FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	38	54

GENERAL NOTES

DESIGN SPECIFICATIONS -- AASHTO:

AASHTO Standard Specifications for Highway Bridges (15th edition), with subsequent Interim Specification 1992.

ALLOWABLE DESIGN STRESSES:

1. Reinforced concrete: $f_c = 0.40\ f'_c$
2. Reinforced steel: f_s = 20,000 psi for Grade 40; 24,000 psi for Grade 60
3. Except as noted otherwise, all structural steel plates and members shall conform to ASTM A 36 and be hot-dip galvanized after fabrication.

MATERIALS:

1. Reinforced concrete: Class A
2. Reinforced steel: ASTM A 615, Grade 40 or Grade 60
3. Admixture In concrete: see Special Provisions
4. All expansion and premolded joint filler shall be incidental to concrete and will not be paid for separately.

CONSTRUCTION METHODS:

1. Refer to Standard Specifications for Road and Bridge Construction, 1985 Edition and Special Provisions.
2. Except as noted otherwise, all vertical dimensions are measured plumb.
3. For concrete finish, see Special Provisions.
4. Pneumatic or impacting type of equipment will not be permitted for drilling of holes.
5. Stagger all splices where possible.
6. Rebars shall be supported, bent and placed as per "Manual of Standard Practice for Detailing Concrete Structures" ACI 315 (latest)
7. For cast-in-place concrete, minimum reinforcement cover:
   Concrete cast against earth: 3"
   Retaining wall: 2"
8. At time concrete is placed, rebars shall be free from mud, oil, laitance or other coatings adversely affecting bond capacity.
9. Reinforcement, dowels and other embedded items shall be positively secured before pouring.
10. All footings shall bear on firm undisturbed natural soils or properly compacted structural fill.
11. Weepholes, 4 inches in diameter, shall be placed not more than 8 feet on center along walls. An 18 inch minimum thick continuous pea gravel drain shall be placed along the entire length of wall connecting the weepholes. Weepholes shall be incidental to concrete in retaining walls.
12. Large random stone pattern architectural finish on face of retaining wall is to be accomplished by form liners.
    Coloring of the stone after curing shall be done per Manufacturer's Instructions.
    Cost of the Large Random Stone Pattern Architectural Finish shall be incidental to "Concrete in Retaining Wall".

REFERENCE:

1. Refer to Standard Plans for additional details and notes not covered by details and typical drawings.

GENERAL:

1. All items noted incidental will not be paid for separately.
2. The Contractor shall verify the locations of all existing utility lines and notify their respective owners before commencing with any work.
3. The Contractor shall verify all grades and dimensions in the field before commencing with any work.
4. The Contractor shall be solely responsible for the protection of adjacent property, utility and existing and new structures from damage due to construction and repair any damage at his own expense, to the satisfaction of the Engineer. He shall conduct his work in such a manner and provide such temporary shoring or other measures as may be necessary to insure the safety of all concerned and to protect existing structures.
5. Excavation for all footings and stems shall be accomplished by maintaining as near a vertical cut as possible.
6. In the event of over-excavation, the space between the footing and ground shall be filled with a minimum of class D concrete at the Contractor's expense and as directed by the Engineer.
7. Unless noted otherwise, chamfer all exposed concrete edges three quarters (3/4") of an inch.

ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITIES
206.5000	Structural Excavation For Retaining Walls	Cu. Yd.	3,550 c.y.
206.7250	Structural Backfill For Retaining Walls	Cu. Yd.	3,820 c.y.
206.8310	Pea Gravel Filter Material For Retaining Walls	Cu. Yd.	400 c.y.
503.1050	Concrete In Retaining Walls	Lump Sum	(1,490 cy.)
508.0100	Cement Rubble Masonry	Cu. Yd.	13 c.y.
602.0050	Reinforcing Steel In Retaining Walls	Lump Sum	(155,000 lbs.)
607.0260	6-Feet Chain Link Fence With Top Rail On Concrete Structure	Lin. Ft.	616 l.f.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE OCT. 1992
	DRAWN BY L.M.A.	OCT. 1992
DESIGN FILE	TRACED BY	OCT. 1992
	DESIGNED BY J.F.	OCT. 1992
No. Standard	QUANTITIES BY M.F.	OCT. 1992
	CHECKED BY M.T.	

