FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	83	126

STRUCTURAL GENERAL NOTES:

General:

A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specification, 7th Edition, Hawaii Standard Specifications for Road and Bridge Construction (2005 Edition), and HDOT Design Criteria for Bridges and Structures, August 8, 2014.
B. The contractor shall compare all the contract documents with each other and report in writing to the engineer all inconsistencies and omissions.
C. The contractor shall take field measurements and verify field conditions and shall compare such field measurements and conditions with the drawings before commencing work. Report in writing to the engineer all inconsistencies and omissions.
D. The contractor shall be responsible for coordinating the work of all trades.
E. The contractor shall be responsible for means and methods of construction, workmanship and job safety.
F. The contractor shall provide temporary shoring and bracing as required for stability of structural members and systems.
G. Construction loading shall not exceed design live load unless special shoring is provided. Permitted construction loads shall be properly reduced in areas where the structure has not attained full design strength.
H. The contractor shall be responsible for protection of the adjacent properties, structures, streets and utilities during the construction period. Any damaged or deteriorated property shall be restored to the condition prior to the beginning of work or better at no cost to the State.
I. Details noted as typical on the structural drawings shall apply in all conditions unless specifically shown or noted otherwise.
J. Elevations and details of the existing bridges and other miscellaneous structures as shown on these plans are based on as-built drawings. The contractor shall be responsible for verifying all existing elevations and existing structure details and shall notify the engineer in writing of any discrepancies for further action.

Design Criteria:

A. Dead load
- Weight of all components of the structures, appurtenances attached thereto, and earth covers.
- Unit weight of concrete ---------- 160 pcf
- Compacted earth ---------- 120 pcf
- Future wearing surface ---------- 25 psf

B. Live load ---------- AASHTO HL-93
C. Collision load ---------- AASHTO TL-3
D. Seismic ---------- See Table
E. Basic Wind Speed ---------- 105 MPH
F. Design soil parameters for retaining structures ---------- See Table

Foundation:

A. Foundation design is based upon Geotechnical Exploration and Evaluation Report by Yogi Kwong Engineers, LLC, dated June 2018.
B. Contractor shall provide for de-watering of excavation from either surface water, ground water or seepage. NPDES permit required for discharging into state waters.
C. Contractor shall provide for design and installation of all cribbing, sheeting, and shoring necessary for personnel safety and to preserve excavations and earth banks, and adjacent structures and property for damage. Shoring shall conform to OSHA regulations.
D. Excavation boundaries and grade elevations for footing shall be accepted by a geotechnical engineer licensed in the State of Hawaii prior to placing the concrete and reinforcing.
E. Footing for Wall 1 shall bear on a 6" layer of aggregate select borrow compacted to a minimum of 95% relative density in accordance with ASTM D1557. Prior to the placement of the select borrow, the exposed soils should be scarified to a depth of 6", moisture conditioned to within 2% of optimum moisture and compacted to no less than 95% relative density in accordance with ASTM D1557. Bottom of footing shall be compacted to provide a relatively firm and smooth bearing surface prior to placement of reinforcing steel and concrete. Footing for Wall 4 shall bear on a clean rock surface. If soft and/or loose materials are encountered at the bottom of excavations, they shall be over-excavated to expose the underlying firm materials. The over-excavated area shall be backfilled with the same select borrow or the footing bottom may be extended down to the underlying competent material. Contractor may substitute flowable concrete for the select borrow upon acceptance from the engineer.
F. Footing for Wall 1 shall bear on a 6-inch layer of aggregate select borrow (min CBR=25) compacted to no less than 95% relative density in accordance with ASTM D1557. Prior to the placement of the select borrow, the exposed soils should be scarified to a depth of 6-inches, moisture conditioned to within 2% of optimum moisture content and compacted to no less than 90% relative density in accordance with ASTM D1557. Bottom of footing shall be compacted to provide a relatively firm bearing surface prior to placement of reinforcing steel and concrete. Footing for Wall 4 shall bear on a clean, rough cut rock surface free from debris and soil.
G. If soft and/or loose materials are encountered at the bottom of excavations, they shall be over-excavated a minimum of 24-inches and replaced to proper grade with Structure Backfill Material A (JSS703.20). Contractor may substitute flowable concrete for the select borrow upon acceptance from the engineer.
H. Engineered fill and backfill shall be in accordance with Section 703.20 of the Hawaii Standard Specifications for Road and Bridge construction, 2005 Edition.
I. Fill should be moisture conditioned to within two percent of the optimum moisture content and placed in horizontal lifts not to exceed six inches. Fill shall be compacted to minimum 95% relative density as measured by ASTM D1557, method A or D.
J. Backfill behind Wall 1 and 4 shall consist of either select granular fills or CLSM. Granular backfill shall be placed in uniform lifts of no more than 8 inches in loose thickness and uniformly compacted to at least 95 percent relative compaction.

Concrete:

A. Concrete shall be regular weight hard rock concrete and shall have the following minimum 28-day compressive strengths and water to cement ratios:

Structural Item	Minimum Compressive Strength f'c (28 days)	Maxmium (W/C)
1. Retaining Walls and Foundations	4,000 psi	0.45
2. Light Standard Foundations	4,500 psi	0.45
3. All other concrete	4,000 psi	0.45

B. The use of any calcium chloride in any concrete is prohibited.
C. Concrete delivery tickets shall record all free water in the mix at batching plant, added for consistency by driver, and any additional request by contractor up to the maximum amount allowed by the mix design.
D. Conduits, pipes, and sleeves passing through a wall not conforming to typical details shall be located and submitted to the structural engineer for approval.
E. Construction joints may be relocated by the contractor and submitted to the structural engineer for approval. Construction joints shall be made and relocated as not to impair the strength of the structure and to minimize shrinkage stresses. All construction joints shall be cleaned, laitance removed and wetted. See typical details for specific requirements.
F. Unless otherwise noted, chamfer all exposed concrete edges 3/4".
G. Reinforcing bars, anchor bolts, inserts and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
H. All inserts, anchor bolts, plates, and other structural items to be cast in the concrete shall be hot-dipped galvanized according to ASTM A153 unless otherwise noted.
I. Non-shrink grout shall be a premixed non-metallic formula, capable of developing a minimum compressive strength of 4,000 psi in 1 day and 7,000 psi in 28 days.
J. Stay-in-place forms shall not be allowed.

Reinforcing Steel:

A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60 unless otherwise noted. Epoxy-coated dowels shall conform to ASTM A775, Grade 60 unless otherwise noted.
B. The contractor shall not damage the epoxy coating on the dowels and deformed bars in any way during shipment, handling, or placement. Damaged epoxy coated dowels and deformed bars shall be replaced at no cost to the State. Repair of epoxy coating as approved by the Engineer shall meet ASTM A775.
C. Clear concrete coverage for reinforcing bars shall be as follows, unless otherwise noted:
   1. Footings, etc. cast against earth ---------- 3"
   2. Footings, walls, etc. formed and exposed to earth or weather ---------- 2"
   3. Pavement slab top bars ---------- 2½"
C. Thru bolts for guardrail connection shall conform to AASHTO M164 (ASTM A325), unless otherwise noted.
D. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule, Sheet S0.2, unless otherwise noted.
E. Mechanical splice connectors shall develop, in tension, 125 percent of the specified minimum yield strength of reinforcing bars.
F. Bar bends and hook shall be "standard hooks" in accordance with typical details Sheet S0.2.
G. Corrosion inhibitors for reinforcing steel threaded connections shall be a thread-sealing compound such as Loctite 5113, or an approved equal.

RETAINING WALL DESIGN PARAMETERS

Item		Wall 1	Wall 4
0.2-second spectral response coefficient, s_s		0.39	0.39
1.0-second spectral response coefficient, s_1		0.11	0.11
Horizontal peak ground coefficient, PGA		0.17	0.17
Site Class		B	B
Seismic Design Zone		1	1
Bearing Capacity (psf)	Extreme Event	7,200	13,500
	Strength	3,240	6,075
Passive Earth Pressure (pcf)	Extreme Event	450	600
	Strength	250	300
Lateral Earth Pressure (pcf)	Active (1.5:1 Slope)	46	46
	At-Rest (1.5:1 Slope)	75	75
Dynamic Lateral Earth Pressure (pcf)	Unrestrained	11.1	11.1
	Restrained	49.3	49.3
Coefficient of Friction	Extreme Event	0.31	0.70
	Strength	0.25	0.56

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KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S0.1 OF 2 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	84	126

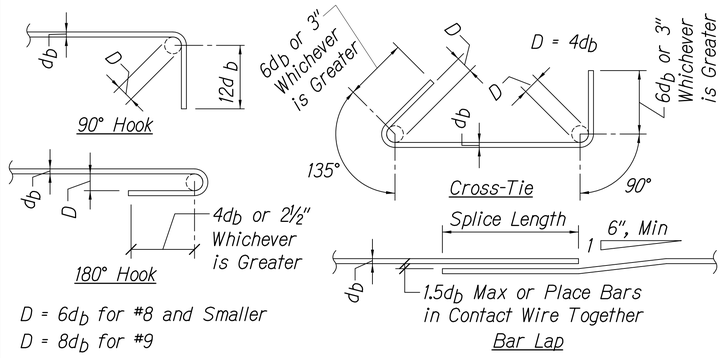
MINIMUM SPLICE & EMBEDMENT LENGTHS

Bar Size	Lap Splice		Embedment		
			Straight		with Standard 90° Hook
	Top Bars	Other Bars	Top Bars	Other Bars	
#3, #4	29″	21″	17″	12″	8″
#5	36″	26″	21″	15″	10″
#6	43″	31″	26″	18″	12″
#7	54″	39″	32″	23″	14″
#8	71″	51″	42″	30″	16″
#9	90″	64″	53″	38″	18″

Notes:
1. "Top Bars" are horizontal bars with 12″ or more of concrete cast below.
2. Splice lengths may be reduced by multiplying the tabulated values by 0.765 if the centerline of splice of adjacent bars are staggered 6′-0″ o.c. for #9 bars and smaller.
3. Embedment lengths for straight bars may be reduced by multiplying the tabulated values by 0.80 if the bars are spaced laterally not less than 6″ center-to-center, with not less than 3″ clear cover measured in the direction of the spacing.
4. Embedment lengths for bars with 90° hook are bars with side cover, normal to plane of hook, of not less than 2½″ and cover on bar extension beyond hook not less than 2″. Increase embedment length by 43% for bars not meeting these requirements.

