FED. ROAD STATE FISCAL SHEET TOTAL YEAR NO. SHEETS PROJ. NO. GENERAL NOTES SHEETS A. MATERIALS HAW. | STP-063-1(21) | 2001 Unless otherwise noted Footing Reinf. Concrete shall be Class A. 1 1/2"x8" Cont. Key 2. Reinforcing steel shall be ASTM A 615 Grade 60. 3. Structural Shapes shall conform to the following ASTM and grade: Expansion or W-shapes: ASTM A992 Construction Jt. ASTM A36 Angles: 18" #4 ___, at 12" O.C., E.F.--First Coat of Flashing 4. All bolts and nuts shall conform to ASTM A307, hot-dipped galvanized. Compound (Clean Conc. -#4 at 12" Horiz., E.F. 5. All structural steel and bolts shall be hot-dipped galvanized after fabrication. Surface Before Application). Dowels to Match Structural steel shall be primed and painted in accordance with the specifications. 1 1/2" Deep Cont. Key Wall Horiz. Reinf. 6. Payment for Flashing Compound and Expansion Joint Filler shall be considered incidental to the various contract items. 2nd Layer Fabric Slope 1/4:1 B. REINFORCEMENT See Specs. *Note:* 1. The minimum covering measured from the surface of the concrete to the Finish Coat With Footing Construction face of any reinforcing bar shall be as follows, except as otherwise noted: Flashing Compound Key At Stem Wall Base a) Retaining Walls & Drainage Structures with Formed or Finished Surface — 2" Not Shown For Clarity. b) Concrete cast against and permanently exposed to earth - 3" TYPICAL FLASHING COMPOUND -Footing Reinf. WATERPROOFING DETAIL STEP FOOTING DETAIL 2. 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 NOT TO SCALE Scale: 3/4"=1'-0 Manual" unless otherwise noted. 3. Minimum spacing between parallel bars shall be 2 1/2 times the diameter of 32'-0" O.C. Max. 32'-0" O.C. Max. bars (for non bundled bars), but in no case shall the clear distance between the 96'-0" O.C. Max. 96'-0" O.C. Max. 3/4" Chamfer -Slope 1/4 :1 bars be less than 1 1/2 times the maximum size of the coarse aggregate. -Slope 1/4 :1 3/4" Chamfer Notes: 4. All dimensions relating to reinforcing are to centers of bars unless otherwise noted. Back Face 1. Provide Flashing Compound C. <u>FOUNDATION</u> Waterproofing at Joints at 1. Spread footings for Retaining Walls shall be excavated and poured neat against Back Face of Walls Only. undisturbed ground. In case of over excavation, space between footing and ground 2. Ftg. Key Shall Be Centered at Vertical Face shall be filled with concrete at the Contractor's expense and as directed by the Mid-depth of Ftg. For Adjacent Of Stem Wall 1 1/2" Clr. (typ.) Engineer. The minimum quality of the fill concrete shall be Class D. Ftgs. of Varying Thicknesses, -1-Layer 45# 1/2" Clr. Comp. Rfg. Paper Key Shall Be Centered on D. CONSTRUCTION METHODS (typ.) 1 3/4" at Walls Smaller Ftg. Thickness. 1. See current edition of Hawaii Standard Specifications for Road and Bridge 2 1/2" at Footing 3. "t" Designates Wall or Ftg. Construction and Special Provisions. Thickness. E. <u>GENERAL</u> __1 1/4" at Walls 1/2" Premolded Jt. 1. All items noted incidental will not be paid for separately. 2" at Footings Filler Cont. Thruout 2. The Contractor shall verify the location of all existing utility lines and notify the respective owners before commencing with work. AT CONTRACTION JOINT <u>AT EXPANSION JOINT</u> 3. 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". 32'-0" O.C. Max. 32'-0" O.C. Max. -Jt. May Be Formed 4. For concrete finish see Standard Specifications and/or Special Provisions. Flashing Compound with 1/8" Masonite -Vert. Control Joint on 5. Standard Detail Drawings refer to all structures in general except for Waterproofing at Back and Cut Back to the Each Face of Wall to Top modifications as may be required for special conditions. For such Face of Walls Only-Root of the Chamfer of Footing. See Adj. modifications refer to corresponding detailed drawings. Detail and as Directed on the Exposed Face. Back Face RETAINING WALL DESIGN DATA by the Engineer. For retaining wall design information at vicinity of 3/4" Chamfer Wall Face 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) Cont. Vert. Sta. 101+72 to Sta. 103+63 (Gabion Wall): See Sht S7 of 10 (Sheet No. 112) Control Jt. -Note: Retaining walls were designed in accordance with recommendations contained 2" (Typ.) Front Face-STATE OF HAWAII #5x 4'-0" DEPARTMENT OF TRANSPORTATION in "GEOTECHNICAL ENGINEERING EXPLORATION, FY 1997-98, STATE HAWAII LICENSED PROFESSIONAL ENGINEER Added at Center HIGHWAYS DIVISION DEPARTMENT OF TRANSPORTATION, SPECIAL MAINTENANCE PROJECT LIKELIKE HWY STRUCTURAL GENERAL NOTES 12" Vert. Spcg. Stop All Horiz. Wall NO. 4767-S/ RESURFACING HONOLULU, OAHU, HAWAII" Dated November 15, 1999 By Geolabs, Inc. Reinf. at Jt. as Shown. Thruout. AND DETAILS REFERENCES 1. AASHTO LRFD Bridge Design Specification, 2nd Edition, 1998 with 1999 & LIKELIKE HIGHWAY RESURFACING ALTERNATE CONTRACTION JOINT OR CONTROL JOINT

TYPICAL JOINT DETAILS /

NOT TO SCALE

S5, S6-

2000 Interim Revisions.

Structural Concrete.

