# SECTION 6 EQUIPMENT PADS AND STREET LIGHT BASES

# CONTENTS

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## PAD & WELL DETAILS FOR TRANSFORMERS, SWITCHES, & JE'S - PADMASTER

DESIGN SUPR DATE REV	INDEX	DRAWING NUMBEF
Liberty Utilities	ELECTRIC INSTALLATION GUII	<b>)E</b> SUBSTRUCTUR
	ENGINEERING & CONSTRUCTION STANDARD	6.1.1 OF 39
TRANSFORMER & SWITCH PA	D REQUIREMENTSSHI	EET 6.8.16
BARRIER POST INSTALLATIO	NSHI	EET 6.8.15
BARRIER POST GUIDELINES		EET 6.8.15
INDEX PURPOSF		EE1 6.8.15 EET 6.8.15
		EET 6 9 15
PADMOUNT APPARATUS	BARRIER POST - PE000911	
PAD ELEVATION AND ISOME CONSTRUCTION AND ENGIN	IRIC DETAILS	EET 6.7.13 EET 6.7.14
I KANSFOKWEK PADS 30	75-2500 KVA - FE00050, FE00060	
TDANGEODMED DATE 20	75 2500 KWA DE000211 DE000411	
PAD ELEVATION AND ISOME CONSTRUCTION AND ENGIN	TRIC DETAILS	EET 6.6.11 EET 6.6.12
TRANSFORMER PAD 1Ø 2	5-167 KVA - PE0001U	
FIELD CAST REQUIREMENTS I STOCK # 8800-240728, STOCK #	FOR LU STOCK # 8800-240726 8800-240732, AND STOCK # 8800-240736SHI	EET 6.5.10
3Ø SWITCH PAD - FIELD C	CAST REQUIREMENTS - PAD03X	
FIELD CAST REQUIREMENTS I	UK LU STUCK # 8800-24069/ SH	EE1 0.4.9
	TILLD CAST REQUIREMENTS - FADU	
30 TRANSFORMER PAD -	FIELD CAST REQUIREMENTS - PADO	12X
FIELD CAST REQUIREMENTS I	FOR LU STOCK # 8800-240692	EET 6.3.8
TRANSFORMER & SWITC	H PAD - FIELD CAST REQUIREMENT	S - PAD01X
SWITCH REFERENCE 7	ABLESHI	EET 6.2.7
LU STOCK # 8800-24072	4SHI	EET 6.2.7
LU STOCK # 8800-24072	1	EET 6.2.6
LU STOCK # 8800-24072	2	EET 6.2.6
LU STOCK # 8800-24073 LU STOCK # 8800-24073	5	EET 6.2.6
LU STOCK # 8800-24072 LU STOCK # 8800-24073	8	EE1 6.2.5 FFT 6.2.6
LU STOCK # 8800-24072	۵SHI ٥	EET 6.2.5
LU STOCK # 8800-24073	6	EET 6.2.5
LU STOCK # 8800-24073	2	EET 6.2.5
LU STOCK # 8800-24072	8SH1	EET 6.2.4
LU STOCK # 8800-24072	6	EET 6.2.4
LU STOCK # 8800-24069	7	EET 6.2.4
LU STOCK # 8800-24069	4 SHI	EET 0.2.5 FFT 6 2 4
LU STOCK # 8800-24069 LU STOCK # 8800-24069	15H ว	EE1 6.2.3 FFT 6.2.3
PAD DIMENSIONS		EET 6.2.3
PURPOSE		EET 6.2.3
INDEX	SH1	EET 6.2.3

GN SUPR DATE REV JM 08/17 04	INDEX	0	DRAWING NUMBER INDEX
berty Utilities	ELECTRIC INSTALLA	TION	SUBSTRUCTURE
	ENGINEERING & CONSTRUCTION S	TANDARD	6.1.2 OF 39
KEDWOOD LANDSCA	I'E WALL5	SHEET 6.1	18.39
TYPICAL WING WALL	SECTION MAXIMUM HEIGHT 3' - 4"	SHEET 6.1	8.38 18.39
TYPICAL WALL SECT TYPICAL WING WALI	ON MAXIMUM HEIGHT 3' - 4" . SECTION MAXIMUM HEIGHT 5' - 4"	SHEET 6.1 SHEET 6.1	18.37 18.38
TYPICAL WALL SECT	ON MAXIMUM HEIGHT 5' - 4"		18.37
RETAINING WALL IN RETAINING WALL IN	STALLATION REQUIRING FILL STALLATION REOUIRING CUT	SHEET 6.1 SHEET 6.1	18.36 18.36
WALL DETAILS		·	
FOR PADMOUNTED EQU CONSTRUCTION NOTES	IPMENT AND VAULTS - TE004	UU SHEET 6.1	8.35
RETAINING WALL DETAI	ILS AND SLOPE MODIFICATIO	<b>DNS</b>	
			17.34
UNDERGROUND DECOR	ATIVE STREETLIGHT BASE - S	LB12U	17 34
SIREEI LIGIII DASE DETAIL			0.35
BASE DETAIL FOR NDOT	TYPE 7 BOLTED BASE POLES -	SLB03U	16 33
O/H & U/G STREET LIGHT BAS	SE DETAIL	SHEET 6.1	15.32
STREET LIGHT LOCATION AN	D DESIGN INFORMATION	SHEET 6.1	15.31
O/H & U/G SIKEEI LIGHI	S - SI BO2LL& ODI 30H		
CONSTRUCTION AND ENGIN	EERING NOTES		4.30
200A / 600A 3Ø INTERRUP	<b>FER PAD DETAIL - PE0030U</b>		4.20
ISOMETRIC DIMENSION DET	EERING NOTES	SHEET 6.1	13.27 13.28
PAD ELEVATION AND ISOME	TRIC DETAILS		13.27
JUNCTION ENCLOSURE I	AD 1Ø/3&4 WIRE - 3Ø 4 WIRE	- PE0025U	
CONSTRUCTION AND ENGIN	EERING NOTES	SHEET 6.1	12.26
PAD ELEVATION AND ISOME	TRIC DETAILS	SHEET 6.1	12.25
DDINAADY METEDINIC 200		200221	
CONSTRUCTION AND ENGIN	EERING NOTES	SHEET 6.1	11.24
600 AMP 3Ø SWITCH PAD PAD ELEVATION AND ISOME	WELL DETAIL - PE0016U, PE00 TRIC DETAILS	17 <b>U, PE0018</b> SHEET 6.1	1.23
		1711 DE0010	
CONSTRUCTION AND ISOME	TRIC DETAILS EERING NOTES	SHEET 6.9	9.21 9.22
200 AMP 3Ø SWITCH PAD	- PE0012U, PE0013U, PE0014U, P	'E0015U	24
	TE DOORD ON GAMME DOOR CLEANINGE		
WINDOW OR OPENING CLEA I IMITED PEDESTRIAN TRAFE	RANCES IC DOORS OR GARAGE DOOR CLEARANCES	SHEET 6.8	3.20 3.20
AIK INTAKE OK EAHAUST CL	EARANCE REQUIREMENTS	SHEET 6.8	3.20
AID INTAKE OD EVILALIST CL			
PADMOUNT EQUIPMENT LIN DOOR AND FIRE ESCAPE CLE	E OF SIGHT TRIANGLE ARANCE REOUIREMENTS	SHEET 6.8 SHEFT 6.9	3.18