TYPICAL REBAR SPLICE AND EMBEDMENT LENGTH SCHEDULE — 1 — S-0.2 | S-0.2

Not to Scale



STANDARD HOOKS AND CROSS-TIE DETAIL — 2 — S-0.2 | S-0.2

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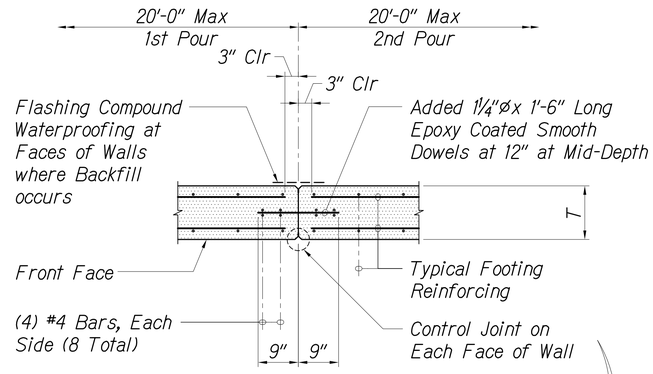
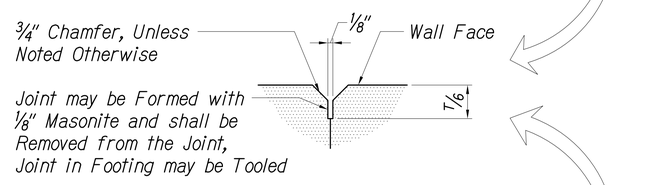
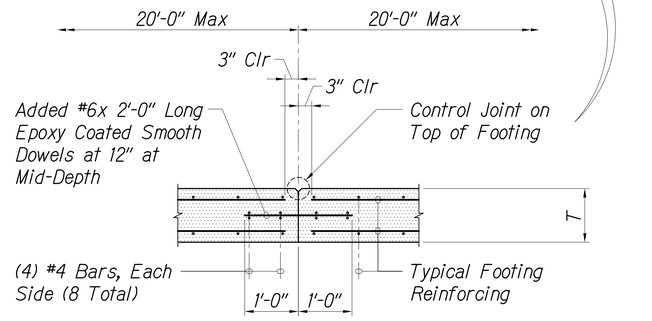
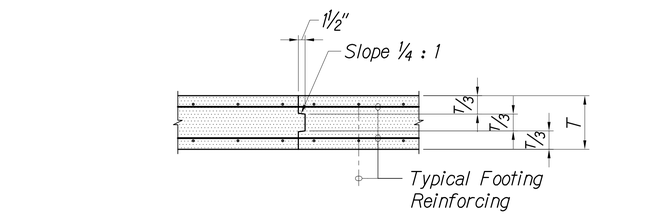


At Control/Construction Joint in Wall





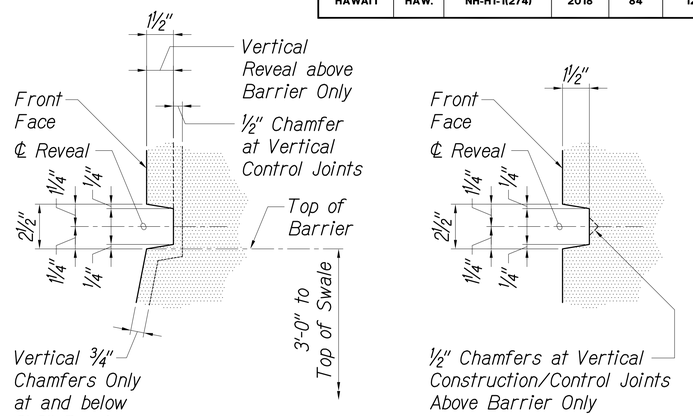
At Control Joint or Construction Joint at Control Joint in Footing



At Construction Joint in Footing

TYPICAL JOINT DETAILS — 3 — S0.2 | S0.2

Not to Scale

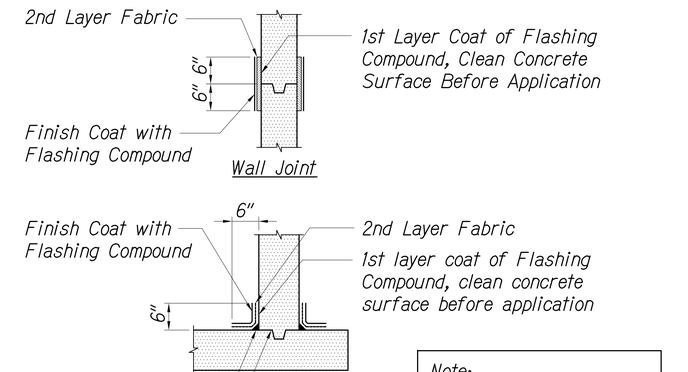


Horizontal Reveal Detail at Top of Barrier

Horizontal or Vertical Reveal Detail above Barrier Only

TYPICAL REVEAL DETAILS — 5 — S0.2 | S0.2

Not to Scale



Wall Footing Joint

Note: Typical each face unless noted otherwise.

TYPICAL WATERPROOFING DETAIL — 4 — S0.2 | S0.2

Not to Scale

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STATE OF HAWAII
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HIGHWAYS DIVISION

TYPICAL DETAILS

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S0.2 OF 2 SHEETS

ORIGINAL PLANS | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

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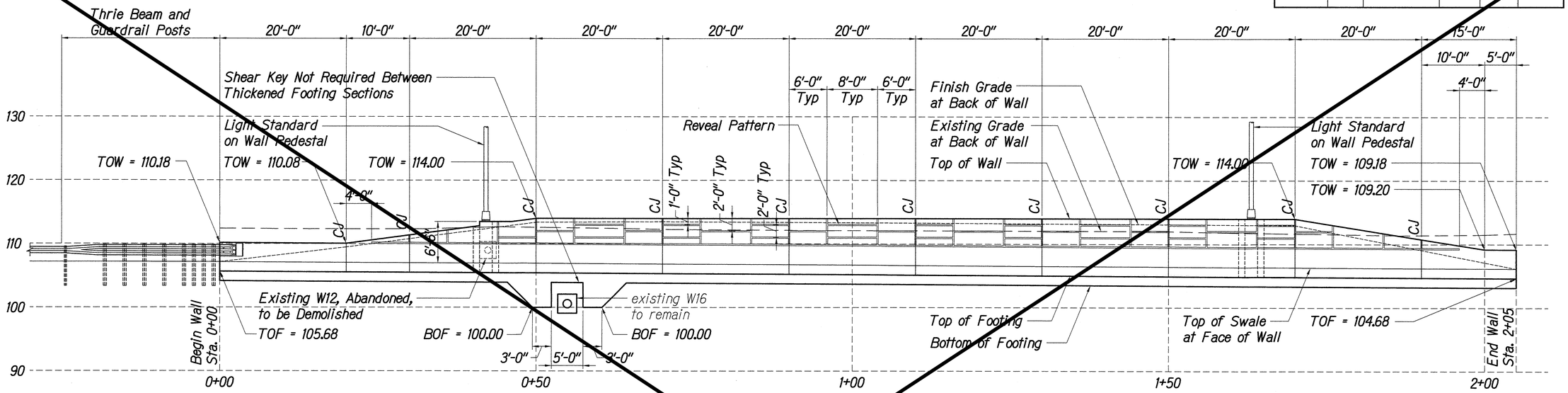
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	85	126



RETAINING WALL NO. 1 REFLECTED ELEVATION (1 S1.1 | S1.1)

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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Approved By:

MAR 18 2019

For Manager and Chief Engineer, BWS — Date

(For Work Affecting BWS Facilities in City/State R/W and BWS Easements Only)

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

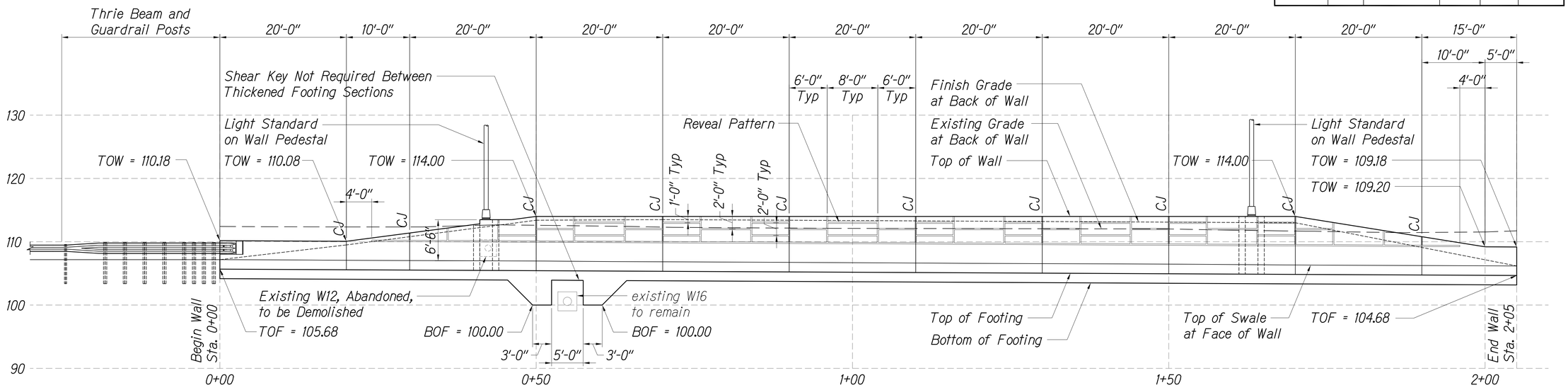
RETAINING WALL NO. 1 REFLECTED ELEVATION

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: January 28, 2019

SHEET No. S1.1 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	85	126



RETAINING WALL NO. 1 REFLECTED ELEVATION

1
S1.1 | S1.1

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 1 REFLECTED ELEVATION

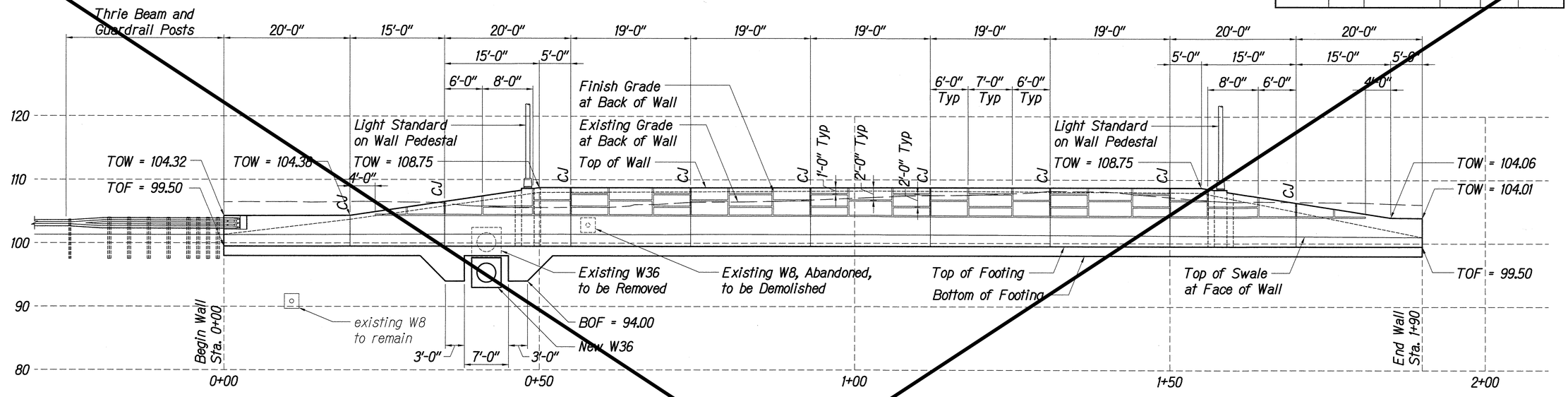
INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S1.1 OF 2 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	86	126



RETAINING WALL NO. 4 REFLECTED ELEVATION (1 / S1.2 | S1.2)

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

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Approved By:

MAR 18 2019

FOR Manager and Chief Engineer, BWS — Date

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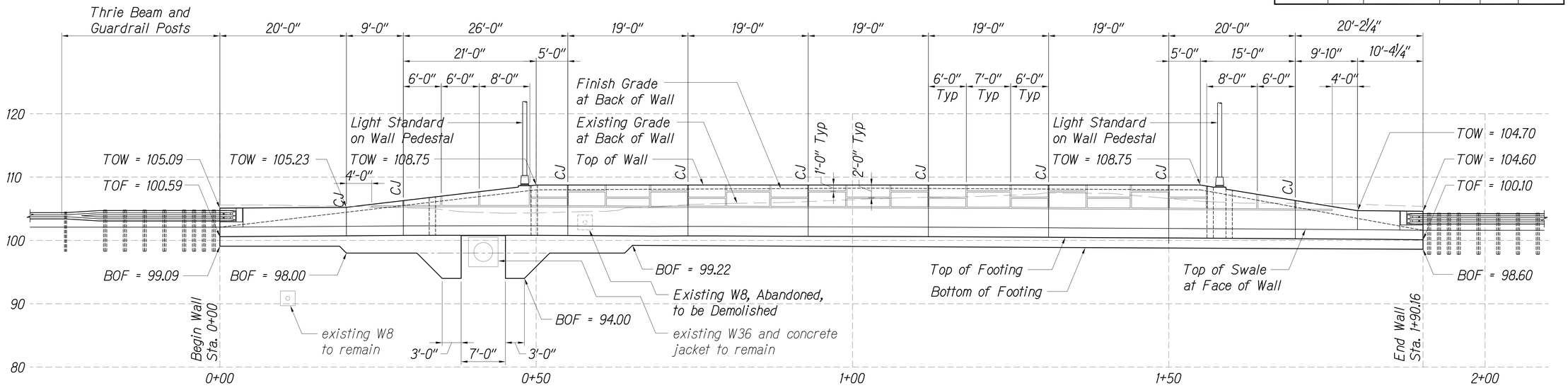
RETAINING WALL NO. 4 REFLECTED ELEVATION

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: January 28, 2019

SHEET No. S1.2 OF 2 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	86	126



RETAINING WALL NO. 4 REFLECTED ELEVATION (1 / S1.2 | S1.2)

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

Notes:

1. Concrete footing shall be placed directly on weathered basalt between Sta. 0+20 to Sta. 0+64.
2. Replace over-excavated material with Structure Backfill Material A and compacted to a minimum of 95% of its maximum dry density per the latest procedure of ASTM D1557.