2. ACI 318-95, American Concrete Institute, Building Code Requirements for

Date: Mar. 2001

Emmeline Place to the Wilson Tunnel

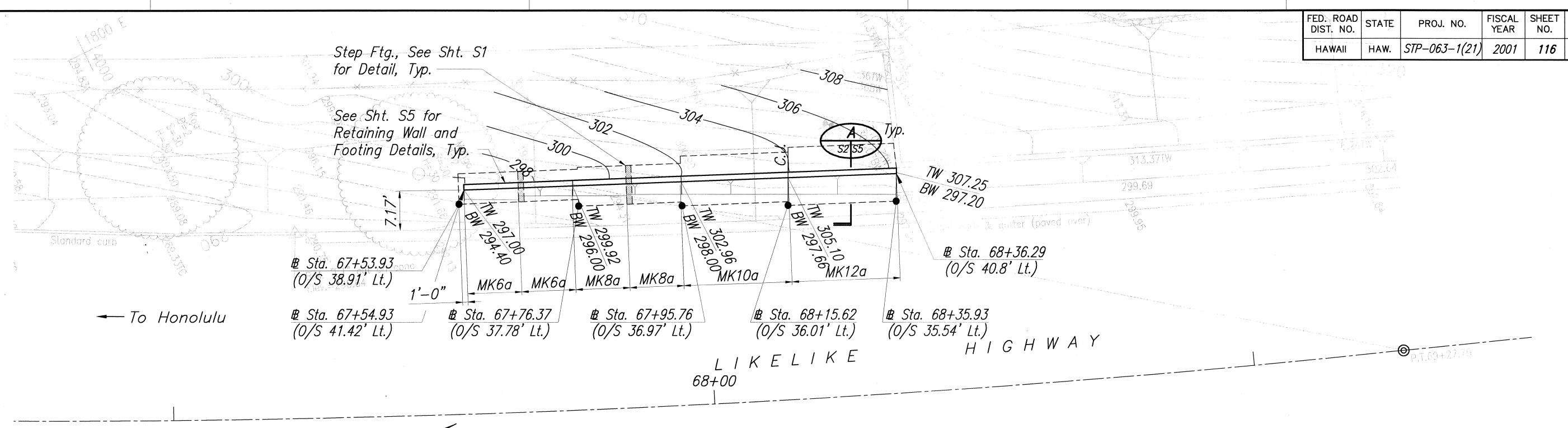
F. A. Project No. STP-063-1(21)

SHEET No. **S1** OF **9** SHEETS

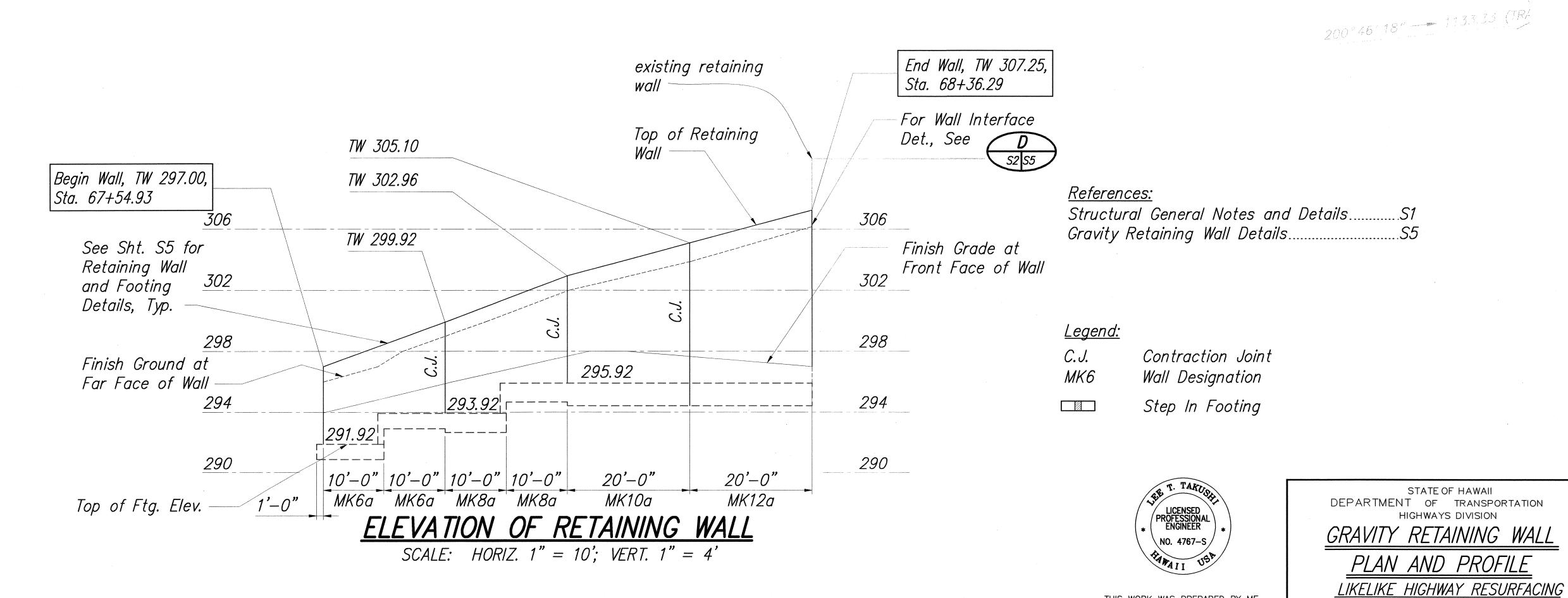
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MeDall