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# PAD AND WELL DETAILS FOR TRANSFORMERS, SWITCHES, AND JUNCTION ENCLOSURES

# 1.0 INDEX

- 1.0 INDEX
- 2.0 PURPOSE
- 3.0 PAD DIMENSIONS

# 2.0 PURPOSE

This guide is to provide footprint dimensions on pads used by LU for padmounted transformers, switches, and junction enclosures. All dimensions shown reflect the required measurements for each application. Standard construction designs will utilize pre-poured manufactured pads. Should a poured in place pad be required, each pad detail defines the reinforcement steel and specifications required. Refer to PAD01X, PAD02X, and PAD03X for drawings.

Conduit configurations for each installation will differ. A generic conduit layout has been provided on each pad drawing as an example. <u>LU's Planners and Inspectors will</u> provide guidance if configuration is Work Order specific.

# 3.0 PAD DIMENSIONS



## LU STOCK # 8800-240692



### LU STOCK #8800-240694

75kVa - 500kVA TRANSFORMERS 86 SERIES REFER TO DRAWING PE0003U



### LU STOCK #8800-240697

750kVa - 2500kVA TRANSFORMERS 86 SERIES REFER TO DRAWING PE0006U



#### LU STOCK #8800-240726

PADMOUNT SWITCHES #8800-253913 & #8800-253924



	Lib	erty	Utili	ties
DRAWN	DESIGN	SUPR	DATE	REV
LL	ET	JM	08/17	04

#### LU STOCK #8800-240728

PADMOUNT SWITCHES #8800-253916 #8800-253917, #8800-253925



PAD & WELL DETAILS FOR TRANSFORMERS, SWITCHES, & JUNCTION ENCLOSURES

SUBSTRUCTURE DRAWING NUMBER **PADMASTER** 

### LU STOCK #8800-240732

PADMOUNT VFI SWITCH #8800-253928 & #8800-253932 OPENING "E1" REFER TO DRAWING PE0014U



## LU STOCK #8800-240726

PADMOUNT SWITCH #8800-253934 & 8800-253931 SWITCH PAD WELL OPENING "E1"



## LU STOCK #8800-240736

PADMOUNT SWITCH OPENING "G" REFER TO DRAWING PE0015U



					ENGINEERING & CONSTRUCTION STANDARD	6.2.5 OF 39
	Libe	erty	Utili	ties	PAD & WELL DETAILS FOR	SUBSTRUCTURE
					I RANSFORMERS, SWITCHES,	DRAWING NUMBER
DRAWN	DESIGN	SUPR	DATE	REV	& JUNCTION ENCLOSURES	PADMASTER
11	ET	JM	08/17	04	,	