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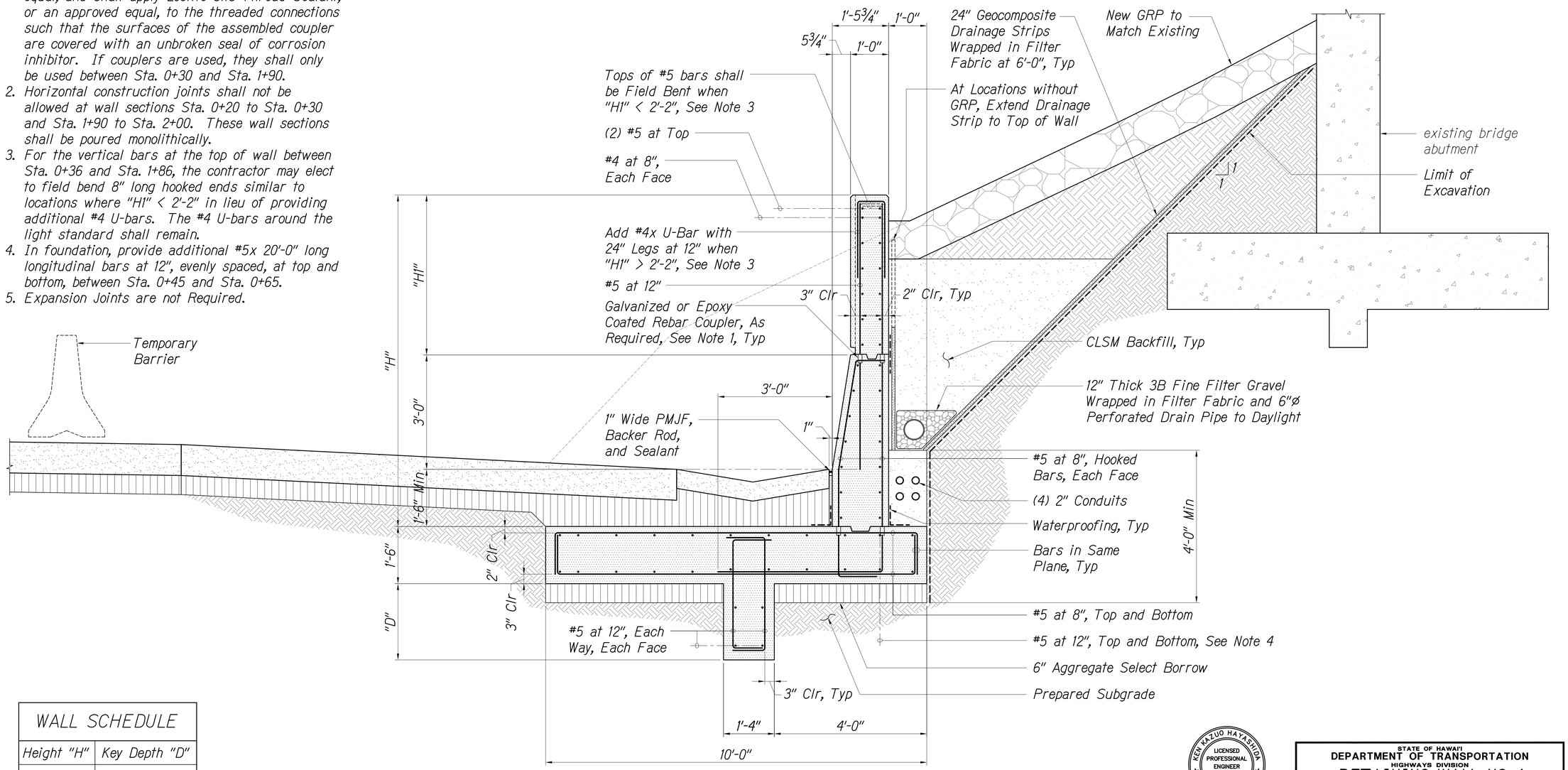
HAWAI'I	HAW.	NH-H1-1(274)	2018	87	126

Notes:

1. *Contractor may use full length vertical bars or lap splice bars at construction joints. If couplers are used, contractor shall use galvanized or epoxy coated Dayton Superior D310 Taper-Lock Standard Coupler, or an approved equal, and shall apply Loctite 5113 Thread Sealant, or an approved equal, to the threaded connections such that the surfaces of the assembled coupler are covered with an unbroken seal of corrosion inhibitor. If couplers are used, they shall only be used between Sta. 0+30 and Sta. 1+90.*
2. *Horizontal construction joints shall not be allowed at wall sections Sta. 0+20 to Sta. 0+30 and Sta. 1+90 to Sta. 2+00. These wall sections shall be poured monolithically.*
3. *For the vertical bars at the top of wall between Sta. 0+36 and Sta. 1+86, the contractor may elect to field bend 8" long hooked ends similar to locations where "H1" < 2'-2" in lieu of providing additional #4 U-bars. The #4 U-bars around the light standard shall remain.*
4. *In foundation, provide additional #5x 20'-0" long longitudinal bars at 12", evenly spaced, at top and bottom, between Sta. 0+45 and Sta. 0+65.*
5. *Expansion Joints are not Required.*



WALL SCHEDULE	
Height "H"	Key Depth "D"
≤ 9'-0"	2'-0"
≤ 7'-0"	1'-6"
≤ 5'-0"	1'-0"

RETAINING WALL NO. 1 SCHEDULE (KAONOHI OVERPASS)

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

1 / S2.1 | S2.1

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

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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 1 SCHEDULE

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

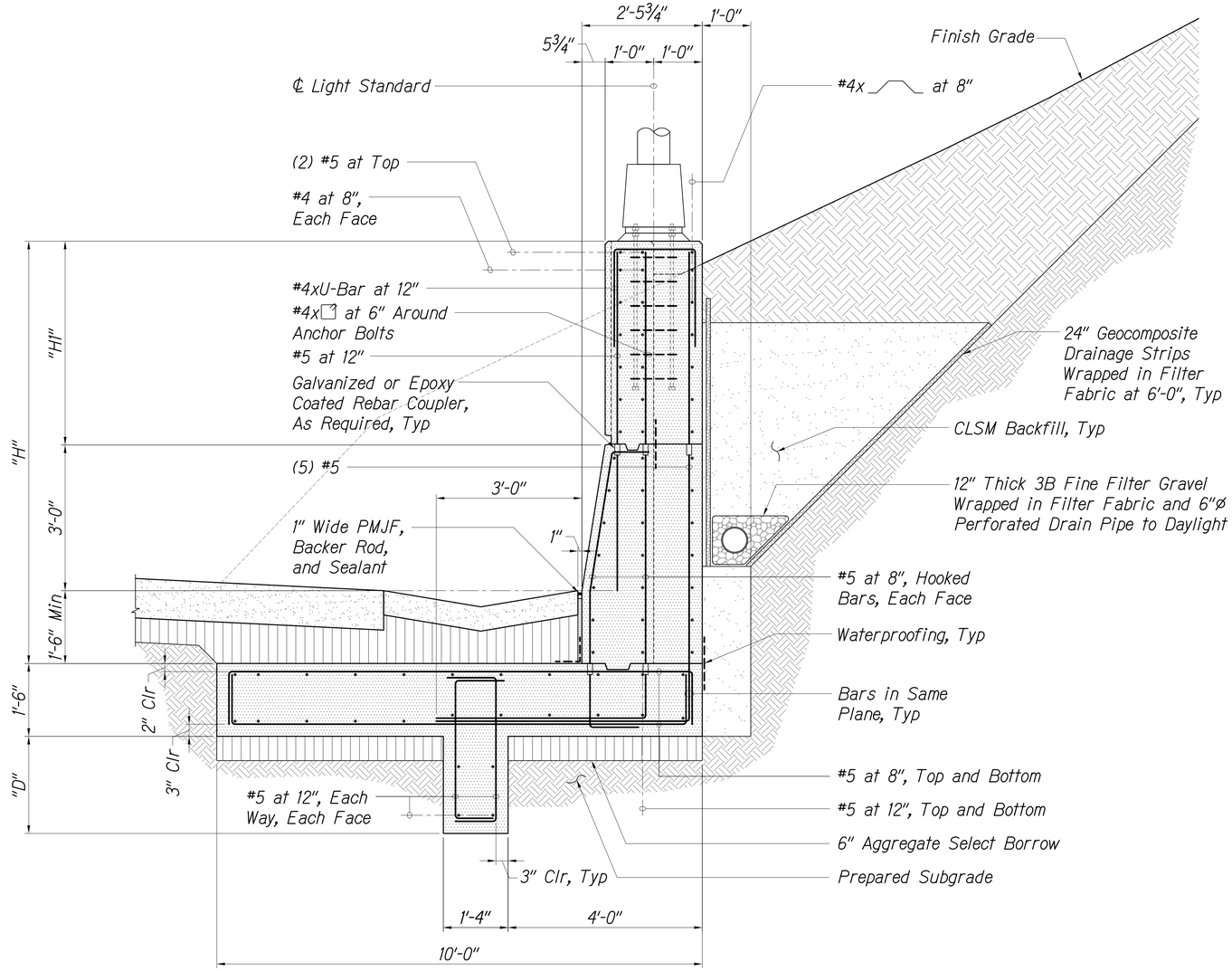
Scale: As Shown — Date: November 30, 2018

SHEET No. S2.1 OF 10 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	88	126

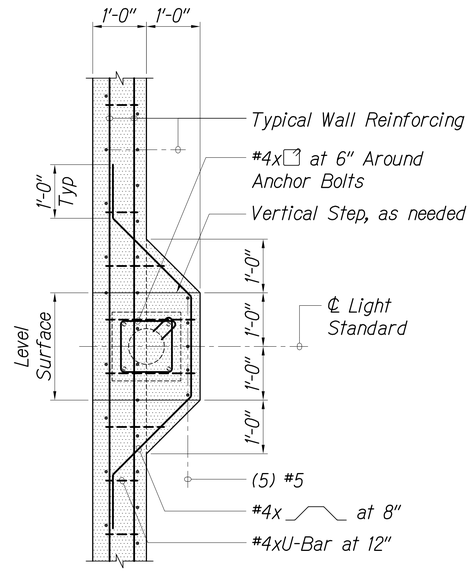
Notes:
1. *For balance of information, see Sheet S2.1.*
2. *Control joint in wall shall not be located within 7'-0" of the centerline of the light standard.*



RETAINING WALL NO. 1 THICKENED SECTION AT LIGHT STANDARD

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

1
S2.2 | S2.2



Section - Plan View

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

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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 1
SECTIONS AT LIGHT STD

