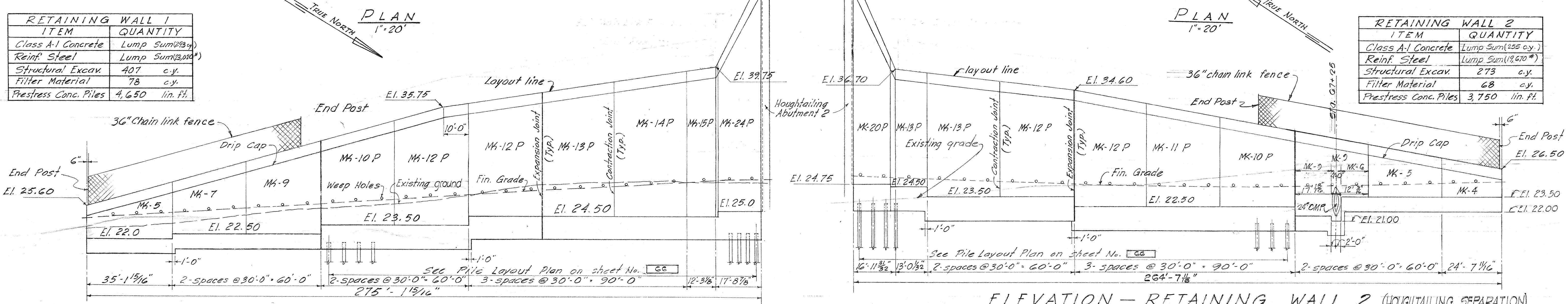


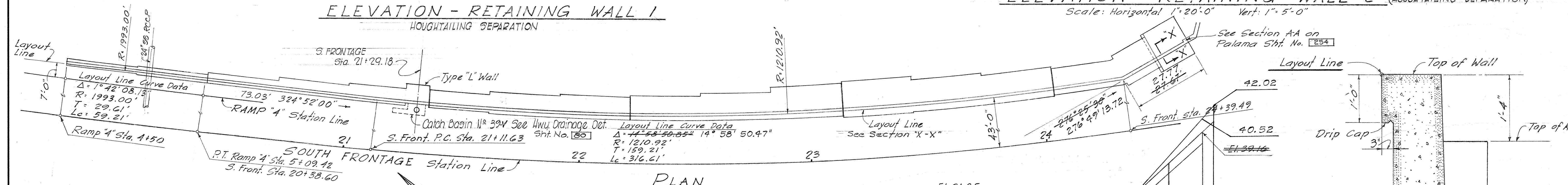
ITEM	QUANTITY
Class A-1 Concrete	Lump Sum (293 cy)
Reinf. Steel	Lump Sum (3,094*)
Structural Excav.	407 c.y.
Filter Material	78 c.y.
Prestress Conc. Piles	4,650 lin. ft.

ITEM	QUANTITY
Class A-1 Concrete	Lump Sum (255 cy.)
Reinf. Steel	Lump Sum (1,670*)
Structural Excav.	273 c.y.
Filter Material	68 c.y.
Prestress Conc. Piles	3,750 lin. ft.

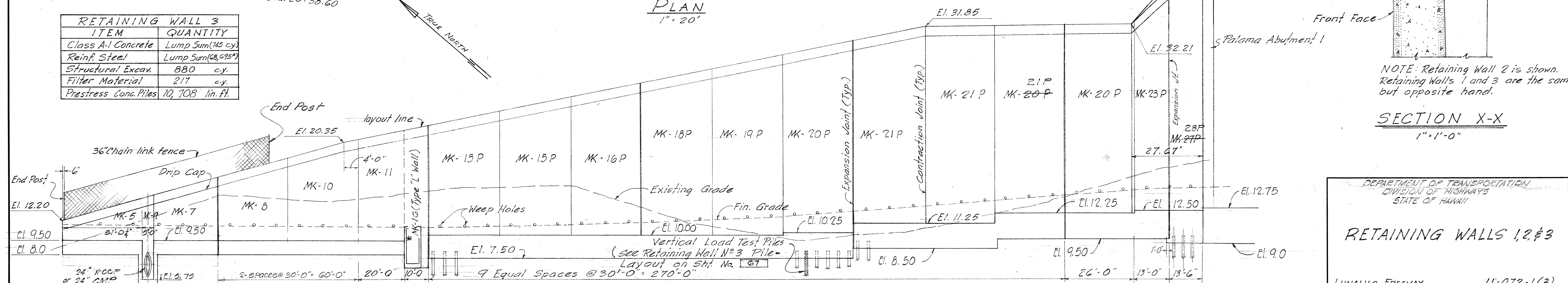


ELEVATION - RETAINING WALL 1
 HOUGHTAILING SEPARATION

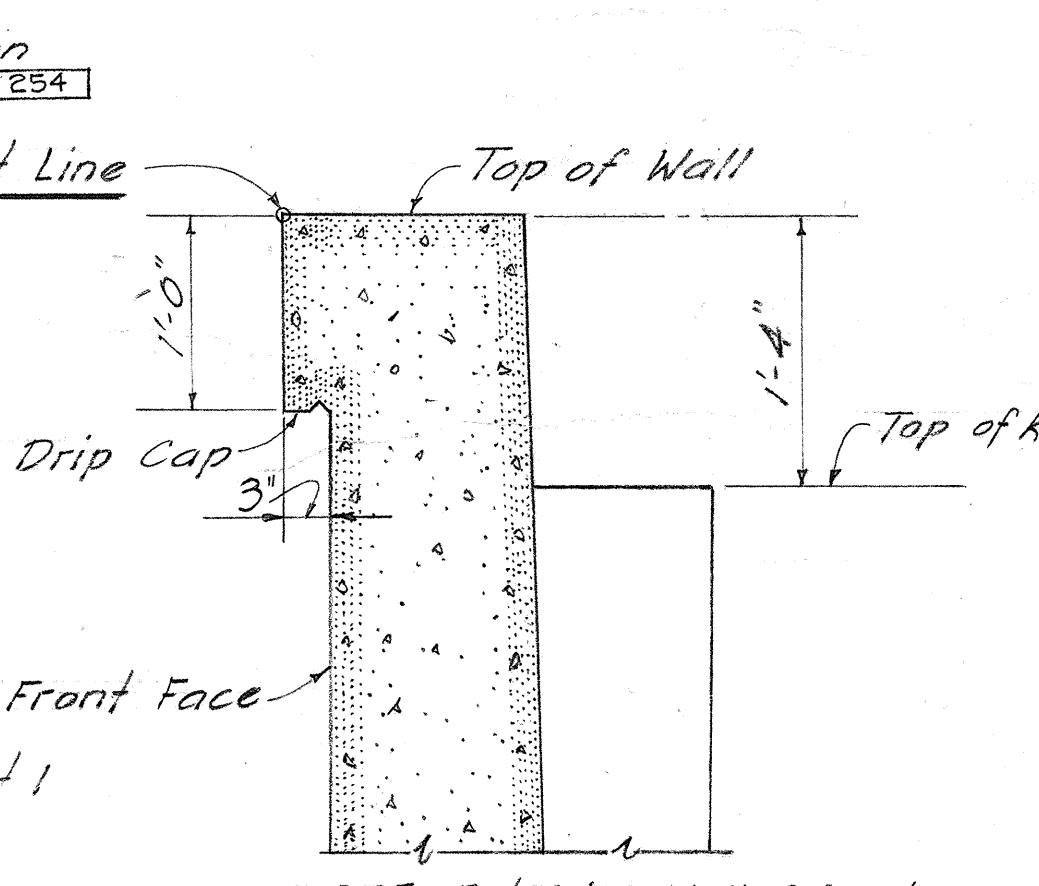
ELEVATION - RETAINING WALL 2 (HOUGHTAILING SEPARATION)
 Scale: Horizontal 1"=20'-0" Vert: 1"=5'-0"



ITEM	QUANTITY
Class A-1 Concrete	Lump Sum (145 cy)
Reinf. Steel	Lump Sum (68,695*)
Structural Excav.	880 c.y.
Filter Material	217 c.y.
Prestress Conc. Piles	10,708 lin. ft.



ELEVATION - RETAINING WALL 3 (PALAMA SEPARATION)
 Horizontal: 1"=20' Vertical: 1"=5'-0"



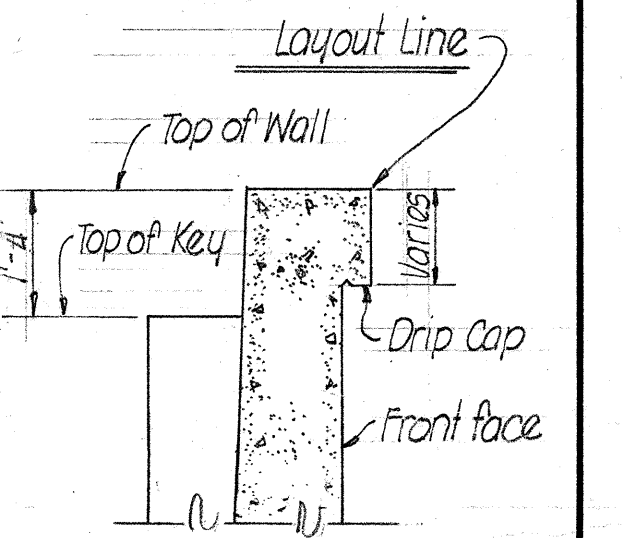
NOTE: Retaining Wall 2 is shown. Retaining Walls 1 and 3 are the same but opposite hand.

DEPARTMENT OF TRANSPORTATION
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 STATE OF HAWAII

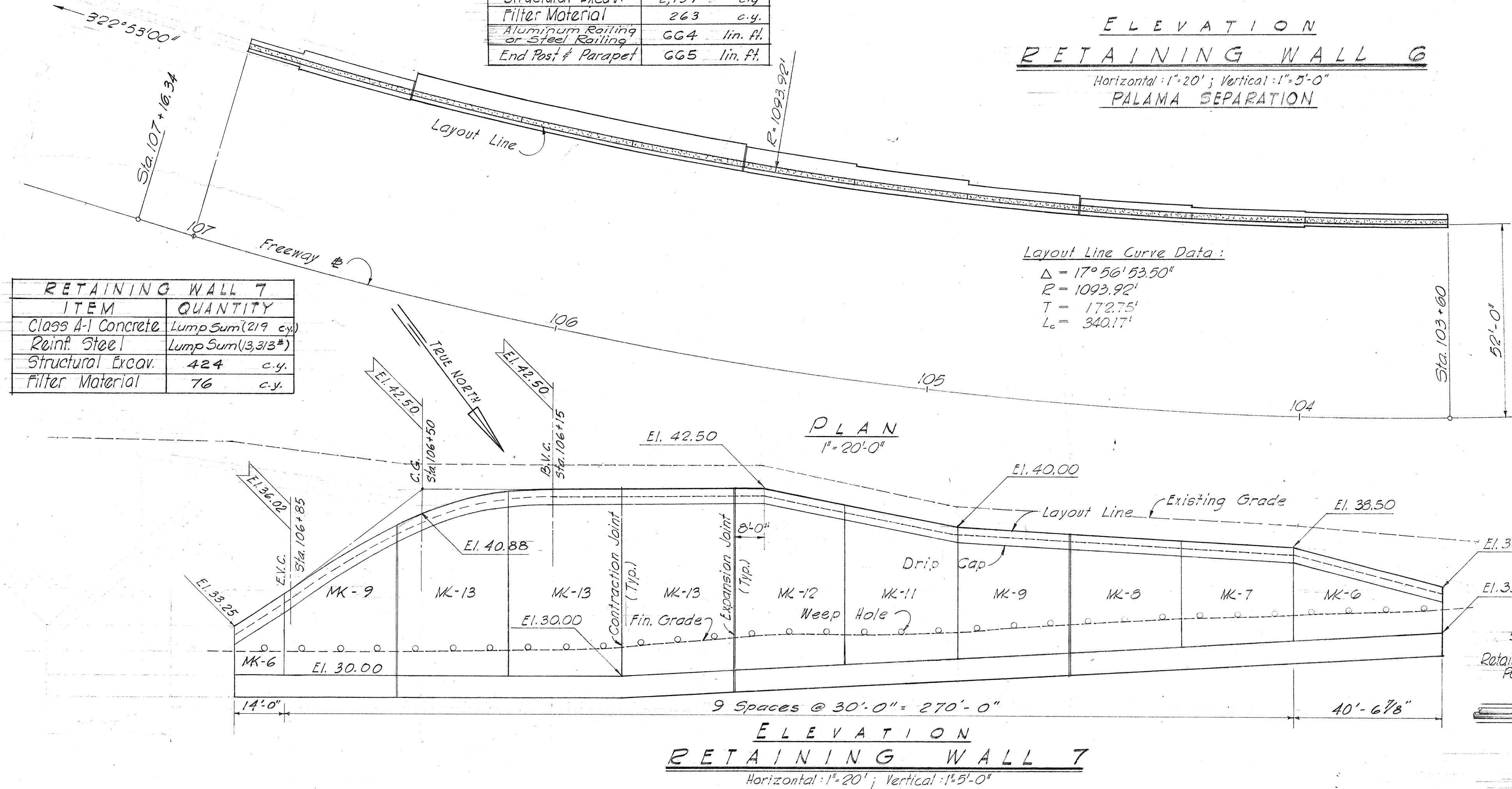
RETAINING WALLS 1, 2 & 3

LUNALILO FREEWAY U-072-1(3)

DATE: _____
 SURVEY PLOTTED BY: _____
 PLAN: _____
 TRACED BY: _____
 NOTE BOOK: _____
 NO. _____



RETAINING WALL 7	
ITEM	QUANTITY
Class A-I Concrete	Lump Sum (219 c.y.)
Reinf. Steel	Lump Sum (13,313#)
Structural Excav.	424 c.y.
Filter Material	76 c.y.