RETAINING WALL LAYOUT PLAN SCALE: 1" = 10'



SHEET No. *\$2* OF *9*

Date: Mar. 2001

SHEETS

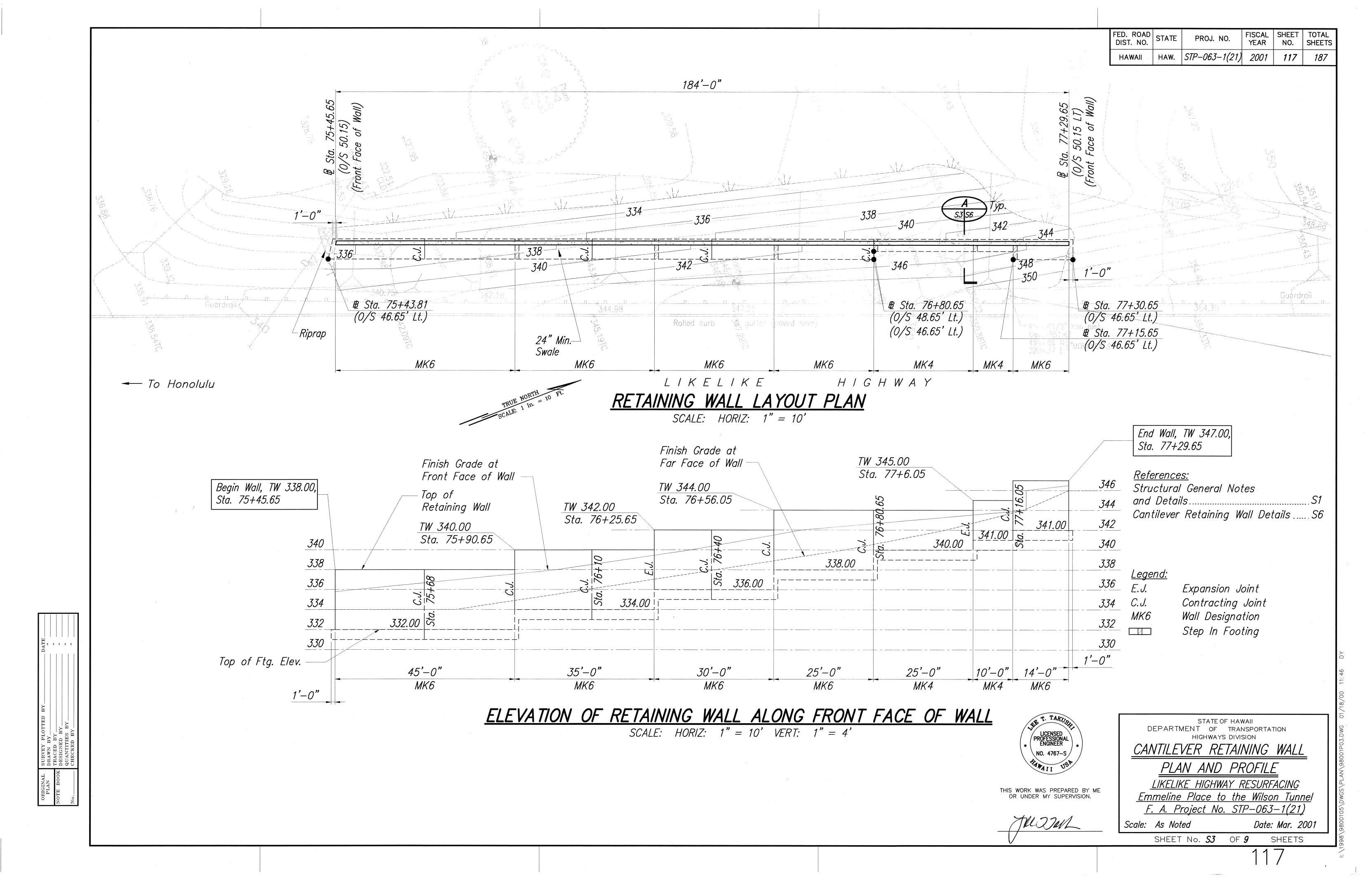
