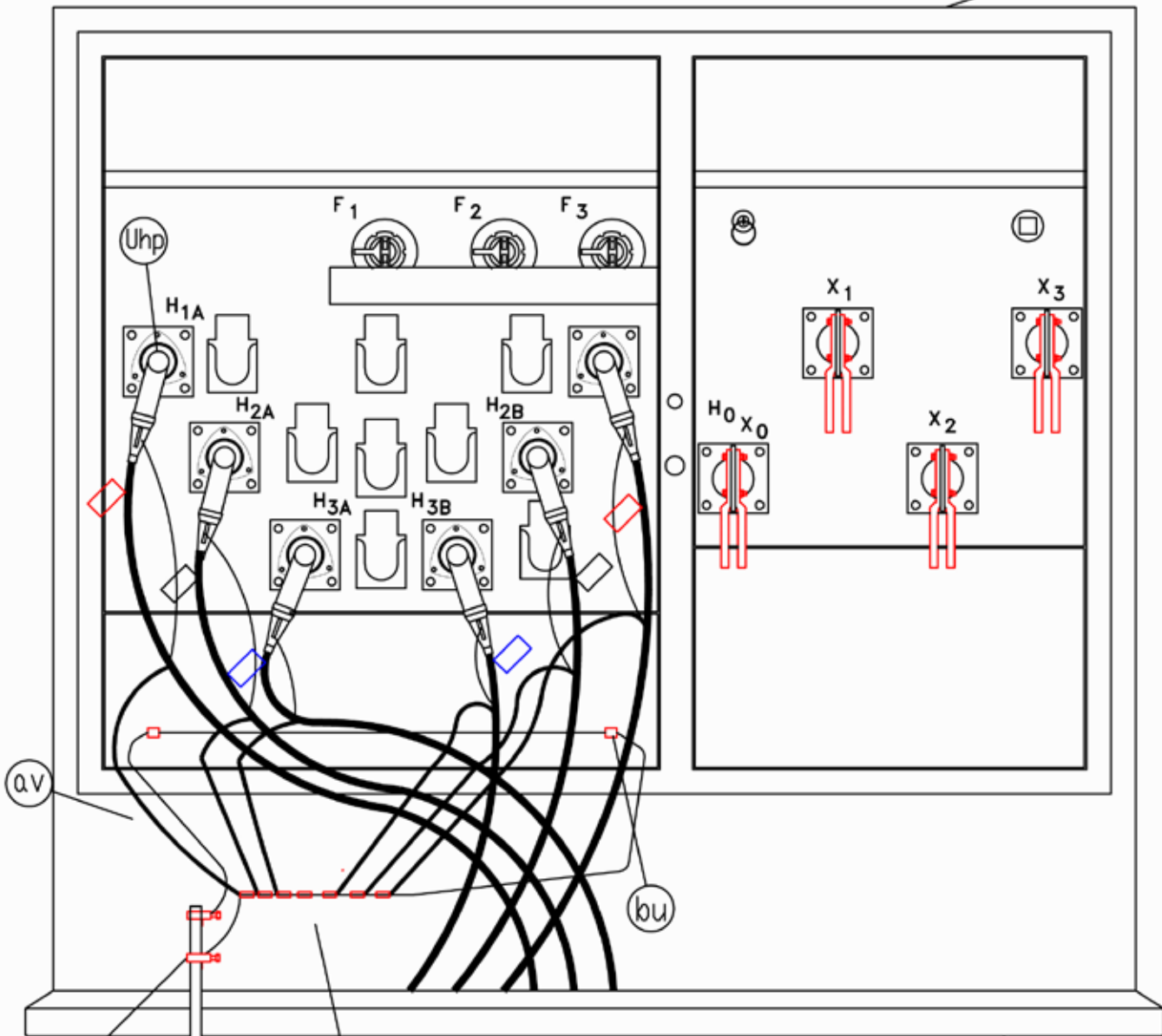
3-PH PADMOUNTED
 TRANSFORMER, RADIAL



MARCH 2008

UG17

Uan



note: 1. Vent before removal of bayonet fuse
 2. Jumper as required, maintain system neutral