DETAIL A



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RETAINING WALLS 6 & 7

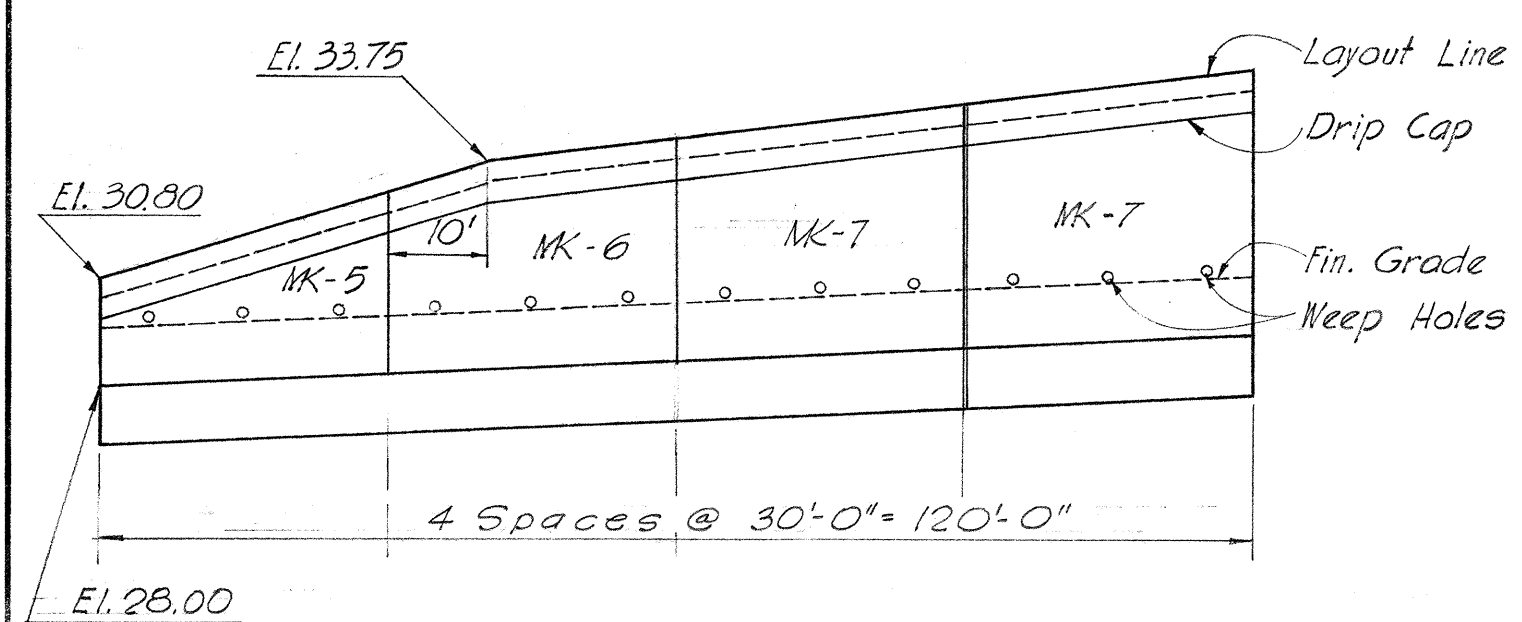
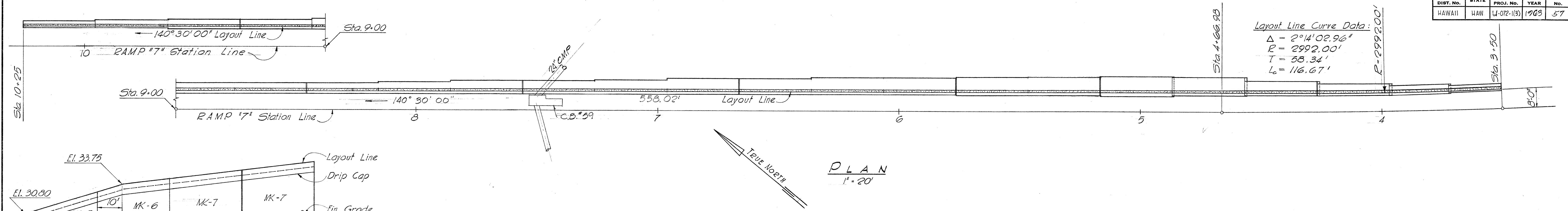
LUNALILO FREEWAY

U - 072 - 1 (3)

SHEET No. 3 OF 9 SHEETS

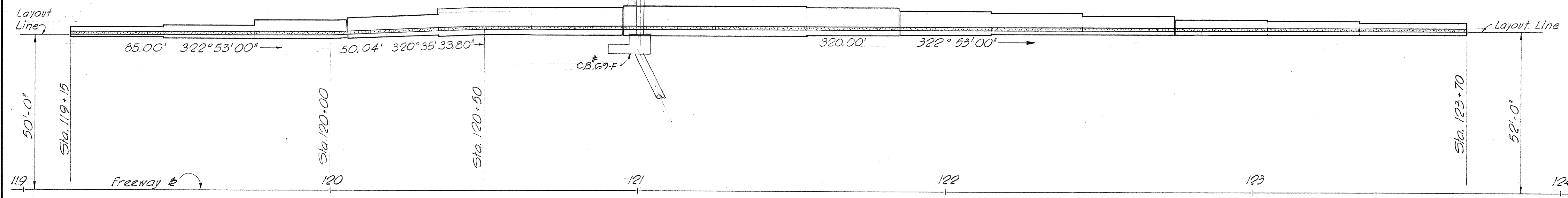
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	57	246

Layout Line Curve Data:
 $\Delta = 2^\circ 14' 02.96''$
 $R = 2992.00'$
 $T = 53.34'$
 $L_c = 116.67'$

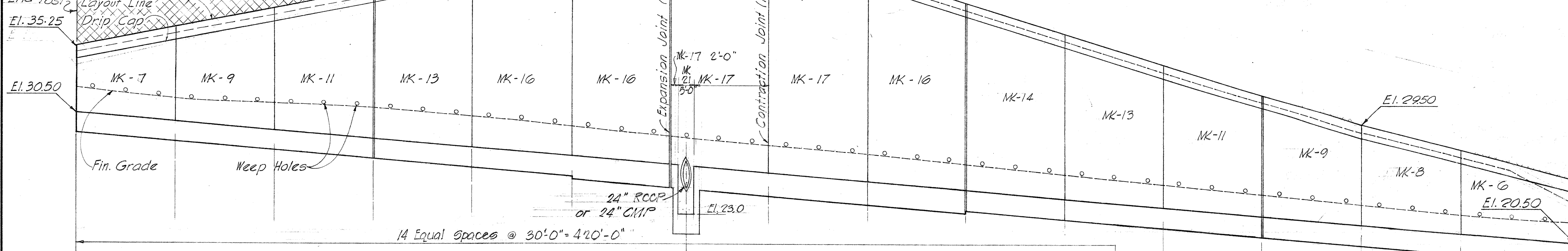


ITEM	QUANTITY
Class A-I Concrete	Lump Sum (494 cy)
Reinf. Steel	Lump Sum (91,227 lb)
Structural Exc.	860 c.y.
Filter Material	263 c.y.

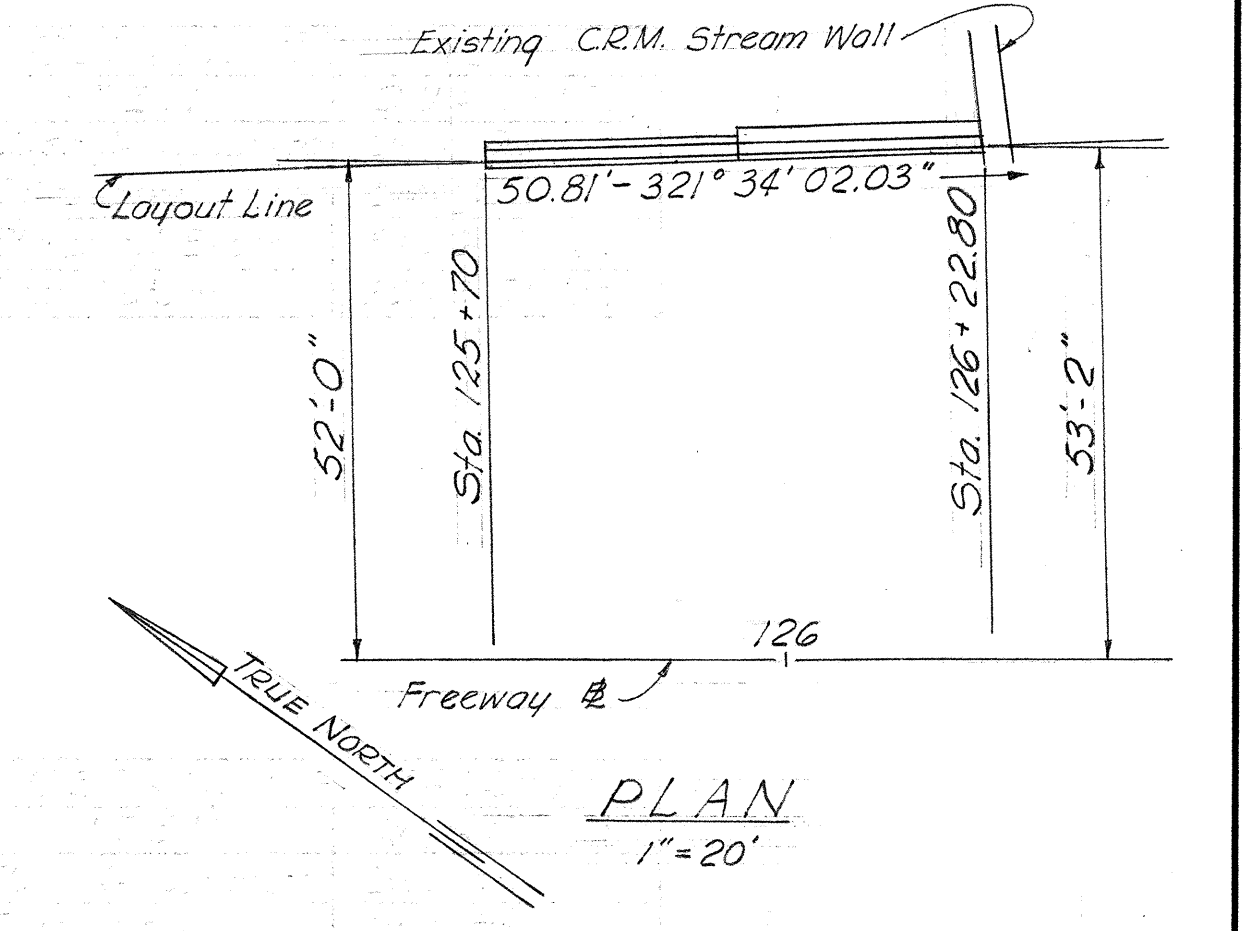
ELEVATION
RETAINING WALL 8
 Horizontal: 1"=20' Vertical: 1"=5'-0"



