

GENERAL NOTES

A. MATERIALS

Unless otherwise noted

- Concrete shall be Class A.
- Reinforcing steel shall be ASTM A 615 Grade 60.
- Structural Shapes shall conform to the following ASTM and grade:
W-shapes: ASTM A992
Angles: ASTM A36
- All bolts and nuts shall conform to ASTM A307, hot-dipped galvanized.
- All structural steel and bolts shall be hot-dipped galvanized after fabrication. Structural steel shall be primed and painted in accordance with the specifications.
- Payment for Flashing Compound and Expansion Joint Filler shall be considered incidental to the various contract items.

B. REINFORCEMENT

- The minimum covering measured from the surface of the concrete to the face of any reinforcing bar shall be as follows, except as otherwise noted:
a) Retaining Walls & Drainage Structures with Formed or Finished Surface - 2"
b) Concrete cast against and permanently exposed to earth - 3"
- Reinforcing shall be detailed in accordance with the latest editions of CRSI's "Placing Reinforcing Bars" and "Manual of Standard Practice" and the "ACI Detailing Manual" unless otherwise noted.
- Minimum spacing between parallel bars shall be 2 1/2 times the diameter of bars (for non bundled bars), but in no case shall the clear distance between the bars be less than 1 1/2 times the maximum size of the coarse aggregate.
- All dimensions relating to reinforcing are to centers of bars unless otherwise noted.

C. FOUNDATION

- Spread footings for Retaining Walls shall be excavated and poured neat against undisturbed ground. In case of over excavation, space between footing and ground shall be filled with concrete at the Contractor's expense and as directed by the Engineer. The minimum quality of the fill concrete shall be Class D.

D. CONSTRUCTION METHODS

- See current edition of Hawaii Standard Specifications for Road and Bridge Construction and Special Provisions.

E. GENERAL

- All items noted incidental will not be paid for separately.
- The Contractor shall verify the location of all existing utility lines and notify the respective owners before commencing with work.
- Except as otherwise noted on drawings, all exterior corners and re-entrant angles 90° or less in concrete work shall be chamfered 3/4" x 3/4".
- For concrete finish see Standard Specifications and/or Special Provisions.
- Standard Detail Drawings refer to all structures in general except for modifications as may be required for special conditions. For such modifications refer to corresponding detailed drawings.

F. RETAINING WALL DESIGN DATA

For retaining wall design information at vicinity of

Sta. 67+55 to Sta. 68+36 (Gravity Wall): See Sht S5 of 10 (Sheet No. 110)

Sta. 75+46 to Sta. 77+30 (Cantilever Wall): See Sht S6 of 10 (Sheet No. 111)

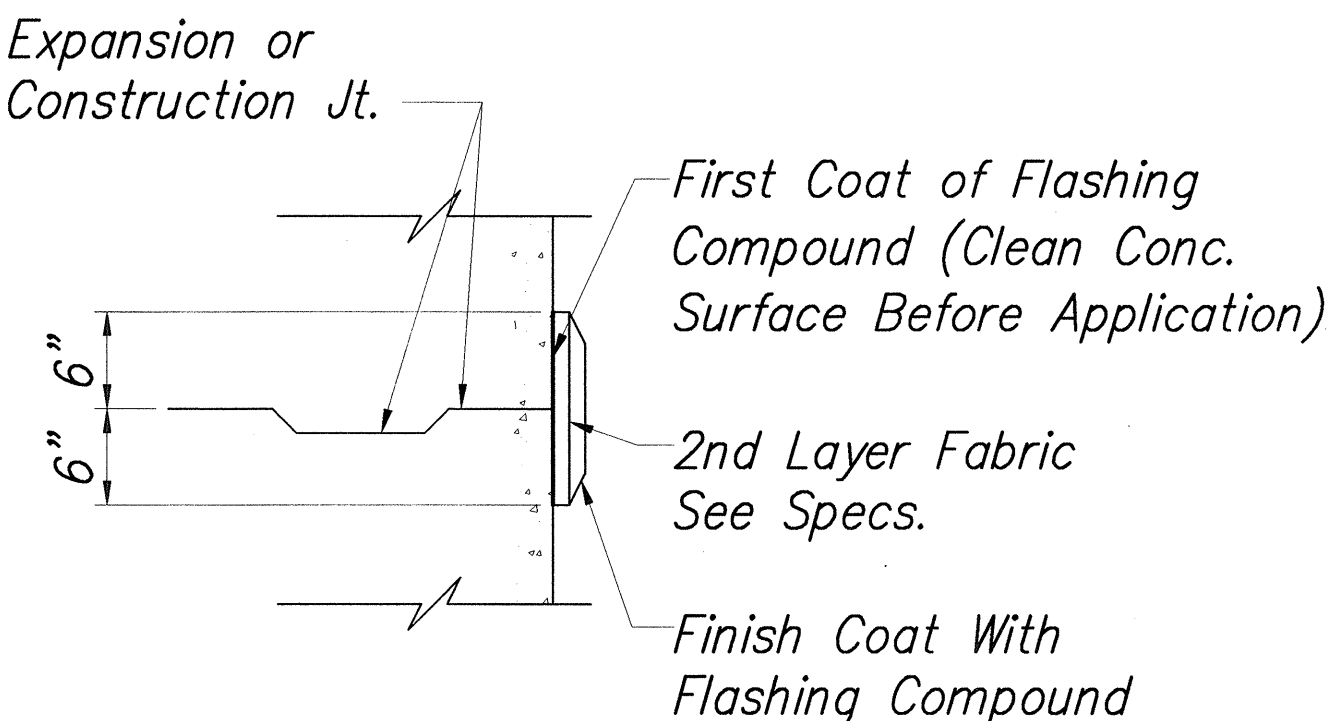
Sta. 101+72 to Sta. 103+63 (Gabion Wall): See Sht S7 of 10 (Sheet No. 112)

Note: Retaining walls were designed in accordance with recommendations contained in "GEOTECHNICAL ENGINEERING EXPLORATION, FY 1997-98, STATE HAWAII DEPARTMENT OF TRANSPORTATION, SPECIAL MAINTENANCE PROJECT LIKELIKE HWY RESURFACING HONOLULU, OAHU, HAWAII" Dated November 15, 1999 By Geolabs, Inc.

G. REFERENCES

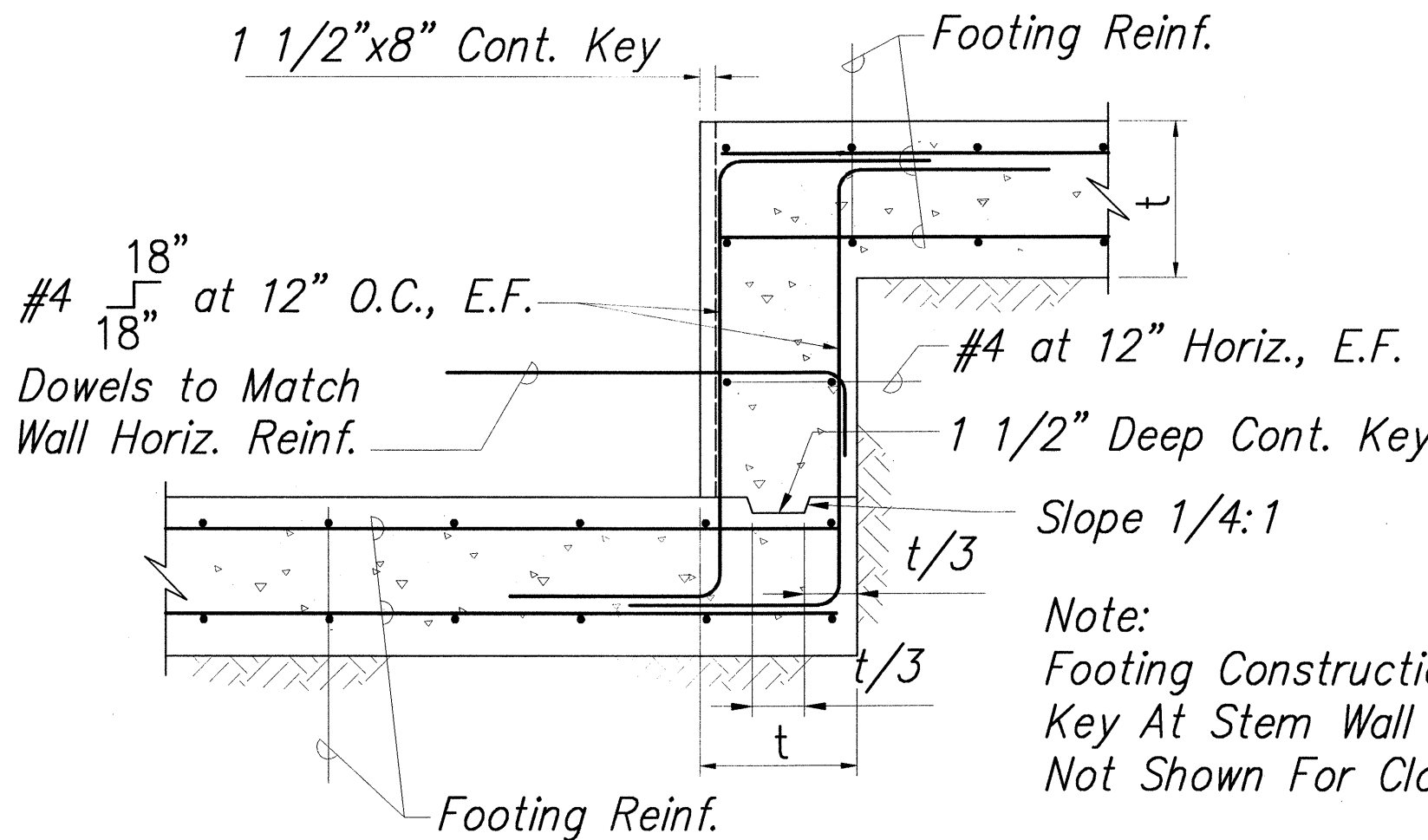
- AASHTO LRFD Bridge Design Specification, 2nd Edition, 1998 with 1999 & 2000 Interim Revisions.
- ACI 318-95, American Concrete Institute, Building Code Requirements for Structural Concrete.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(21)	2001	115	187