Emmeline Place to the Wilson Tunnel

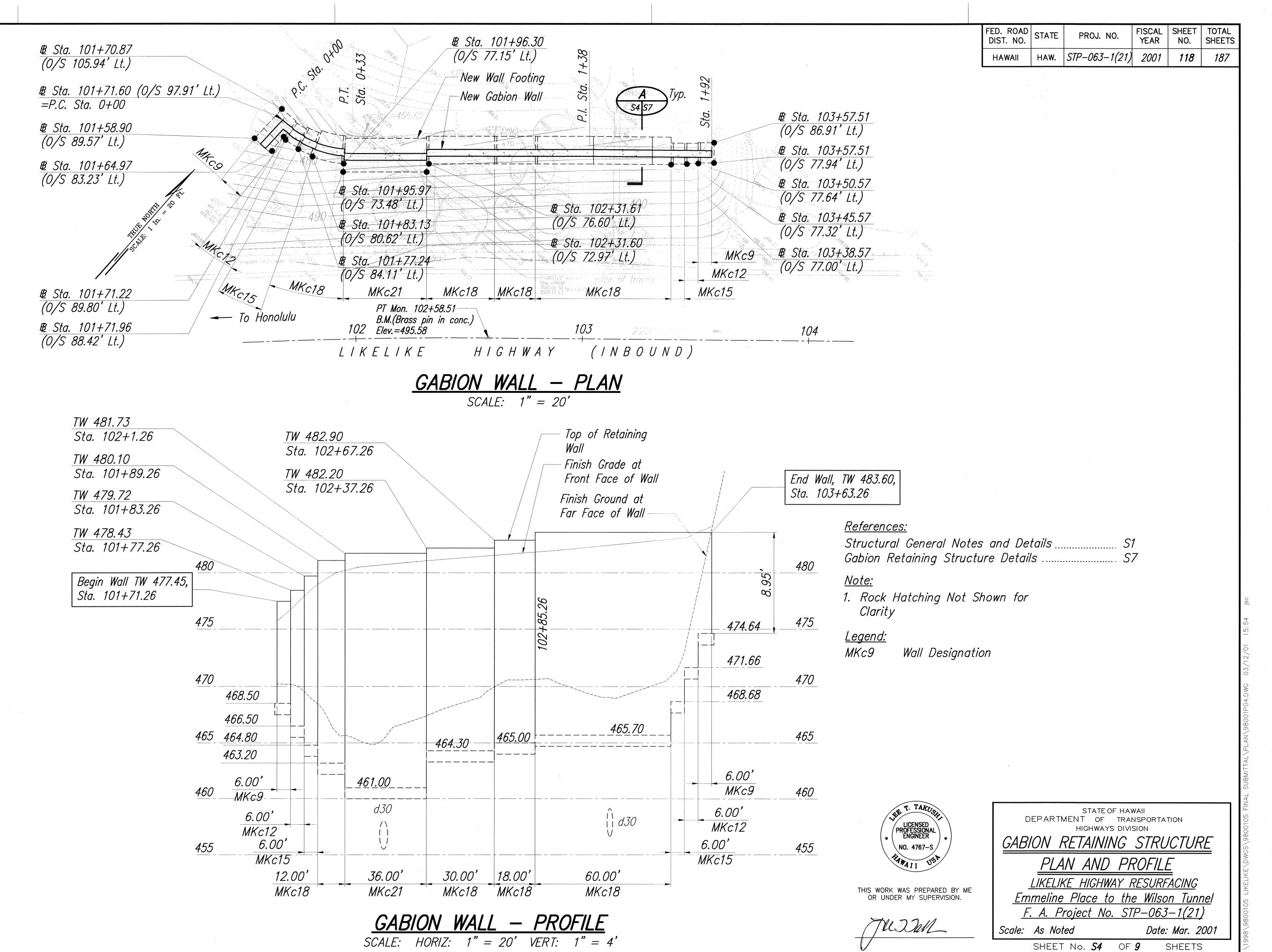
F. A. Project No. STP-063-1(21)