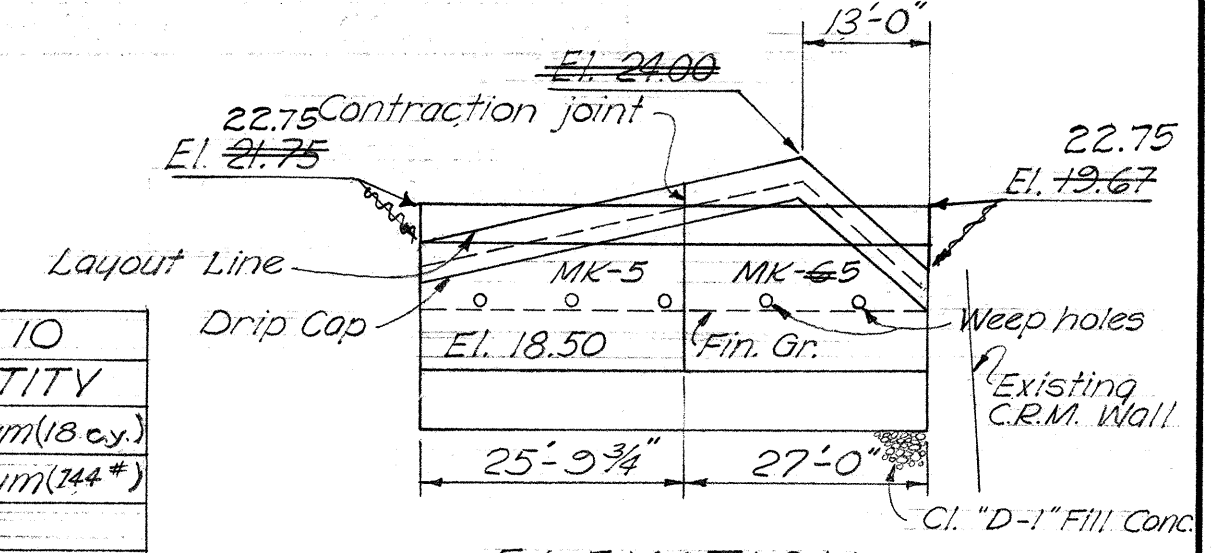
ITEM	QUANTITY
Class A-I Concrete	Lump Sum (417 cy)
Reinf. Steel	Lump Sum (30,278 lb)
Structural Exc.	746 c.y.
Filter Material	136 c.y.



ELEVATION
RETAINING WALL 9
 Horizontal: 1"=20' Vertical: 1"=5'-0"



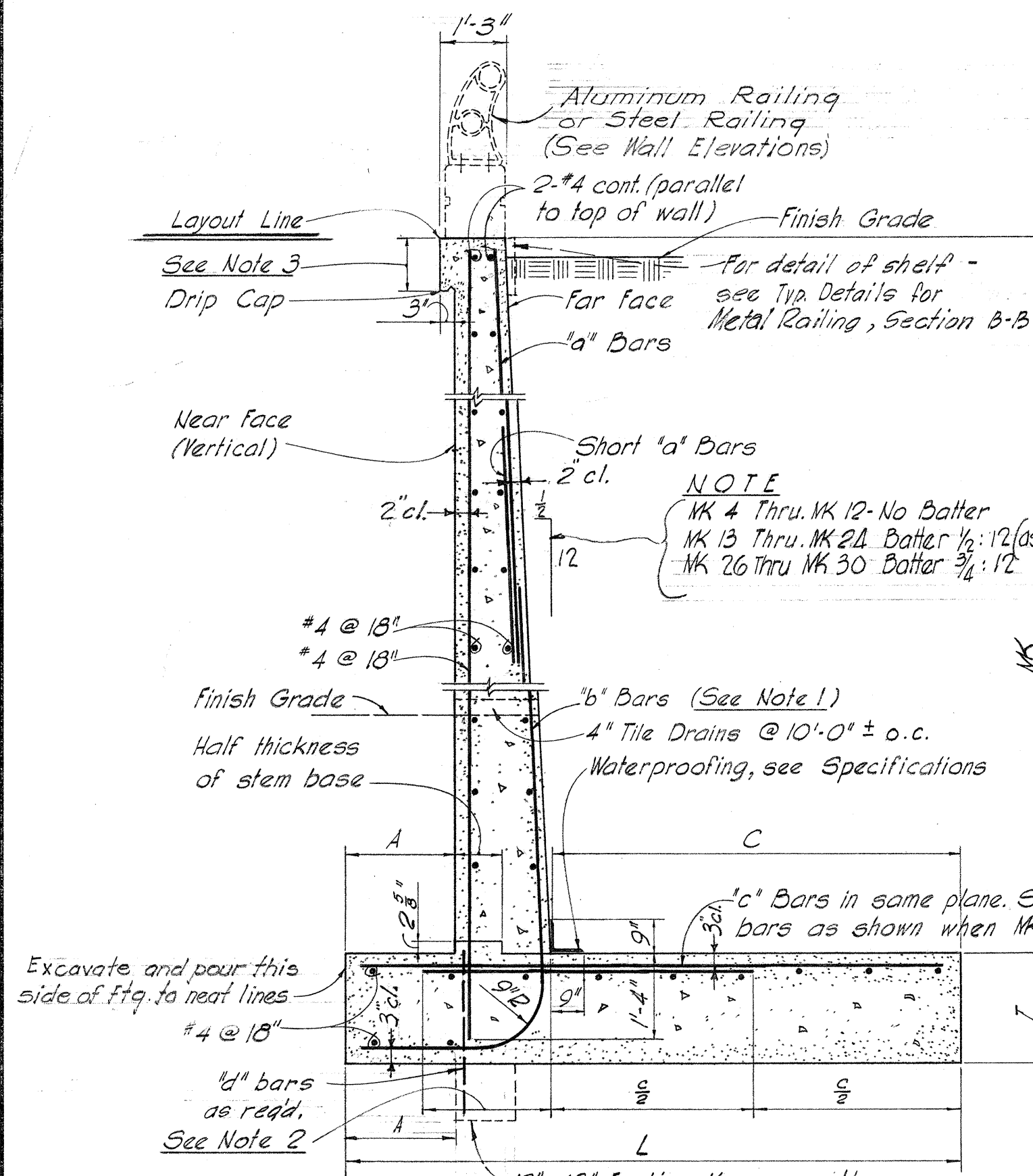
ITEM	QUANTITY
Class A-I Concrete	Lump Sum (18 cy)
Reinf. Steel	Lump Sum (44 lb)
Structural Exc.	36 c.y.
Filter Material	3 c.y.



ELEVATION
RETAINING WALL 10
 Horizontal: 1"=20' Vertical: 1"=5'-0"

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 REGISTERED PROFESSIONAL ENGINEER
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 BELT, COLLINS & ASSOC., LTD.
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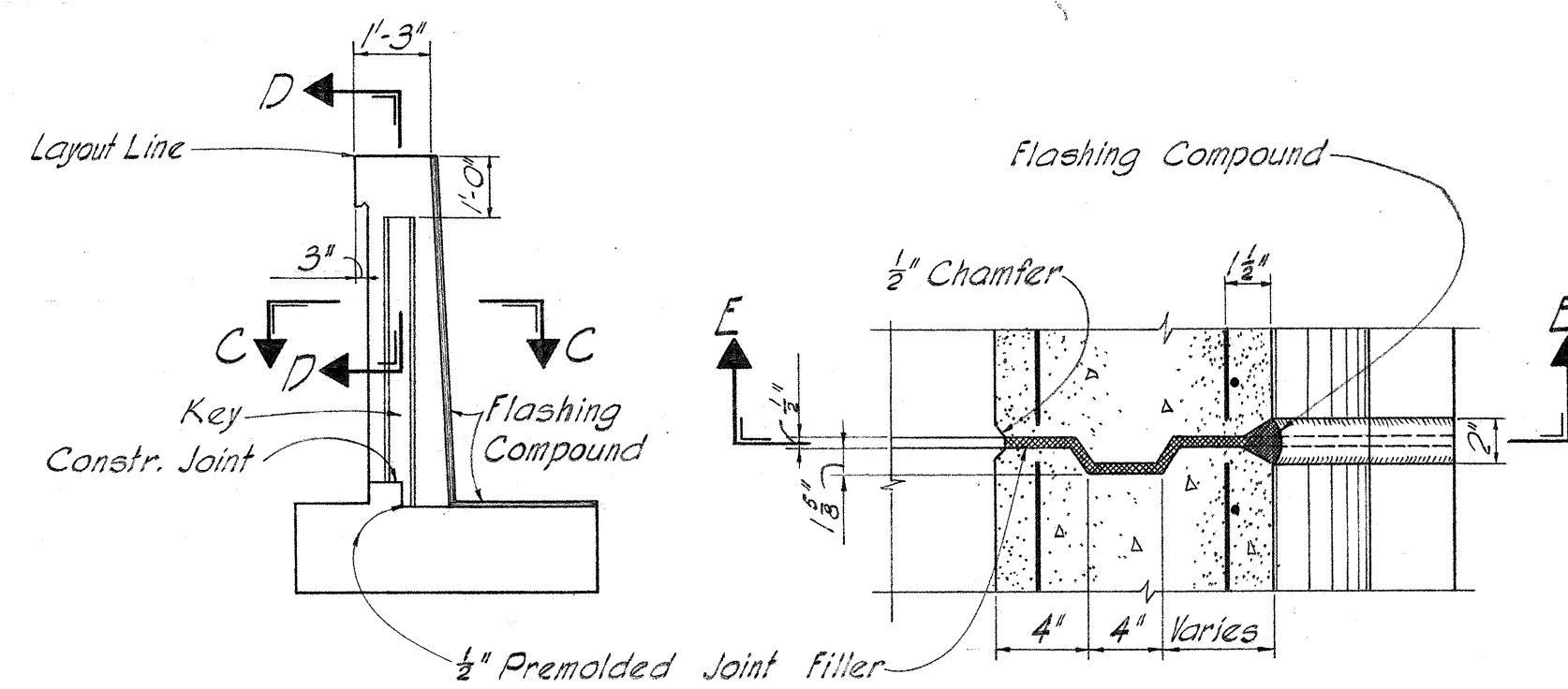
DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 STATE OF HAWAII
RETAINING WALLS 8, 9 & 10
 LUNALILO FREEWAY U-072-1 (3)



NOTE 1: Spacing given in schedule is at base of stem.
NOTE 2: For MK-10' or less, extend all "c" Bars to toe. For MK-17' and over, extend alternate "c" Bars 32 diameters.
NOTE 3: Height of Drip Cap varies for Wing Walls, pour to match Structure Drip Cap. Height for Retaining Wall Drip Cap - 1'-0".

TYPICAL SECTION

NOTE: See RETAINING WALL 5 DETAILS for Retaining Wall excavation and backfill details.