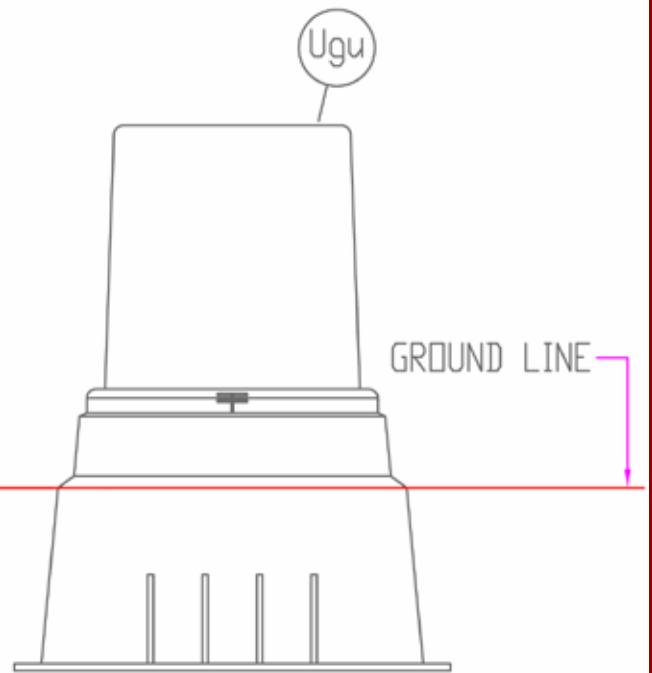
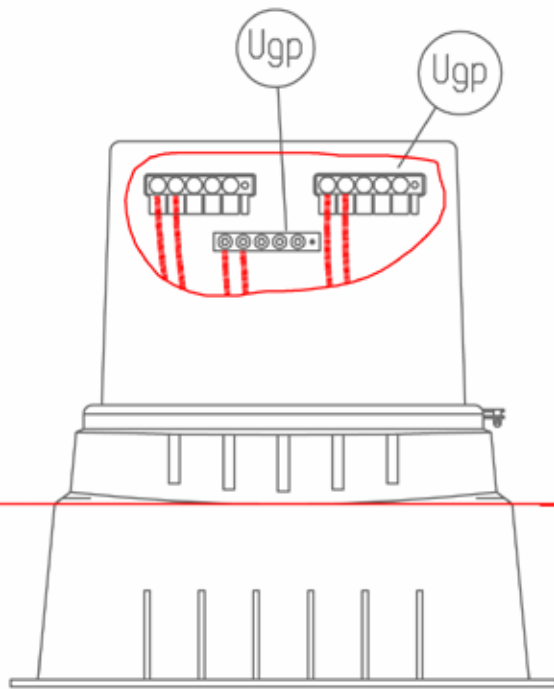
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
ai	1	Ground rod	Uhw		Safety signs
aj	2	Ground rod clamp	Uja	1	Pad, equipment, incl. box pad
av		Jumper, as required			
bu		Grounding connector(s), as required			
Uan	1	Transformer, pad mounted, three phase			
Uhp		Elbow termination, as required			