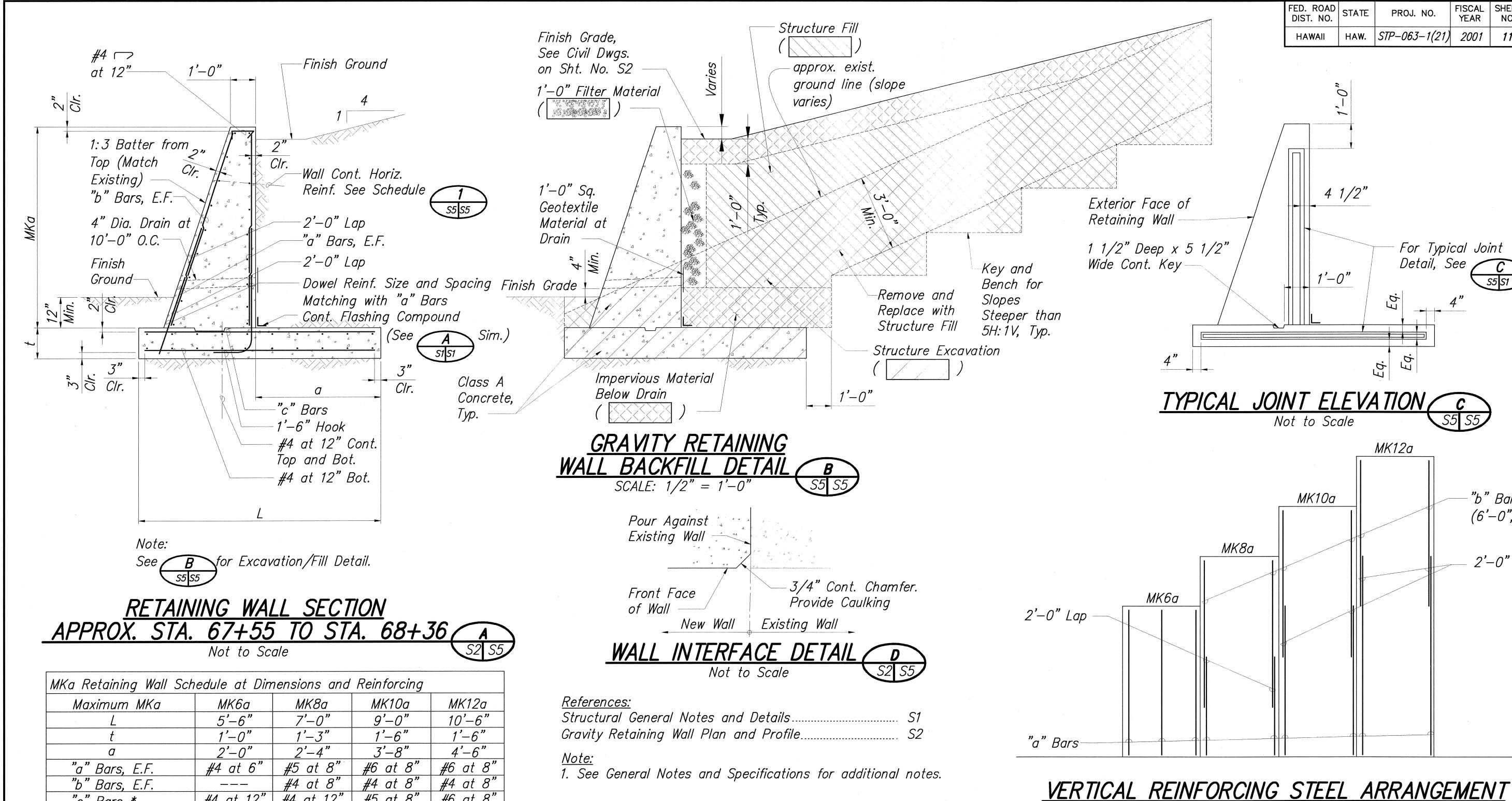
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Me Dall







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Maximum MKa	MK6a	MK8a	MK10a	MK12a
L	5'-6"	7'-0"	9'-0"	10'-6"
t	1'-0"	1'-3"	1'-6"	1'-6"
а	2'-0"	2'-4"	3'-8"	4'-6"
"a" Bars, E.F.	#4 at 6"	#5 at 8"	#6 at 8"	#6 at 8"
"b" Bars, E.F.		#4 at 8"	#4 at 8"	#4 at 8"
"c" Bars *	#4 at 12"	#4 at 12"	#5 at 8"	#6 at 8"
			_	
Wall Cont Horiz Reinforcing Schedule				ETAININIC MA

Wall Cont. Horiz. Reinforcing Schedule		
Distance From Top of Wall	Horiz. Reinf. E.F.	
0 FT 3 FT.	#4 AT 12" E.F.	
3 FT 6 FT.	#6 AT 12" E.F.	
6 FT. – 8 FT.	#6 AT 10" E.F.	
8 FT. – 10 FT.	#6 AT 8" E.F.	
10 FT. — 12 FT.	#6 AT 6" E.F.	

WALL REINF. SCHEDULE

RETAINING WALL DESIGN DATA

The following information shall apply to the Gravity Wall at vicinity of Sta. 67+55 to Sta. 68+36

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

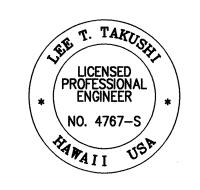
1. Active pressure (Level Backfill Condition) Horizontal component =40 p.c.f. $Vertical\ component = 0\ p.c.f.$ Active pressure (4:1 Slope Condition) Horizontal component =45 p.c.f.

 $Vertical\ component = 11\ p.c.f.$

2. Seismic Acceleration Coefficient =0.18

3. Cohesion

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



=200 p.s.f. this work was prepared by Me or under my supervision.

NOT TO SCALE

DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION GRAVITY RETAINING WALL DETAILS

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

STATE OF HAWAII

Scale: As Noted Date: Mar. 2001 SHEET No. **S5** OF **9** SHEETS

TREDUL

FISCAL SHEET TOTAL YEAR NO. SHEETS

119 187

PROJ. NO.