JOINT SECTIONAL ELEV. E-E

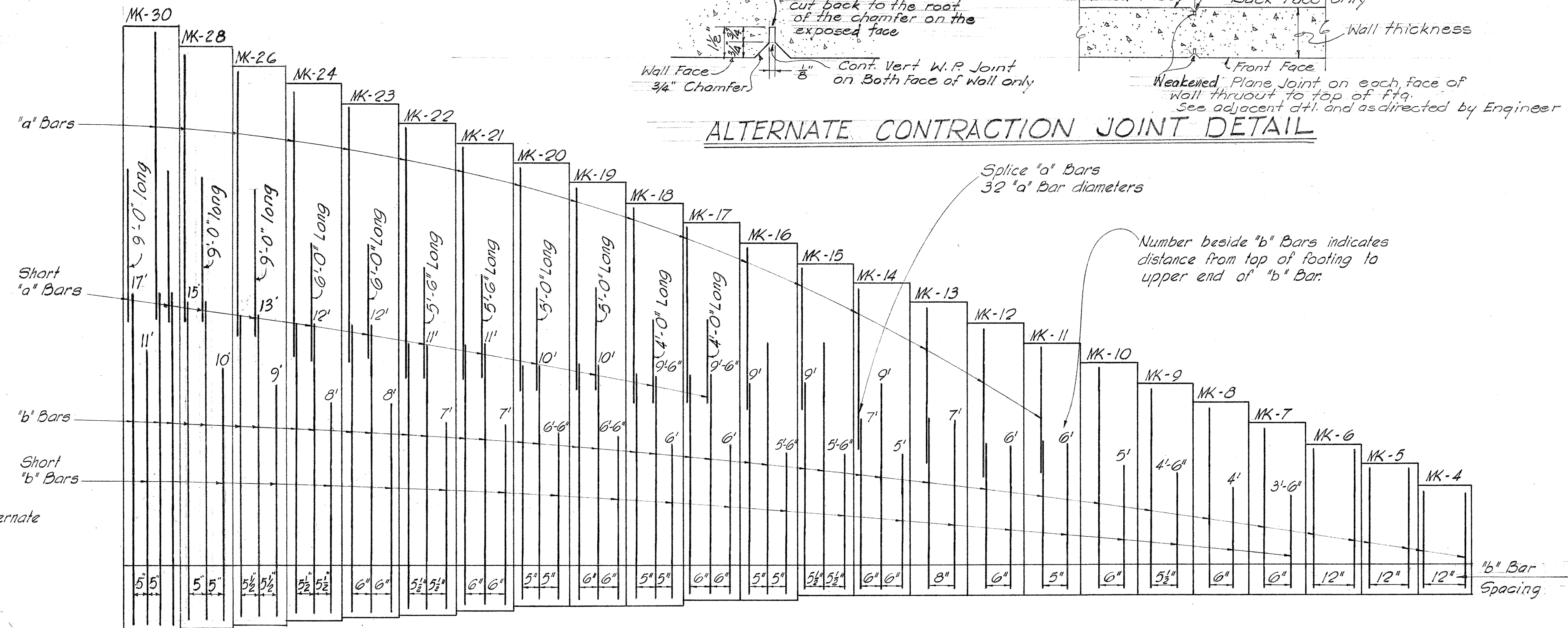
SECTION C-C

SECTION D-D

TYPICAL JOINT DETAILS

No scale

NOTE: Contraction Joint detail is similar except that one layer 55" Composition Roofing shall be used in place of Premolded Joint Filler, and the joint shall extend through the stem only.



REINFORCING DIAGRAM

No scale

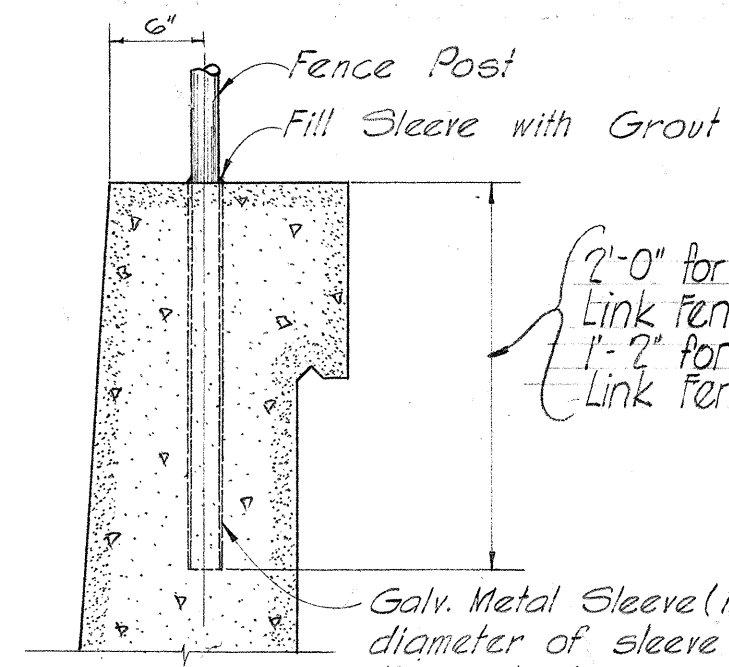
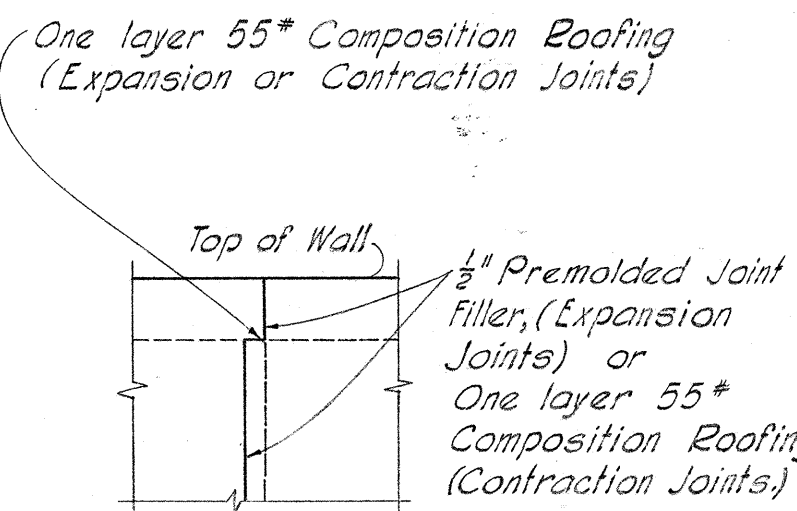
TYPICAL WALL SCHEDULE (on Earth)

MK	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	26	28	30
A	6"	6"	6"	12"	12"	12"	12"	12"	12"	12"	15"	18"	21"	24"	24"	24"	27"	30"	33"	36"	39"	54"	60"	72"
L	2.50'	3.0'	3.50'	4.0'	4.50'	5.0'	5.50'	6.0'	6.50'	7.0'	7.75'	8.25'	9.0'	9.75'	10.50'	11.50'	12.50'	13.50'	14.50'	15.25'	16.0'	18.0'	20.0'	21.0'
T	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"	18"	21"	21"	24"	24"	27"	30"	31"	33"	36"	39"	42"	
"b" Bars	*3@12	*3@12	*4@12	*3@12	*4@12	*4@12	*5@12	*5@12	*6@12	*6@12	*6@12	*6@12	*6@12	*7@12	*7@12	*8@12	*8@12	*9@12	*9@12	*10@12	*10@12	*10@12	*11@12	*11@12
"c" Bars	*3@12	*3@12	*3@12	*3@12	*3@12	*4@12	*5@12	*5@12	*5@12	*6@12	*6@12	*6@12	*6@12	*7@12	*7@12	*8@12	*8@12	*9@12	*9@12	*10@12	*10@12	*10@12	*11@12	*11@12
"d" Bars	*3@12	*3@12	*3@12	*3@12	*4@12	*4@12	*4@12	*4@12	*4@12	*4@12	*4@12	*4@12	*4@12	*4@12	*4@12	*5@12	*5@12	*5@12	*5@12	*6@12	*6@12	*6@12	*6@12	*6@12

* For Stem Reinf. See Typ. Wall Sch. (on Earth)

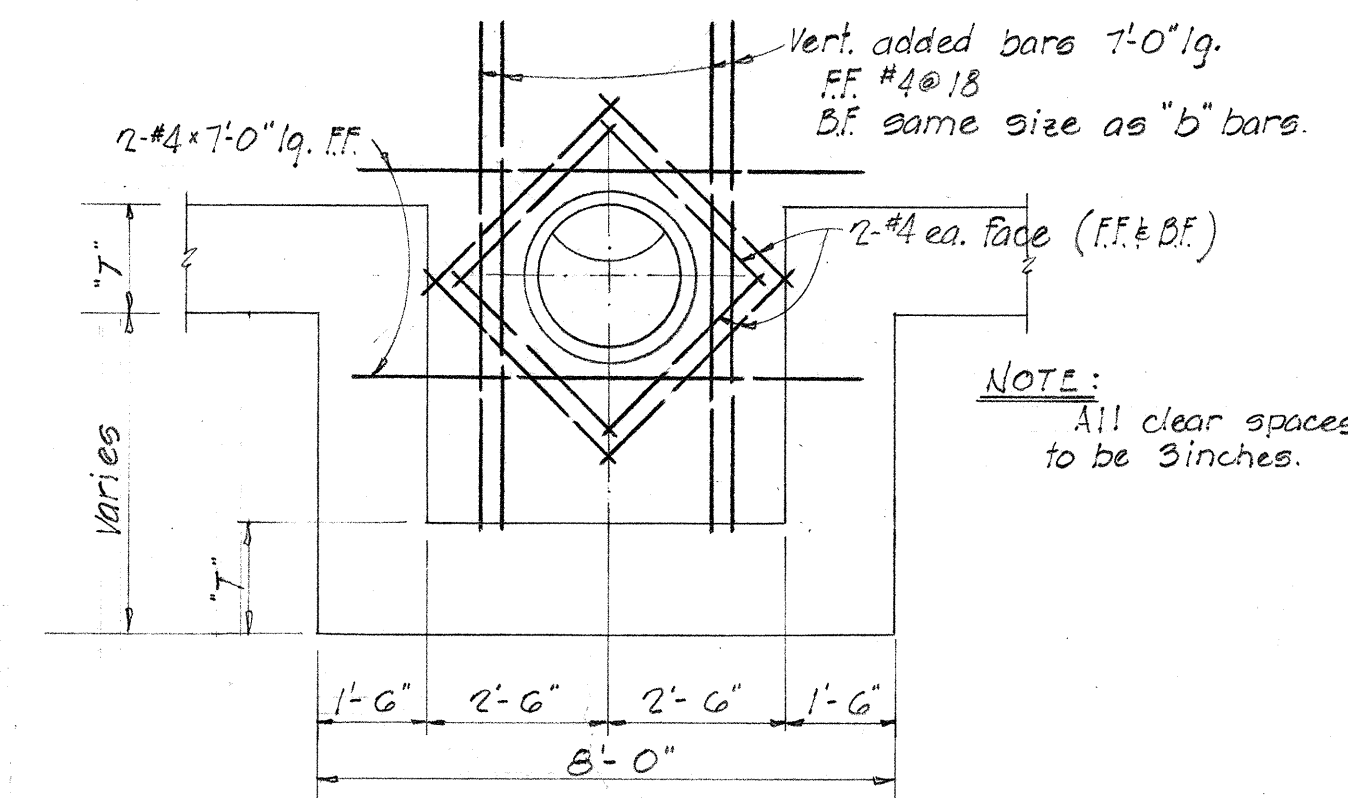
* TYPICAL WALL SCHEDULE (On Rock)

MK	A	L	T	"c" Bars
17R	21"	9.25'	18"	*7@6
18R	21"	10.0'	18"	*7@6
21R	27"	11.50'	21"	*9@6