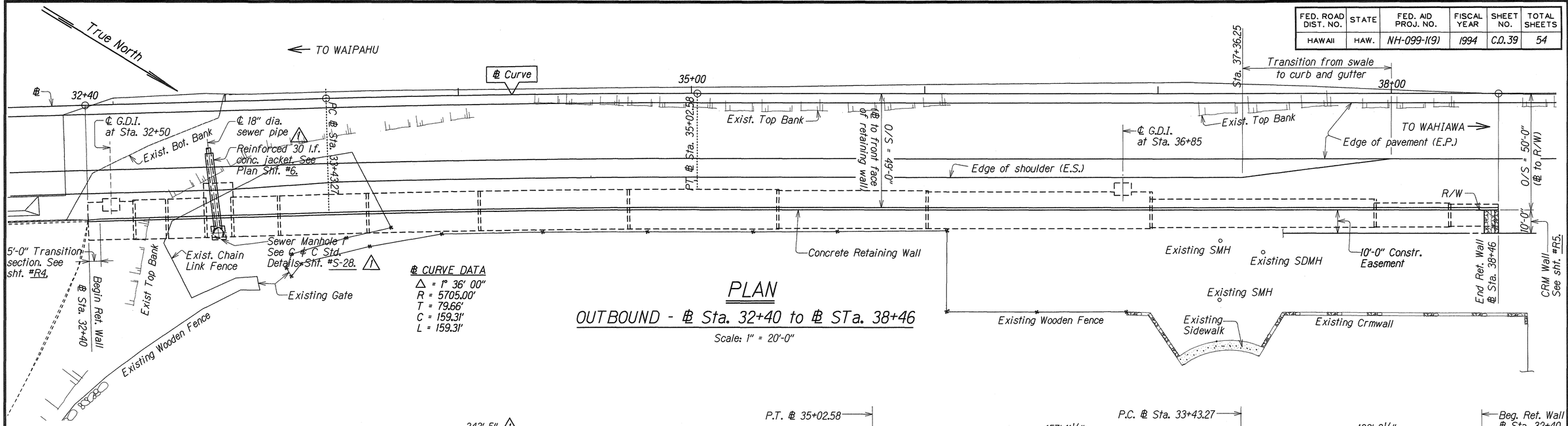
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL
GENERAL NOTES & ESTIMATED QUANTITIES
KAMEHAMEHA HIGHWAY WIDENING
LUMIAINA STREET TO WAIPIO UKA STREET
Project No. NH-099-1(9)

Scale: As Noted Date: May, 1994

SHEET No. R1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	C.O.39	54



PLAN

OUTBOUND - ℄ Sta. 32+40 to ℄ STa. 38+46

Scale: 1" = 20'-0"

ELEVATION

OUTBOUND ℄ STA. 32+40 TO ℄ STA. 38+46

Scale: Horiz. 1" = 20'-0"
Vert. 1" = 10'-0"

ORIGINAL PLAN	DESIGN FILE	SURVEY PLOTTED BY	DRAWN BY	TRACED BY	DESIGNED BY	QUANTITIES BY	CHECKED BY	DATE
No. Symbol2		LMA			JF	JF	MT	OCT 1992

APPROVED:

CHIEF, DIVISION OF PLANNING & SERVICES CONTROL
DEPARTMENT OF WASTEWATER MANAGEMENT
(FOR SEWER WORK WITHIN PUBLIC R/W AND EASEMENT ONLY)

2/15/95
DATE

DATE	REVISION
12/30/94	Revised dimensions and elevation. Realigned 18"ø sewer pipe. Add reinforced 30 l.f. conc. jacket and C ℄ C manhole.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL PLAN AND ELEVATION OUTBOUND ℄ STA. 32+40 TO 38+40

KAMEHAMEHA HIGHWAY WIDENING
LUMIAINA STREET TO WAIPIO UKA STREET
Project No. NH-099-1(9)

Scale: As Noted — Date: May, 1994

SHEET No. R2 OF 5 SHEETS

"AS-BUILT"