#### LU STOCK #8800-240738

PADMOUNT SWITCH #8800-253922 & #8800-253923 SWITCH PAD WELL OPENING "G" **REFER TO DRAWING PE0018U** 

PADMOUNT PRIMARY METER-**ING SWITCH PAD WELL REFER TO DRAWING PE0023U** 

LU STOCK #8800-240731



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### LU STOCK #8800-240721

### FOR USE WITH 1Ø STEEL JE #8800-252120 & 8800-252125



## LU STOCK # 8800-240724

### 3Ø JUNCTION ENCLOSURE #8800-252130 USED FOR 504 VAULT CONVERSIONS REFER TO DRAWING PE0025U



Underground SSP 'U' Reference.	Substructure Ref.	Switch #	25KV Switch Description	
SSP01U	8800-240692 pad (44" x 48" X 6")	PE0001U	8800-253912	1P, 200AMP, 2 WAY, 1 FUSE WAY, 2UBW
SSP02U	8800-240726 pad (55" X 72" x 6")	PE0012U	8800-253913	3P, 200AMP, 2 WAY, 1 FUSE WAY, 6UBW
SSP05U	8800-240728 pad (68" x 72" X 6")	PE0013U	8800-253916	3P, 200AMP, 4 WAY, 0 FUSE WAY, 12UBW
SSP06U, maint. only. (See SSP30U, new)	8800-240728 pad (68" x 72" X 6")	PE0013U	8800-253917	3P, 200AMP, 4 WAY, 1 FUSE WAY, 12UBW
SSP07U, maint. only. (See SSP30U, new)	8800-240736 pad (92" x 72" x 8")	PE0015U	8800-253918	3P, 200AMP, 4 WAY, 2 FUSE WAY, 12UBW
SSP15U well SSP16U vault	8800-2400734 (well) 8800-241077 (612 vault)	PE0017U VB0085U	8800-253921	3P, 600AMP, 4 WAY, 0 FUSE WAY, 0UBW
SSP18U well, maint. only SSP19U vault, maint. only (See SSP38/39U, new)	8800-240738 (Well) 8800-241076 (612 vault)	PE0018U VB0085U	8800-253922	3P, 600/200AMP, 4 WAY, 1 FUSE WAY, 3UBW
SSP21U well, maint. only SSP22U vault, maint. only (See SSP32/33 U, new)	8800-240692 (well) 8800-241076 (612 vault)	PE0018U VB0085U	8800-253923	3P, 600/200AMP, 4 WAY, 2 FUSE WAY, 6UBW
SSP30U	8800-240732 pad (81" x 86" x 8")	PE00014	8800-253928	3P, 200AMP, 4 WAY, 2 VFI, 12UBW
SSP32U SSP33U	8800-240730 (well) 8800-241075 (vault)	PE0016U VB0085U	8800-253931	3P, 600/200AMP, 4 WAY, 2 VFI, 6UBW
SSP38U SSP39U	8800-240730 (well) 8800-241075 (612 vault)	PE0016U VB0085U	8800-253934	3P, 600/200AMP, 4 WAY, 1 VFI, 3UBW
SSP50U	8800-240692 pad (44" x 48" x 6")	PE0001U	8800-253937	1P, 200AMP, 3 WAY, 2 FUSE WAY, 4UBW
SSP52U	8800-240726 pad (57" x 74" x 6")	PE0012U	8800-253924	3P/1P, 200AMP, 4 WAY, 3P UNSWITCHED, 3 - 1P FUSED, 9UBW
SSP45U, maint. only (See SSP56U, new)	8800-240728 pad (70" x 74" x 6")	PE0013U	8800-253925	3P/1P, 200AMP, 5 WAY, 1 FUSE WAY, 2UBW
SSP56U	SSP56U 8800-240732 pad (81" x 86" x 8")		8800-253932	1P, 200AMP, 2 WAY, 1 FUSE WAY, 2UBW
PPM01U	8800-240731 (well)	PE0023U	PRIMARY RISER	1P, 200AMP, 2 WAY, 1 FUSE WAY, 2UBW
		ENGINEERING	& CONSTRUCTIO	IN STANDARD 6.2.7 OF 3
Liberty U	tilities	PAD & W	VELL DETA	AILS FOR SUBSTRUCT

# SWITCH "EASY-REFERENCE" SUMMARY TABLE

		/	• • • • •	
DRAWN	DESIGN	SUPR	DATE	REV
LL	ET	JM	08/17	04

# PAD & WELL DETAILS FOR TRANSFORMERS, SWITCHES, & JUNCTION ENCLOSURES

DRAWING NUMBER
PADMASTER

Refer to Construction Standards PE0001U, and PE0003U for spacings and sizing details.

- LU Stock # 8800-240692 supports a max. weight of 2000 lbs.
- LU Stock # 8800-240694 supports a max. weight of 5700 lbs.
- Field cast pads as follows:
  - 1. Compact and level area of proposed pad.
  - 2. Pad location, forms, layout must be inspected and approved by LU prior to pouring concrete (3000 psi at 28 days).
  - 3. Shaded 'conduit' areas to be free and clear of concrete.
  - 4. Reinforcing steel to conform to ASTM 615, #4 rebar will be grade 60.
  - 5. Top of pad shall receive a smooth and level trowel finish. Corners and edges shall be rounded or beveled.
  - 6. Hold down capabilities will be required on all single phase pads and California three phase pad installations, See Detail A, or coordinate location and quantity of 1/2" inserts as shown in above referenced Standards with LU's Inspector.



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Refer to Construction Standards PE0003U, and PE0006U for spacings and sizing details.

- LU Stock # 8800-240697 supports a max. weight of 20,000 lbs.
  - Field cast pads as follows:
    - 1. Compact and level area of proposed pad.
    - 2. Pad location, forms, layout must be inspected and approved by LU prior to pouring concrete (3000 psi at 28 days).
    - 3. Shaded 'conduit' areas to be free and clear of concrete.
    - 4. Reinforcing steel to conform to ASTM 615, #4 rebar will be grade 60.
    - 5. Top of pad shall receive a smooth and level trowel finish. Corners and edges shall be rounded or beveled.
    - 6. Hold down capabilities will be required on all California three phase pad installations, coordinate location and quantity of 5/8" inserts as shown in above referenced Standards with LU's Inspector.



<u>_11011</u>	<b>T</b> T												
REINFORCEMENT STEEL													
PAD	UNIT	NIT CONFIGURATION # REQ'D. LENGTH TOTAL LENGT											
	A	34"	80"		4	12'-4"	49'-4"	32.9					
	в	18"	80"	18"	2	9'–8"	19'-4"	12.9					
8800-240697 (3 PHASE XFMR) 750 KVA 1000 KVA 1500 KVA 2000 KVA 2500 KVA	с	35"	80" 2 80" 2	22"]22"	2	13'-3"	26'-6"	17.7					
	D	12"	34"	12"	5	5'-11"	29'–7"	19.7					
	E		10"		9	10"	7'-6"	5.0					
	C	ONCRETE APP	PROX. = 1.6 C	U. YD.	TOTAL #	4 REBAR	132'-3"	88.22					
			ENGINE	ERING & (	CONSTRUCT	TION STAN	DARD	6.4.9 0					
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# NON-PREFERRED: POURED IN PLACE PADS

ENGINEERING & CONSTRUCTION	STANDARD (	6.4.9 OF 39			
Liberty Utilities 30 TRANSFORME	R PAD SUB	STRUCTURE			
FIELD CASI	DRA	WING NUMBER			
DESIGN SUPR DATE REV REOLIIREMEN	тс   <i>р</i>	PAD02X			
ET JM 08/17 04	15	NDULA			

Refer to Construction Standards PE0012U through PE0015U for spacing and sizing details.