3-PH PADMOUNTED
 TRANSFORMER, LOOP FEED



MARCH 2008

UG17-2



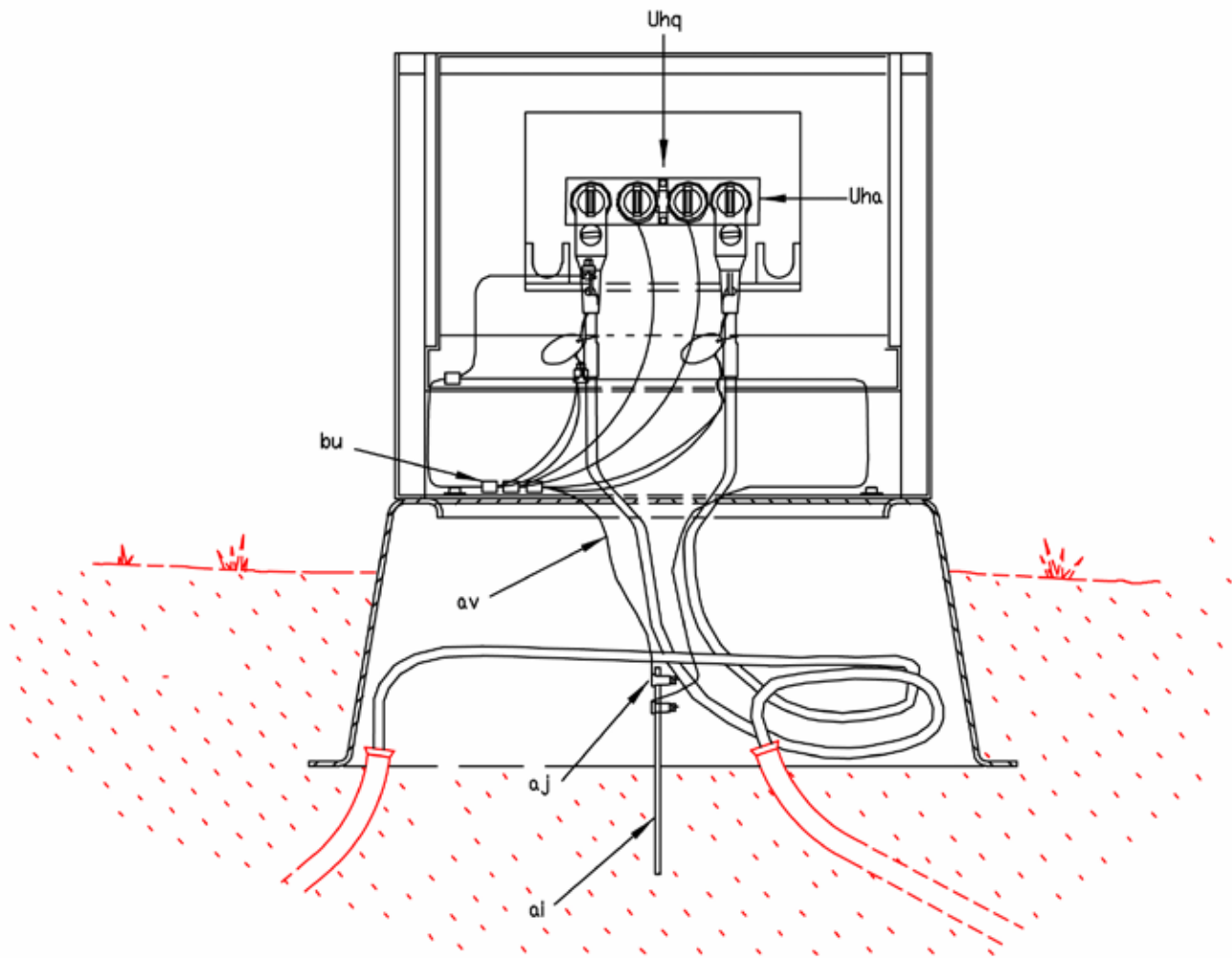
CM	NO.	MATERIAL	ITEM	NO.	MATERIAL
gu		Pedestal, power			
gp		Connector blocks			
		Ground rod , if required			
hw		Safety signs			