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

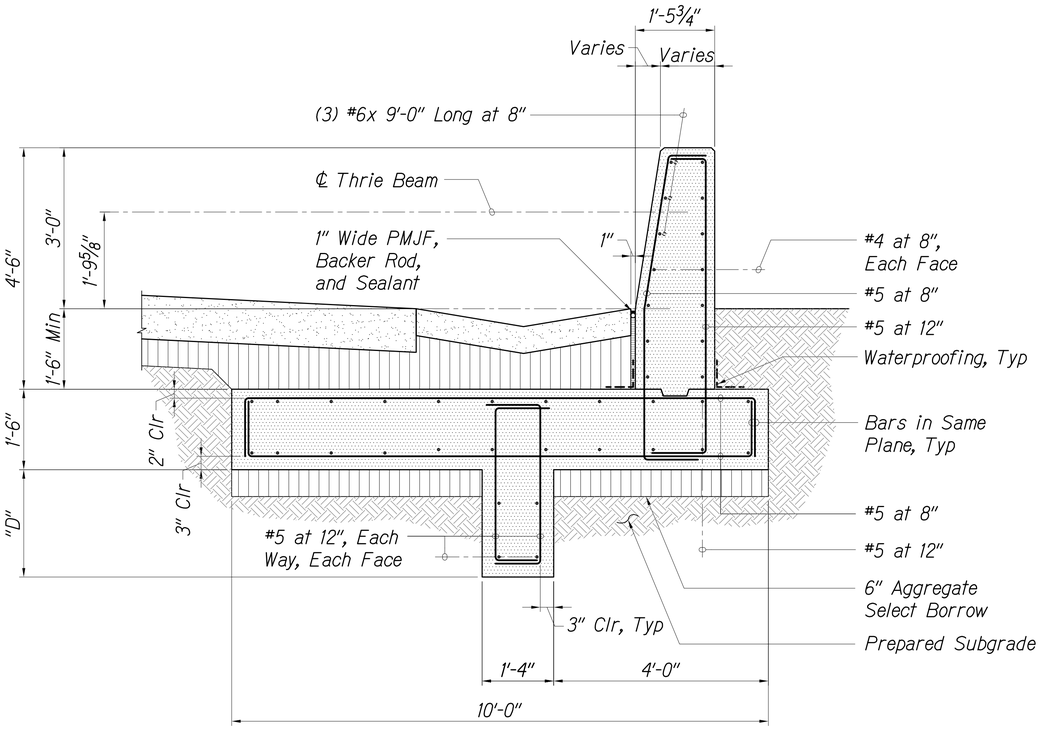
Scale: As Shown Date: November 30, 2018

SHEET No. S2.2 OF 10 SHEETS

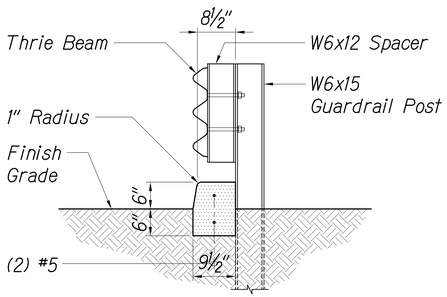
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	89	126

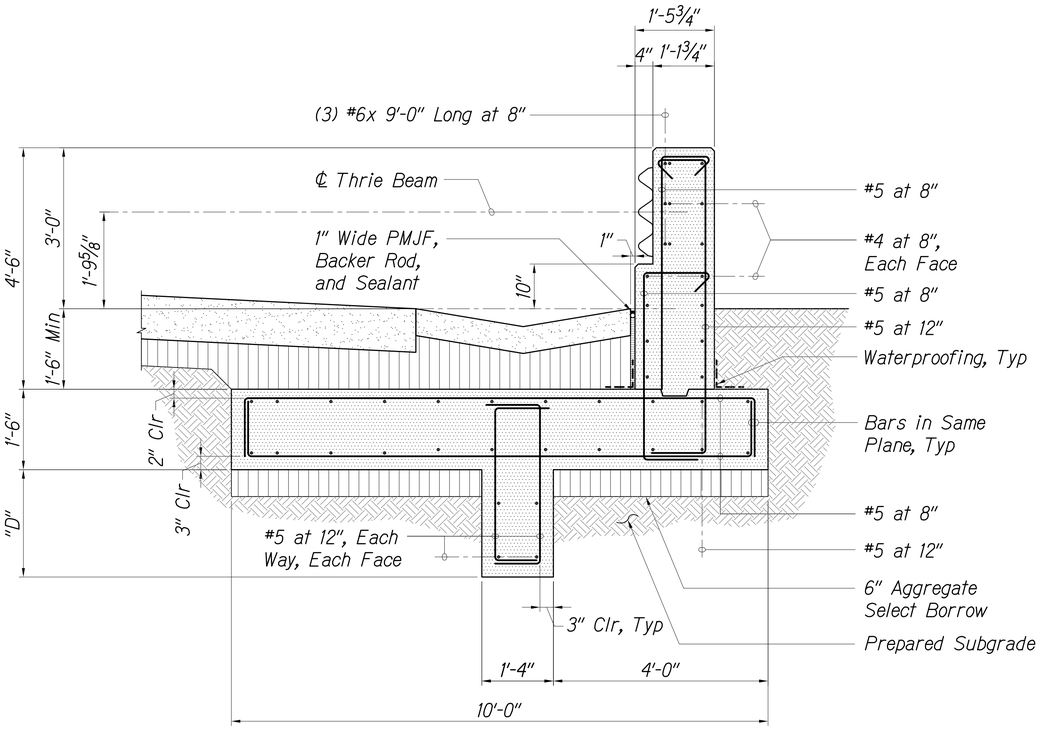
Note:
For balance of information, see Sheet S2.1.



Section at Transition



Section at Guardrail Post



Section at Terminal Connection

RETAINING WALL NO. 1 SECTIONS AT END POST
Scale: 3/4" = 1'-0"

1
S2.3 | S2.3

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 1
SECTIONS AT END POST

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT
CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown Date: November 30, 2018

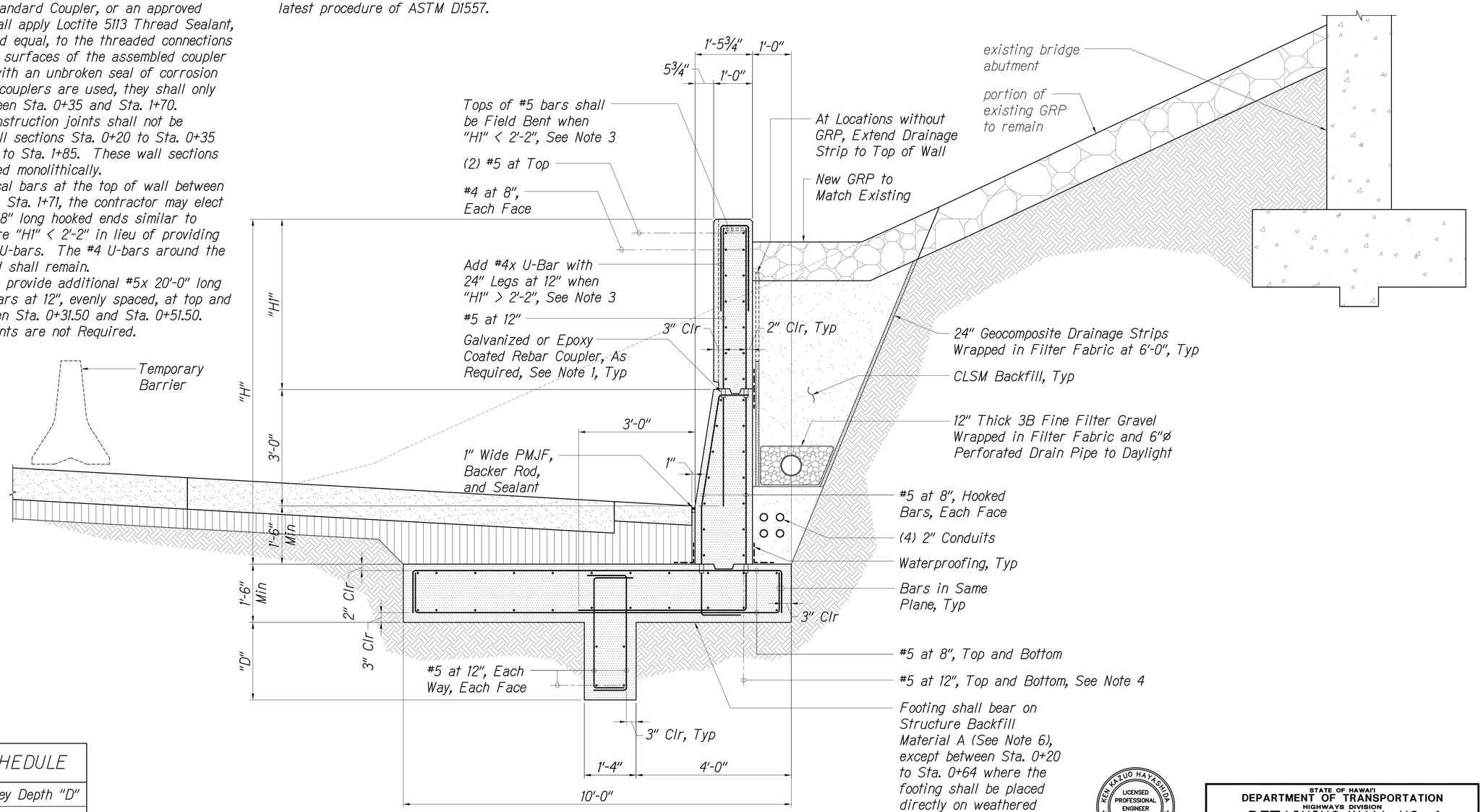
SHEET No. S2.3 OF 10 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	90	126

Notes:

1. *Contractor may use full length vertical bars or lap splice bars at construction joints. If couplers are used, contractor shall use galvanized or epoxy coated Dayton Superior D310 Taper-Lock Standard Coupler, or an approved equal, and shall apply Loctite 5113 Thread Sealant, or an approved equal, to the threaded connections such that the surfaces of the assembled coupler are covered with an unbroken seal of corrosion inhibitor. If couplers are used, they shall only be used between Sta. 0+35 and Sta. 1+70.*
2. *Horizontal construction joints shall not be allowed at wall sections Sta. 0+20 to Sta. 0+35 and Sta. 1+70 to Sta. 1+85. These wall sections shall be poured monolithically.*
3. *For the vertical bars at the top of wall between Sta. 0+35 and Sta. 1+71, the contractor may elect to field bend 8" long hooked ends similar to locations where "H1" < 2'-2" in lieu of providing additional #4 U-bars. The #4 U-bars around the light standard shall remain.*
4. *In foundation, provide additional #5x 20'-0" long longitudinal bars at 12", evenly spaced, at top and bottom, between Sta. 0+31.50 and Sta. 0+51.50.*
5. *Expansion Joints are not Required.*
6. *Concrete footing shall be placed directly on weathered basalt between Sta. 0+20 to Sta. 0+64.*
7. *Replace over-excavated material with Structure Backfill Material A and compacted to a minimum of 95% of its maximum dry density per the latest procedure of ASTM D1557.*



WALL SCHEDULE	
Height "H"	Key Depth "D"
≤ 9'-0"	2'-0"
≤ 7'-0"	1'-6"
≤ 5'-0"	1'-0"

RETAINING WALL NO. 4 SCHEDULE (KAAMILO OVERPASS)

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

1
S2.4 | S2.4

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 4 SCHEDULE

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown Date: November 30, 2018

SHEET No. S2.4 OF 10 SHEETS

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NOTE BOOK | No.