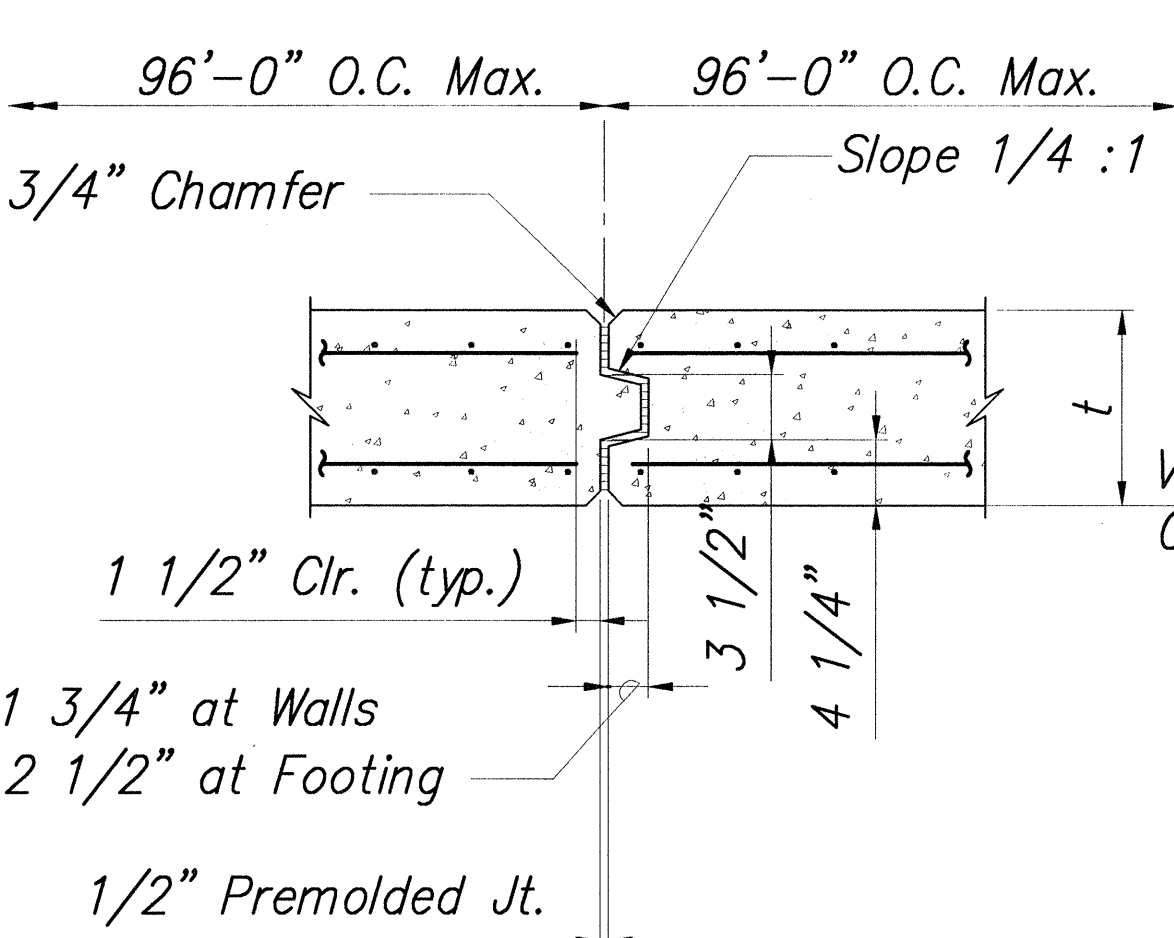
TYPICAL FLASHING COMPOUND WATERPROOFING DETAIL

NOT TO SCALE

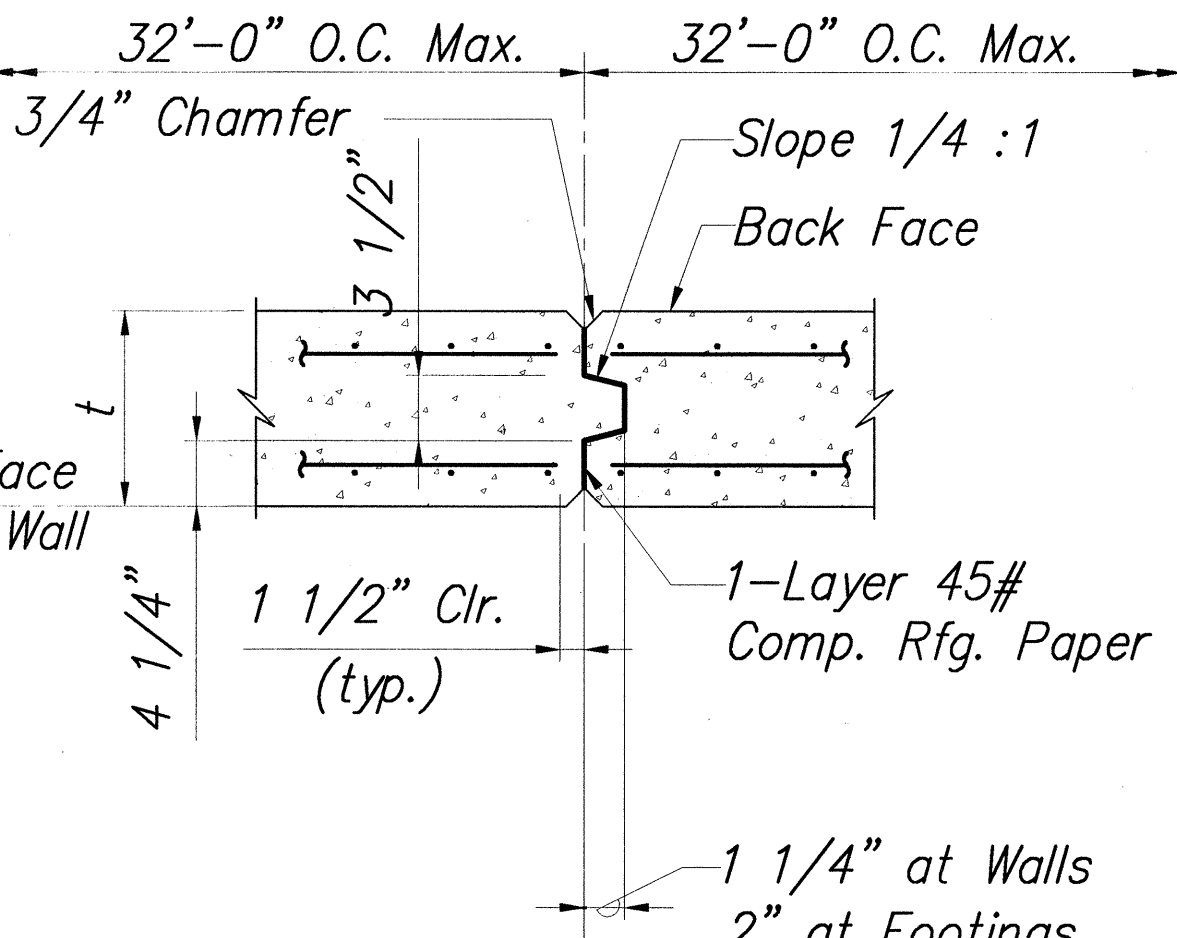


STEP FOOTING DETAIL

Scale: 3/4"=1'-0"

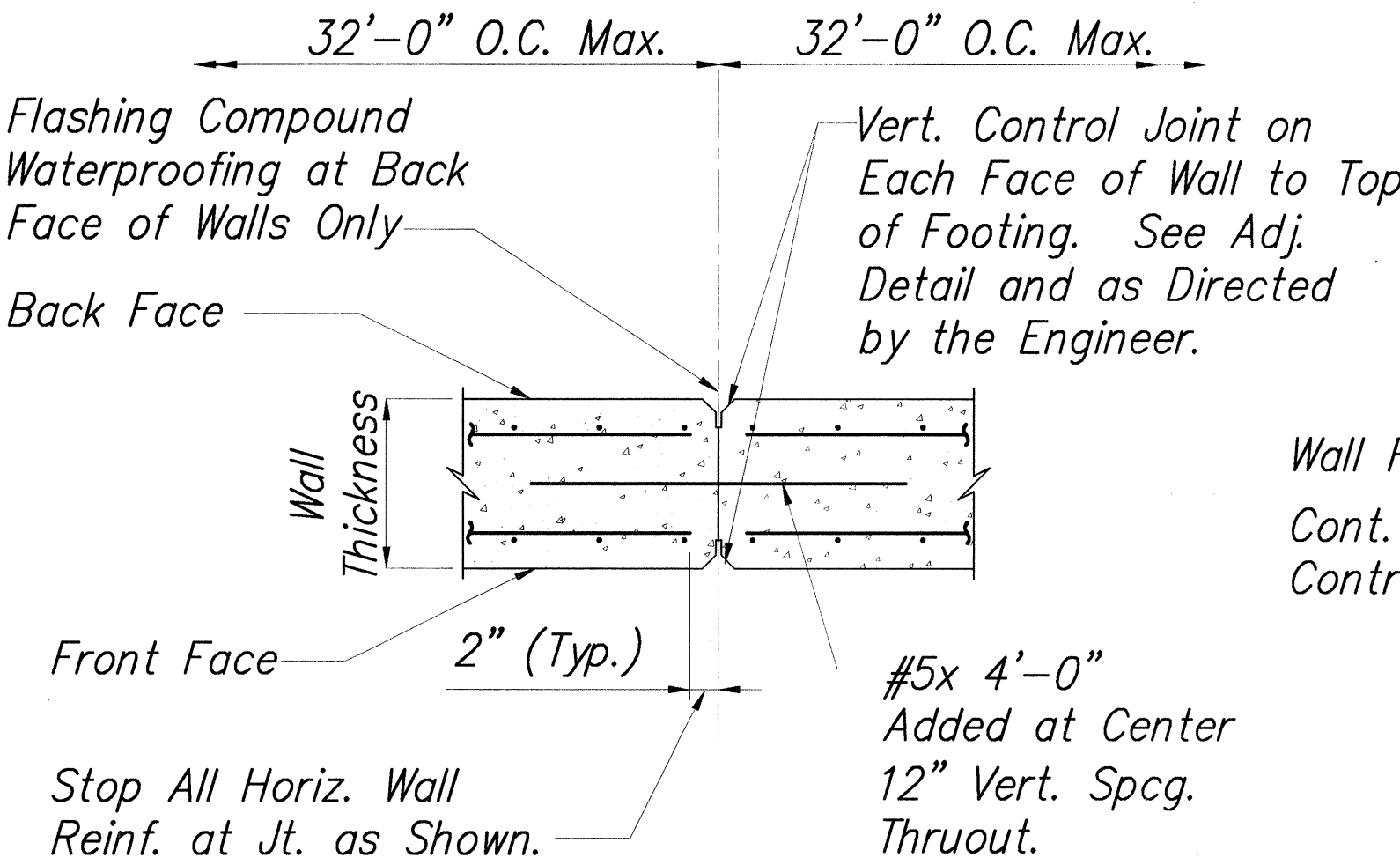


AT EXPANSION JOINT



AT CONTRACTION JOINT

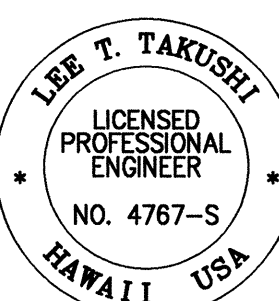
- Notes:
- Provide Flashing Compound Waterproofing at Joints at Back Face of Walls Only.
 - Ftg. Key Shall Be Centered at Mid-depth of Ftg. For Adjacent Ftgs. of Varying Thicknesses, Key Shall Be Centered on Smaller Ftg. Thickness.
 - "t" Designates Wall or Ftg. Thickness.