SECONDARY PEDESTAL

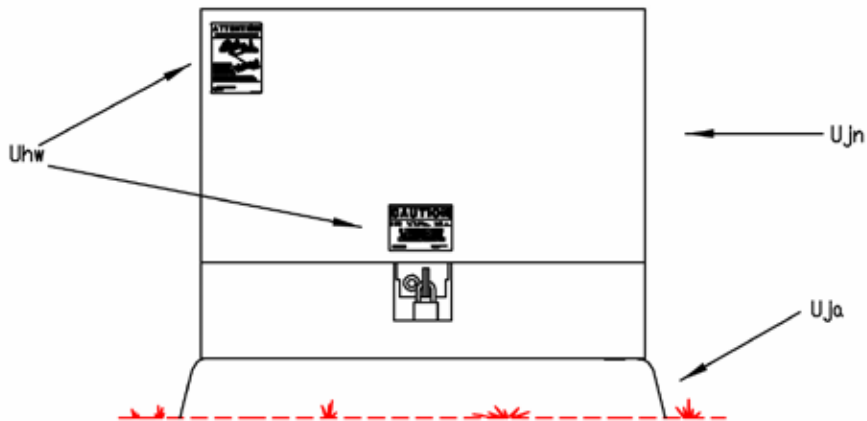


APRIL 2010

UK-5



NOTE: JUMPER AS REQUIRED, MAINTAIN SYSTEM NEUTRAL



FRONT VIEW

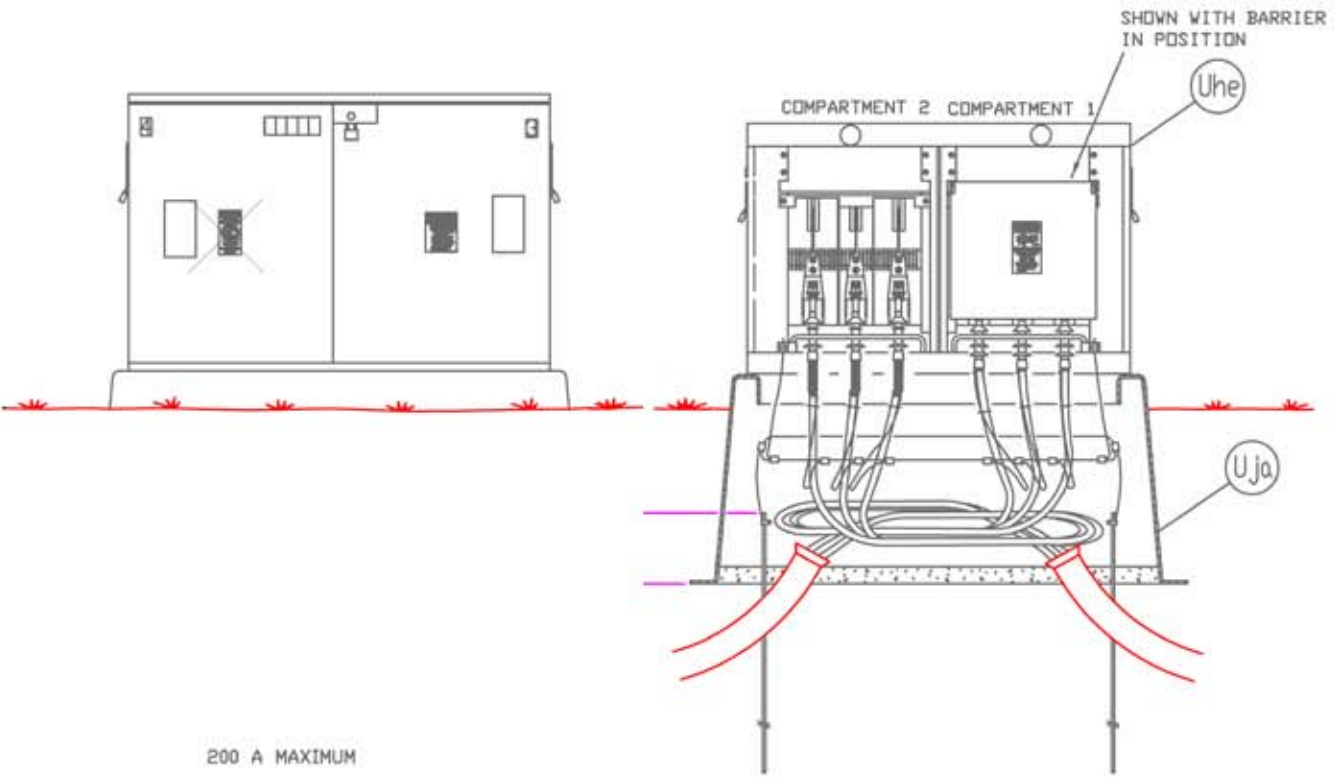
ITEM	NO	
al	1	Ground rod
aj	2	Ground rod clamp
av		Jumper, as required
bu		Grounding connector(s), as required
Ujn	1	Primary Junction Enclosure
Uha		Elbow termination, as required
Uhq	1	Terminations, multi-point
Uhw		Safety signs, as required
Uja	1	Pad, equipment, ncl box pad