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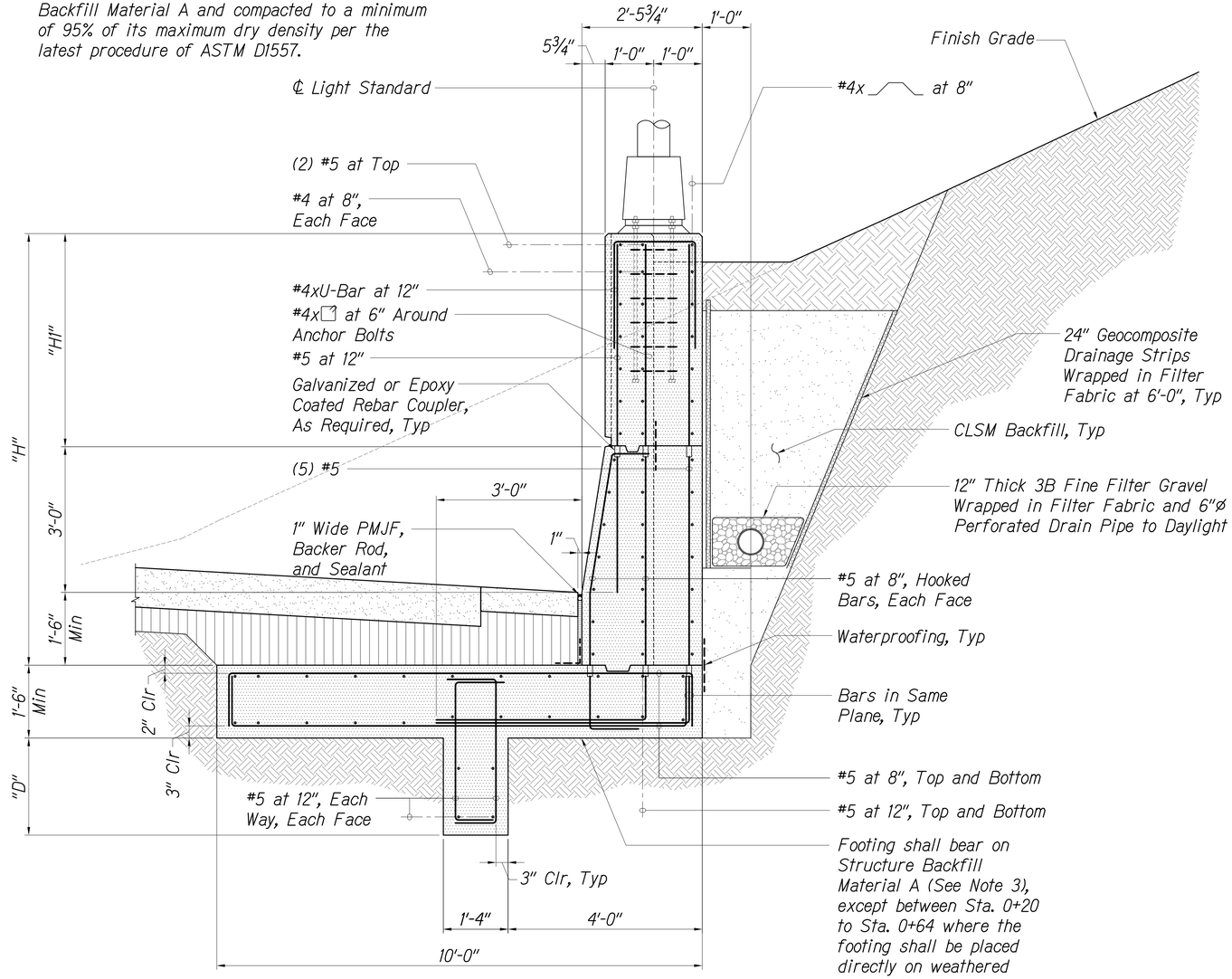
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	91	126

Notes:

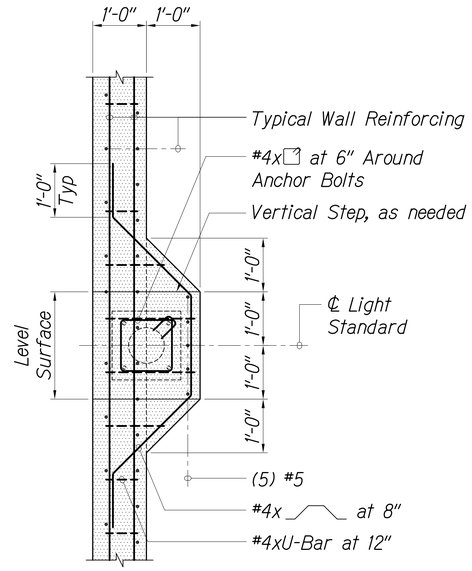
1. *For balance of information, see Sheet S2.4.*
2. *Control joint in wall shall not be located within 7'-0" of the centerline of the light standard.*
3. *Concrete footing shall be placed directly on weathered basalt between Sta. 0+20 to Sta. 0+64.*
4. *Replace over-excavated material with Structure Backfill Material A and compacted to a minimum of 95% of its maximum dry density per the latest procedure of ASTM D1557.*



RETAINING WALL NO. 4 THICKENED SECTION AT LIGHT STANDARD

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

1 / S2.5 | S2.5



Section - Plan View

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HIGHWAYS DIVISION

RETAINING WALL NO. 4 SECTIONS AT LIGHT STD

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S2.5 OF 10 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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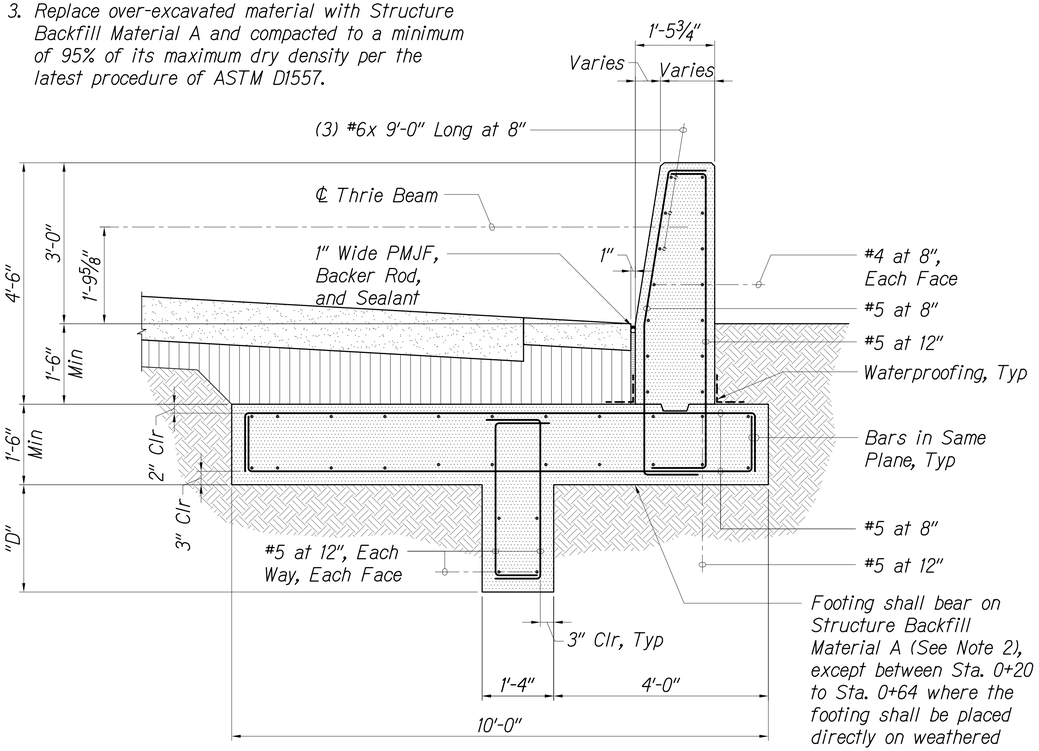
"AS-BUILT"

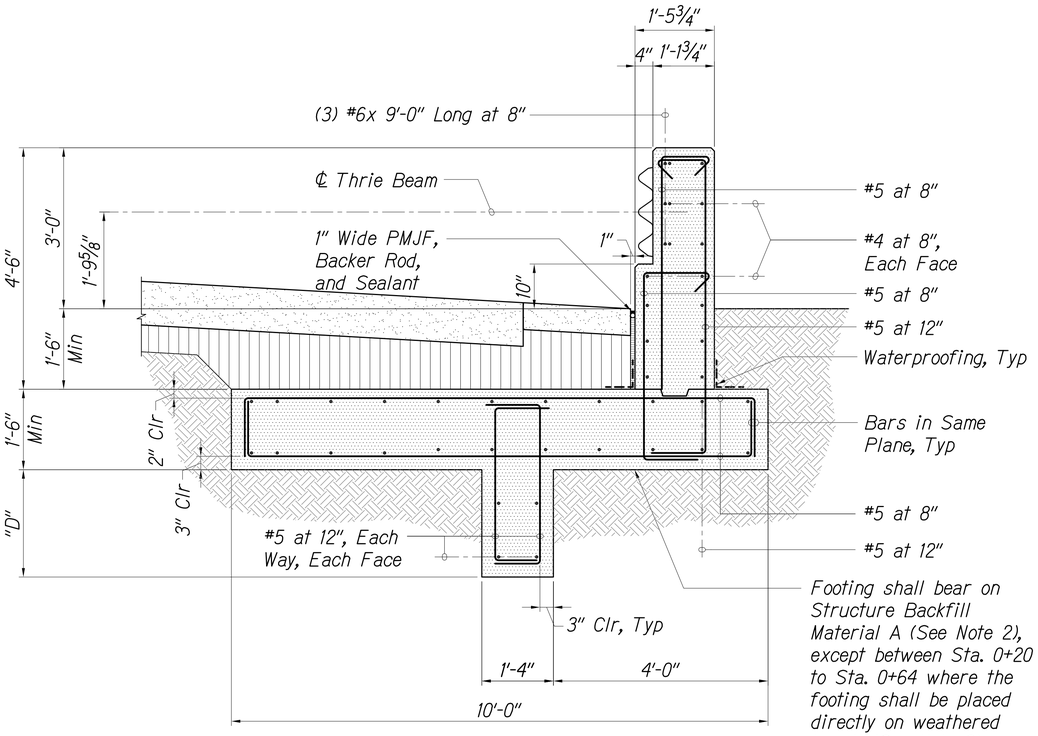
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	92	126

Notes:

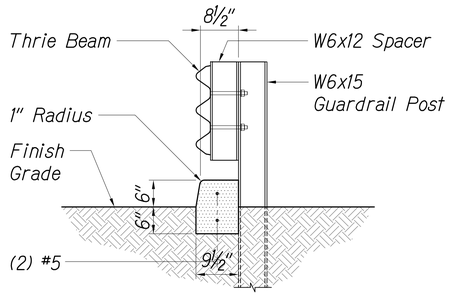
1. *For balance of information, see Sheet S2.4.*
2. *Concrete footing shall be placed directly on weathered basalt between Sta. 0+20 to Sta. 0+64.*
3. *Replace over-excavated material with Structure Backfill Material A and compacted to a minimum of 95% of its maximum dry density per the latest procedure of ASTM D1557.*