CHAIN LINK FENCE POST DETAIL

No scale

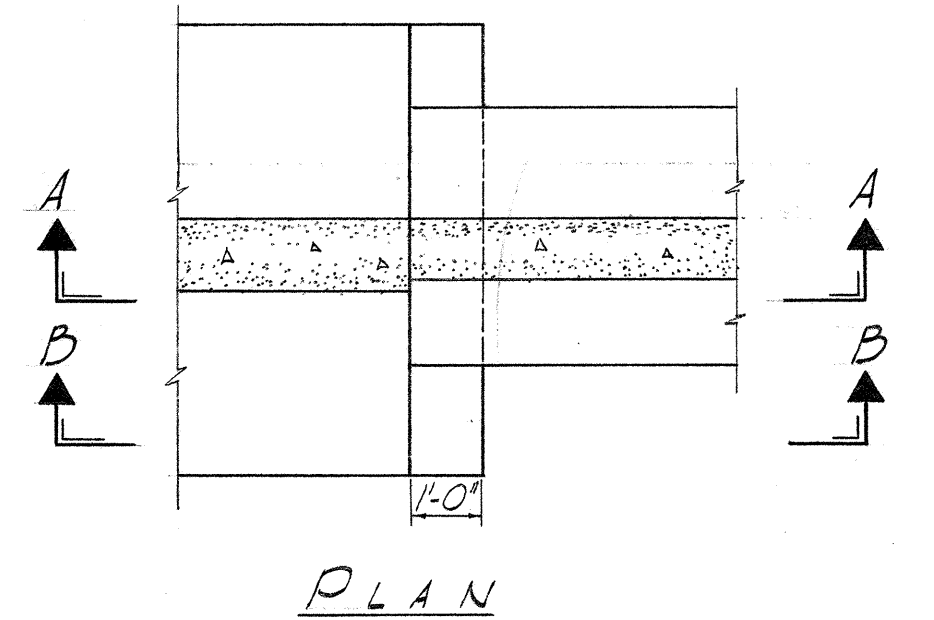


TYPICAL DETAIL AT PIPE OPENING

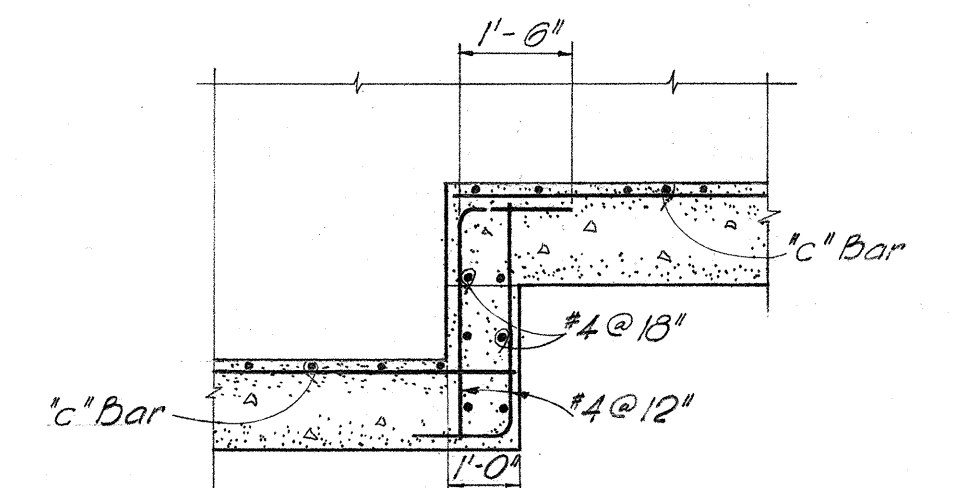
scale: 3/8" = 1'-0"



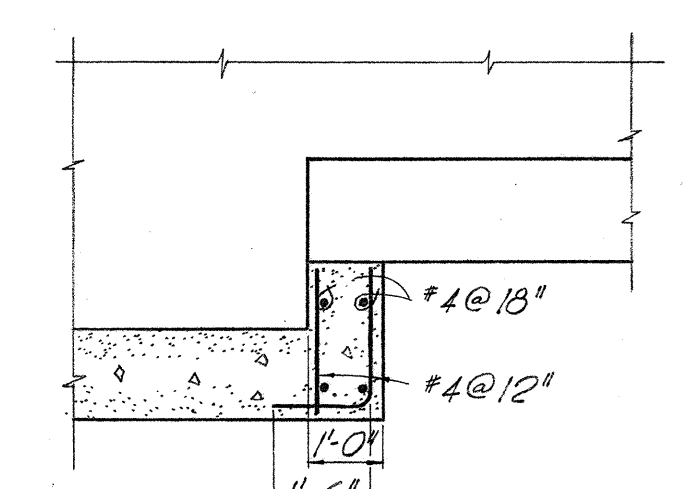
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ELEVATION



SECTION A-A



FOOTING STEP DETAILS

No scale

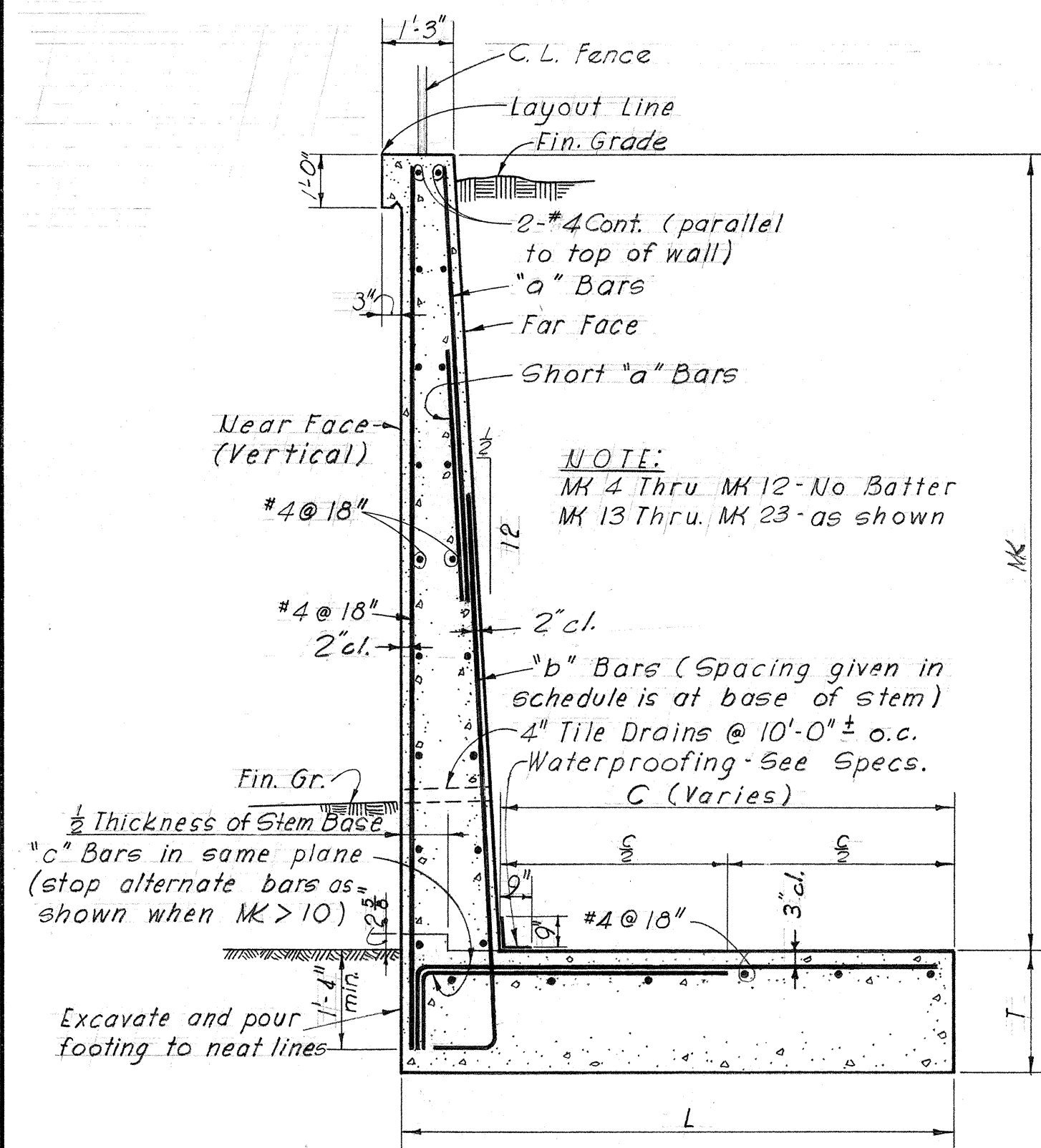
REFERENCE DRAWINGS

RETAINING WALL DETAILS II
TYPICAL DETAILS AND GENERAL STRUCTURAL NOTES.

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

TYPICAL RETAINING WALL DETAILS

LUNALILO FREEWAY U-072-1(3)

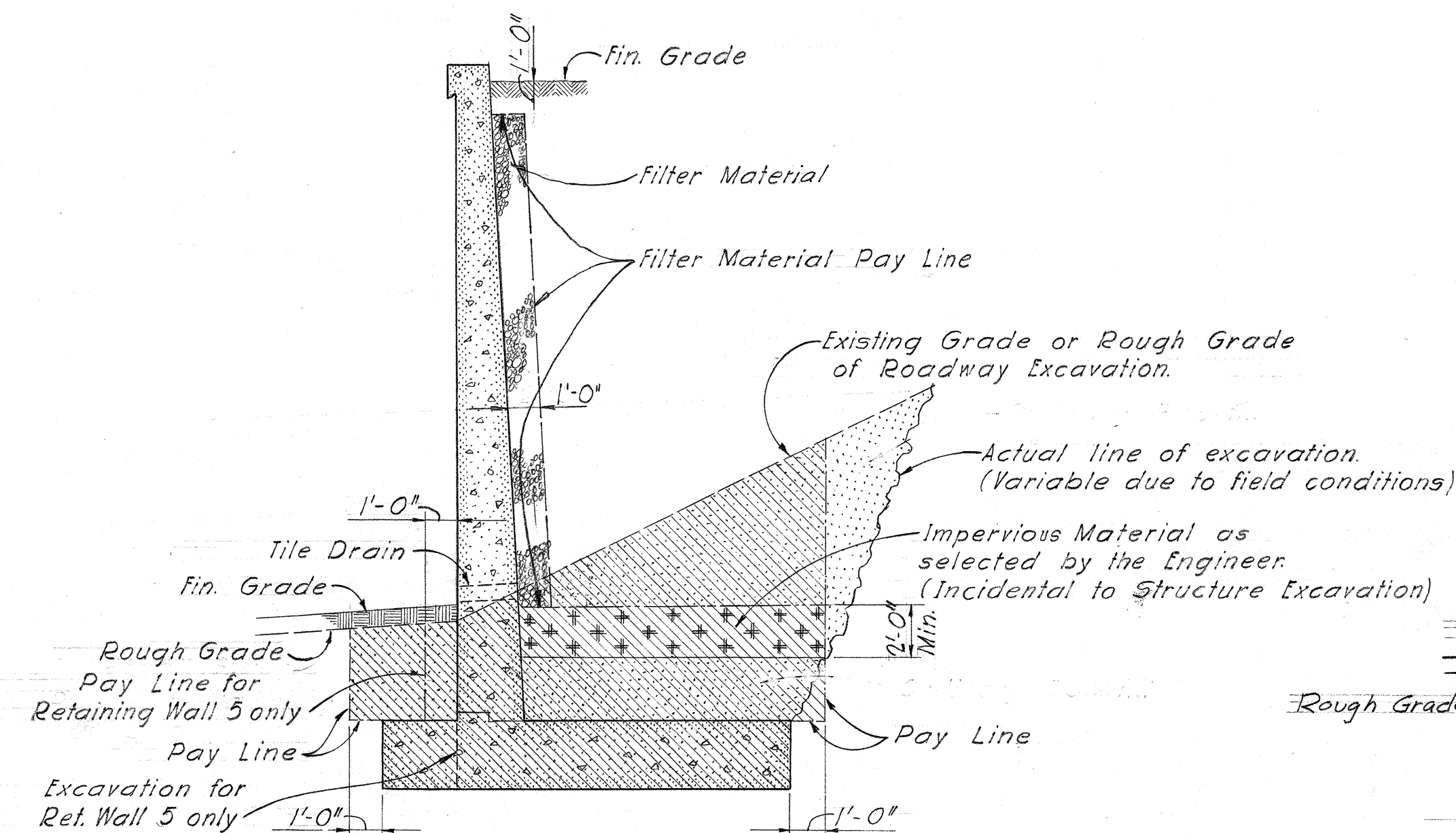


TYPICAL SECTION

W A L L S C H E D U L E																						
MK	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
L	3'-6"	4'-0"	4'-6"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-6"	8'-0"	9'-0"	10'-0"	11'-0"	12'-3"	13'-6"	14'-9"	16'-0"	18'-0"	20'-0"	22'-0"		
T	18"	18"	18"	18"	18"	18"	18"	18"	20"	20"	22"	22"	22"	24"	24"	24"	24"	26"	26"	30"		
"a" Bars	—	—	—	—	—	—	—	#4	#4	#4	#4	#4	#4	#4	#4	#5	#5	#6	#6	#7		
"b" Bars	#3 @ 12"	#3 @ 12"	#4 @ 12"	#3 @ 6"	#4 @ 6"	#4 @ 5½"	#5 @ 6"	#5 @ 5"	#6 @ 6"	#6 @ 8"	#6 @ 6"	#6 @ 5½"	#6 @ 5"	#7 @ 6"	#7 @ 5"	#8 @ 6"	#8 @ 5"	#9 @ 6"	#9 @ 5½"	#10 @ 6"		
"c" Bars	#3 @ 12"	#3 @ 12"	#4 @ 12"	#3 @ 6"	#4 @ 6"	#4 @ 5½"	#5 @ 6"	#5 @ 5"	#6 @ 6"	#8 @ 8"	#8 @ 6"	#8 @ 5½"	#8 @ 5"	#9 @ 6"	#8 @ 5"	#9 @ 6"	#8 @ 5"	#10 @ 5"	#11 @ 5½"	#11 @ 5½"		