1-PHASE, 200A JUNCTION, 4 WAY

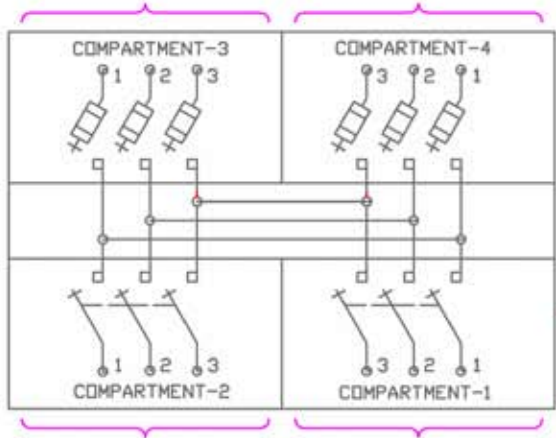
NOVEMBER 2010



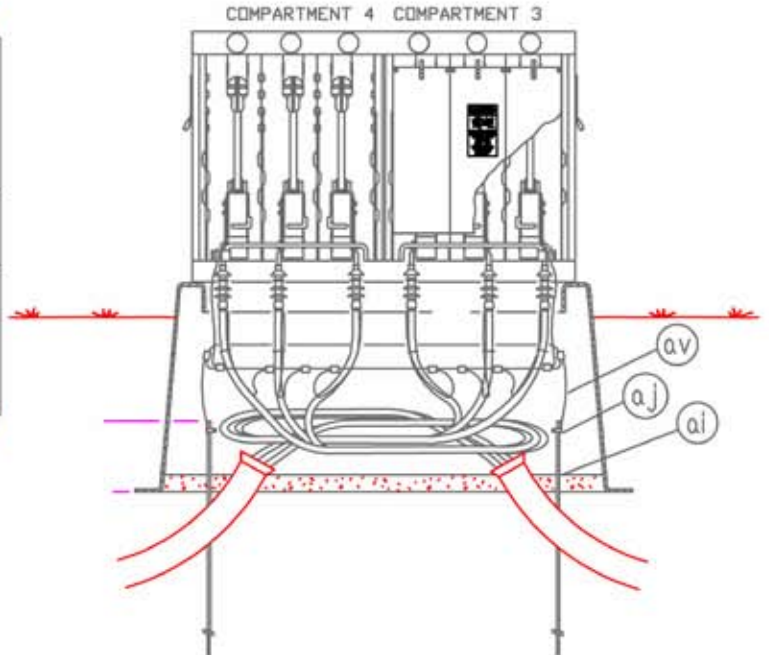
UM3-14



200 A MAXIMUM



600 A MAXIMUM
PMH-9

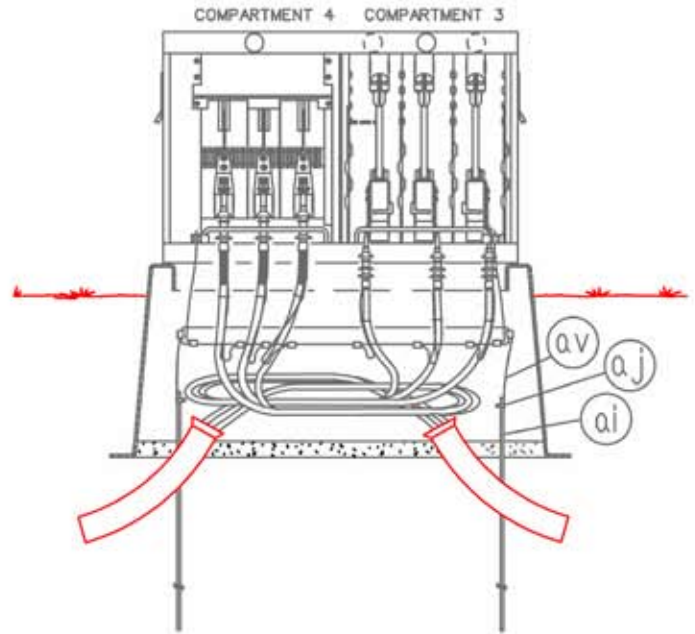
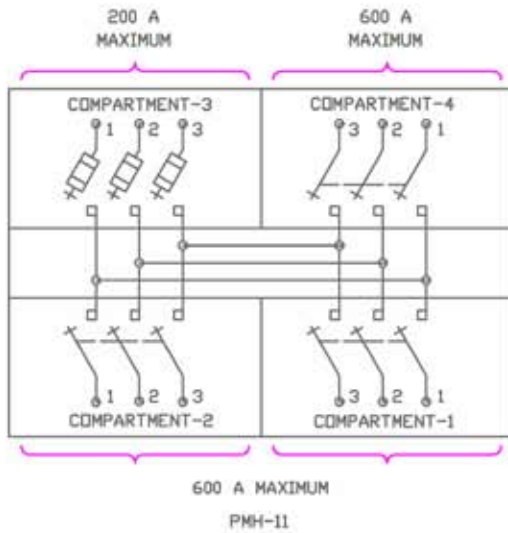
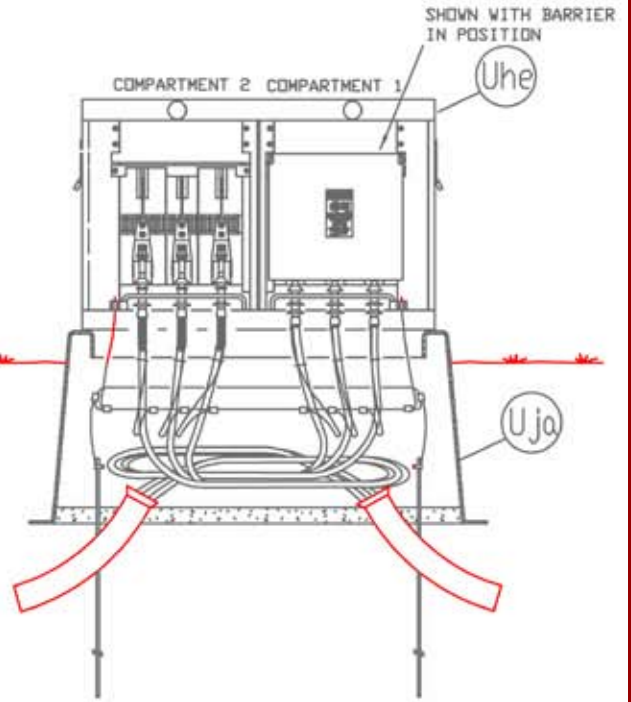
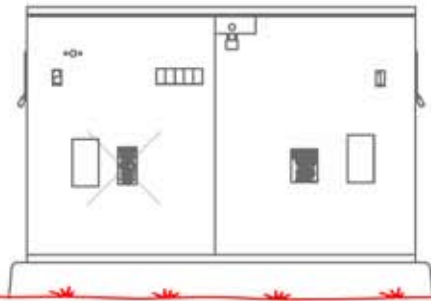


ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
ai		Ground rod, as required			
aj		Ground rod clamps, as required			
av		Jumper, as required			
uhe	1	Switchgear, pad mounted			
uhw		Safety signs, as required			
uja	1	Switch basement, PMH (Boxpad)			

PADMOUNT SWITCHGEAR
AIR INSULATED (PMH-9)



APRIL 2010
UM3E-9



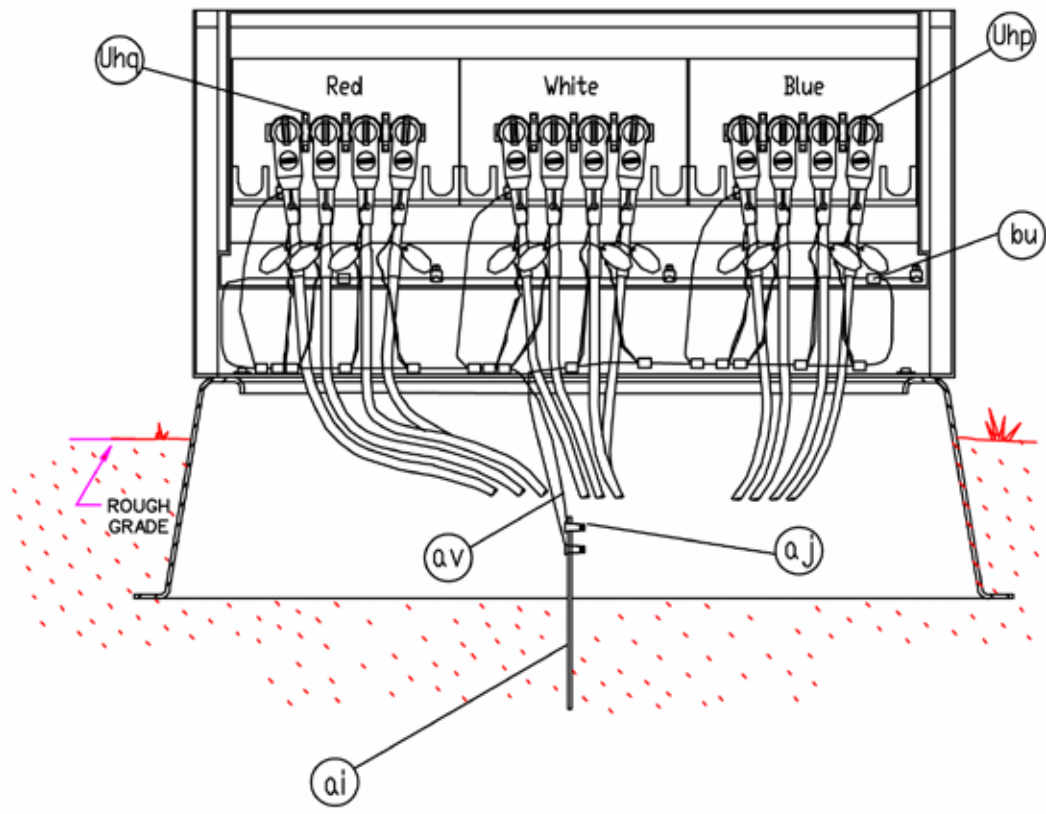
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
ai		Ground rod, as required			
aj		Ground rod clamps, as required			
av		Jumper, as required			
uhe	1	Switchgear, pad mounted			
uhw		Safety signs, as required			
uja	1	Switch basement, PMH (Boxpad)			

PADMOUNT SWITCHGEAR
AIR INSULATED (PMH-11)