ALTERNATE CONTRACTION JOINT OR CONTROL JOINT TYPICAL JOINT DETAILS

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S5, S6



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Lee T. Takushi

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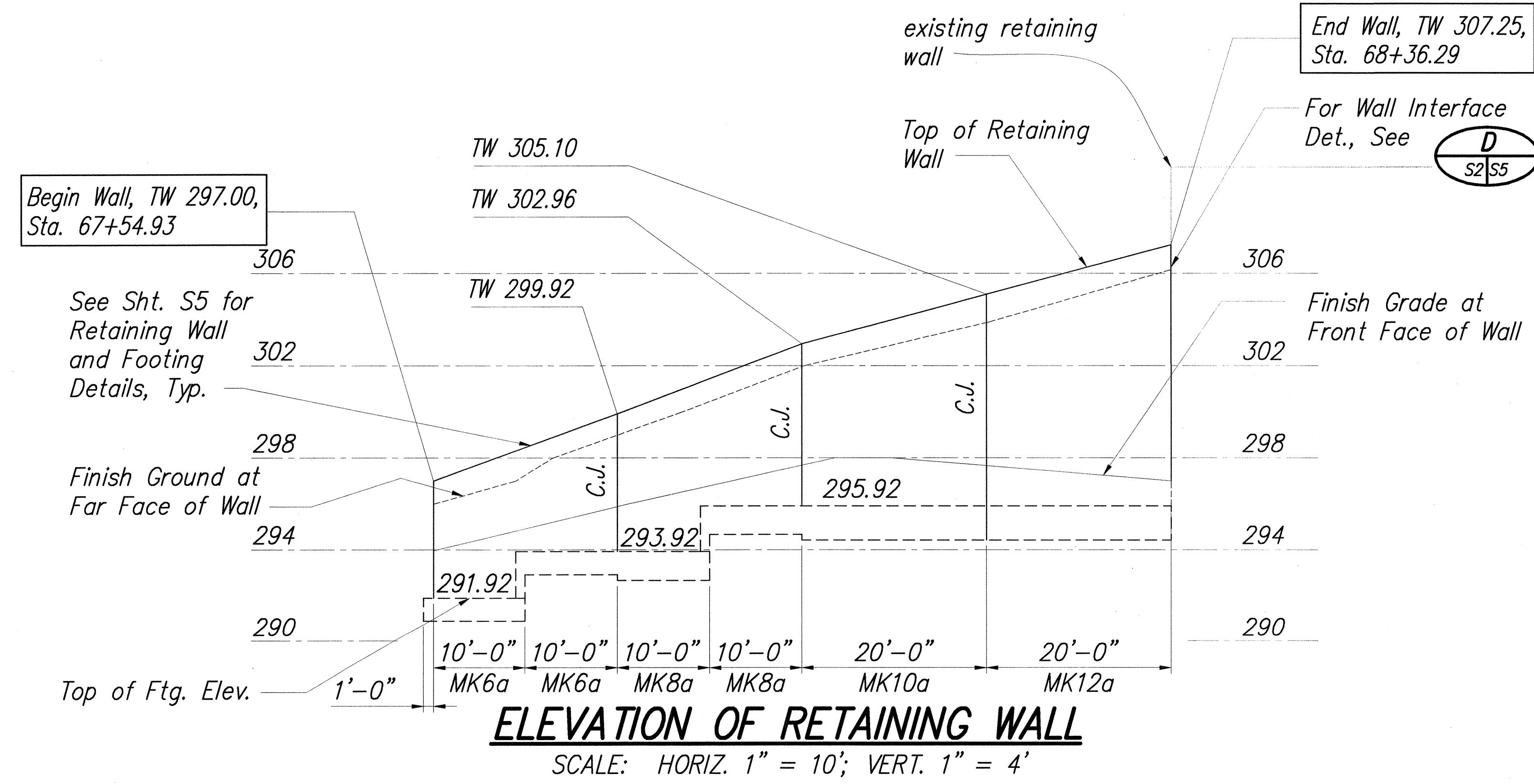
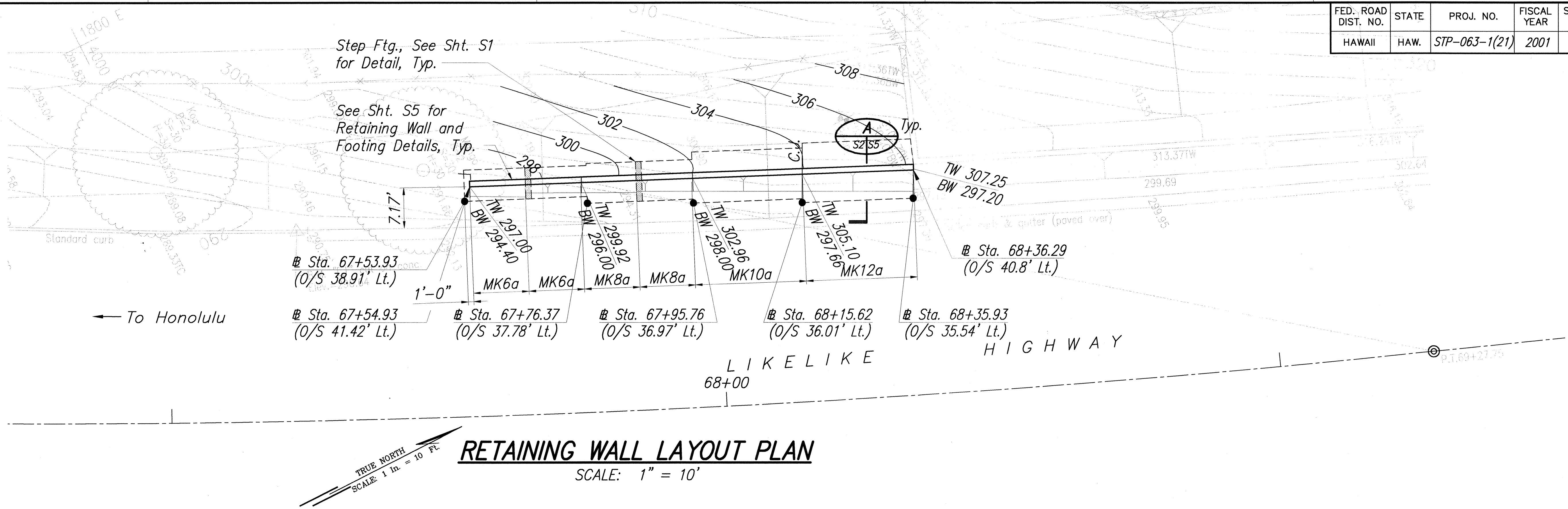
STRUCTURAL GENERAL NOTES AND DETAILS

LIKELIKE HIGHWAY RESURFACING
Emmeline Place to the Wilson Tunnel
F. A. Project No. STP-063-1(21)

Scale: As Noted Date: Mar. 2001

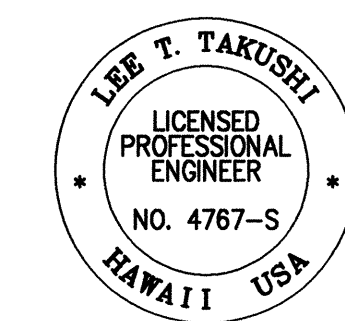
SHEET No. S1 OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(21)	2001	116	187



References:
 Structural General Notes and Details.....S1
 Gravity Retaining Wall Details.....S5

Legend:
 C.J. Contraction Joint
 MK6 Wall Designation
 [Step Symbol] Step In Footing



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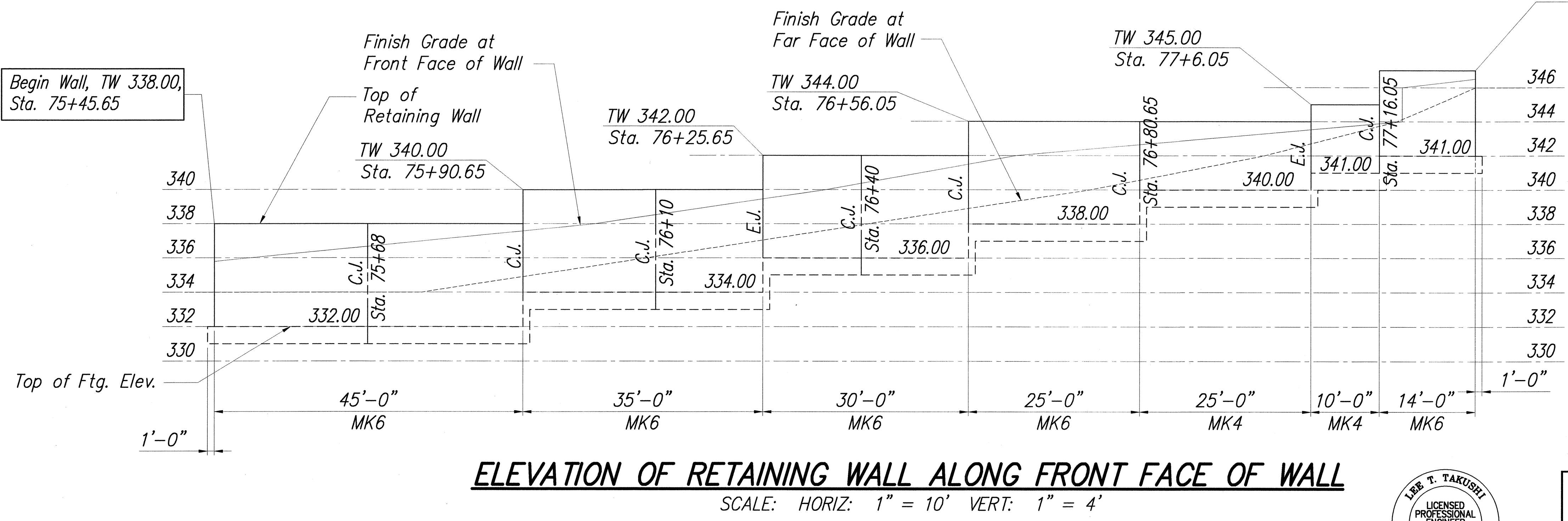
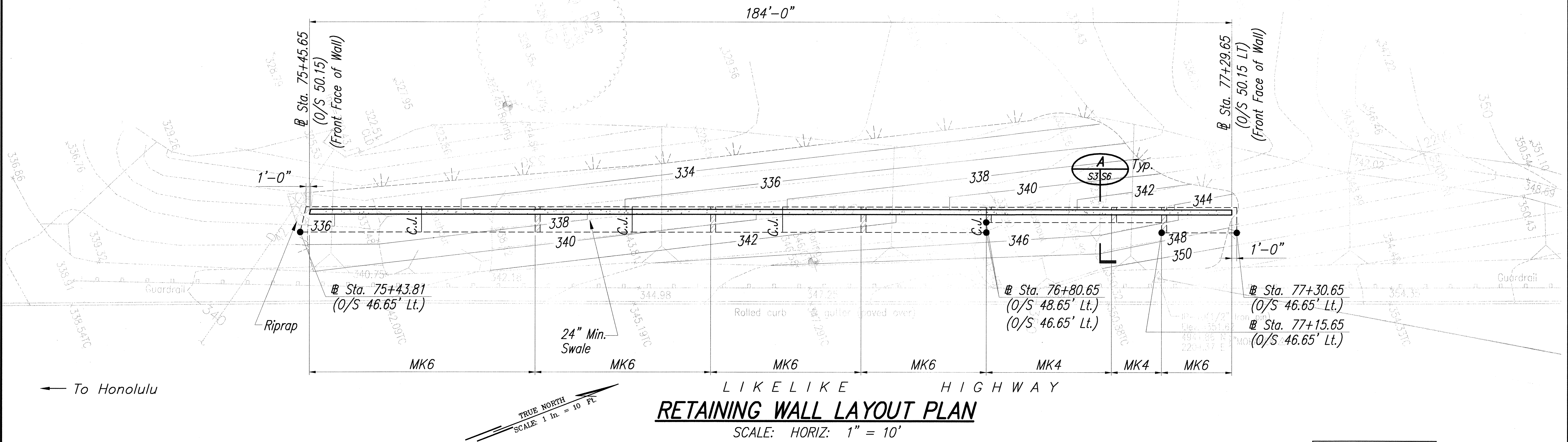
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STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
GRAVITY RETAINING WALL
PLAN AND PROFILE
 LIKELIKE HIGHWAY RESURFACING
 Emmeline Place to the Wilson Tunnel
 F. A. Project No. STP-063-1(21)
 Scale: As Noted Date: Mar. 2001
 SHEET No. S2 OF 9 SHEETS