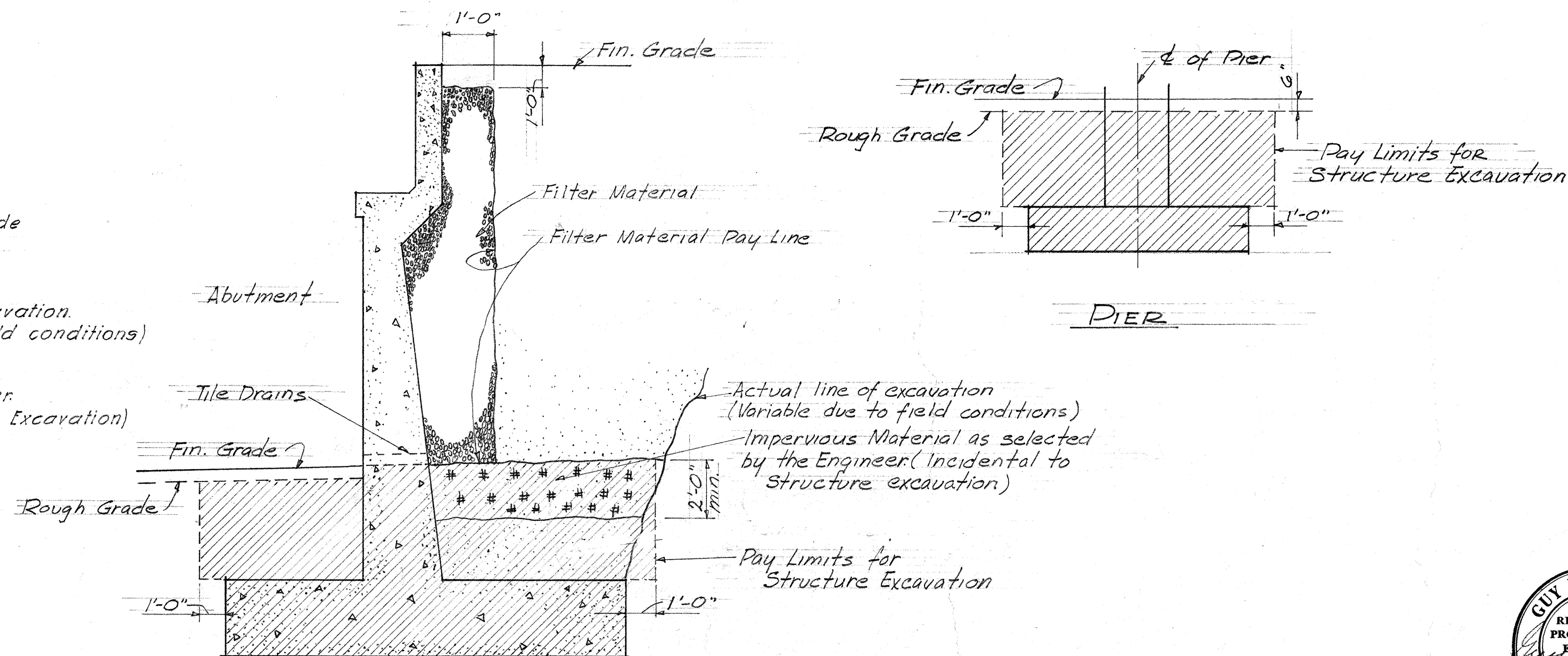
NOTE: See Typ Retaining Wall Details for Reinforcing Diagram.

RETAINING WALL 5



NOTE: Pay Limits for Structure Excavation indicated by hatched area

EXCAVATION AND BACKFILL DETAIL



ABUTMENT AND RETAINING WALLS

EXCAVATION AND BACKFILL DETAILS

No Scale



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DIVISION OF HIGHWAYS
STATE OF HAWAII

RETAINING WALL NO. 5 DETAIL
TYPICAL EXCAVATION
BACKFILL DETAIL

LUNALILO FREEWAY U-072-1(3)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	60	246

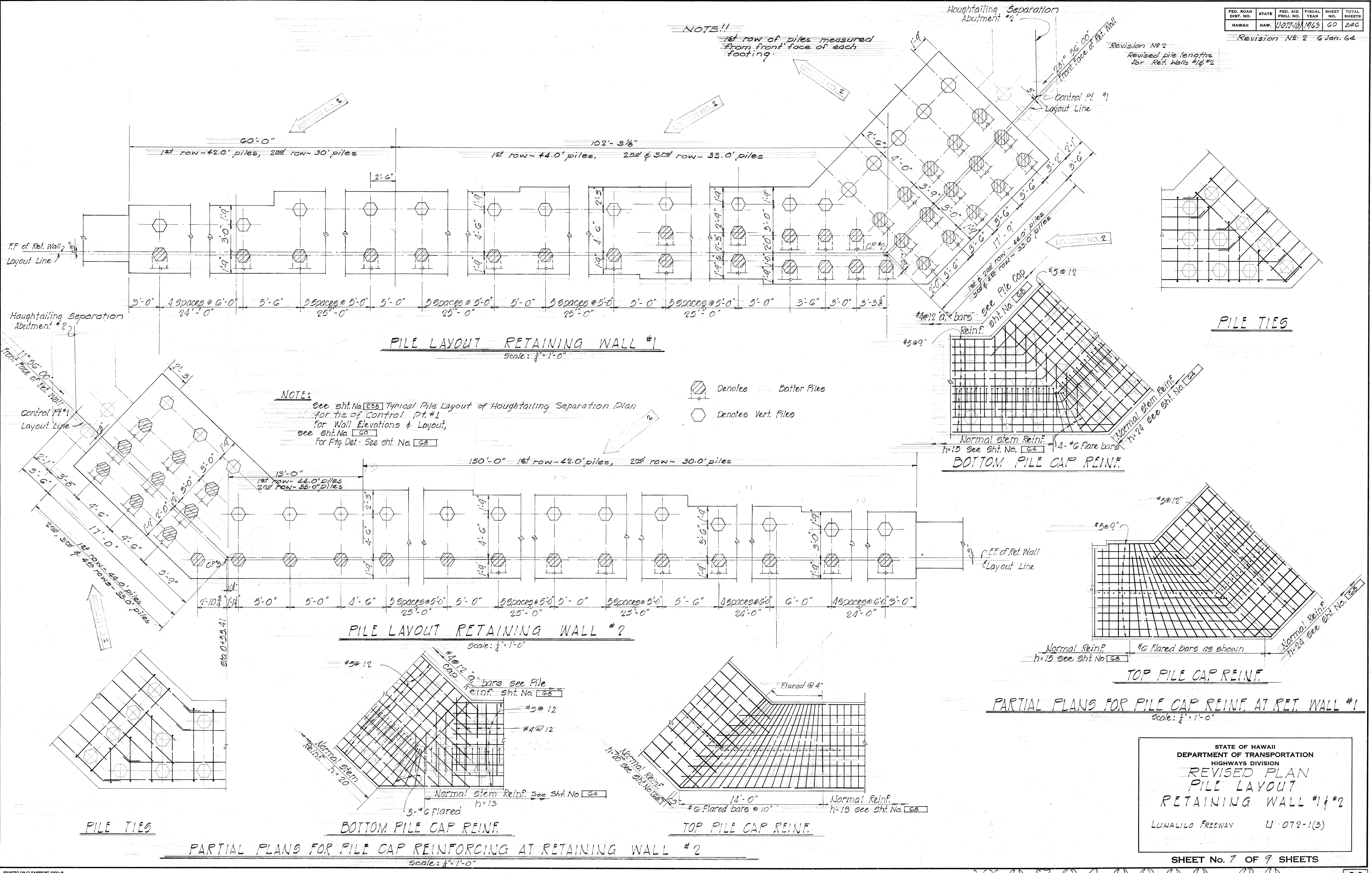
Revision No. 2 6 Jan. 64

NOTE!!

1st row of piles measured from front face of each footing.

Hoghtailing Separation Abutment #2

Revision No. 2
Revised pile lengths for Ret. Walls #1 & #2



PILE LAYOUT RETAINING WALL #1
Scale: 1/4" = 1'-0"

NOTE:
See Sht. No. 63B Typical Pile Layout of Hoghtailing Separation Plan for tie of Control Pt. #1 for Wall Elevations & Layout, see Sht. No. 60 for Fig. Det. See Sht. No. 68

- Denotes Batter Piles
- Denotes Vert. Piles

PILE LAYOUT RETAINING WALL #2
Scale: 1/4" = 1'-0"

BOTTOM PILE CAP REINF.

TOP PILE CAP REINF.

PARTIAL PLANS FOR PILE CAP REINF. AT RET. WALL #1
Scale: 1/4" = 1'-0"

PARTIAL PLANS FOR PILE CAP REINFORCING AT RETAINING WALL #2
Scale: 1/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
REVISED PLAN
PILE LAYOUT
RETAINING WALL #1 & #2
LUNALILO FREEWAY U-072-1(3)

SHEET No. 7 OF 9 SHEETS

U07210300.60

66

SURVEY PLOTTED BY	DATE
DRAWN BY	" "
DESIGNED BY	" "
QUANTITIES BY	" "
CHECKED BY	" "
ORIGINAL PLAN	No.
NOTE BOOK	" "