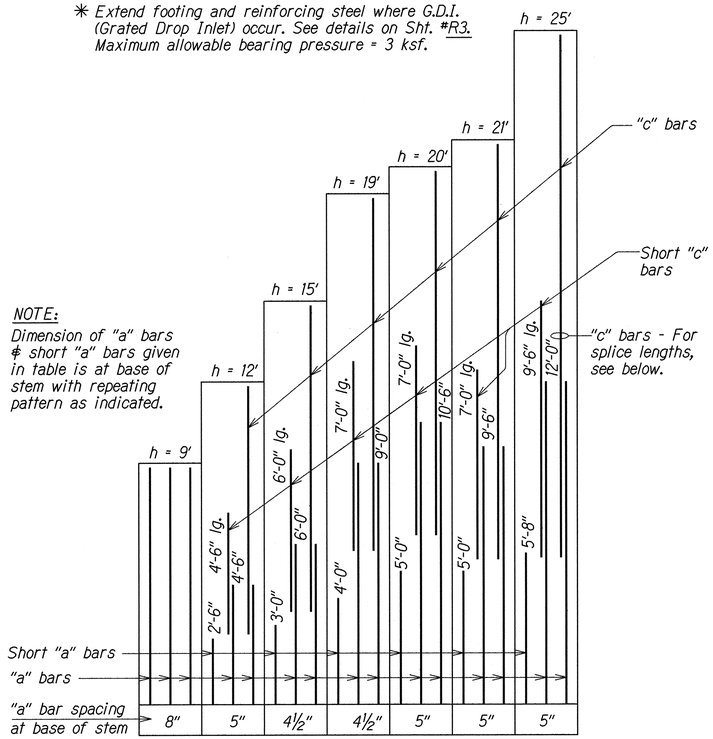
C.O. 39

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	40	54

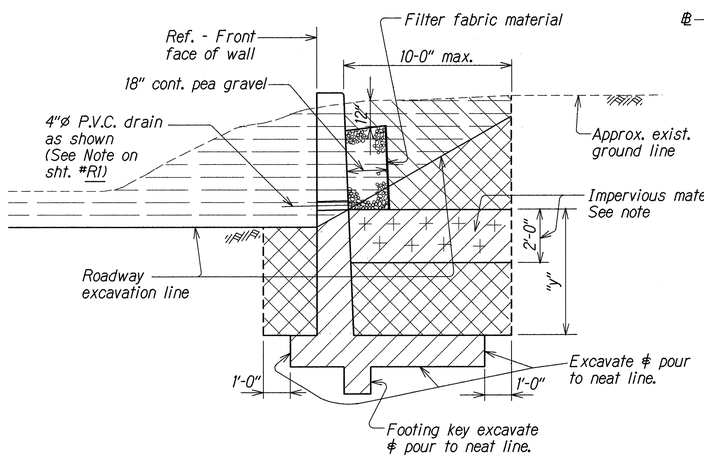
SCHEDULE OF DIMENSIONS ℄ REINFORCING STEEL FOR RETAINING WALL

Maximum "h"	9'	12'	15'	19'	20'	21'	25'
"a" bars	#6@8"	#6	#7	#8	#9	#9	#11
Short "c" bars	—	#5	#6	#7	#7	#7	#9
"c" bars	—	#5	#5	#5	#5	#5	#7
"b" bars	#6@6"	"6@4"	#7@4½"	#8@6½"	#8@6"	#7@5"	#6@5½"
a	1'-6"	1'-9"	3'-6"	*6'-6"	*7'-0"	7'-9"	14'-0"
b	—	0'-10"	1'-6"	4'-0"	4'-0"	4'-3"	7'-6"
c	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"	7'-0"
d	3'-9"	4'-0"	4'-2"	3'-6"	3'-6"	3'-6"	—
e	No batter	½ : 12	½ : 12	¾ : 12	¾ : 12	¾ : 12	¾ : 12
f	1'-9"	2'-3"	3'-0"	3'-6"	4'-0"	4'-0"	4'-6"
L	9'-6"	10'-3"	12'-2"	*15'-9"	*16'-3"	17'-0"	23'-7"
t	1'-2"	1'-3"	1'-6"	1'-9"	1'-9"	2'-0"	3'-6"
g	2'-3"	2'-11"	4'-9"	8'-2"	8'-8"	9'-6"	16'-0"

* Extend footing and reinforcing steel where G.D.I. (Grated Drop Inlet) occur. See details on Sht. #R3. Maximum allowable bearing pressure = 3 ksf.