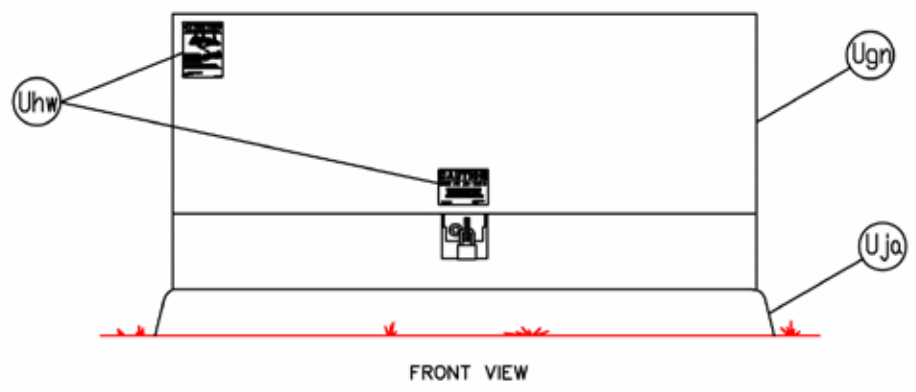


APRIL 2010

UM3E-11



NOTE: JUMPER AS REQUIRED, MAINTAIN SYSTEM NEUTRAL

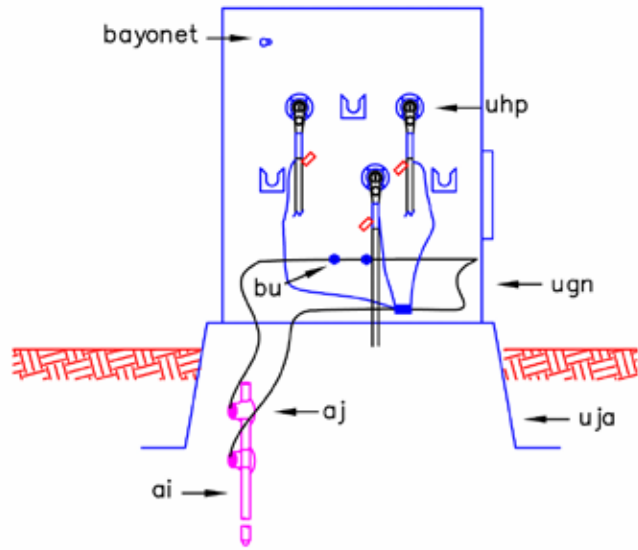


EM	NO.	MATERIAL	ITEM	NO.	MATERIAL
	1	Ground rod	Uhq	3	Terminations, multipoint
	2	Ground rod clamp	Uhw		Safety signs, as required
		Jumper, as required	Uja	1	Pad, equipment, incl. box pad
		Grounding connector(s), as required			
	1	Primary junction enclosure			
		Elbow termination, as required			

3-PHASE, 200 A JUNCTION, 4 WAY



NOVEMBER 2010
UM33



- Note: 1. Vent before removal of bayonet fuse
 2. Jumpers as required, maintain system neutral

ITEM	NO.		ITEM	NO.	
ai	1	Ground rod	uhp		Elbow termination, as required
aj	2	Ground clamp	ugn	1	Enclosure, equipment
bu		Grounding connector(s), as required	uja	1	Pad, equipment
			uhw		Safety signs, as required
			SINGLE PHASE PADMOUNTED FUSED SECTIONALIZING ASSEMBLY (200A)		
			NOVEMBER 2010		
			UM-4		
			MMUA		

Utility Billing Monthly Report Calendar Year 2019

Description	As of 1/31/2020	As of 2/29/2020	As of 3/31/2020	As of 4/30/2020	As of 5/31/2020	As of 6/30/2020	As of 7/31/2020	As of 8/31/2020	As of 9/30/2020	As of 10/31/2020	As of 11/30/2020	As of 12/31/2020
Total Account Balances	\$ 601,347.50	\$ 551,698.11	\$ 595,134.72	\$ 616,922.85	\$ 652,958.35	\$ 725,179.76	\$ 705,793.25	\$ 790,994.12	\$ 888,277.49			
Current Period	\$ 555,704.84	\$ 497,019.39	\$ 532,608.19	\$ 551,300.51	\$ 579,482.47	\$ 659,525.21	\$ 545,317.99	\$ 616,153.44	\$ 579,109.88			
1 Period Overdue	\$ 28,985.02	\$ 35,747.28	\$ 32,808.33	\$ 23,753.59	\$ 25,596.14	\$ 16,360.71	\$ 111,589.98	\$ 46,188.93	\$ 163,212.84			
2 Periods Overdue	\$ 8,396.86	\$ 11,454.21	\$ 17,307.07	\$ 19,021.53	\$ 13,850.87	\$ 14,200.48	\$ 9,298.69	\$ 101,298.20	\$ 28,743.15			
3 Periods Overdue	\$ 8,471.17	\$ 7,568.36	\$ 12,342.36	\$ 22,938.35	\$ 34,120.00	\$ 35,242.42	\$ 39,776.30	\$ 27,353.55	\$ 117,211.62			
Total Penalties Applied to Account	\$ 6,226.45	\$ 6,190.49	\$ 7,827.78	\$ -	-	-	\$ -	\$ 5,744.83	\$ 22,811.95			
Past Due/Disconnection Notices Mailed (customer 30 days or more past due) *	71	66	0	0	0	0	52	38	70			
Utility Disconnects	0	6	0	0	0	0	0	13	3	0	0	0
Missed Payments on Payment Agreement	0	0	0	0	0	0	0	0	3	0	0	0
No Response to Past Due/Disc Notice/Door Tag	0	6	0	0	0	0	0	13	0	0	0	0