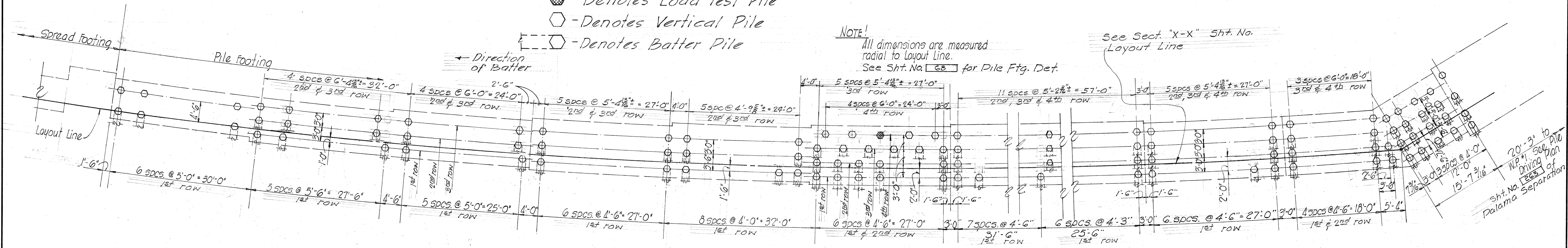
PRINTED ON CLEARPRINT 1000-14

SYMBOLS

- - Denotes Load Test Pile
- - Denotes Vertical Pile
- ◊ - Denotes Batter Pile

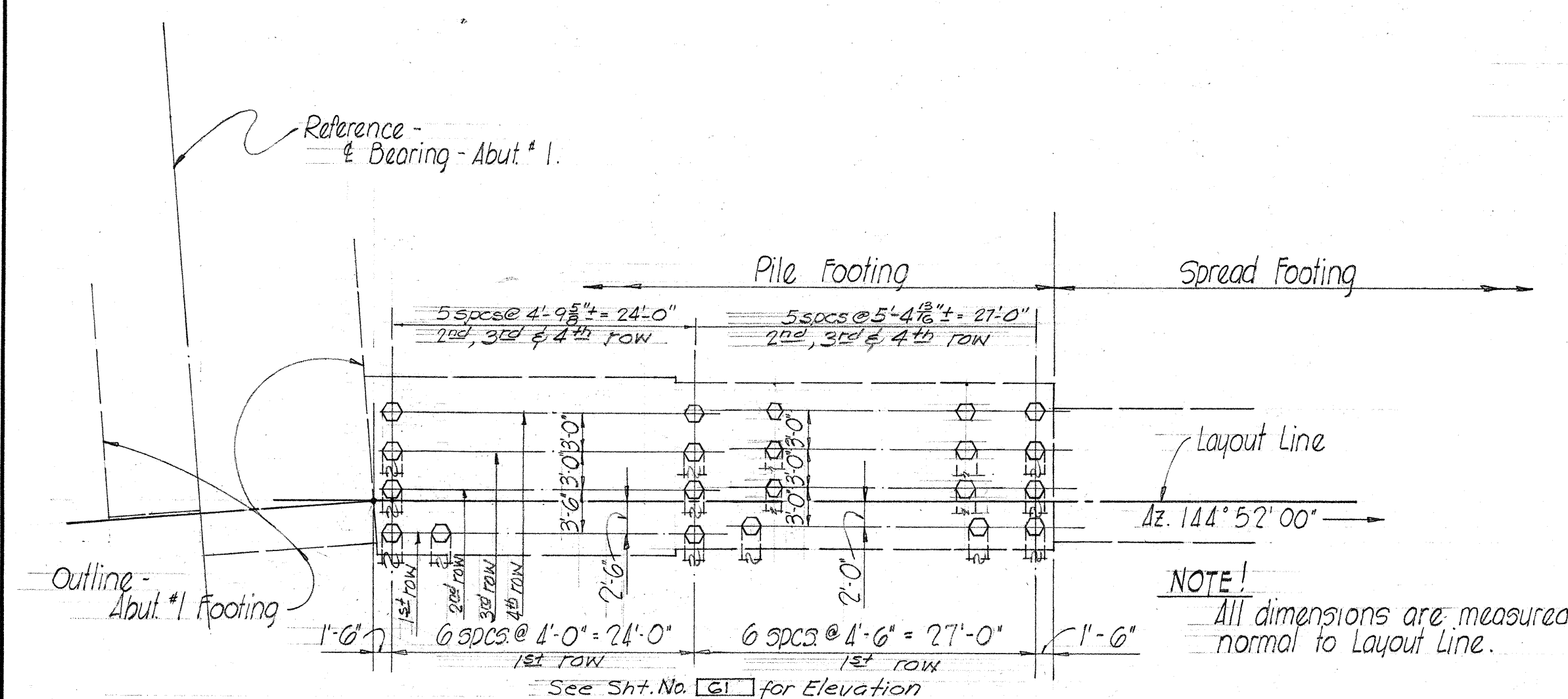
NOTE!
All dimensions are measured radial to layout line.
See Sht. No. 65 for Pile Ftg. Det.

See Sect. "X-X" Sht. No. Layout Line



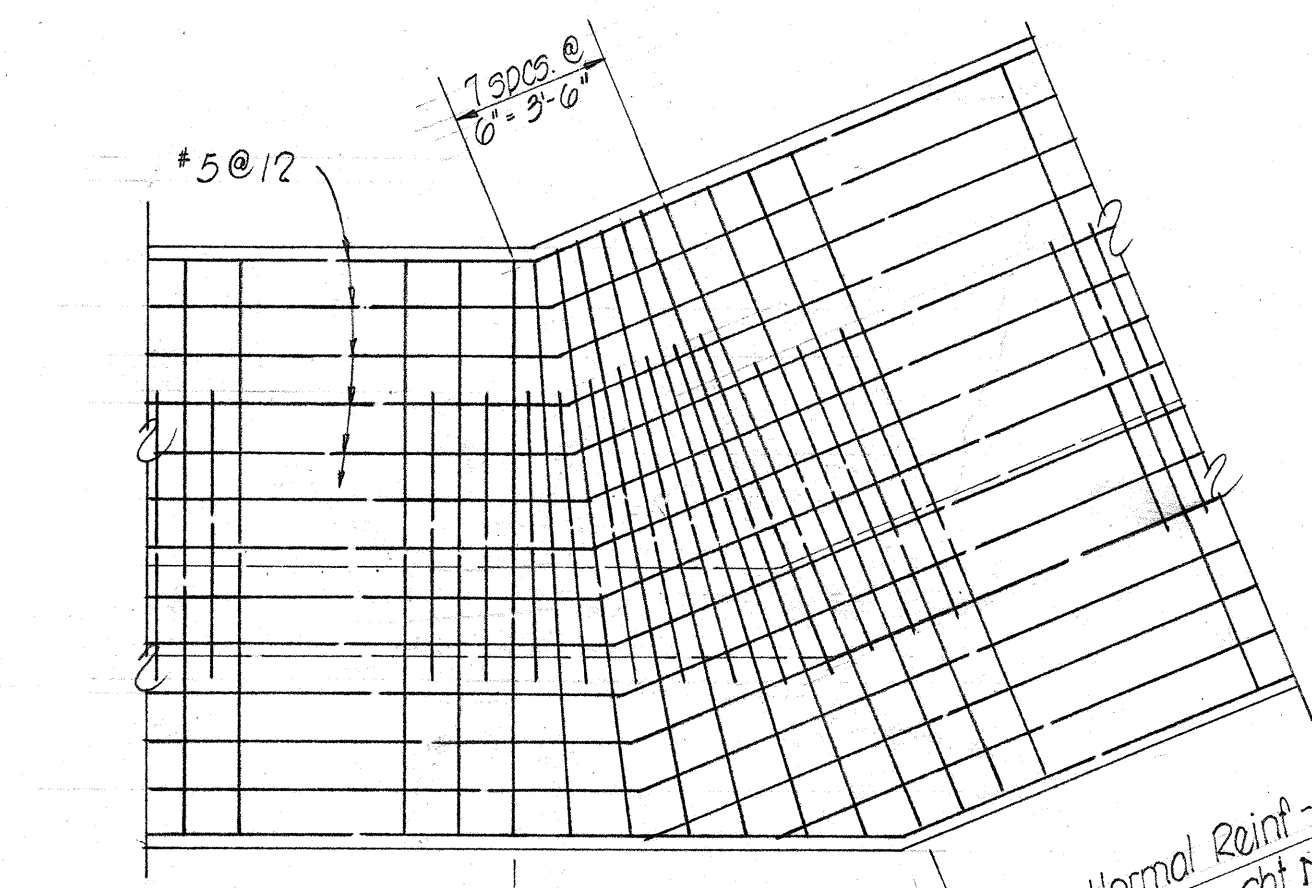
PILE LAYOUT - RETAINING WALL #3

SCALE: 1" = 10'-0"

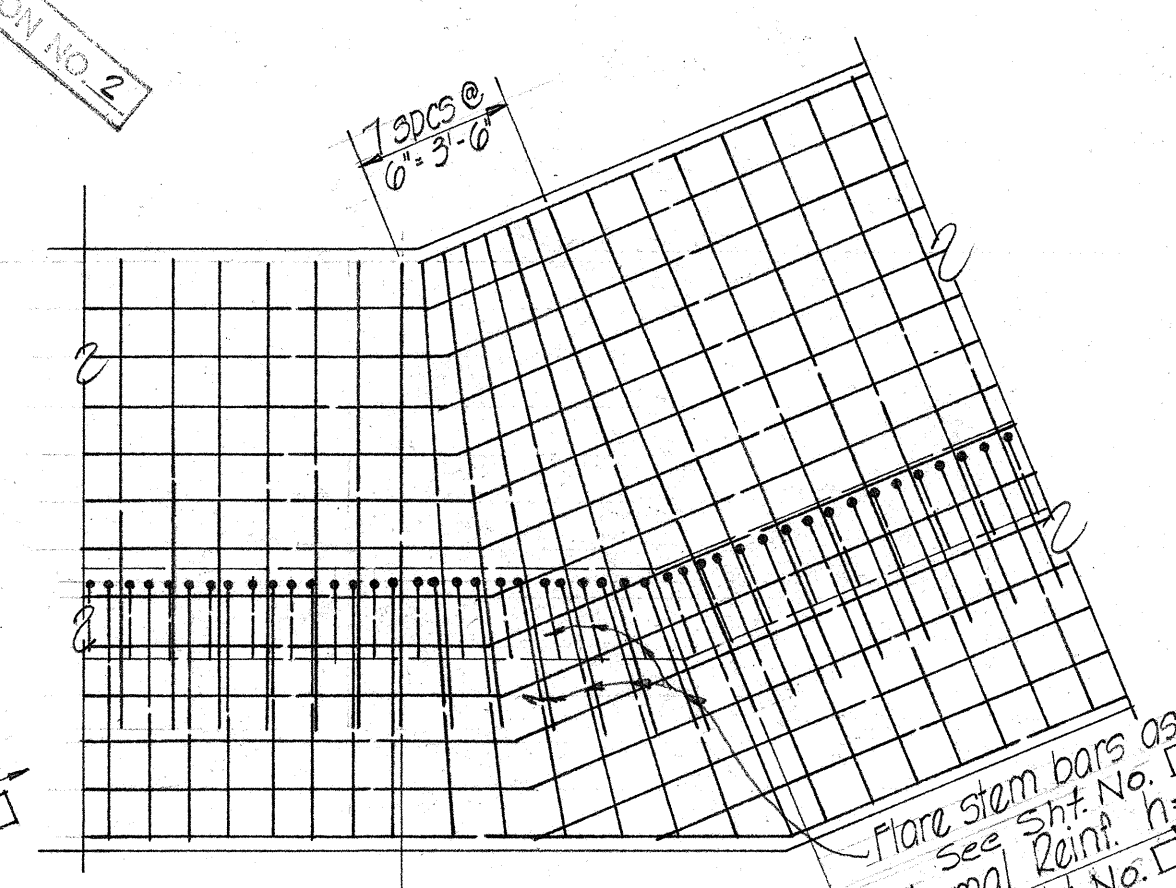


PILE LAYOUT - RETAINING WALL #4

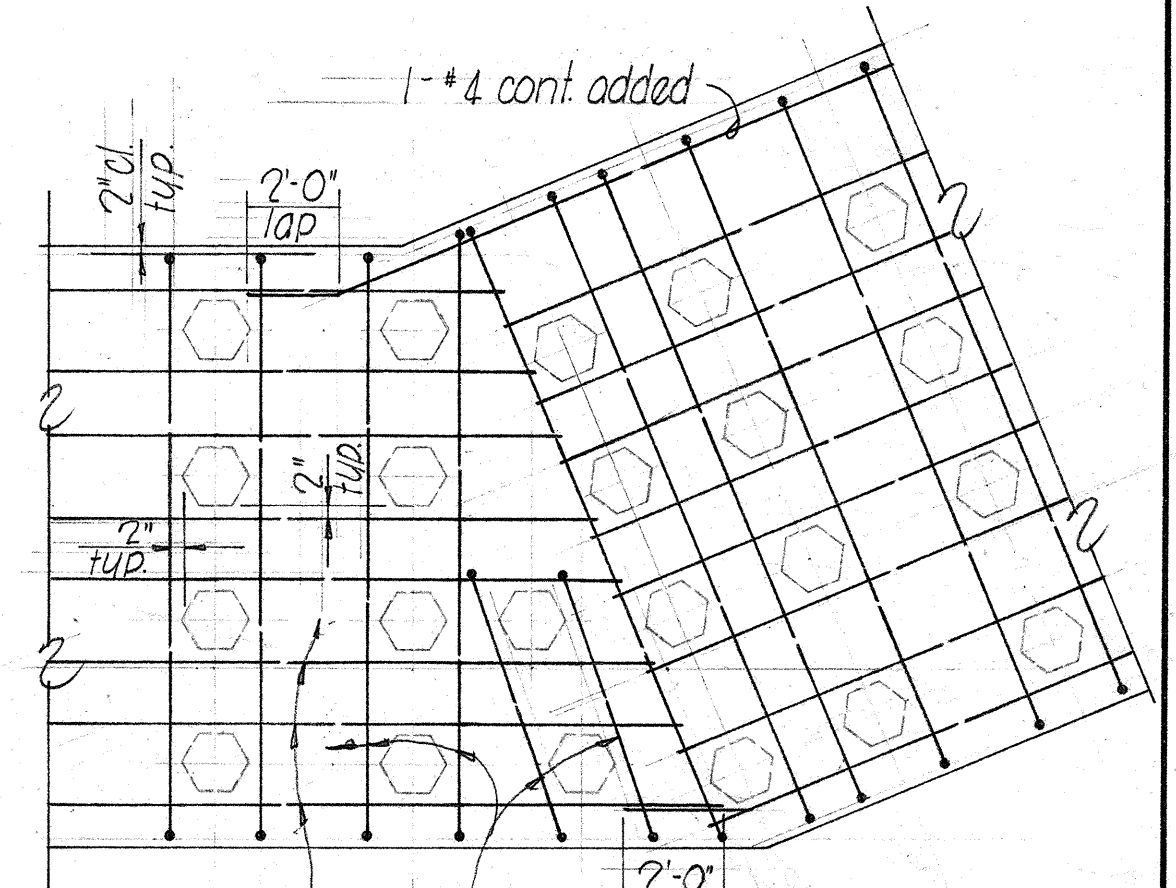
SCALE: 1" = 10'-0"



TOP PILE CAP REINF.