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ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NO.		

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HAWAII	HAW.	STP-063-1(21)	2001	117	187

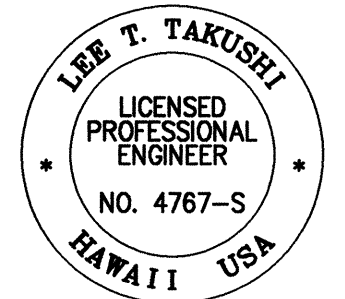


End Wall, TW 347.00,
Sta. 77+29.65

References:
Structural General Notes
and Details..... S1
Cantilever Retaining Wall Details S6

Legend:
E.J. Expansion Joint
C.J. Contracting Joint
MK6 Wall Designation
Step In Footing

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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Julian

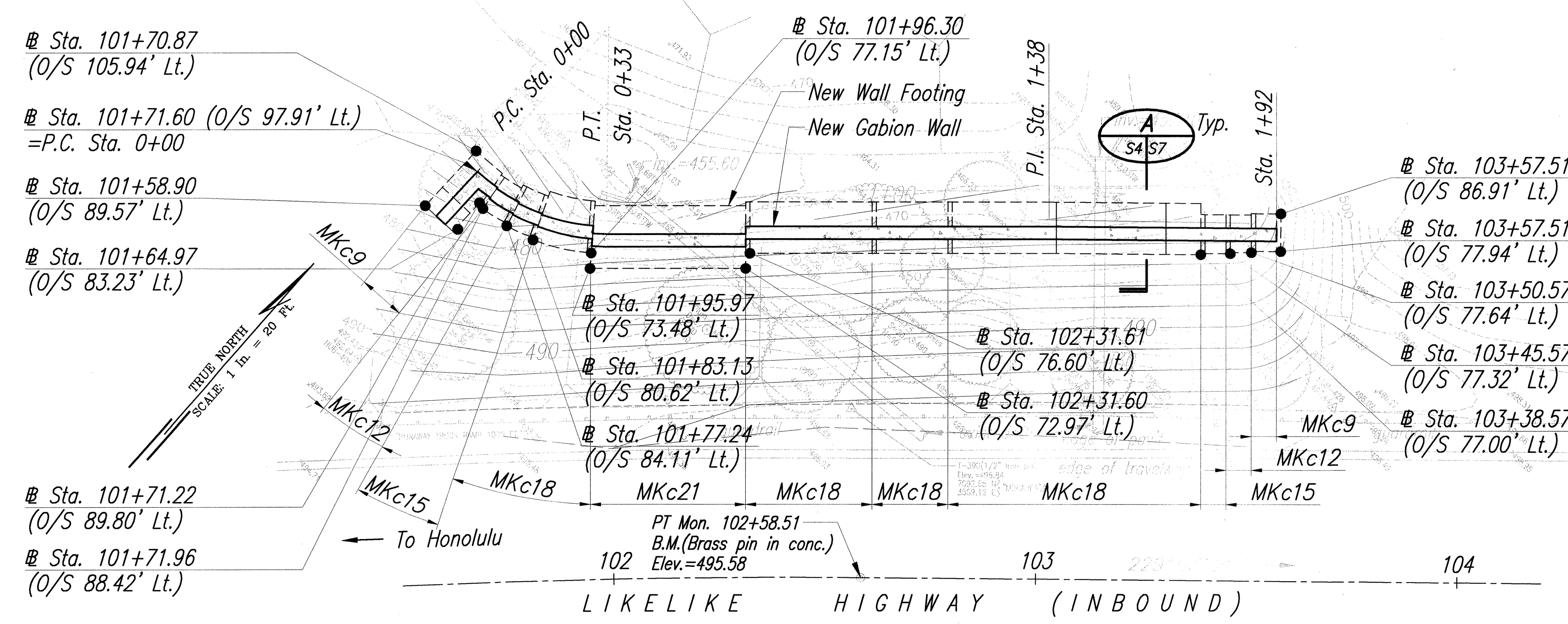
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CANTILEVER RETAINING WALL
PLAN AND PROFILE
LIKELIKE HIGHWAY RESURFACING
Emmeline Place to the Wilson Tunnel
F. A. Project No. STP-063-1(21)

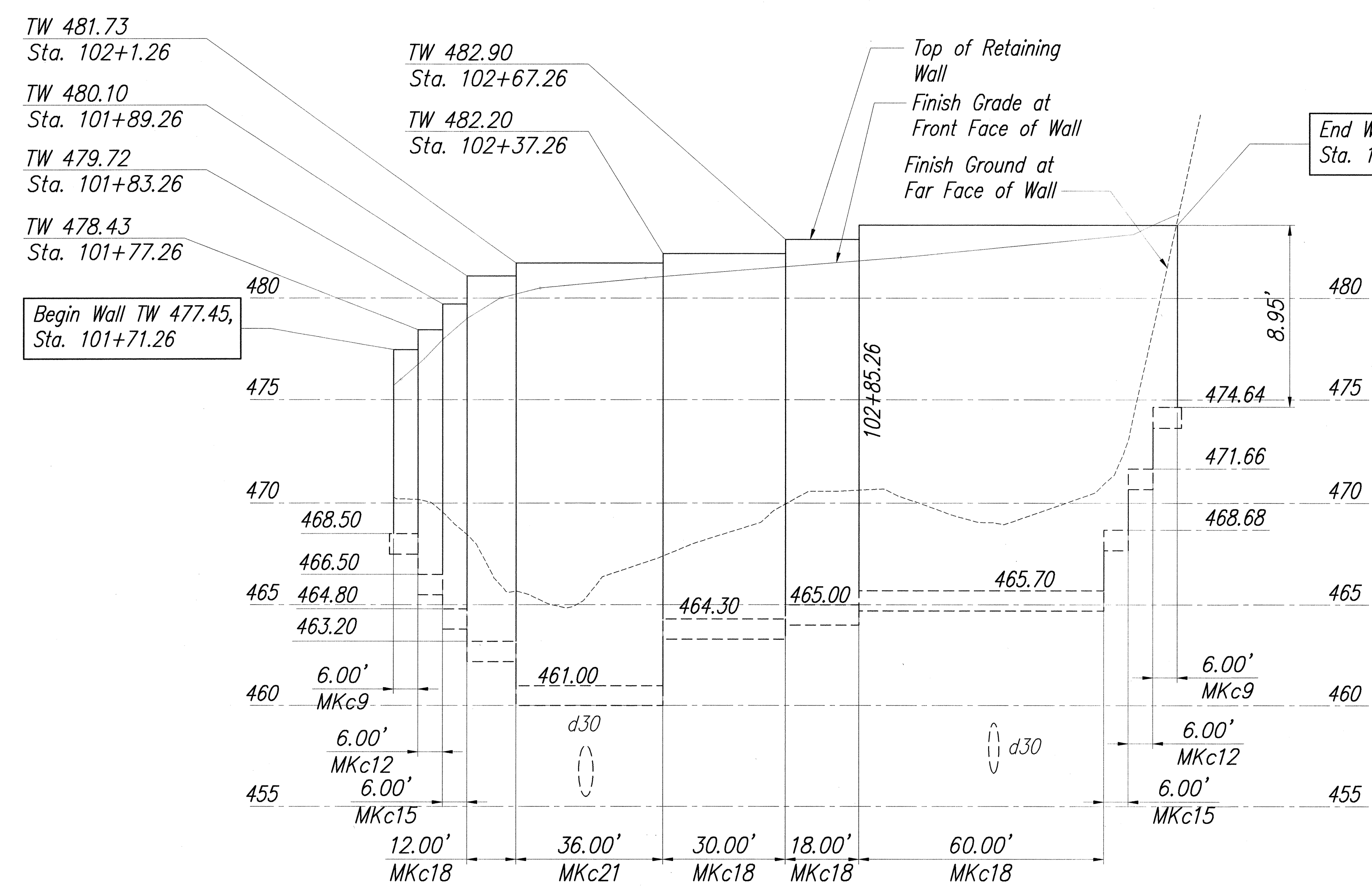
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SHEET No. **S3** OF **9** SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(21)	2001	118	187



GABION WALL – PLAN
SCALE: 1" = 20'