- LU Stock #24-0726 supports a max. weight of 2600 lbs.
- LU Stock #24-0728 supports a max. weight of 2800 lbs.
- LU Stock #24-0732 supports a max. weight of 3500 lbs.
- LU Stock #24-0736 supports a max. weight of 3800 lbs.
- Field cast pads as follows:
  - 1. Compact and level area of proposed pad.
  - 2. Pad location, forms, layout must be inspected and approved by LU prior to pouring concrete (3000 psi at 28 days).
  - 3. Shaded 'conduit' areas to be free and clear of concrete.
  - 4. Reinforcing steel to conform to ASTM 615, #4 rebar will be grade 60.
  - 5. Top of pad shall receive a smooth and level trowel finish. Corners and edges shall be rounded or beveled.
  - 6. Hold down capabilities will be required on all California three phase pad installations, coordinate location and quantity of 5/8" inserts as shown in above referenced Standards with LU's Inspector.



#### NON-PREFERRED: POURED IN PLACE PADS

	REINFORCEMENT STEEL												
		PAD	UNIT	c	ONFIGURATION		# REQ'D.	LENGTH	TOTAL LENGTH	H WEIGHT			
			•	42" <b>L</b>	48"	<sup>-42</sup>	2	11'-0"	22'-0"	22.9			
	8800	-240726	в		52"		4	4'-4"	17'-4"	18.1			
	F 6	.00120	С		26"		4	2'-2"	8'-8"	9.0			
			co	NCRETE APP	PROX. = .35 CU.	YD.	TOTAL #	5 REBAR	48'-0"	49.9			
			<b>A</b>	42"	62"	J42"	2	12'-2"	24'-4"	25.4			
	8800	-240728	в		65"		4	5'-5"	21'-8"	22.6			
			c		26"	•	4	2'-2"	8'-8"	9.0			
			C0	NCRETE APP	PROX. = .4 CU.	YD.	TOTAL #	5 REBAR	54'-8"	57.01			
			<b>A</b>	42" <b>L</b>	76"	<sup>-2</sup> 2″	4	13'-4"	26'-8"	27.8			
	8800-240732			18"	79"	<sup></sup> 18"	4	6'-7"	26'-4"	27.5			
			с		26"		6	2'-2"	13'-0	13.6			
			C	DNCRETE APP	PROX. = .65 CU.	YD.	TOTAL #	5 REBAR	66'-0"	68.9			
			<b>^</b>	42"	86"	<u>م</u>	4	14'-2"	56'-8"	59.1			
	8800 PF	0-240736	в		89"	•	4	7'-5"	29'–8"	30.9			
			с		26"		8	2'-2"	17'-4"	18.1			
			C (	DNCRETE APP	PROX. = .75 CU.	YD.	TOTAL #	5 REBAR	103'-8"	108.1			
					ENGINEER	ING &	CONSTRUC	TION STAN	NDARD	6.5.10	) OF 39		
	Liberty Utilities 30 SWITCH PAD SUBSTRI									UCTUR			
₹.						FII	ELD CA	AST		DRAWING	NUMBE		
╋	DESIGN ET	SUPR JM	DATE 08/17	REV 04	REQUIREMENTS PAD								



LU DRAWING #	А	A1	В	B1	С	D	Е	F	G	Н	Ι	J	WEIGHT (LBS)
PE0001U 1Ø XFMR PAD STOCK # 8800-240692	44"	45"	48"	49"	13"	7"	8.5"	27"	2"	6"	12"	9"	800 CONCRETE

- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING AND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8" 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SECTION 5.0 OF SUB01X, SUBSTRUCTURE, SECTION 3.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%. 12" OF SAND MUST COVER THE CONDUIT.
- 5. A 17" X 30" X 12" (N36) EXTENSION IS REQUIRED, STK #8800-240480: IF 750 KCM IS USED; OR IF A F.T.S. OR F.I.T. TRANSFORMER (BREAKER OR FUSED TRANSFORMER) IS TO BE INSTALLED; OR IF THE TRANSFORMER IS BEING INSTALLED IN THE LAKE TAHOE AREA. IN THE LAKE TAHOE AREA, GROUT THE BOTTOM 2" OF THE 17" X 30" X 12" (N36) EXTENSION FOR PEST PREVENTION.
- 6. GROUND ROD (5/8" X 8' COPPER-CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 7. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO 128, RULE 34.3A.

### **ENGINEERING NOTES**

- A. ALL FIELD CAST PADS ARE TO BE BUILT TO LU`S SPECIFICATION PAD01X AND MUST BE INSPECTED BY LU PRIOR TO POURING CONCRETE.
- B. DO NOT CONCRETE SHADED AREAS.
- C. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO-128, RULE 21.5A.
- D. PAD STOCK #8800-240692 WILL FIT ALL SINGLE PHASE TRANSFORMERS AND SWITCHES, STOCK #8800-253912 AND #8800-253937.

					ENGINEERING & CONSTRUCTION STANDARD	6.6.12 OF 39	
Liberty Utilities				ties	TRANSFORMER PAD	SUBSTRUCTURE	
					1Ø	DRAWING NUMBER	
DRAWN	DESIGN	SUPR	DATE	REV	25-167 KVA	PENNN1II	
LL	ET	JM	08/17	04	2J-107 KVA	1200010	

PE0003U & PE0006U



LU DRAWING # 3Ø XFMR PADS	А	A1	В	B1	С	D	Е	F	G	Н	Ι	J	K	L	М	WEIGHT (lbs.)
<b>PE0003U</b> (75-500 kVA) LOOP OR SWITCHING STOCK # 8800-240694	72"	74"	60"	62"	15"	8"	10"	52"	2"	8"	20"	24"	11"	25"	18"	2600
<b>PE0006U</b> (750-2500 kVA) LOOP OR SWITCHING STOCK # 8800-240697	85"	87"	79"	81"	18"	15"	10"	65"	2"	12"	5"	26"	14"	30"	26"	5900

- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING AND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8" 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SECTION 5.0 OF SUB01X , SUBSTRUCTURE, SECTION3.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%. 12" OF SAND MUST COVER THE CONDUIT.
- 5. A SECONDARY (17" X 30") 12" BOX EXTENSION IS REQUIRED TO BE INSTALLED BELOW THE PAD ON THE SECONDARY SIDE TO FACILITATE CABLE LAYING. (LAKE TAHOE REQUIREMENTS SEE BELOW).
- 6. IN THE LAKE TAHOE AREA, A 12" EXTENSION INSTALLED BELOW THE PAD WILL BE REQUIRED. USE REDWOOD/TREATED WOOD OR A 17" X 30"; 12" BOX EXTENSION UNDER PAD.
- 7. GROUND ROD (5/8" X 8' COPPER-CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 8. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO-128, RULE 34.3A.

### **ENGINEERING NOTES**

- A. ALL FIELD CAST PADS ARE TO BE BUILT TO LU SPECIFICATION PAD01X AND MUST BE INSPECTED BY LU PRIOR TO POURING CONCRETE.
- B. DO NOT CONCRETE SHADED AREAS.
- C. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO-128, RULE 21.5A.
- D. PE0006U, PAD 8800-240697, WILL BE USED FOR PRIMARY CAPACITORS AS SHOWN IN UNDERGROUND.

					ENGINEERING & CONSTRUCTION STANDARD	6.7.14 OF 39		
	Libe	erty	Utili	ties	TRANSFORMER PADS	SUBSTRUCTURE		
					1Ø - RADIAL/LOOPING	DRAWING NUMBER		
DRAWN	DESIGN	SUPR	DATE	REV	75-2500 KVA	PE0003U		
LL	ET	JM	08/17	04	7 J-2300 KVA	PE0006U		

# PADMOUNTED APPARATUS BARRIER POST RESIDENTIAL AND COMMERCIAL

# 1.0 INDEX

- 1.0 INDEX
- 2.0 PURPOSE
- 3.0 BARRIER POST GUIDELINES
- 4.0 BARRIER POST INSTALLATION
- 5.0 TRANSFORMER AND SWITCH PAD REQUIREMENTS

# 2.0 PURPOSE

This Standard provides information on the placement of barrier posts for the protection of pad mounted apparatus both in residential and commercial applications.

# 3.0 BARRIER POST GUIDELINES

- 3.1 If padmounted apparatus is to be located in an area subject to vehicular traffic, suitable barrier posts are to be supplied and installed by the customer in accordance with this Standard.
- 3.2 Apparatus located in an area which will not ultimately be subject to vehicular traffic, but is in the path of construction equipment, requires temporary barriers complying with these Standards. **Temporary barriers must be provided by the customer until the hazard of the apparatus being struck no longer exists.**

# 4.0 BARRIER POST INSTALLATION

- 4.1 Barrier posts will be installed a minimum of 24" away from the side of the transformer and switch pads, see Details 1 & 2, Sheet 6.8.16.
- 4.2 Barrier posts will be installed 36" away from the front and back of switch pads, see Detail 2.
- 4.3 Residential area posts will be a minimum 4" OD steel pipe (well casing), primed and painted yellow. LU Stock #8800-950931 (permanent), #8800-950932 (removable).
- 4.4 Commercial area posts will be minimum 6" OD steel pipe (well casing), primed and painted yellow. LU Stock #8800-950930 (permanent), #8800-950929 (removable).

					ENGINEERING & CONSTRUCTION STANDARD	6.8.15 OF 39		
	Libe	erty	Utili	ties	PADMOUNTED APPARATUS	SUBSTRUCTURE		
					BARRIER POST-RESIDENTIAL	DRAWING NUMBER		
DRAWN	DESIGN	SUPR	DATE	REV	& COMMERCIAL	PENNA		
LL	ET	JM	08/17	04		1200070		

# 5.0 TRANSFORMER & SWITCH PAD REQUIREMENTS

- 5.1 If traffic free zone is a building, fence, or electrical panel, the back or side of the transformer pad shall maintain a minimum 3'-0" clearance for transformers 1000 kva or less and a 3'-6" clearance for transformers greater than 1000 kva.
- 5.2 If front of transformer pad faces a building, fence, or electrical panel, a 10'-0" clear and level area must be maintained for the safe operation of the equipment.
- 5.3 If traffic free zone is a building, fence, or electrical panel, the side of the switch pad shall maintain a minimum 3'-0" clearance.
- 5.4 If front/back of switch pad faces a building, fence, or electrical panel, a 10'-0" clear and level area must be maintained for the safe operation of the equipment.



# PADMOUNT EQUIPMENT LOCATIONS / CLEARANCES

Where LU desires to install transformers and padmount equipment on customer's premises, the customer shall furnish a satisfactory right-of-way for such purposes, and shall provide adequate space for the installation.

## Padmount equipment shall conform to the following:

- **A.** Padmount transformers/equipment shall not be located directly in front of doors, stairways, beneath windows which can be opened, or where they will obstruct the vision of vehicular traffic. The front (doors) of padmount equipment shall open away from any structure. See Figures 1 7.
- **B.** Padmount transformers/equipment shall be located at least the minimum distance away from buildings or other structures to ensure adequate space for operating, proper ventilation, to minimize vibration hums, and to meet fire safety requirements.