* Does not include Quamba residents, customers with a payment agreement in place, and water only accounts.

COMMENTS:

Credit balance for '3 Periods Overdue' is due to pre-payment on accounts, energy assistance, and a solar connection credits.

**Monthly Utility Account Adjustments Report
For Adjustments \$50.00 or higher**

DATE	SERVICE	QTY	AMOUNT	NOTES
SEPT 2020				
	NO ADJUSTMENTS TO REPORT FOR SEPTEMBER, 2020			

**MORA MUNICIPAL UTILITIES
SANITARY SEWER RESPONSE REPORT
2020**

No.	Date	Time	Address	Sewage Back-up	Manholes Clear	Comments
1	Sat, January 04, 2020	5:30pm	325 West Forest	yes	yes	Checked mainline, up and downstream manholes, all flowing . Staff suggested cleaning service line.
2	Tue, February 18, 2020	9:07 AM	121 South Union St.	yes	yes	Checked mainline, up and downstream manholes, all flowing . Staff suggested cleaning service line.
3	Thu, February 20, 2020	11:28 AM	213 Maple Ave.W.	yes	yes	Checked mainline, up and downstream manholes, all flowing . Staff suggested cleaning service line.**Owner of property has lift pump, not functional at time of staff inspection. This home shares sewer with neighboring property**
4	Tue, February 25, 2020	8:36 AM	918 Maple Ave. E.	yes	yes	Checked mainline, up and down stream manholes, all flowing. Staff suggested cleaning.**Owner says sewers are connected, will look into this item**
5	Fri, February 28, 2020	2:02 PM	608 McLean St.	yes	yes	Checked mainline, up and down stream manholes, all flowing. Staff suggested cleaning.
6	Fri, February 28, 2020	9:43 PM	500 MN- 65	yes	yes	checked mainline, up and down stream manholes, all clear. Plumber there cleaning line.
7	Sat, March 07, 2020	3:40 PM	231 Stewart Ave.	yes	yes	Checked mainline, up and downstream manholes, all clear. Staff suggested cleaning line.
8	Fri, March 20, 2020	11:59 AM	170 White Pine Court	yes	yes	Checked mainline, up and downstream manholes, all clear. Staff suggested cleaning line. Staff did jet and flush line per homeowners request.
9	Thu, April 09, 2020	12:00 PM	431 3rd Street	yes	yes	Checked mainline, up and downstream manholes, all clear. Staff suggested cleaning line.
10	Fri, May 08, 2020	7:00 AM	612 Watkins Street	yes	yes	Checked mainline, up and downstream manholes, all clear. Staff suggested cleaning line.

11	Thu, May 14, 2020	7:00 PM	513 Union Street South	yes	yes	Checked mainline, up and downstream manholes, all clear. Staff suggested cleaning line. Jetted mainline due to low flow.
12	Mon, June 01, 2020	11:00 AM	700 Forest Ave West	yes	yes	Checked mainline per home owner request. Lines flowing and clear.
13	Thu, June 04, 2020	7:20 AM	39 North Union St.	yes	yes	Checked up and downstream manholes mainline was flowing. Staff suggested cleaning line.
14	Thu, June 18, 2020	3:30 PM	222 2nd Street	yes	yes	Checked manhole where service enters, clear with trickle of water. Staff suggested cleaning line.
15	Wed, August 12, 2020	1:10 PM	17 North Pine	yes	yes	Sewage in crawl space. Checked up and downstream manholes, all clear. Staff suggested cleaning service line to owner.
16	Mon, August 17, 2020	7:32 PM	230 North Park St	yes	yes	Sewage in basement. Checked up and down stream manholes, all clear. Staff suggested cleaning service line.