VERTICAL REINFORCING STEEL ARRANGEMENT



STRUCTURE EXCAVATION ℄ DRAINAGE DETAIL

Not to Scale

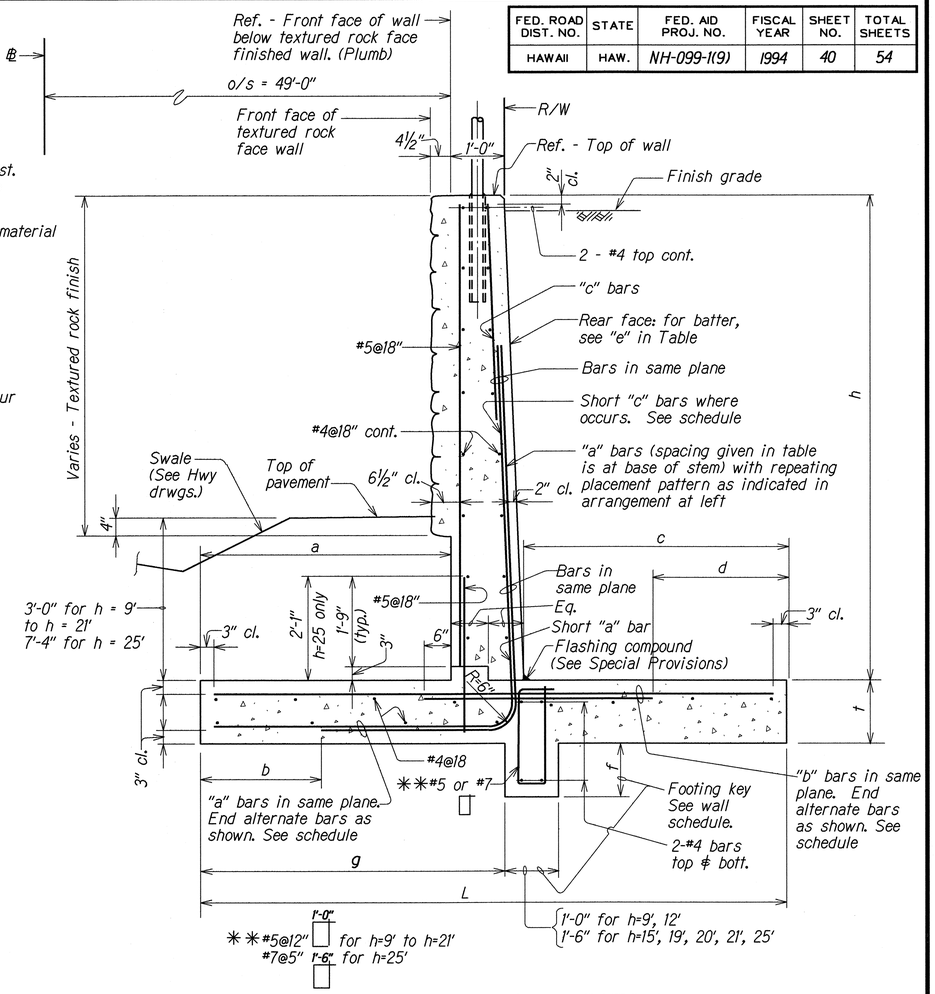
NOTES

HATCHED AREA

1. Hatched area shown thus ⧸⧸⧸⧸ denotes limits of structure excavation payline.
2. Hatched area shown thus ⧹⧹⧹⧹ denotes limits of structure backfill.
3. Hatched area shown thus |=== denotes limits of roadway excavation.

IMPERVIOUS MATERIAL

1. Impervious material as selected by the Engineer shall be incidental to structure backfill.
2. When "y" is 2'-0" or less, all backfill below PVC drain level shall be impervious material.
3. The subgrade upon which filter material is to be placed shall be made as impervious as possible by pneumatic tamping or other approved methods.

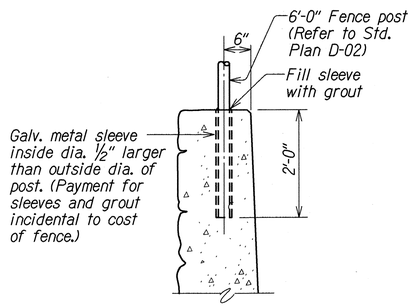


TYPICAL WALL SECTION

Not to Scale

BAR SIZE	SPLICE LENGTH (Inch)
6	22
7	30
8	39
9	50
11	78

When splicing different size bars, length of larger bar shall govern.



CHAIN LINK FENCE POST DETAIL

Not to Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	LMA	DATE	OCT 1992
	DRAWN BY			OCT 1992
	TRACED BY			OCT 1992
DESIGN FILE	DESIGNED BY	J.E.		OCT 1992
	QUANTITIES BY	M.L.		
No. Skomb#14	CHECKED BY			

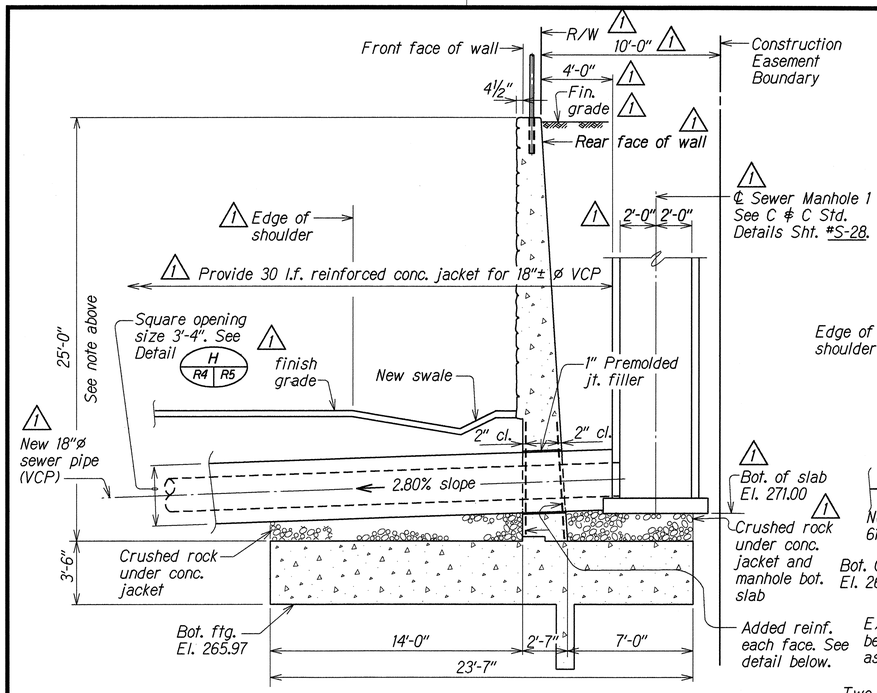
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL
TYPICAL DETAILS, T-TYPE WALL
KAMAHAMEHA HIGHWAY WIDENING
LUMIAINA STREET TO WAIPIO UKA STREET
Project No. NH-099-1(9)