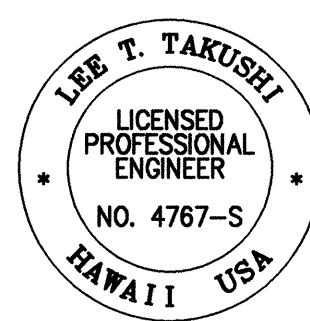


GABION WALL – PROFILE
SCALE: HORIZ: 1" = 20' VERT: 1" = 4'

References:
Structural General Notes and Details S1
Gabion Retaining Structure Details S7

Note:
1. Rock Hatching Not Shown for Clarity

Legend:
MKc9 Wall Designation



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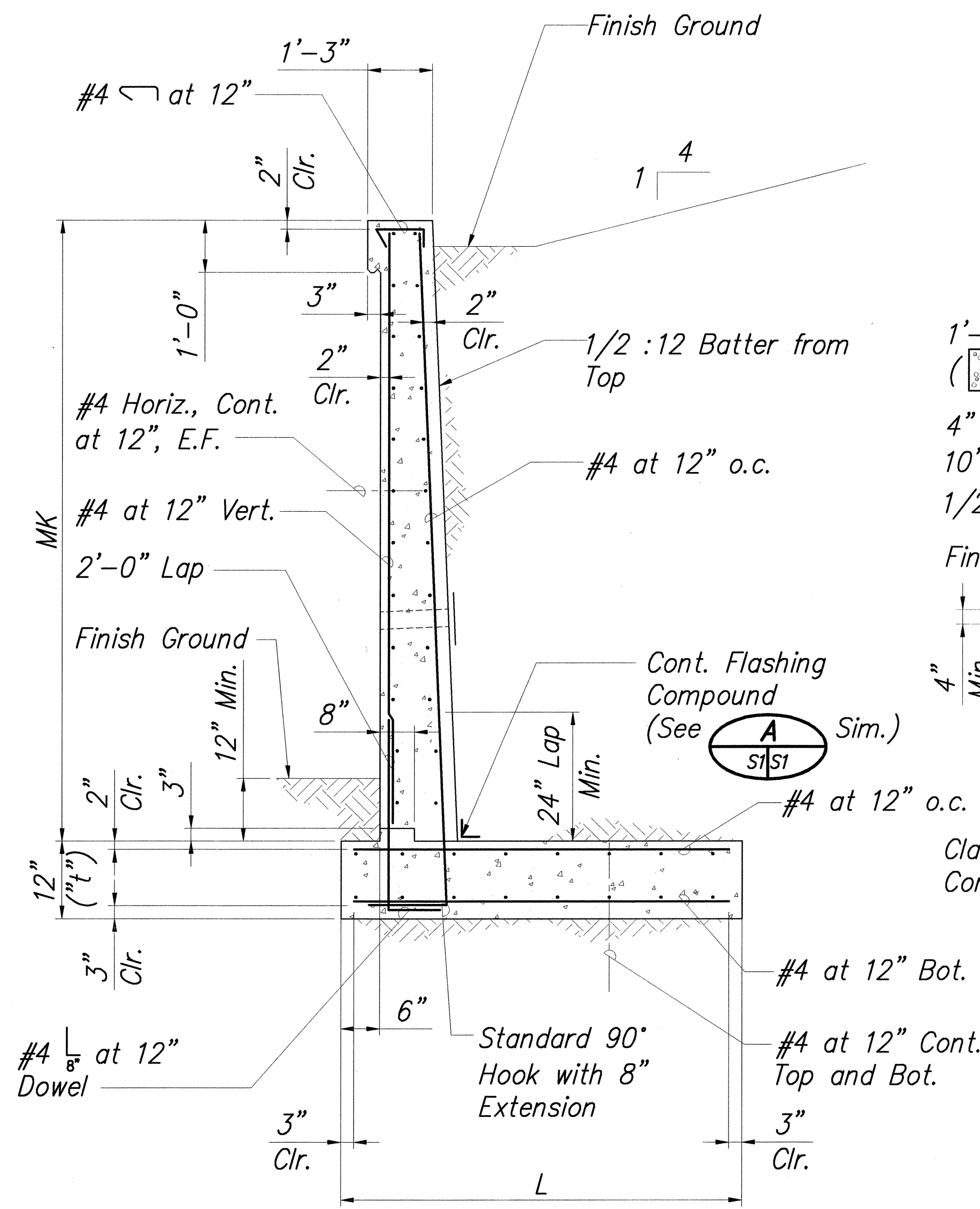
STATE OF HAWAII
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HIGHWAYS DIVISION

GABION RETAINING STRUCTURE
PLAN AND PROFILE
LIKELIKE HIGHWAY RESURFACING
Emmeline Place to the Wilson Tunnel
F. A. Project No. STP-063-1(21)

Scale: As Noted
Date: Mar. 2001

SHEET No. **S4** OF **9** SHEETS

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ORIGINAL PLAN	No.
NOTE BOOK	

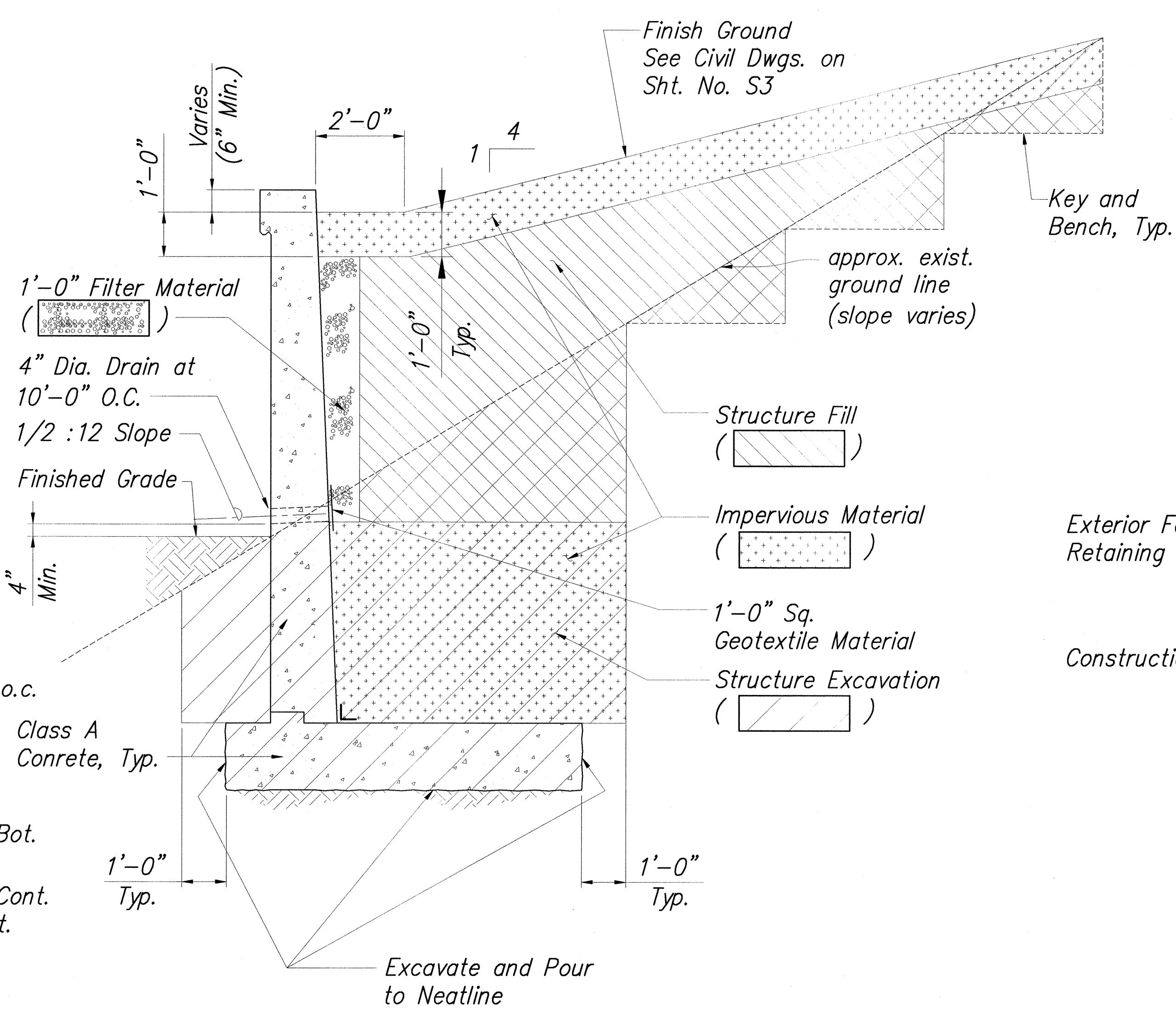


TYPICAL RETAINING WALL DETAIL

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

A S3 S6

MK Retaining Wall Schedule at Dimensions and Reinforcing		
Maximum MK	MK4	MK6
L	3'-4"	5'-3"