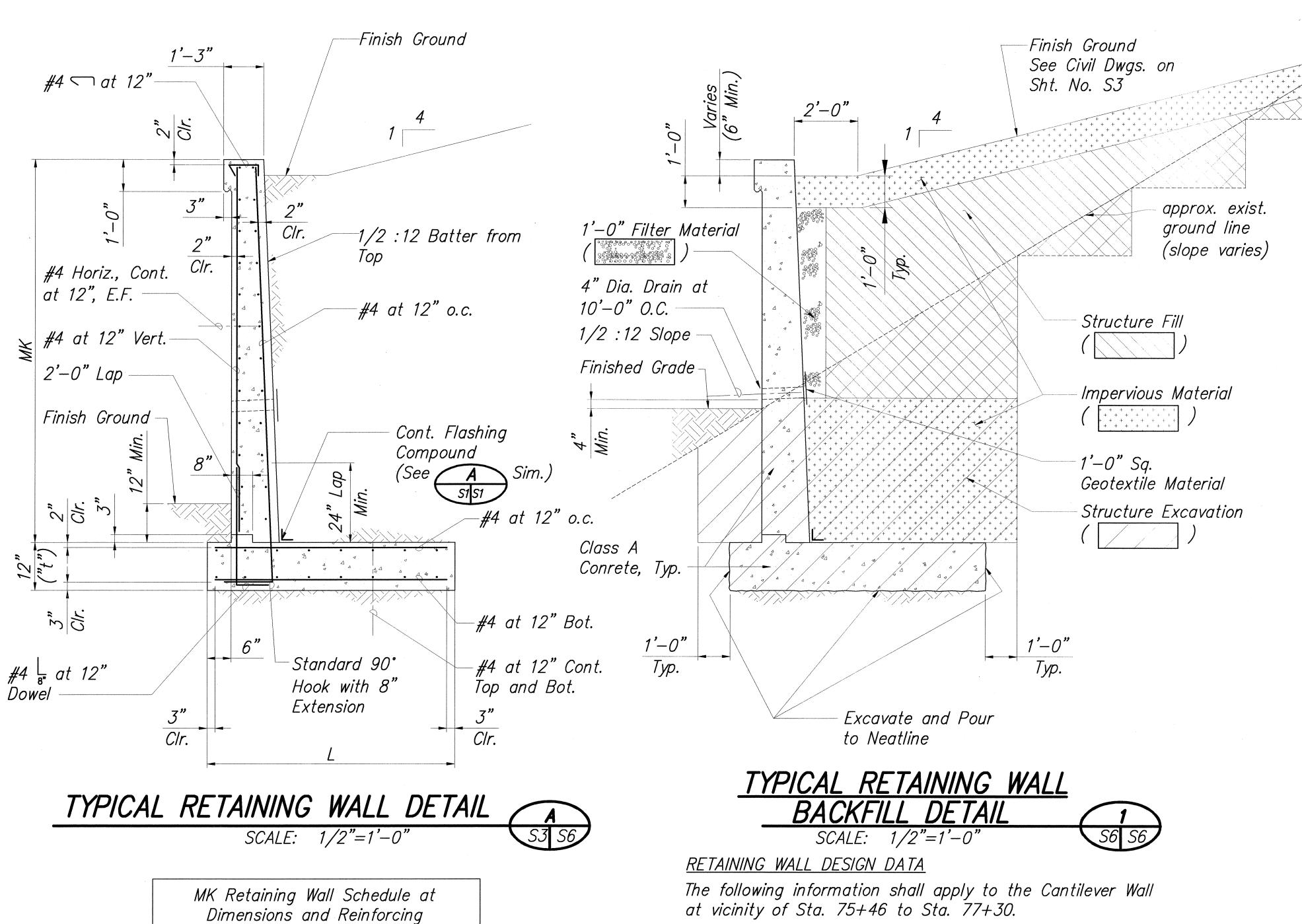
For Typical Joint

"b" Bars

(6'-0", Typ.)

2'-0" Lap

Detail, See /



1	ing Wall Scho ns and Reini		The following information at vicinity of Sta. 75	
Maximum MK L	MK4 3'-4"	<i>MK6</i> 5'-3"	Soil Values	Extreme E Limit Stat
			Bearing Pressure	10,000 psi
			Coefficient of Sliding	0.5

Strength **Event** Service Limit Štate Limit State *3,500 psf* 6,000 psf 0.3

Passive Pressure 815 pcf 408 pcf 1. 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.

2. Seismic Acceleration Coefficient = 0.18

3. Cohesion =200 p.s.f. 4. Unit weight of backfill

=120 p.c.f.

204 pcf

12" -Stem Wall Key. Exterior Face of Retaining Wall Typical Joint Detail Construction Key Ftg. Key. See S6 S1
For Typical Joint Details

TYPICAL JOINT ELEVATION NOT TO SCALE

References:

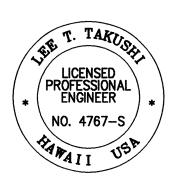
-Key and

Bench, Typ.

Cantilever Retaining Wall Plan and Profile S3

<u>Note:</u>

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



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THEDUL

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION 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