Scale: As Noted — Date: May, 1994

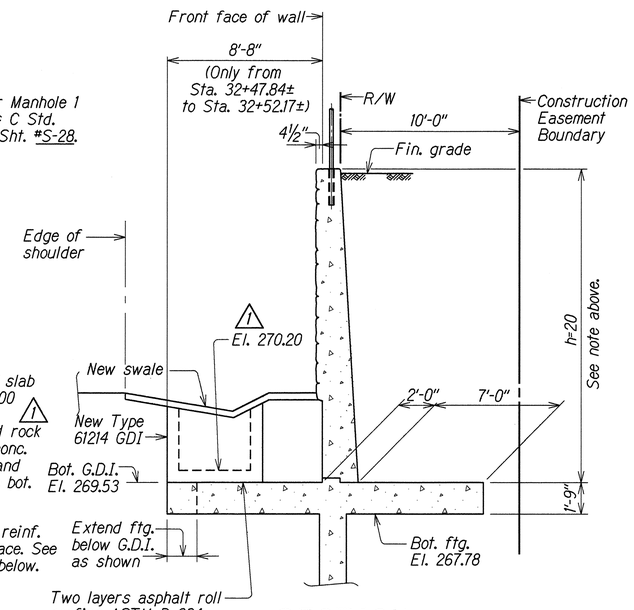
SHEET No. R3 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	C.O. 41	54

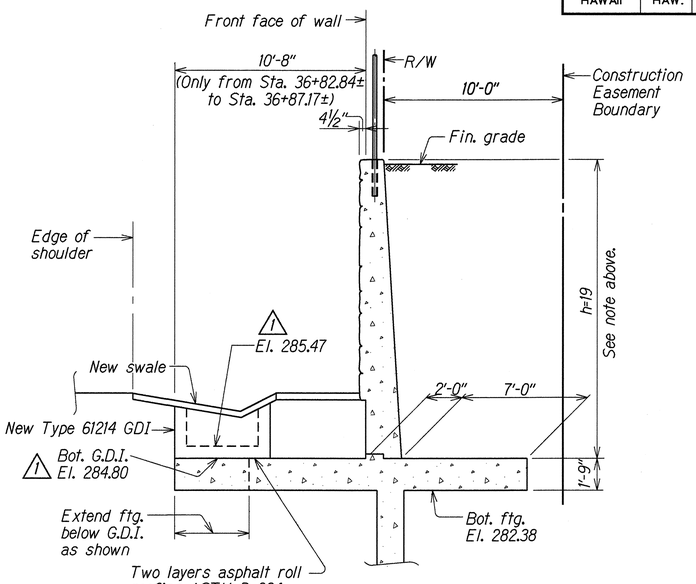


SECTION
ALONG ℄ 18"ø VCP
Scale: ¼" = 1'-0"

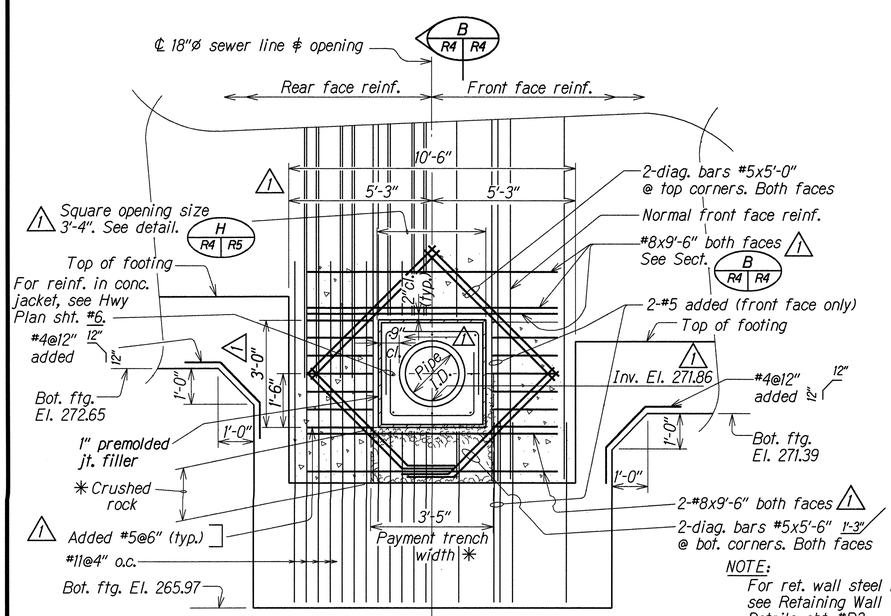
NOTE:
See sht. #R3 for "Typical Wall Section".