Feature	Clearance Distance
<b>Noncombustible walls</b> , (doesn't burn) provided the side of the equipment facing the wall does not have doors. A <u>clear level 10 ft area</u> must be provided in front of equipment doors to allow personnel access for the operation and maintenance of the equipment.	3 ft
Combustible walls (including stucco*), main doors, windows, air intakes /exhaust vents, stairs and fire e scapses.	10 ft
Gas service meter relief vents.	3 ft
Fire sprinkler values, standpipes and fire hydrants.	6 ft
The waters edge of a swimming pool or any body of water.	15 ft
Facilities used to dispense hazardous liquids or gases (service station gas pumps or propane bulk dispensing.	20 ft
Facilities used to store hazardous liquids or gases (service station fuel storage tank filler openings or emergency generator fueling points.	10 ft
* Stucco on wood framing is combustible: Stucco on metal framing is non-combustible. (1). Clearances between padmount equipment and structures must be measured from the portion of the equipment closest to the structure (including overhangs). (2). Consult local building and fire codes for more detailed customer information.	closest metal

- C. A clear vehicle passageway of 12 feet minimum shall be available at all times <u>immediately adjacent (within 8') to one side of the equipment</u> to provide an accessible roadway for equipment maintenance. This passageway shall be designed to meet H-20, (20-ton) construction.
- D. Transformer and equipment structures will normally be installed only in non-traffic areas. Transformer and equipment protection is required when LU equipment is exposed to traffic. This protection may be in the form of barriers, barricades (See PE0009U) or curb. A curb must have a minimum height of 6" and be at least 6" thick and its front face located 54" minimum from the equipment foundation (pad).

					ENGINEERING & CONSTRUCTION STANDARD	6.8.17 OF 39		
	Libe	erty	Utili	ties	PADMOUNT EQUIPMENT	SUBSTRUCTURE		
		-			LOCATIONS &	DRAWING NUMBER		
DRAWN	DESIGN	SUPR	DATE	REV	CLEARANCES	PENN1NII		
LL	ET	JM	08/17	04		1200100		



## Working space and fire safety requirements:

Padmount equipment can be a fire hazard since it contains flammable oil. *Figures 2 through 7*, show detailed clearances to buildings required for fire safety. Fire safety clearances can be reduced by building a suitable <u>masonry</u> fire barrier wall 3' from the back or side of the equipment to the side of the combustible wall (see figures below). Barriers must be at least 9' wide and 15' tall. If there is an combustible overhang on the building, that overhang must be 16' or greater from the bottom of the transformer (10' radial clearance from a 6' high transformer).

All LU equipment will be installed in accessible areas only, and have unobstructed vertical access for the installation and removal of the equipment. It will be the builders responsibility to check that all applicable, municipality and insurance regulations are met.

Pad mounted equipment locations and clearances are minimum requirements only and are intended as a design guide. They do not necessarily represent the final design criteria for any particular project. LU reserves the right to accept, reject or to approve all applications of this particular standard before construction. Please consult the particular designer/ planner for your particular project to ensure the design is acceptable. Only LU approved final drawings will be used for construction/ inspection purposes of LU facilities.

Adequate storm water drainage and runoff protection must be provided to prevent flooding of the LU electrical equipment.

Any device that can not be maintained or safely operated will not be installed.







LU DRAWING # SWITCH PADS	А	A1	В	B1	С	D	Е	F	G	Н	Ι	J	K	L	WEIGHT (lbs.)
PE0012U PADMOUNTED SWITCHPAD STOCK # 8800-240726	55"	57"	72"	74"	15"	6-1/2"	6-1/2"	42"	7-1/2"	6"	16"	20"	6-1/2"	29"	1431
PE0013U PADMOUNTED SWITCHPAD STOCK # 8800-240728	68"	70"	72"	74"	15"	6-1/2"	6-1/2"	55"	2"	6"	16"	22"	6-1/2"	29"	1690
PE0014U PADMOUNTED SWITCHPAD STOCK # 8800-240732	81"	83"	86"	88"	15"	9"	4"	64"	-	8"	16"	22"	8"	38"	2650
<b>PE0015U</b> PADMOUNTED SWITCHPAD STOCK # 8800-240736	92"	94"	72"	74"	15"	6-1/2"	6-1/2"	79"	2"	8"	16"	39"	6-1/2"	29"	3000

- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING AND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8"- 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SECTION 5.0 OF SUB01X, SUBSTRUCTURE, SECTION 3.0.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%. 12" OF SAND MUST COVER THE CONDUIT.
- 5. IN LAKE TAHOE AREA, A 12" EXTENSION WILL BE REQUIRED. USE REDWOOD OR SEVERAL 17" x 30" CONCRETE EXTENSIONS.
- 6. GROUND ROD (5/8" X 8' COPPER-CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 7. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO-128, RULE 34.3A.

## **ENGINEERING NOTES**

- A. ALL FIELD CAST PADS ARE TO BE BUILT TO LU'S SPECIFICATION PAD01X -AND **MUST** BE INSPECTED BY LU PRIOR TO POURING CONCRETE.
- B. DO NOT CONCRETE SHADED AREAS.
- C. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO-128, RULE 21.5A.
- D. SEE DETAIL "A" FOR CONDUIT LAYOUT FOR 5 WAY SWITCH 8800-253932. REFERENCE SSP56U, UNDERGROUND, FOR SWITCH AND CONDUIT

					ENGINEERING AND CONSTRUCTION STANDARD	6.9.22 OF 39
Liberty Utilities					200 AMP 3Ø SWITCH	SUBSTRUCTURE
					PAD DETAILS	DRAWING NUMBER
DRAWN	VN DESIGN SUPR DATE REV		REV		PE0012U-PE0015U	
LL	ET	JM	08/17	04		



LU DRAWING # SWITCH PAD WELLS	А	A1	В	B1	С	D	Е	F	G	Н	Ι	J	K	WEIGHT (lbs.)
PE0016U PADMOUNTED SWITCH PAD WELL STOCK # 8800-240730	104"	112"	80"	88"	15"	6"	20"	64"	13"	48"	12"	25"	38"	9500
PE0016U PADMOUNTED SWITCH PAD WELL STOCK # 8800-240734	104"	112"	80"	88"	15"	10-1/2"	20"	64"	17"	48"	12"	25	29	9500
PE0016U PADMOUNTED SWITCH PAD WELL STOCK # 8800-240738	104"	112"	80	88"	15"	10-1/2"	12-1/2"	79"	17"	48"	16"	28"	29"	9500

- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING AND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8" 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SECTION 5.0 OF SUB01X , SUBSTRUCTURE.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%. 12" OF SAND MUST COVER THE CONDUIT.
- 5. PAD WELLS ARE NOT MAN ACCESSIBLE, FUTURE POSITIONS MUST BE STUBBED, FISHED, WITH GROUND WIRES CONNECTED TO THE GROUND ROD AND POSITIONED TO BE ACCESSIBLE FROM WINDOW OPENINGS.
- 6. GROUND ROD (5/8" X 8' COPPER-CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 7. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO-128, RULE 34.3A.