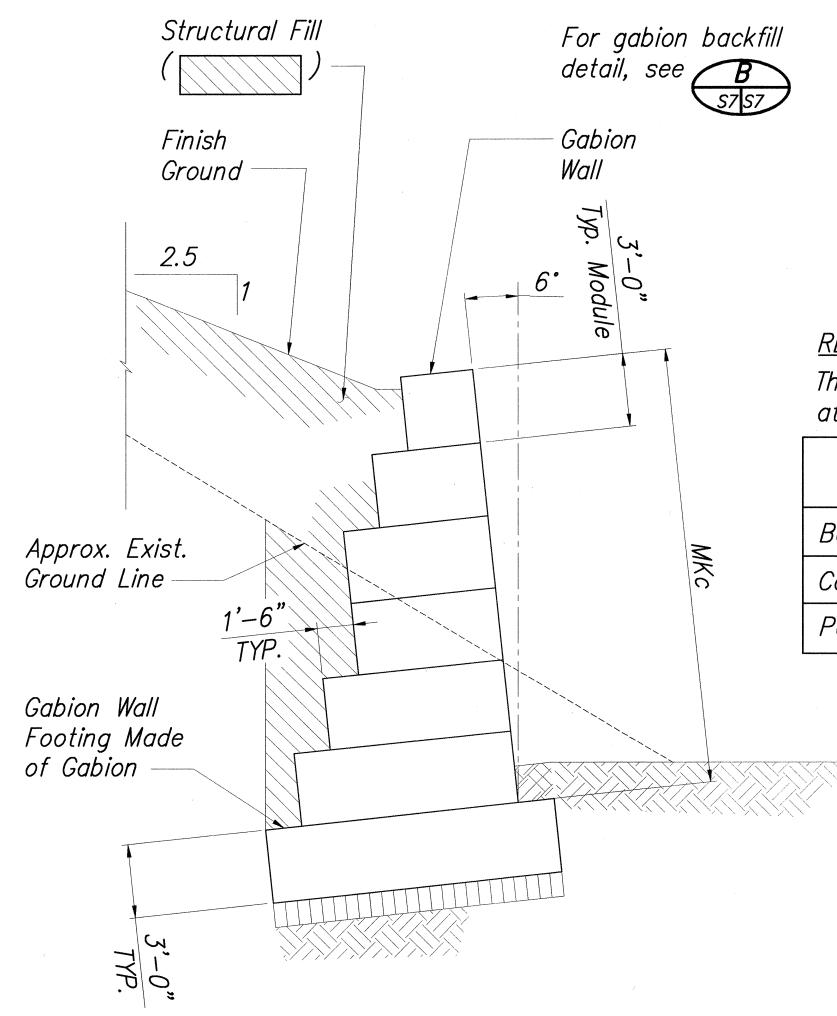
SHEET No. **56** OF **9** SHEETS

FISCAL SHEET TOTAL YEAR NO. SHEETS

PROJ. NO.

HAW. STP-063-1(21) 2001 120





TYPICAL GABION RETAINING STRUCTURE

Structure Excavation

Remove and Replace with Structure Fill

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	<i>35 pcf</i>	0 pcf
4H: 1V	40 pcf	8 pcf
3H: 1V	44 pcf	10 pcf
2H: 1V	54 pcf	12 pcf

Finish

Ground

Structural Fill

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 hieght 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.

> Wall Mark MKc12

Maximum Height In Feet Of Gabion Wall Front Face

8'-0' Gabion Wall Approx. Exist. Ground Line .-6" Min.

GABION BACKFILL DETAIL

Geotextile Filter

Fabric

MKc9 MKc12

Gabion Wall Sections are

for schematic purposes

only. See Gabion Wall

Notes for gabion wall

design requirements.

Note:

MKc15

MKc18

SCALE: 1/8" = 1'-0"

FED. ROAD STATE

PROJ. NO.