Section at Transition



Section at Terminal Connection



Section at Guardrail Post

RETAINING WALL NO. 4 SECTIONS AT END POST

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

1 / S2.6 | S2.6

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 4 SECTIONS AT END POST

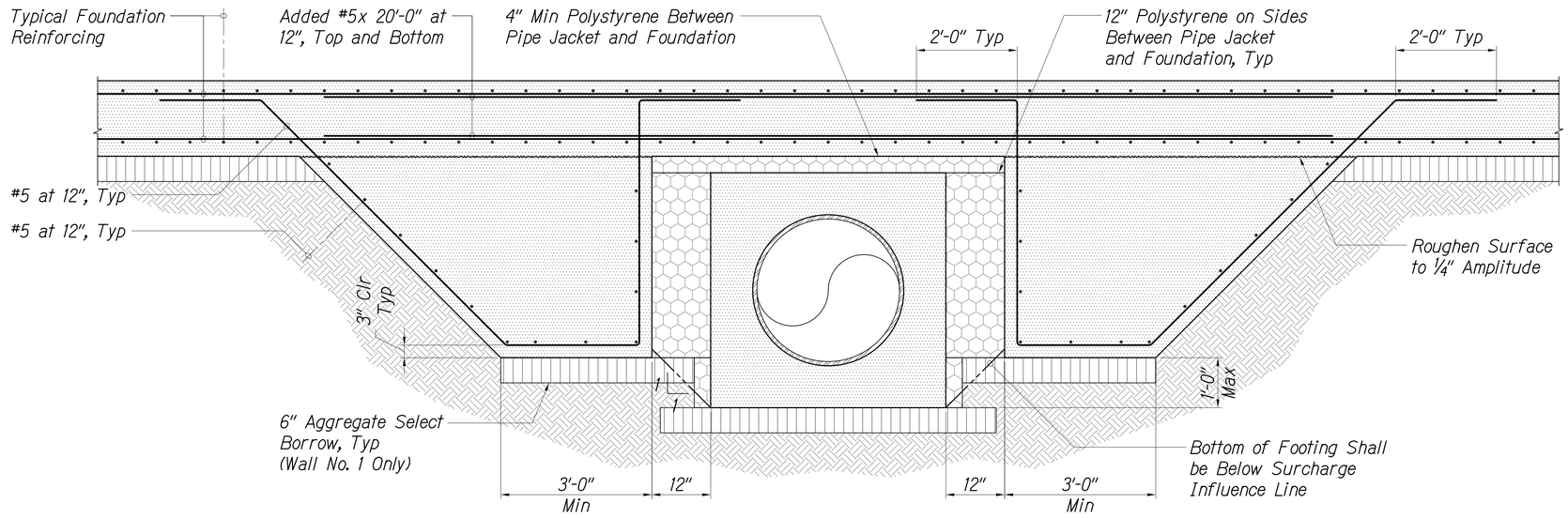
INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S2.6 OF 10 SHEETS

"AS-BUILT"

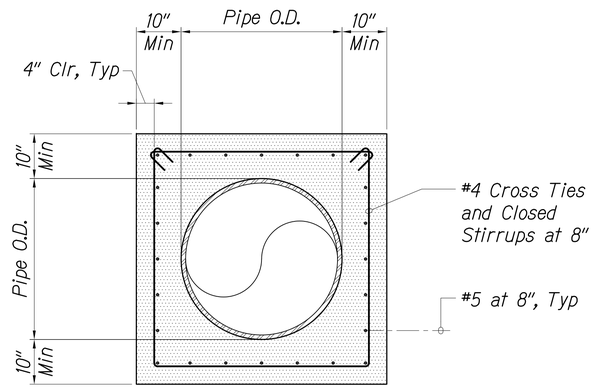
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	93	126



TYPICAL THICKENED FOUNDATION AT WATERLINE

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

1 S2.7 | S2.7



TYPICAL WATERLINE JACKET DETAIL

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

2 S2.7 | S2.7

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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No.	QUANTITIES BY	
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STATE OF HAWAI'I
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HIGHWAYS DIVISION

RETAINING WALL NOS. 1 & 4 TYPICAL DETAILS

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown Date: November 30, 2018

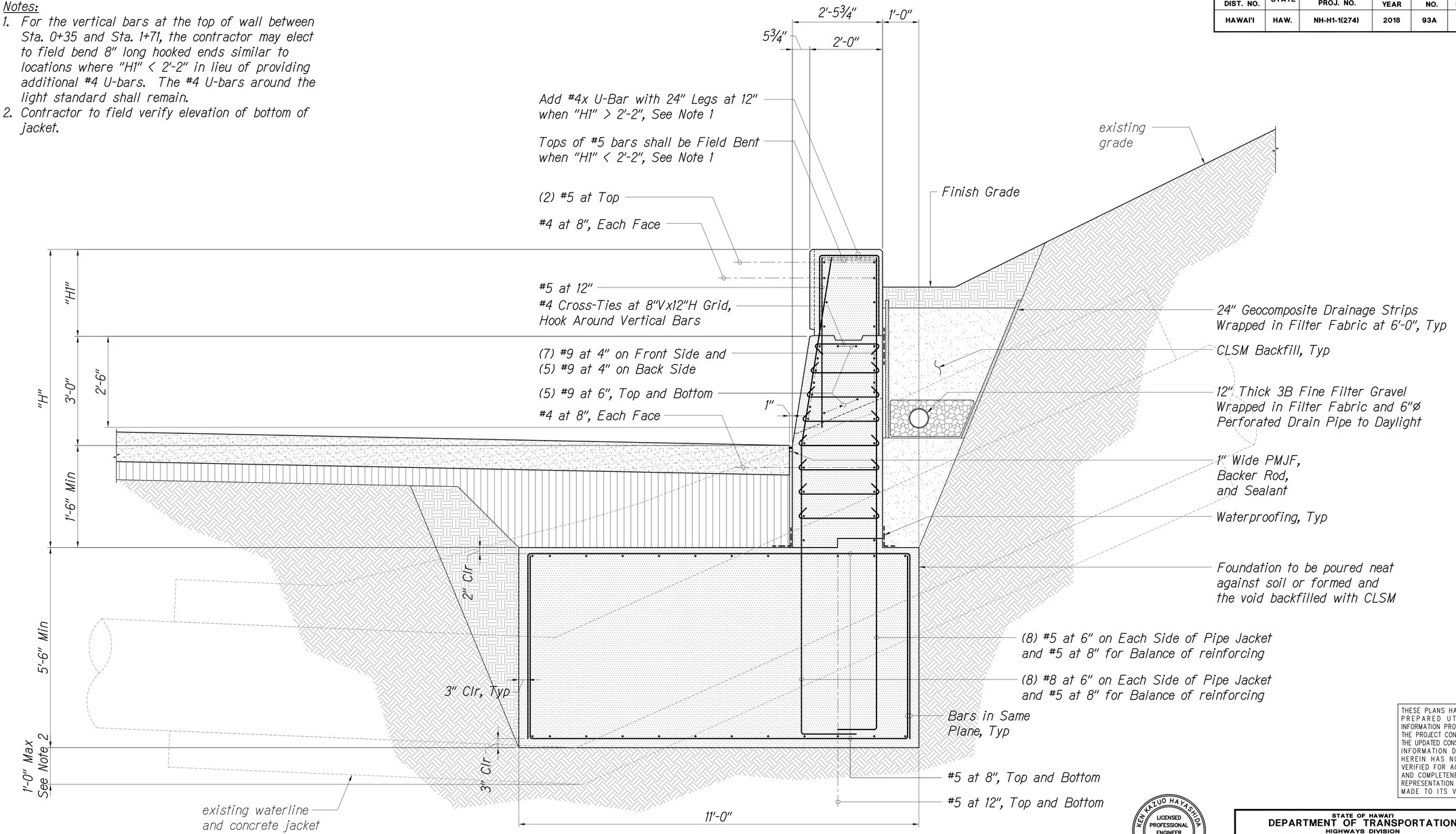
SHEET No. S2.7 OF 10 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	93A	126

Notes:

1. *For the vertical bars at the top of wall between Sta. 0+35 and Sta. 1+71, the contractor may elect to field bend 8" long hooked ends similar to locations where "H1" < 2'-2" in lieu of providing additional #4 U-bars. The #4 U-bars around the light standard shall remain.*
2. *Contractor to field verify elevation of bottom of jacket.*



RETAINING WALL NO. 4 SECTION AT EACH SIDE OF WATERLINE

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

1 S2.8 | S2.8

ORIGINAL PLANS	SURVEY PLOTTED BY	DATE
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 4
SECTION AT WATERLINE - 1

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown Date: November 30, 2018

SHEET No. S2.8 OF 10 SHEETS

"AS-BUILT"

93A

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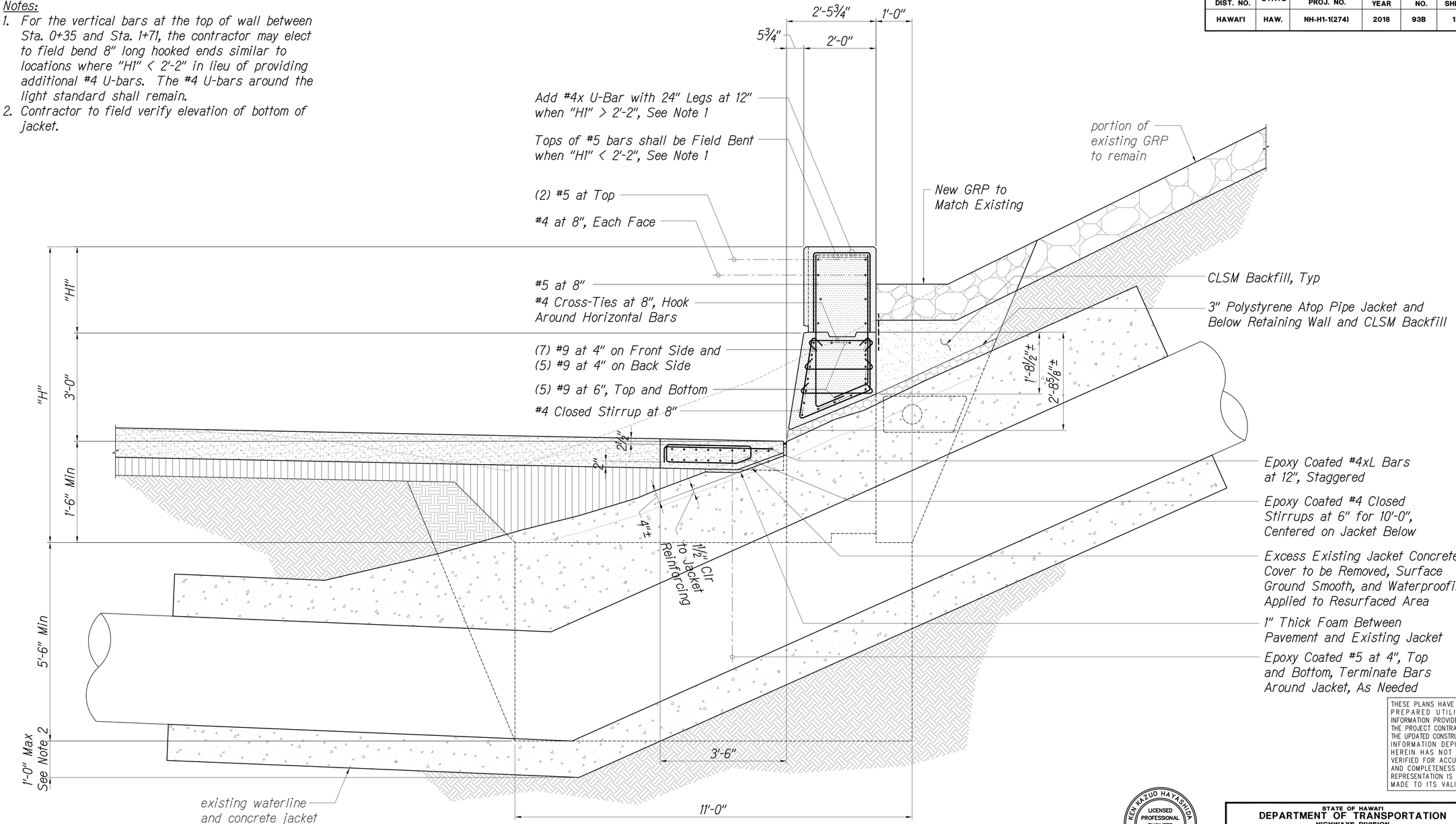
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	93B	126

Notes:

1. *For the vertical bars at the top of wall between Sta. 0+35 and Sta. 1+71, the contractor may elect to field bend 8" long hooked ends similar to locations where "H1" < 2'-2" in lieu of providing additional #4 U-bars. The #4 U-bars around the light standard shall remain.*
2. *Contractor to field verify elevation of bottom of jacket.*



RETAINING WALL NO. 4 SECTION AT WATERLINE

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

1
S2.9 | S2.9

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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 4
SECTION AT WATERLINE - 2