## **ENGINEERING NOTES**

A. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO-128, RULE 21.5A.

					ENGINEERING AND CONSTRUCTION STANDARD	6.11.24 OF 39
Liberty Utilities					600 AMP 3Ø SWITCH	SUBSTRUCTURE
					PAD WELL DETAIL	DRAWING NUMBER
DRAWN	WN DESIGN SUPR DATE REV		REV		PE0016U-PE0018U	
LL	ET	JM	08/17	04		



LU DWG #	А	В	С	D	E	F	G	Н	Ι	J	K	WEIGHT (LBS)
PE0023U PRIMARY METERING PAD WELL STOCK # 8800-240731	112"	88"	104"	80"	24-1/2"	56"	10-1/4"	49"	SEE DETAILS A&B"	30"	2-1/2"	9865

- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING AND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8" 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SUB01X 5.0, SECTION 3, SUBSTRUCTURE.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%, 12" OF SAND MUST COVER THE CONDUIT.
- 5. GROUND ROD (5/8" X 8' COPPER CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 6. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO-128, 34.3A.

# **ENGINEERING NOTES**

A. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO 128, RULE 21.5A.



*PE0023U* 

**PAD WELL DETAIL** 

		erty	Utili	ties
DRAWN	DESIGN	SUPR	DATE	REV
LL	ET	JM	08/17	04



- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING ND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8" 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SUB01X 5.0, SECTION 3, SUBSTRUCTURE.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%, 12" OF SAND MUST COVER THE CONDUIT.
- 5. GROUND ROD (5/8" X 8' COPPER CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 6. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO-128, RULE 34.3A.
- 7. IN LAKE TAHOE AREA, A 17"x 30" (N-36) EXTENSION IS REQUIRED FOR THE SINGLE PHASE PAD. USE REDWOOD OR SEVERAL 17" X 30" CONCRETE EXTENSIONS FOR THE THREE PHASE PAD. FIBERGLASS WELLS ARE AVAILABLE: 8800-240723 (1Ø) / 8800-240725 (3Ø).
- 8. THIS PAD DRAWING IS FOR METAL JUNCTION ENCLOSURES, STK. #8800-252120, 8800-252125 & 8800-252130.

### **ENGINEERING NOTES**

- A. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO-128, RULE 21.5A.
- B. REFERENCE PAD MASTER FOR ADDITIONAL INFORMATION.

					ENGINEERING AND CONSTRUCTION STANDARD	6.13.27 OF 39		
	Libe	erty	Utili	ties	JUNCTION ENCLOSURE PAD	SUBSTRUCTURE		
					10/3 & 4 WIRE	DRAWING NUMBER		
DRAWN	DESIGN	SUPR	DATE	REV	30 / 4 WIRE	PE002511		
LL	ET	JM	08/17	04	- /- /	1200200		





LU DWG #	А	A1	В	B1	С	D	Е	F	G	Н	Ι	J	К	WEIGHT (LBS)
<b>PE0030U</b> INTERRUPTER PAD 200/600 AMP STOCK <b>#</b> 8800-240691	60"	62"	72"	74"	16"	30-1/4"	12"	36"	5"	8"	39"	8"	15"	2600 Concrete

- 1. CONDUITS TO BE IN PROPER CONFIGURATION TO ALLOW CONDUIT SPACING AND PLUGGED PER CD0001U, SECTION 12.1.
- 2. 8" 12" TYPE 2 BACKFILL TO BE COMPACTED AT 95%. SEE SECTION 5.0 OF SUB01X , SUBSTRUCTURE, SECTION 3.
- 3. OPTIONAL AREA MUST BE COMPACTED TO 90%.
- 4. SAND AREA TO BE COMPACTED AT 90%. 12" OF SAND MUST COVER THE CONDUIT.
- 5. IN LAKE TAHOE AREA, A REDWOOD OR 17" x 36" CONCRETE EXTENSION WILL BE REQUIRED.
- 6. GROUND ROD (5/8" X 8' COPPER-CLAD), TO BE INSTALLED BY DEVELOPER. TELEPHONE AND CABLE TV GROUND WIRE TO BE ATTACHED BY APPLICANT.
- 7. IN CALIFORNIA, ALL PADMOUNTED EQUIPMENT WILL BE SECURED IN PLACE. SEE GO-128, RULE 34.3A.

## **ENGINEERING NOTES**

- A. ALL FIELD CAST PADS ARE TO BE BUILT TO LU'S SPECIFICATION PAD01X -AND **MUST** BE INSPECTED BY LU PRIOR TO POURING CONCRETE.
- B. DO NOT CONCRETE SHADED AREAS.
- C. IN CALIFORNIA, OR LAKE TAHOE AREAS, IF THE GROUND ROD DOES NOT MEASURE LESS THAN 25 OHMS, ANOTHER GROUND ROD MUST BE DRIVEN. SEE GO-128, RULE 21.5A.