HAW. | STP-063-1(21) 2001

FISCAL SHEET TOTAL YEAR NO. SHEETS

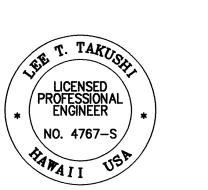
121

MKc21

GABION WALL SECTIONS 1

12"t Compacted

Base Course



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GABION RETAINING STRUCTURE

DETAILS

STATE OF HAWAII

HIGHWAYS DIVISION

DEPARTMENT OF TRANSPORTATION

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

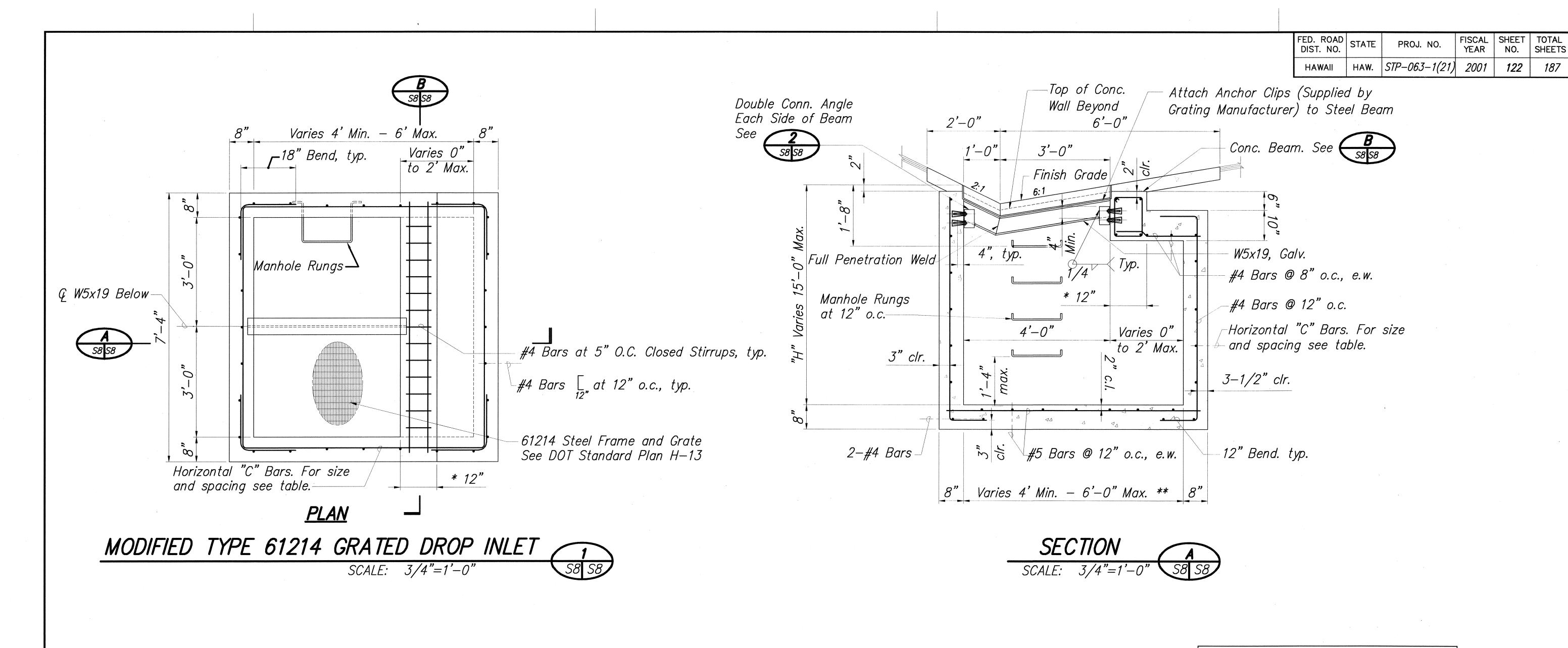
Scale: As Noted SHEET No. **57** OF **9** SHEETS

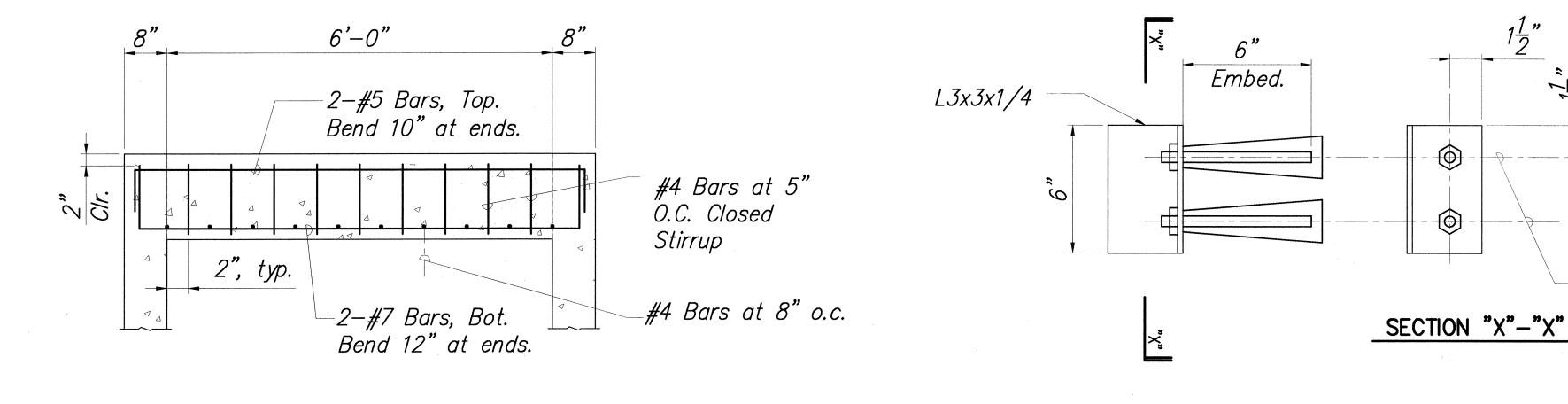
Date: Mar. 2001

Gabion Wall Notes:

- 1. See Specifications for additional notes.
- 2. See Structural General Notes and Details for other Geotechnical design information.
- 3. For Gabion Walls 15 feet or higher, provide 2 1.5 feet deep layers of gabions for footing instead of the typical 3 feet deep gabions. Place these layers in their longest directions perpendicular to the long axis of the wall.
- 4. Empty gabions in each course shall be securely wired to adjacent courses before filling.
- 5. Gabions may be filled by hand or by mechanical means. Every effort shall be made to keep voids and bulges in the gabion to a minimum.
- 6. Provide a front face batter 6° minimum.
- 7. Top 12" of soil at lower front face of gabion wall shall be ignored for passive pressure resistance.
- 8. Gabion wall shall be designed by an authorized gabion wall designer and shall bear the seal of a professional structural engineer registered in the State of Hawaii.
- 9. Gabion Wall designer shall submit design documents and shop drawings.

11.

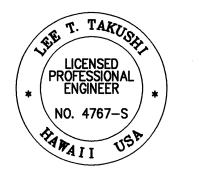




SECTION

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.



170

DETAIL

SCALE: 3"=1'-0

2-3/4" Dia.

Anchor Bolts

Expansion

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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)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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Scale: As Noted

Date: Mar. 2001 SHEET No. 58 OF 9 SHEETS