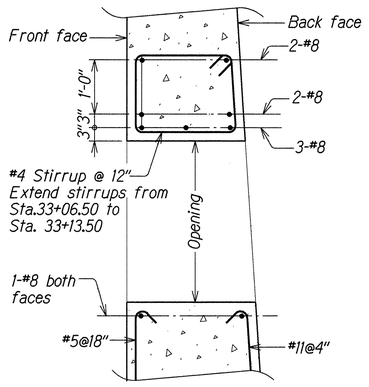
SECTION
AT ℄ STA. 32 + 50
Scale: ¼" = 1'-0"



SECTION
AT ℄ STA. 36 + 85
Scale: ¼" = 1'-0"



REINFORCING AT 18"ø SEWER PIPE
AT ℄ STA. 32 + 94.95±
N.T.S.



SECTION
B R4 R4
Scale: ¾" = 1'-0"

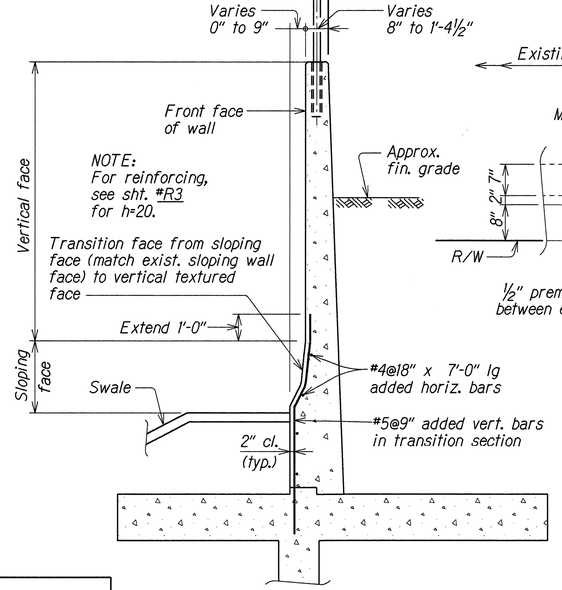
NOTE:
For ret. wall steel reinf. data, see Retaining Wall Typical Details sht. #R3.

✳ Provide crushed rock under concrete jacket and manhole bottom slab. See section above.

APPROVED:

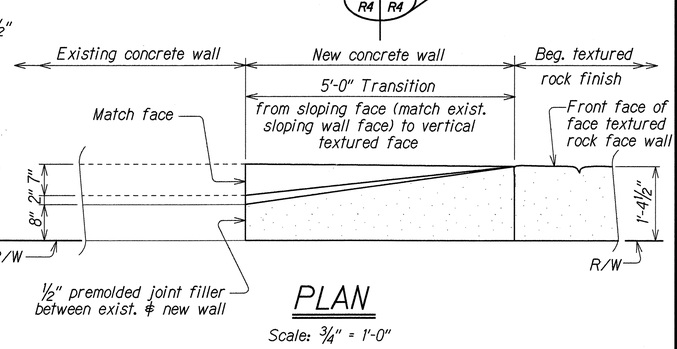
CHIEF, DIVISION OF PLANNING & SERVICES CONTROL
DEPARTMENT OF WASTEWATER MANAGEMENT
(FOR SEWER WORK WITHIN PUBLIC R/W AND EASEMENT ONLY)

2/15/95
DATE



A R4 R4

SECTION
TYPICAL TRANSITION SECTION
N.T.S.



PLAN
Scale: ¾" = 1'-0"

1/30/95	Concrete jacket lengthen to 30 l.f. and extended to sewer manhole at rear face. Revised clearance, dimensions, elevation ⋕ station. Revised, moved or deleted labels as necessary. Added ⋕ lengthen reinf. at square opening.
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL
5'-0" TRANSITION, SECTIONS AT G.D.I. SECTION AND DETAIL AT 18"ø SEWER PIPE

KAMEHAMEHA HIGHWAY WIDENING
LUMIAINA STREET TO WAIPIO UKA STREET
Project No. NH-099-1(9)