TYPICAL RETAINING WALL BACKFILL DETAIL

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

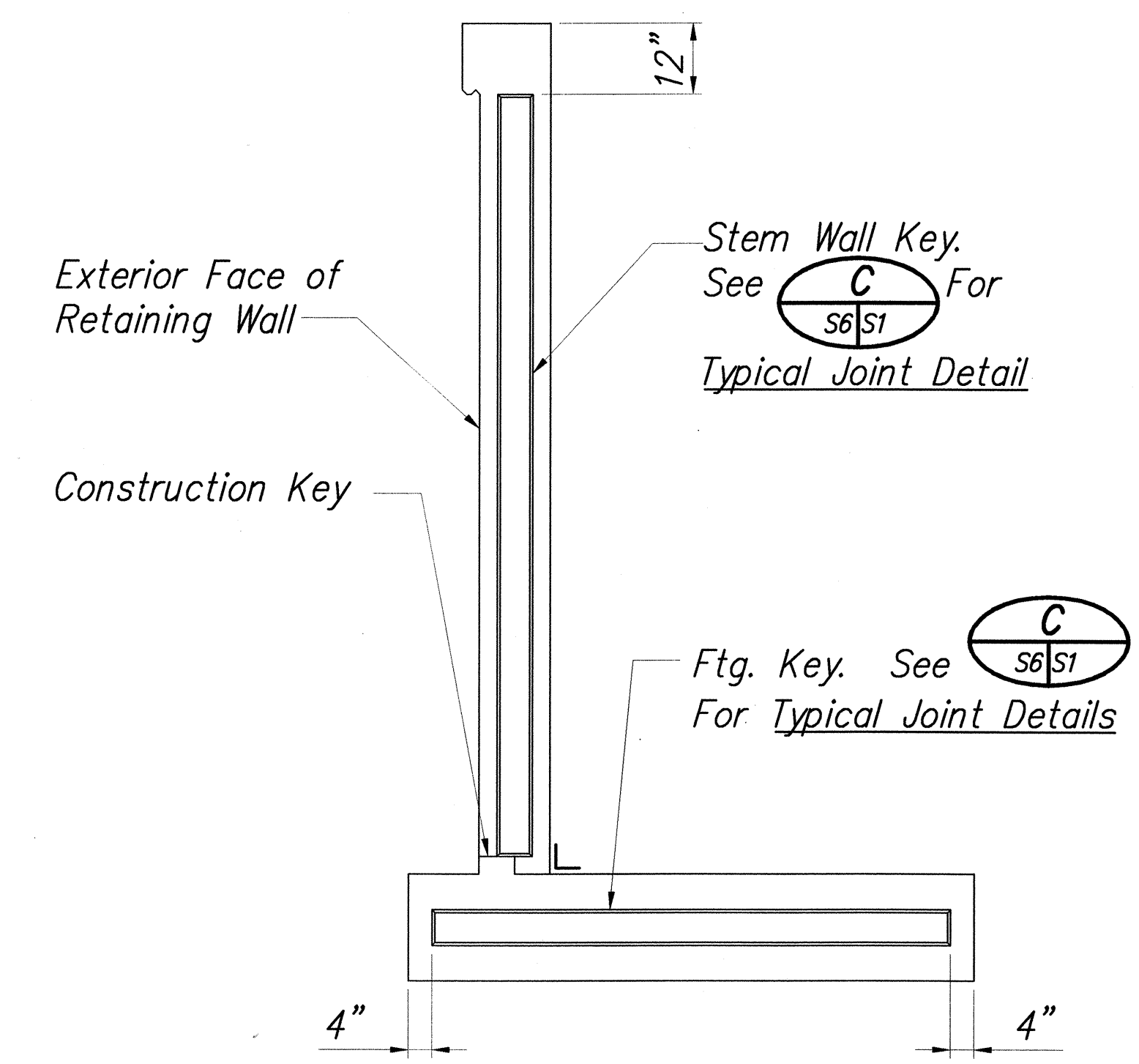
1 S6 S6

RETAINING WALL DESIGN DATA

The following information shall apply to the Cantilever Wall at vicinity of Sta. 75+46 to Sta. 77+30.

Soil Values	Extreme Event Limit State	Strength Limit State	Service Limit State
Bearing Pressure	10,000 psf	6,000 psf	3,500 psf
Coefficient of Sliding	0.5	0.4	0.3
Passive Pressure	815 pcf	408 pcf	204 pcf

- Active pressure (Level Backfill Condition)
Horizontal component = 40 p.c.f.
Vertical component = 0 p.c.f.
Active pressure (4:1 Slope Condition)
Horizontal component = 45 p.c.f.
Vertical component = 11 p.c.f.
- Seismic Acceleration Coefficient = 0.18
- Cohesion = 200 p.s.f.
- Unit weight of backfill = 120 p.c.f.



TYPICAL JOINT ELEVATION

NOT TO SCALE

References:

Structural General Notes and Details S1

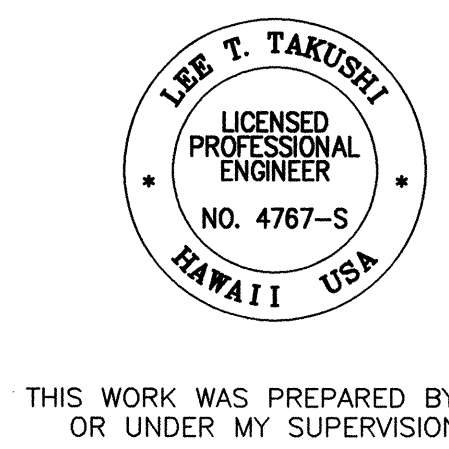
Cantilever Retaining Wall Plan and Profile S3

Note:

1. See General Notes and Specifications For Concrete Class and Additional Notes

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NOTE BOOK	



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HIGHWAYS DIVISION

CANTILEVER RETAINING WALL DETAILS

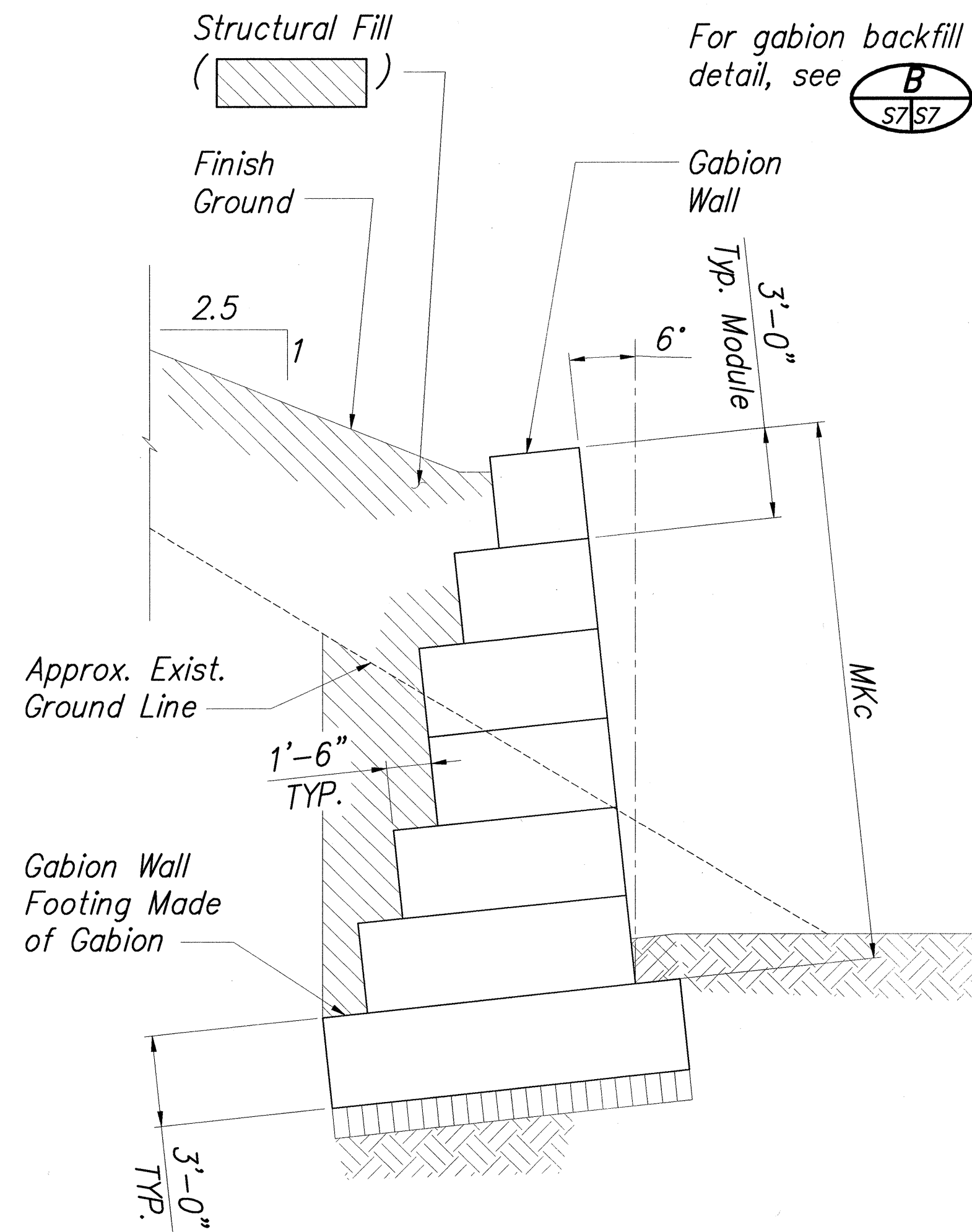
LIKELIKE HIGHWAY RESURFACING

Emmeline Place to the Wilson Tunnel

F. A. Project No. STP-063-1(21)

Scale: As Noted Date: Mar. 2001

SHEET No. S6 OF 9 SHEETS



TYPICAL GABION RETAINING STRUCTURE
SCALE: 1/4"=1'-0"

RETAINING WALL DESIGN DATA

The following information shall apply to the Gabion Wall at vicinity of Sta. 101+71 to Sta. 103+63.

Soil Values	Extreme Event Limit State	Strength Limit State	Service Limit State
Bearing Pressure	15,000 psf	9,000 psf	5,000 psf
Coefficient of Sliding	0.72	0.6	0.5
Passive Pressure	815 pcf	408 pcf	204 pcf

1. Active pressure

Backfill Slope Inclination	Horizontal Active Pressure	Vertical Active Pressure
LEVEL	35 pcf	0 pcf
4H:1V	40 pcf	8 pcf
3H:1V	44 pcf	10 pcf
2H:1V	54 pcf	12 pcf