BOTTOM PILE CAP REINF.



PILE TIES

ARRANGEMENT OF REINF. AT FLARE

SCALE: 1/4" = 1'-0"

P I L E S C H E D U L E																						
NAME	RET. WALL #1					RET. WALL #2							RET. WALL #3						RET. WALL #4			
Type	Str.	Batter	Str.	Batter	Batter	Str.	Batter	Str.	Batter	Str.	Batter	Batter	Str.	Batter	Str.	Batter	Str.	Batter	Str.	Batter	Str.	Batter
Pile Cut-off El.	21.75	21.75	22.75	22.75	22.75	20.75	20.75	21.75	21.75	22.75	22.75	22.75	10.25	10.25	9.25	9.25	8.25	8.25	12.12	12.12	12.57	12.37
Pile Tip El. (±)	-5.75	-15.71	-7.75	-6.71	-16.60	-6.75	-16.71	-5.75	-15.71	-7.75	-6.71	-16.60	-38.25	-38.61	-38.25	-38.66	-39.25	-39.66	-39.38	-39.58	-39.13	-39.33
Pay Length	30.00	42.00	33.00	33.00	44.00	30.00	42.00	30.00	42.00	33.00	33.00	44.00	51.00	54.00	50.00	53.00	50.00	53.00	54.00	57.00	54.00	57.00
No. of Piles	11	11	25	14	32	16	16	12	12	6	6	7	14	47	12	38	*33	74	5	16	6	19
Total Pay Length	330	462	825	462	1408	480	672	360	504	198	198	308	714	2,538	600	2,014	*1650	3,972	270	912	324	1083

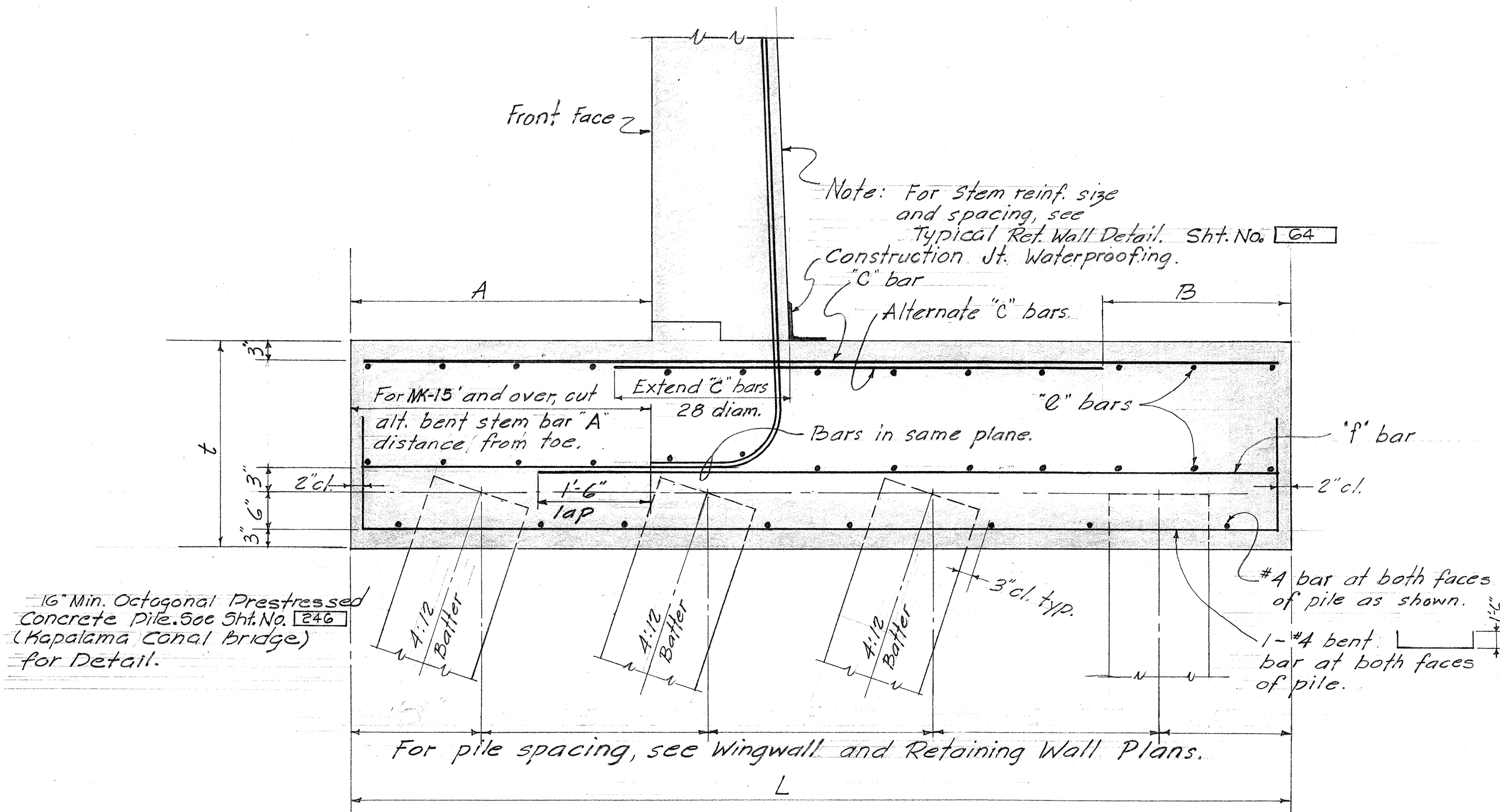
* Test pile included

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

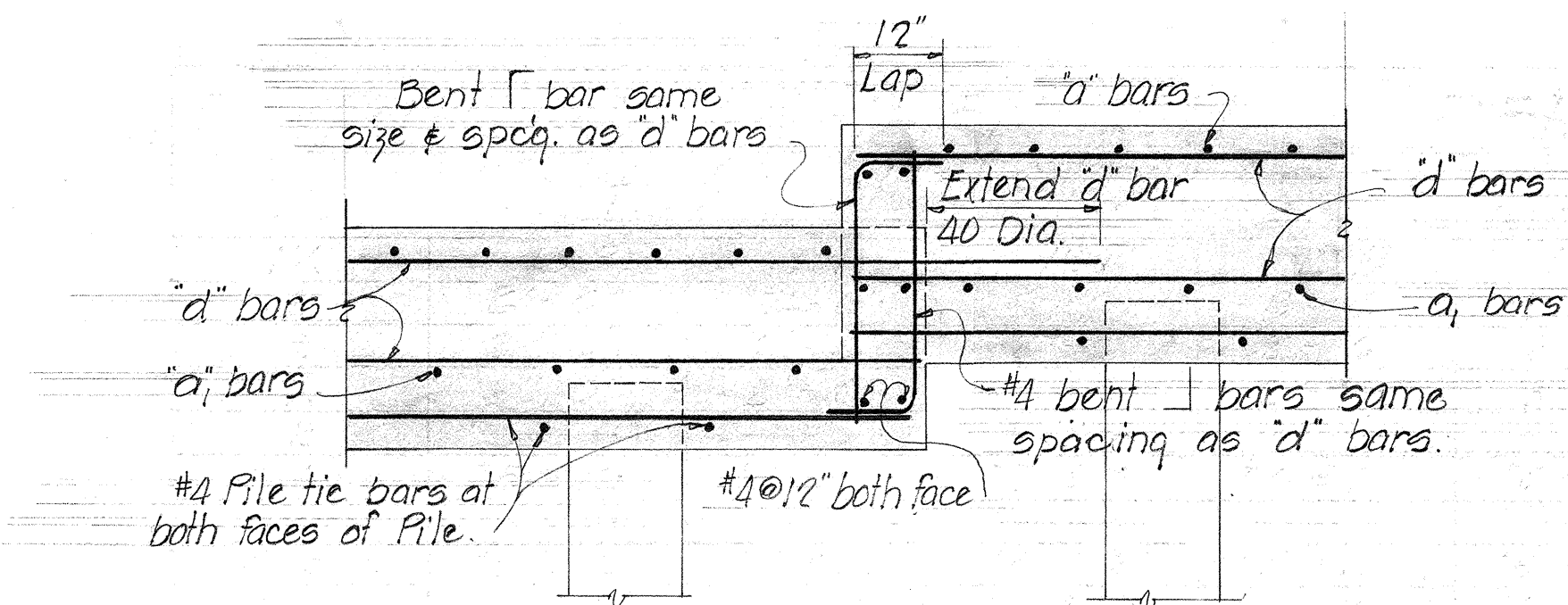
RETAINING WALLS No.3 & No.4

Pile Layout

LUNALILO FREEWAY 41-072-1(3)



TYPICAL PILE FOOTING SECTION



FOOTING STEP DETAIL

SCALE: 1/2" = 1'-0"

PILE FOOTING DIMENSION & REINF. STEEL SCHEDULE FOR WING WALLS & RET. WALLS

MK	10P	11P	12P	13P	14P	15P	16P	17P	18P	19P	20P	21P	22P	23P	24P	25P	26P	27P	28P
L	6'-6"	7'-0"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"	11'-0"	11'-6"	12'-6"	13'-0"	14'-0"	14'-6"	15'-0"	15'-6"	16'-0"	16'-6"	17'-0"
t	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	2'-9"	2'-9"	3'-0"	3'-0"	3'-0"	3'-0"	3'-0"	3'-6"	3'-6"
A	2'-0"	2'-0"	2'-0"	2'-0"	2'-6"	3'-0"	3'-0"	3'-0"	3'-6"	3'-6"	4'-0"	4'-0"	4'-6"	4'-6"	5'-0"	5'-0"	5'-6"	5'-6"	5'-6"
B									3'-0"	3'-0"	3'-0"	3'-3"	3'-6"	4'-0"	4'-0"	4'-0"	4'-0"	4'-6"	4'-9"
"C" bars	#5@12	#5@9	#5@7	#6@10	#6@7 1/2	#6@7	#7@8	#7@6 1/2	#7@12	#8@14	#8@14	#8@13	#8@13	#8@11	#8@11	#9@13	#9@13	#9@13	#9@12
Alt. "C" bars									#7@12 x 4'-9 1/2"	#8@14 x 5'-10 1/2"	#8@14 x 6'-4"	#8@13 x 6'-6 1/2"	#8@13 x 6'-9"	#8@11 x 6'-8 1/2"	#8@11 x 6'-8"	#9@13 x 7'-5 1/2"	#9@13 x 7'-5"	#9@13 x 7'-4 1/2"	#9@12 x 7'-7"
"d" bars	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12	#5@12
"P" bars	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12	#4@12
No. Piles Per Row	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4
Max. Pile Spg.	7'-0"	6'-6"	5'-6"	5'-0"	5'-6"	5'-6"	5'-0"	5'-0"	4'-6"	4'-0"	4'-6"	4'-6"	4'-0"	4'-0"	4'-0"	3'-6"	3'-6"	3'-0"	3'-0"

DESIGNED BY	DATE
TRACED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

RETAINING WALL
PILE FOOTING DETAIL

LUNALILO FREEWAY U-072-1(3)