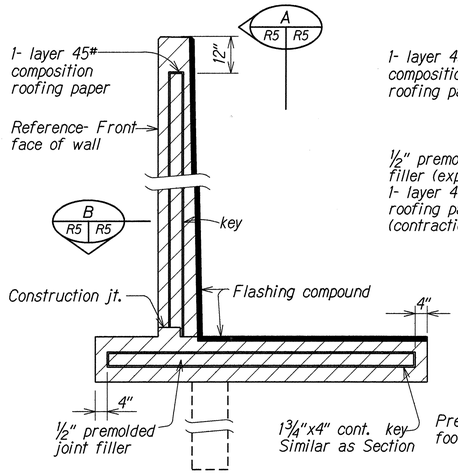
Scale: As Noted — Date: May, 1994

SHEET No. R4 OF 5 SHEETS

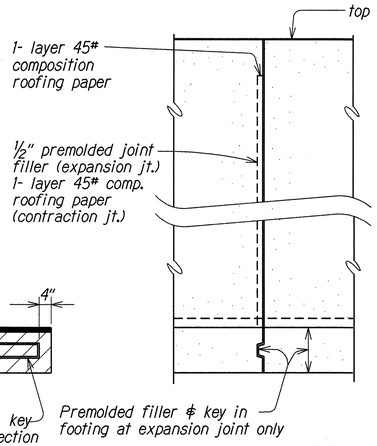
ORIGINAL PLANS	SURVEY PLOTTED BY	DATE OCT 1992
	DRAWN BY LMA	
	TRACED BY	OCT 1992
DESIGN FILE	DESIGNED BY J.F.	OCT 1992
No. Skamdr1.3	QUANTITIES BY M.T.	OCT 1992
	CHECKED BY	

C. O. 41

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	C.O. 42	54



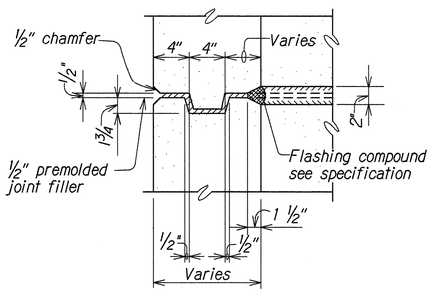
JOINT ELEVATION



SECTION A R5 R5

NOTE

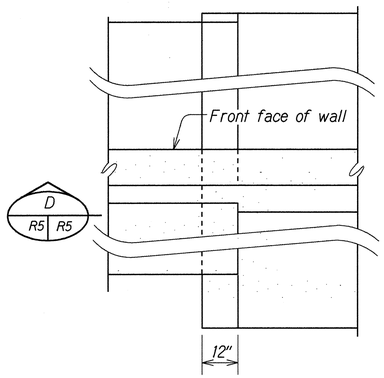
Spacing of joints: Expansion = 96'-0" max.
Contraction = 32'-0" max.