2. Seismic Acceleration Coefficient =0.18

3. Cohesion =400 p.s.f.

4. Unit weight of backfill =120 p.c.f.

5. Surcharge stresses due to areal surcharges, live loads, and point loads shall be considered in the design.

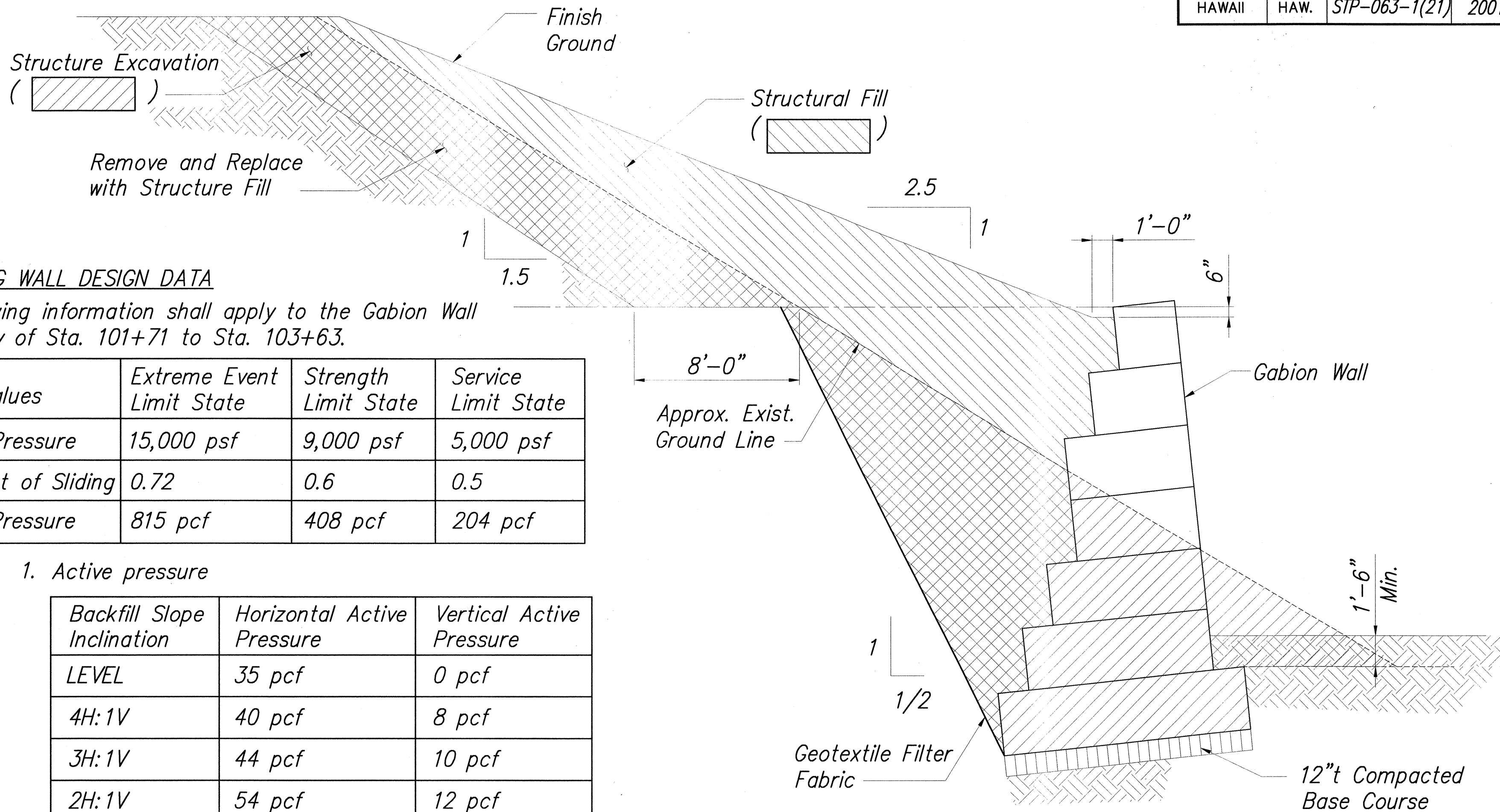
6. For uniform surcharge stresses imposed on the loaded side of the wall, a rectangular distribution with uniform pressure equal to 40 percent of the vertical surcharge pressure acting on the entire height of the wall, which is free to deflect, may be used in the design. Additional analysis during design may be needed to evaluate the surcharge effects of point loads and line loads.

7. For earthquake analysis, a soil strength phi angle of 40 degrees may be used to obtain pseudo-static earth pressures.

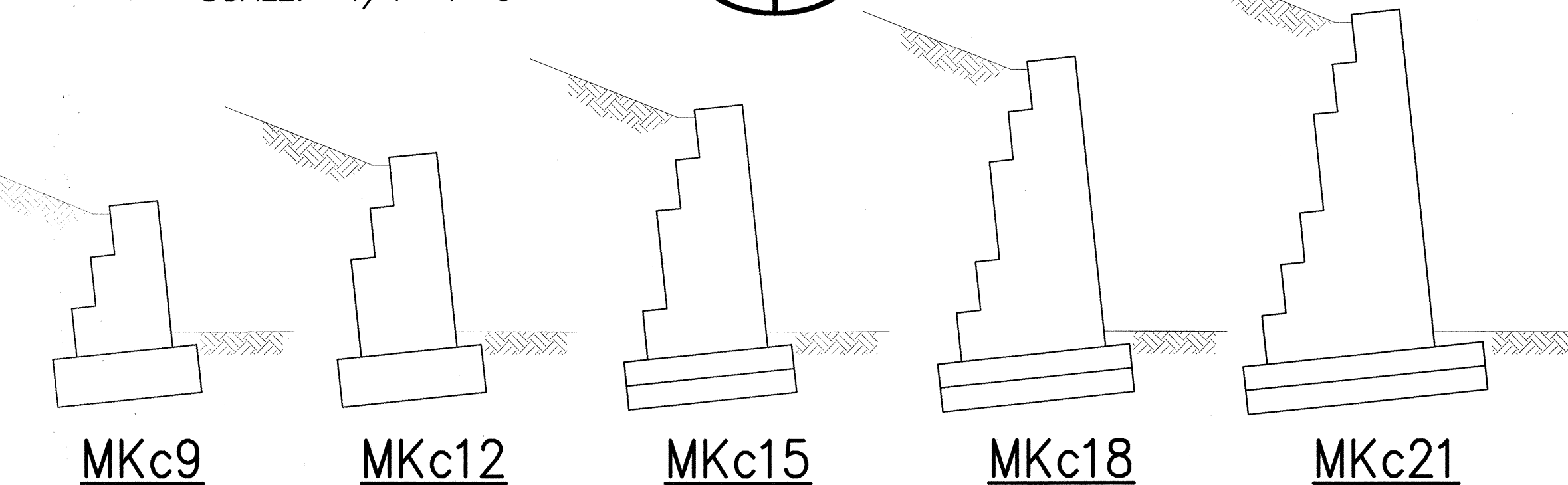
10. The typical gabion wall block modules are 3'-0" deep. Gabions Widths are in increments of 1'-6". Gabion Lengths are in increments of 6', 9', or 12'. Standardize to the greatest extent possible.

11.

Wall Mark
MKc12
Maximum Height In Feet Of Gabion Wall Front Face

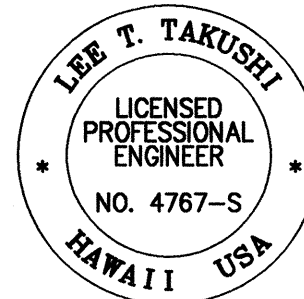


GABION BACKFILL DETAIL
SCALE: 1/4"=1'-0"



Note:
Gabion Wall Sections are for schematic purposes only. See Gabion Wall Notes for gabion wall design requirements.

GABION WALL SECTIONS
SCALE: 1/8" = 1'-0"



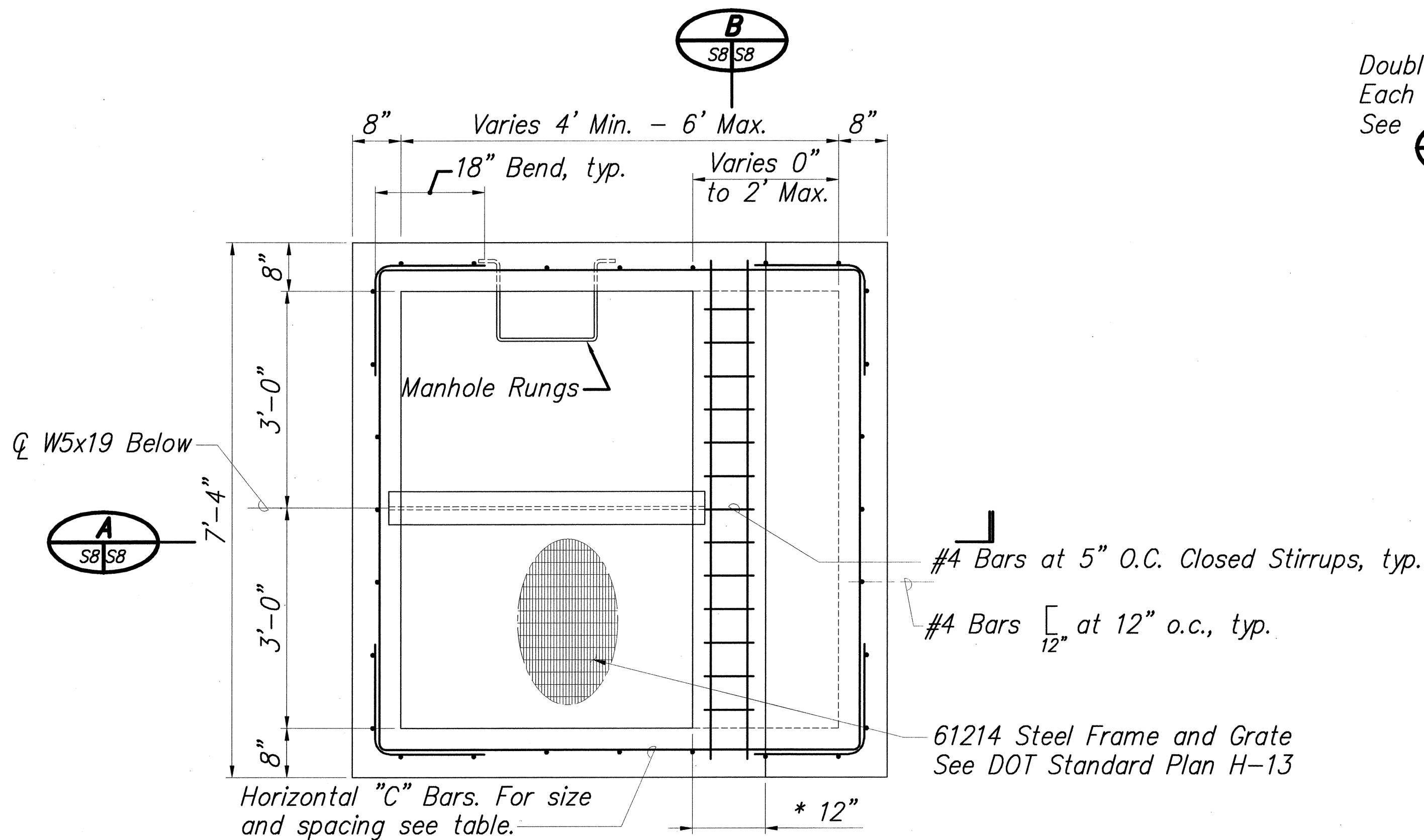
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GABION RETAINING STRUCTURE DETAILS
LIKELIKE HIGHWAY RESURFACING
Emmeline Place to the Wilson Tunnel
F. A. Project No. STP-063-1(21)
Scale: As Noted Date: Mar. 2001
SHEET No. S7 OF 9 SHEETS