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S2.9 OF 10 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK	TRACED BY	
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No.	QUANTITIES BY	
	CHECKED BY	

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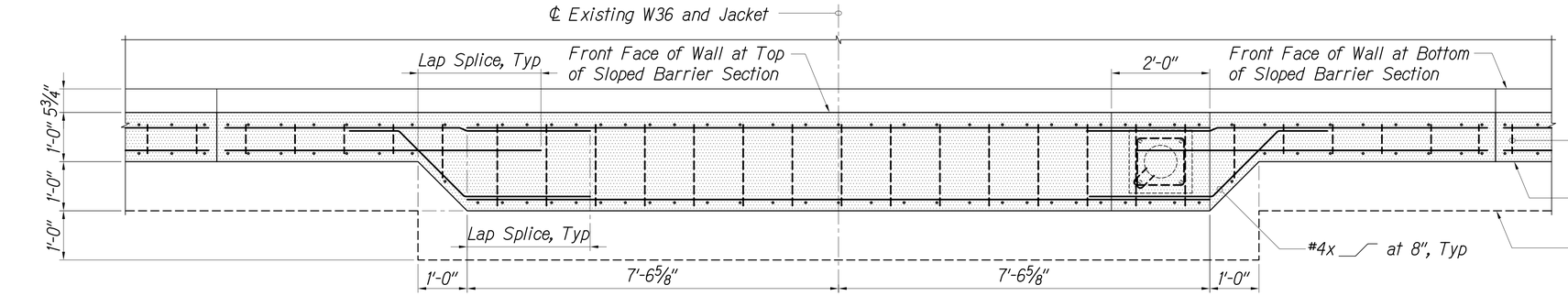
"AS-BUILT"

93B

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	93C	126

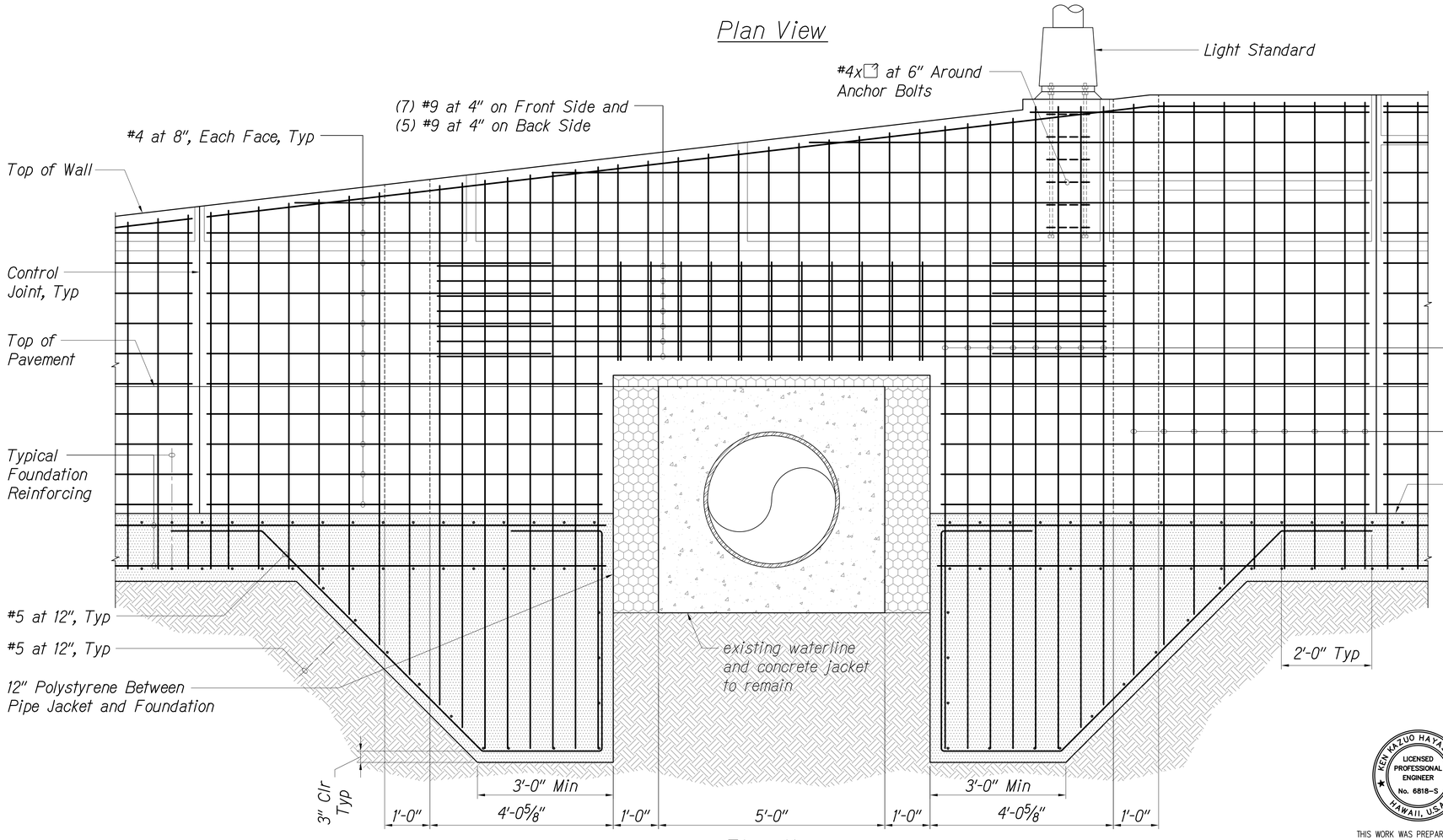


Add #4x U-Bar with 24" Legs at 12" when "H1" > 2'-2", See Note 1

Back Face of Wall

Edge of Foundation Below

Plan View



(8) #8 at 6" on Front Face and #5 at 8" on Back Face, Each Side

#5 at 8", Each Face, Each Side

Top of Footing

Elevation

Notes:

1. For the vertical bars at the top of wall between Sta. 0+35 and Sta. 1+71, the contractor may elect to field bend 8" long hooked ends similar to locations where "H1" < 2'-2" in lieu of providing additional #4 U-bars. The #4 U-bars around the light standard shall remain.

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KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

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April 30, 2020
SIGNATURE — EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NO. 4 PARTIAL PLAN & WALL ELEV.

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S2.10 OF 10 SHEETS

RETAINING WALL NO. 4 PARTIAL PLAN AND WALL ELEVATION

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

1 / S2.10 | S2.10

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

P:\4451-4500\4458 H001 - Kiewit Design build of H1 Widening\004 Drawings\Structural\AutoCAD_format\Phase 2\2020-02-06 - As-Built\4458_S2-1-S2-10.dwg 2/6/2020 11:21 AM BRIAN LUM

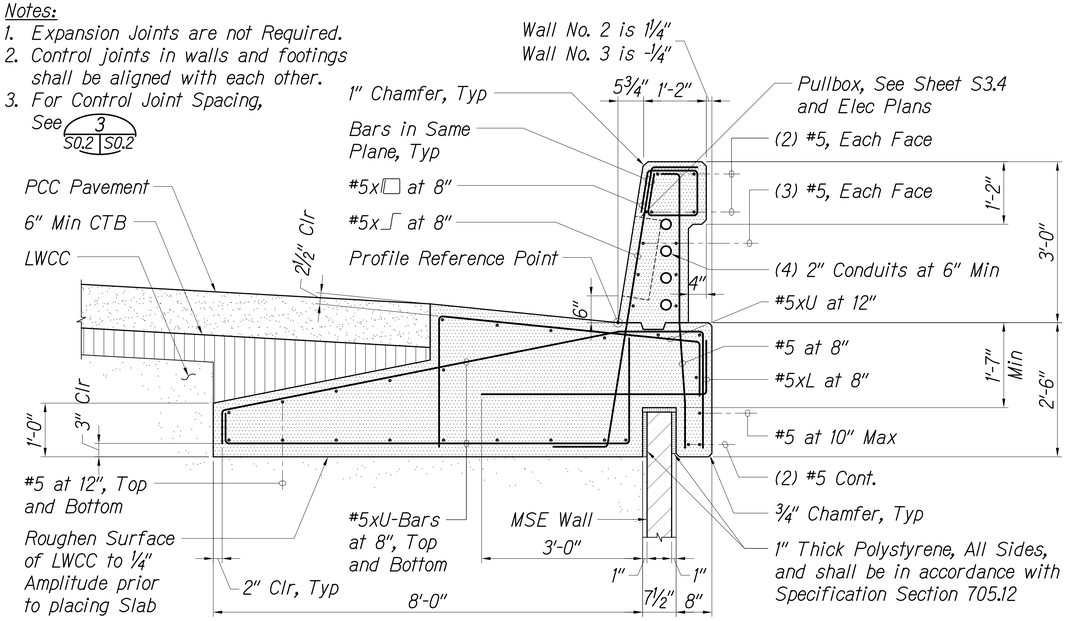
P:\4451-4500\4458 H001 - Kiewit Design build of H1 Widening\004 Drawings\Structural\AutoCAD_format\Phase 2\2020-02-06 - As-Built\4458_S2-1-S2-10.dwg 2/6/2020 11:21:13 AM KA Adobe PDF.pc3

"AS-BUILT"

93C

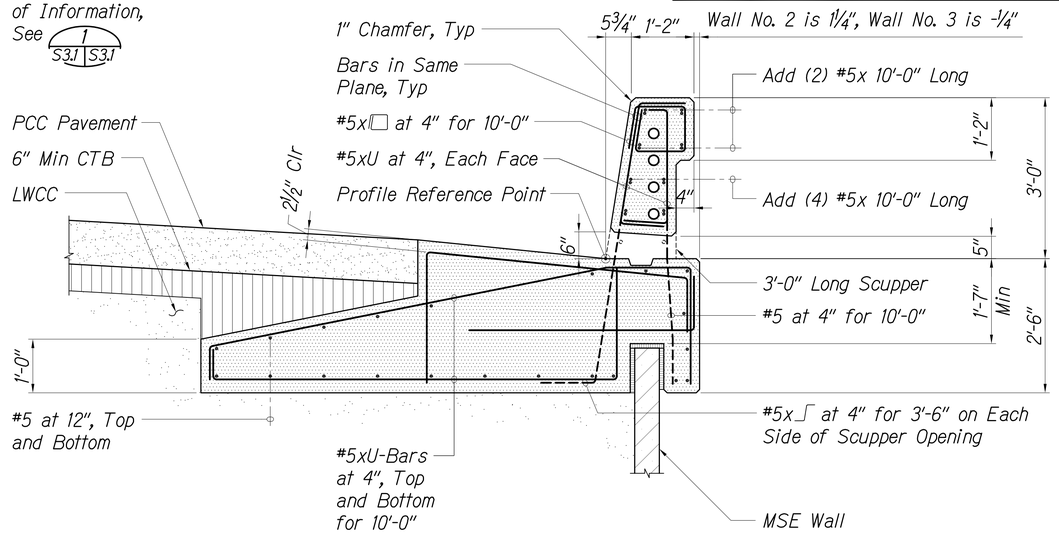
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	94	126

Notes:
1. Expansion Joints are not Required.
2. Control joints in walls and footings shall be aligned with each other.
3. For Control Joint Spacing, See 3 (S0.2 | S0.2)