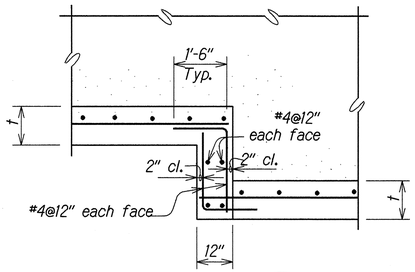
SECTION B R5 R5

⚠ TYPICAL EXPANSION JOINT DETAILS

Not to Scale

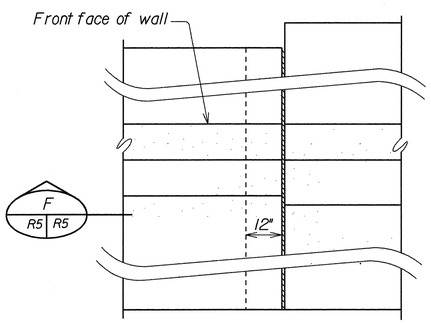


PLAN

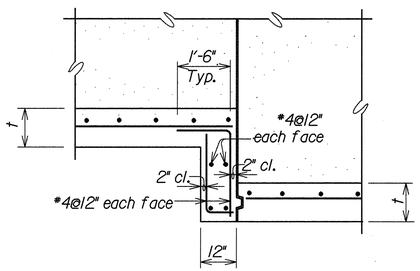


SECTION D R5 R5

AT CONTINUOUS FOOTING



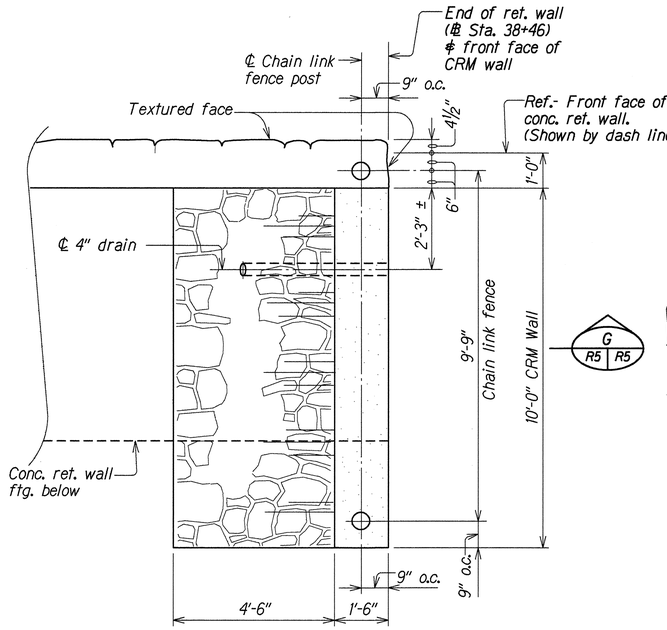
PLAN



⚠ SECTION F R5 R5

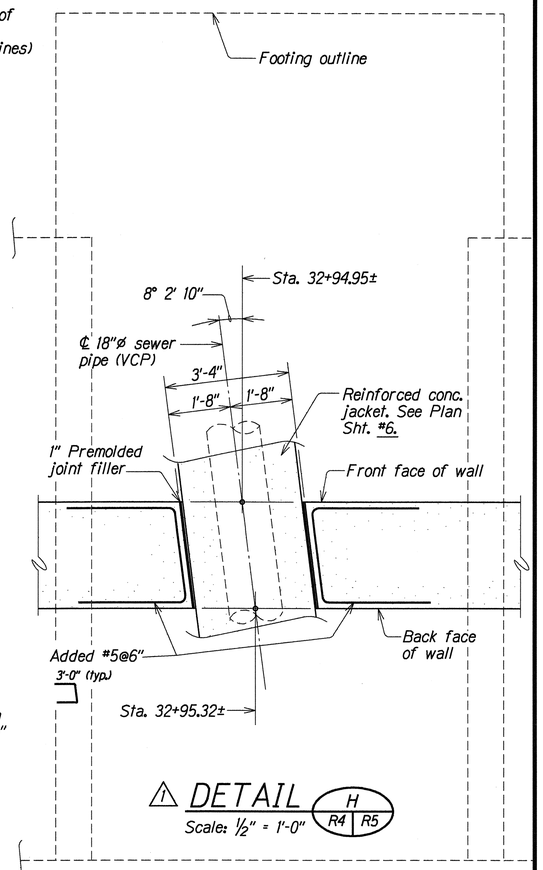
AT EXPANSION JOINT

TYPICAL FOOTING STEP-UP DETAILS Not to Scale



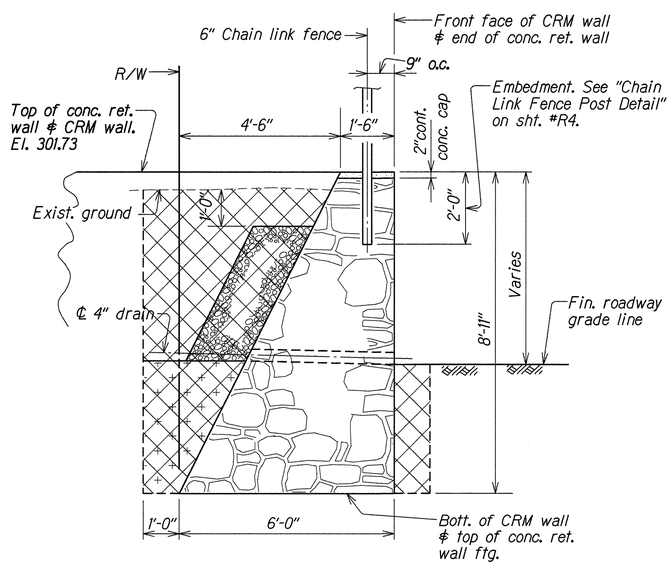
PLAN

Scale: ½" = 1'-0"



⚠ DETAIL H R4 R5

Scale: ½" = 1'-0"



CRM WALL SECTION G R5 R5 ⚠

Scale: ½" = 1'-0"

NOTE:
For structure excavation & drainage detail, see sht. #R4.

APPROVED:

CHIEF, DIVISION OF PLANNING & SERVICES CONTROL
DEPARTMENT OF WASTEWATER MANAGEMENT
(FOR SEWER WORK WITHIN PUBLIC R/W AND EASEMENT ONLY)

2/15/95
DATE

⚠ 1/30/95	Moved details as necessary. Added "Detail H". Revised dimensions and detail as necessary. Added approval block.
DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL
STEP-UP DETAILS; EXPANSION JOINT DETAILS
KAMEHAMEHA HIGHWAY WIDENING
LUMIAINA STREET TO WAIPIO UKA STREET
Project No. NH-099-1(9)

Scale: As Noted Date: May, 1994

SHEET No. R5 OF 5 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	LMA	OCT 1992
	DRAWN BY		
	TRACED BY	SK	OCT 1992
DESIGN FILE	DESIGNED BY	KF	OCT 1992
N:\Standards	QUANTITIES BY	ML	OCT 1992
	CHECKED BY		

C. O. 42