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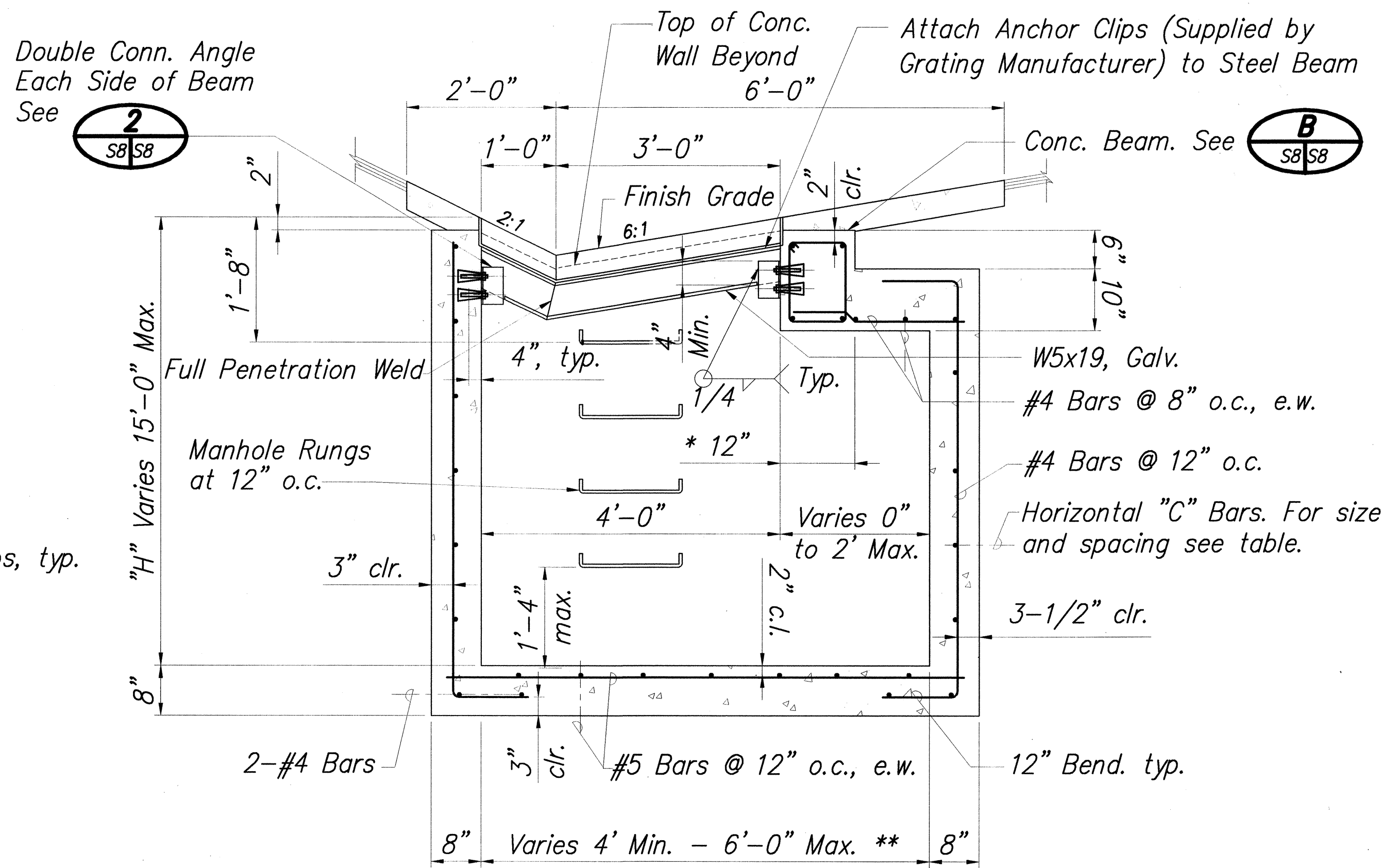
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-063-1(21)	2001	122	187



PLAN

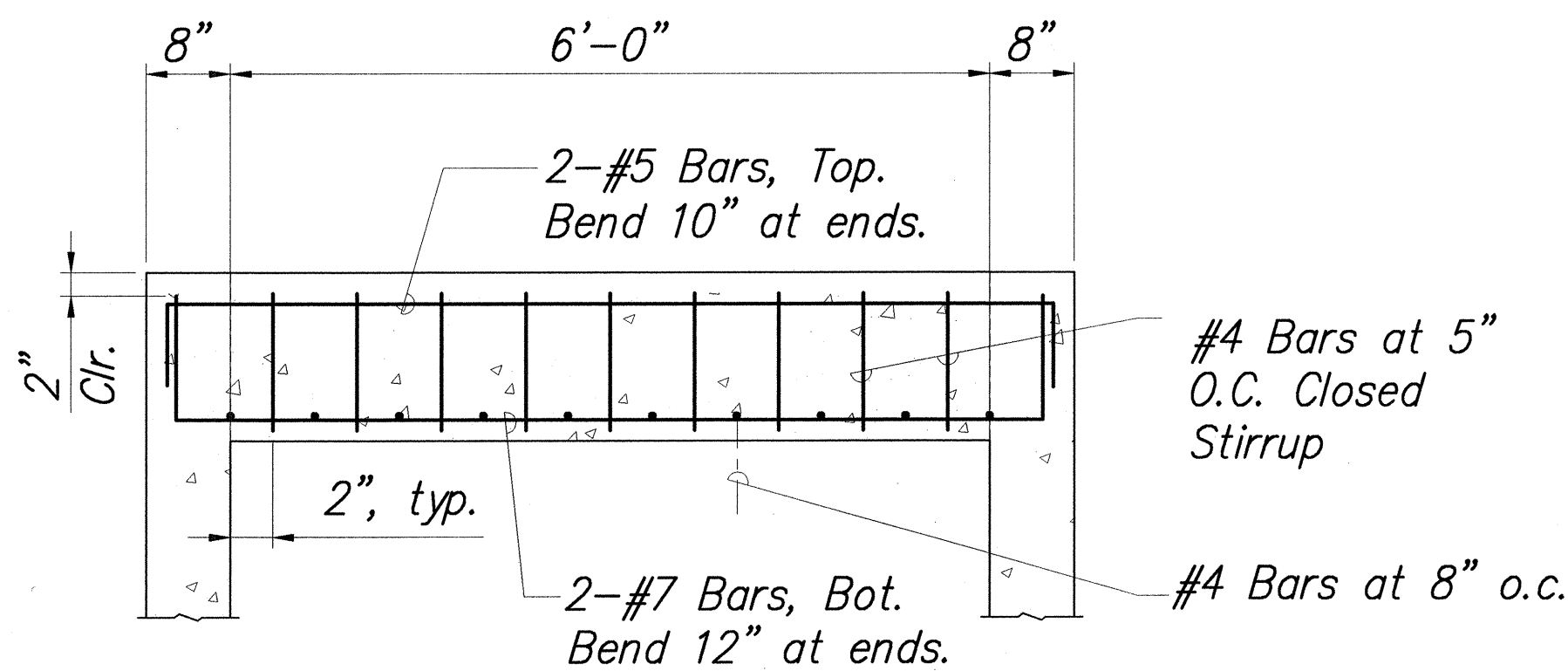
MODIFIED TYPE 61214 GRATED DROP INLET

SCALE: 3/4"=1'-0"



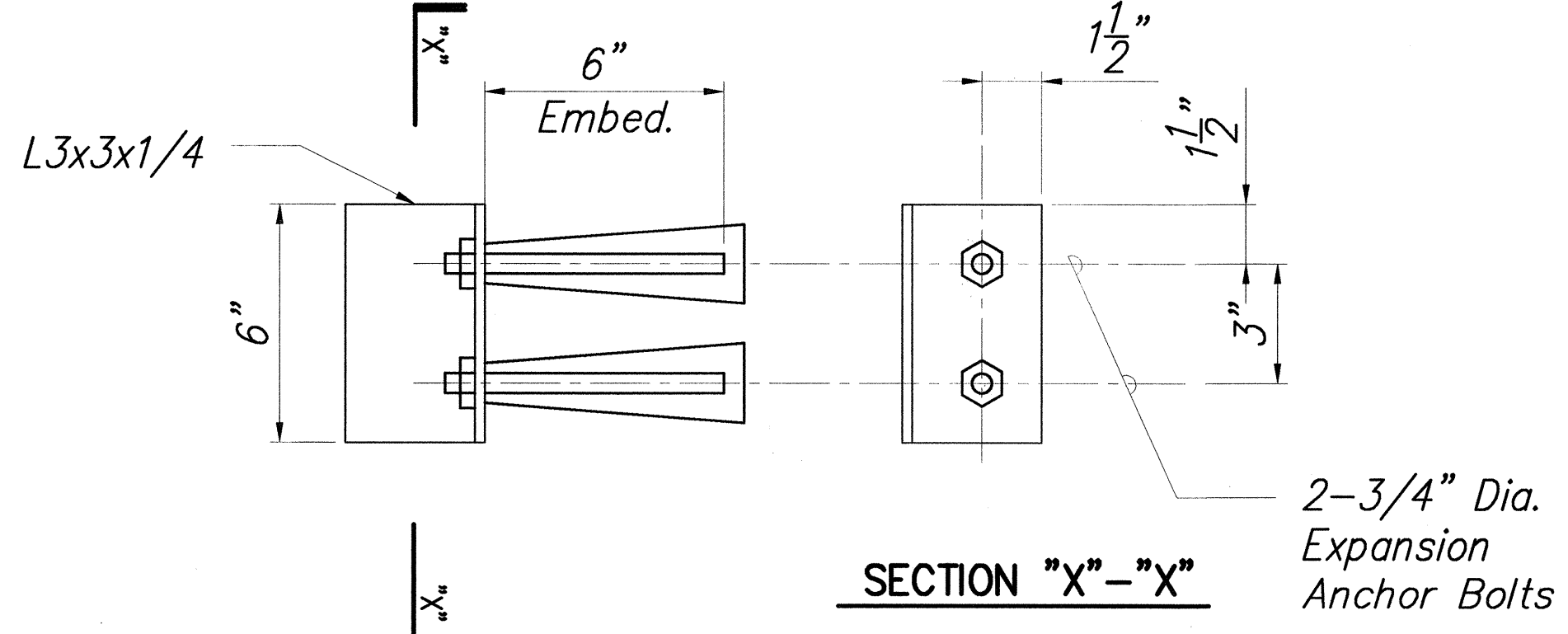
SECTION

SCALE: 3/4"=1'-0"



SECTION

SCALE: 3/4"=1'-0"

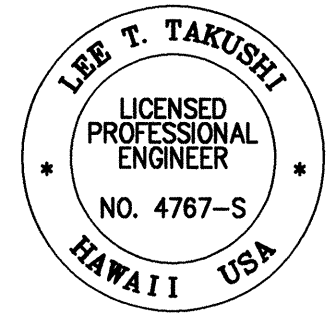


DETAIL

SCALE: 3"=1'-0"

SCHEDULE- GRATED DROP INLET	
"H"	"C" BARS
5' Max.	#4 @ 10" o.c.
10' Max.	#5 @ 9" o.c.
15' Max.	#5 @ 6" o.c.

* For minimum size box, eliminate beam and use typical wall and wall reinforcing shown in the top portion.



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GRATED DROP INLET
PLANS AND SECTIONS
LIKELIKE HIGHWAY RESURFACING
Emmeline Place to the Wilson Tunnel
F. A. Project No. STP-063-1(21)

Scale: As Noted
Date: Mar. 2001

SHEET No. 58 OF 9 SHEETS

ORIGINAL PLAN	DATE
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