					ENGINEERING AND CONSTRUCTION STANDARD	6.14.30 OF 39
Liberty Utilities					200 / 600 AMP	SUBSTRUCTURE
					<b>30 INTERRUPTER</b>	DRAWING NUMBER
DRAWN	DESIGN	SUPR	DATE	REV	PAD DETAIL	PEOOSOII
LL	ET	JM	08/17	04		1200500

## 1.0 Street Light Location and Design Information

Streetlights, Bases and Sonotubes will be located on property lines and/or curb returns. Preferred applications behind sidewalks or a minimum of 2.5' behind face of curb in parkways or roadways. Location, light levels or spacing will meet requirements as required per the local governing agencies set application.

- 1.1 Luminaire Placement At Intersections And Cul-De-Sacs Shall Be Installed As Follows:
  - A. A minimum of one luminaire shall be located at each residential, (local/local), two lane road at street intersections. 100 Watt HPS at 25' mounting height.
  - B. A minimum of two luminaires shall be located at each, (major or collector/collector or local), street intersections or three legged intersections. A minimum of a 200 watt HPS will be used at a 35' mounting height.
  - C. A minimum of four luminaires will be located at each (major/major) intersection, minimum of 200 watt HPS. Note: These intersections are typically scheduled for signals with streetlights and installed with metered facilities. If designated as a State Highway, lighting may be NDOT'S responsibility.
  - D. A minimum of one luminaire shall be installed in the vicinity of cul-de-sacs. 100 watt HPS (Note: Does not apply to rural areas in county).
- 1.2 LU recommends that all decorative luminares be limited to local roadways at a maximum spacing of 225', preferred design will be staggered, alternate design will be on one side of the road. Lights will be located per sections 4.0 and 4.1 (A) and (D) of the street light design guide (SLD01U). Underground, street light section.

Note: This application is for uniformity and to set an ambiance for the development. *No light level is required to be met.* Check with your local governing agency to verify approval, proper application and/or special requirement.

					ENGINEERING AND CONSTRUCTION STANDARD	6.15.31 OF 39
	Libe	erty	Utili	ties®	O/H & U/G STREET LIGHT	SUBSTRUCTURE
					BASE, SONOTUBE	DRAWING NUMBER
DRAWN	DESIGN	SUPR	DATE	REV	LOCATION AND DESIGN	SLB02U
LL	ET	JM	08/17	04		ODL30H





# **CONCRETE /CONCRETE BLOCK**



## NOTES:

- 1. Retaining wall is designed for slopes up to 1-1/2 : 1 (35°) max. or for HS20-44 live load surcharge.
- 2. Retaining wall shall not exceed 5'-4" max. height. Slope modification may be required in some areas to meet height restraint.
- 3. Retaining wall to conform to all local building codes.
- 4. Developer is responsible for retaining wall construction.
- 5. Retaining wall to be completed prior to installation of transformer or switch.
- 6. Retaining wall may be cast in place, concrete to meet design criteria per all local building codes.
- 7. Reinforcing bars shall be deformed billet steel, conforming to the latest revision of ASTM A-615, grade 60, with a minimum yield strength of 0,000 p.s.i.
- 8. Concrete shall have an in-place minimum compression strength of 3000 p.s.i at 28 days. Cement shall be fresh type II Portland cement conforming to ASTM designation C-33. Concrete shall contain a minimum of 4% but not more than 8% entrained air by volume of concrete.
- 9. Concrete blocks shall be type NII in accordance with ASTM C-90 with a minimum compressive strength of 800 p.s.i. per individual unit.
- 10. Mortar shall be type M or S in accordance with ASTM C-270 with a minimum compressive strength of 1800 p.s.i. at 28 days.
- 11. Grout shall be either fine or coarse grout in accordance with ASTM C-476 with a minimum compressive strength of 2000 p.s.i. at 28 days. **GROUT ALL CELLS FULL.**
- 12. Provide control joints at maximum 10'-0" on centers. Place blocks leaving a 1/4" gap without mortar at each control joint.
- 13. The clear working space in front of doors on double sided switch equipment shall be a minimum of 10'-0" from edge of pad. Contact LU representative to confirm switch layout prior to construction.
- 14. Secondary conduit to be stubbed-out prior to retaining wall construction.
- 15. Side clearance on all equipment installations shall be a minimum of 30" from edge of pad unless equipment is placed next to a combustible material; in that case a minimum of 36" is required.

DRAWN DESIGN SUPR DATE REV					ENGINEERING AND CONSTRUCTION STANDARD RETAINING WALL DETAILS AND SLOPE MODIFICATIONS FOR PADMOUNTED	6.18.35 OF 39 SUBSTRUCTURE
					EQUIPMENT & VAULTS	DRAWING NUMBER <b>TEOO4OII</b>
LL	ET	JM	08/17	04		1200100



# TYPICAL WALL SECTION MAXIMUM HEIGHT 5'-4"



# TYPICAL WALL SECTION MAXIMUM HEIGHT 3'-4"





# **REDWOOD LANDSCAPE WALLS**



# NOTES:

- 1. LANDSCAPE TIMBER TO BE CALIFORNIA REDWOOD, #3 OPEN GRADE OR BETTER OR TREATED DOUGLAS FIR, #2 GRADE OR BETTER. INSTALLATION IS LIMITED TO 23" MAXIMUM.
- 2. STACKED CONCRETE LANDSCAPING BLOCKS MAY BE USED. INSTALL PER MANUFACTURER'S SPECIFICATIONS. <u>MAXIMUM HEIGHT 4'-0"</u>
  - A. INSTALLATIONS OF CONCRETE LANSCAPING BLOCKS OVER 4'-0" MAY BE INSTALLED IF A (PE) CIVIL ENGINEER HAS APPROVED AND STAMPED DRAWINGS.

					ENGINEERING AND CONSTRUCTION STANDARD	6.18.39 OF 39
Liberty Utilities				ties®	RETAINING WALL DETAILS AND SLOPE	SUBSTRUCTURE
					MUDIFICATIONS FOR PADMOUNTED	DRAWING NUMBER
DRAWN	DESIGN	SUPR	DATE	REV	EQUIPMENT & VAULTS	TEOO4OII
LL	ET	JM	08/17	04		1200100