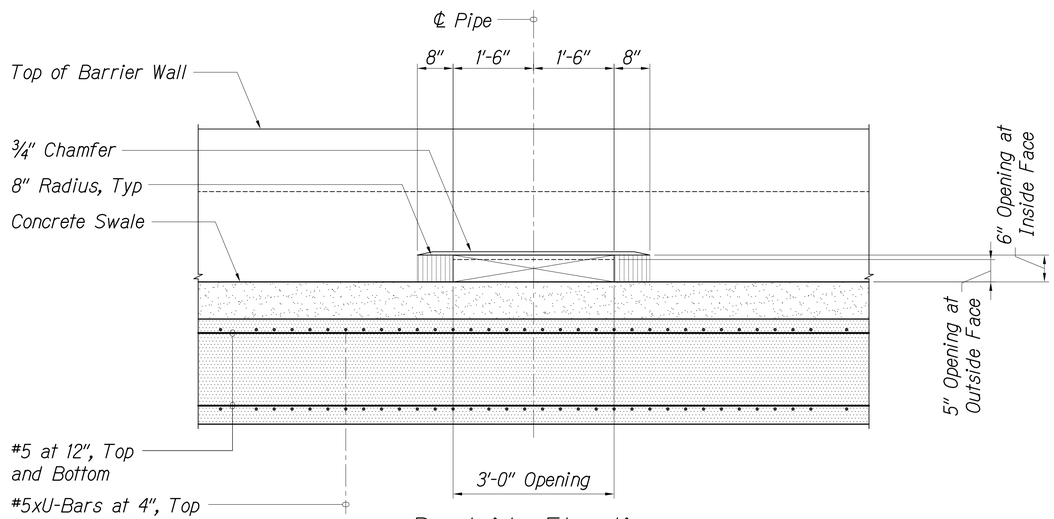


RETAINING WALL NOS. 2 & 3 TYPICAL SECTION
Scale: 3/4" = 1'-0"
1 (S3.1 | S3.1)

Note:
For Balance of Information, See 1 (S3.1 | S3.1)

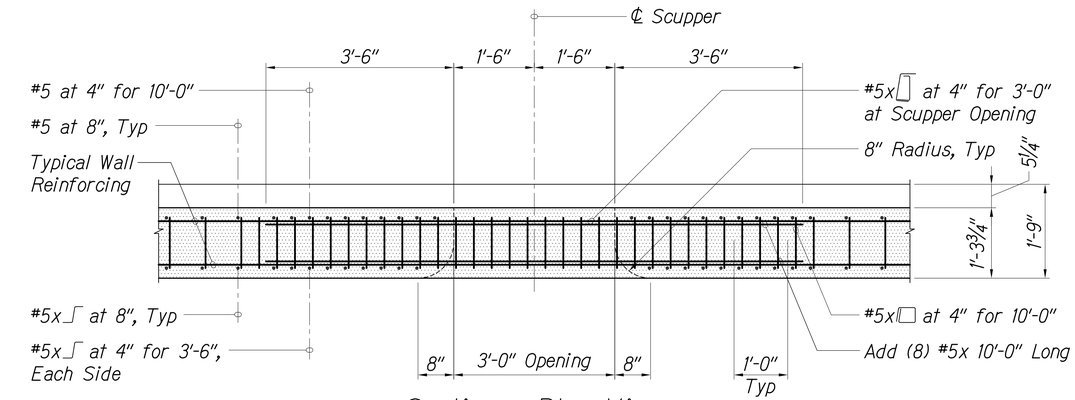


RETAINING WALL NOS. 2 & 3 CROSS SECTION AT SCUPPER
Scale: 3/4" = 1'-0"
2 (S3.1 | S3.1)



Roadside Elevation

RETAINING WALL NOS. 2 & 3 SECTION AT SCUPPER
Scale: 3/4" = 1'-0"
3 (S3.1 | S3.1)



Section - Plan View

Note:
Control joint in wall and footing shall not be located within 7'-0" of the centerline of the scupper.

KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NOS. 2 & 3 DETAILS - 1

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S3.1 OF 4 SHEETS

"AS-BUILT"

94

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

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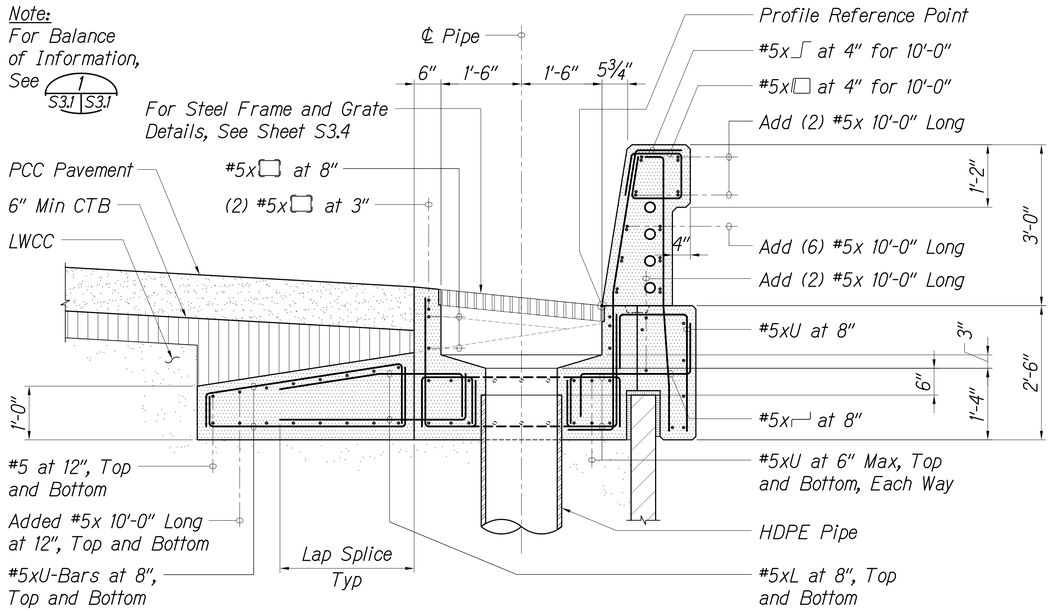
P:\4451-4500\4458 H001 - Kiewit Design build of H1 Widening\004 Drawings\Structural\AutoCAD_format\Phase 2\2020-02-06 - As-Built\4458_S3-1-S3-4.dwg, 2/6/2020 11:21:19 AM, Kyocera KM-8230.pc3

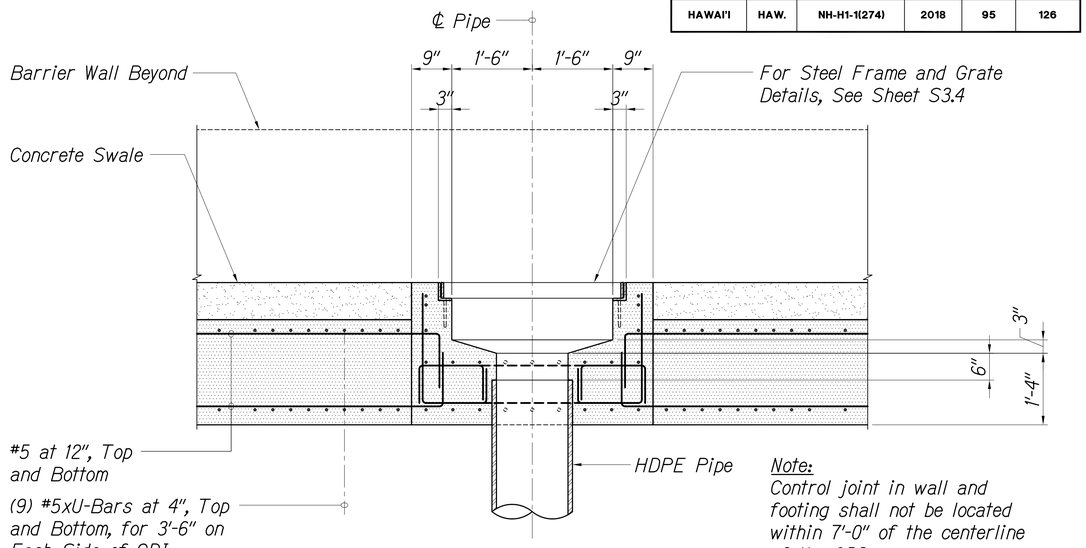
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	95	126

Note:
For Balance of Information, See 1 | S3.1 | S3.1



RETAINING WALL NOS. 2 & 3 CROSS SECTION AT GDI
Scale: 3/4" = 1'-0"

1 | S3.2 | S3.2

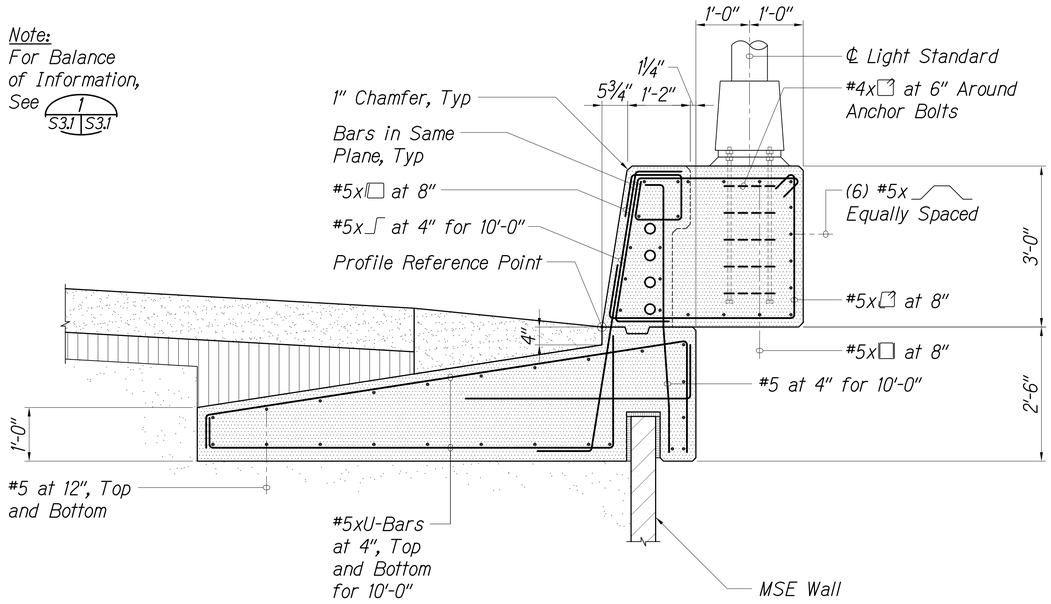


Note:
Control joint in wall and footing shall not be located within 7'-0" of the centerline of the GDI.

RETAINING WALL NOS. 2 & 3 LONGITUDINAL SECTION AT GDI
Scale: 3/4" = 1'-0"

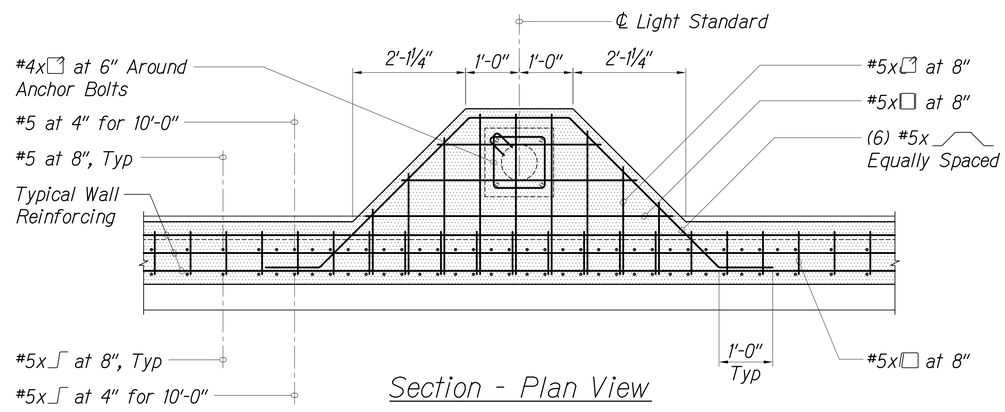
2 | S3.2 | S3.2

Note:
For Balance of Information, See 1 | S3.1 | S3.1



RETAINING WALL NOS. 2 & 3 SECTION AT LIGHT STANDARD
Scale: 3/4" = 1'-0"

3 | S3.2 | S3.2



Section - Plan View

Note:
Control joint in wall and footing shall not be located within 7'-0" of the centerline of the light standard.

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April 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NOS. 2 & 3 DETAILS - 2

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S3.2 OF 4 SHEETS

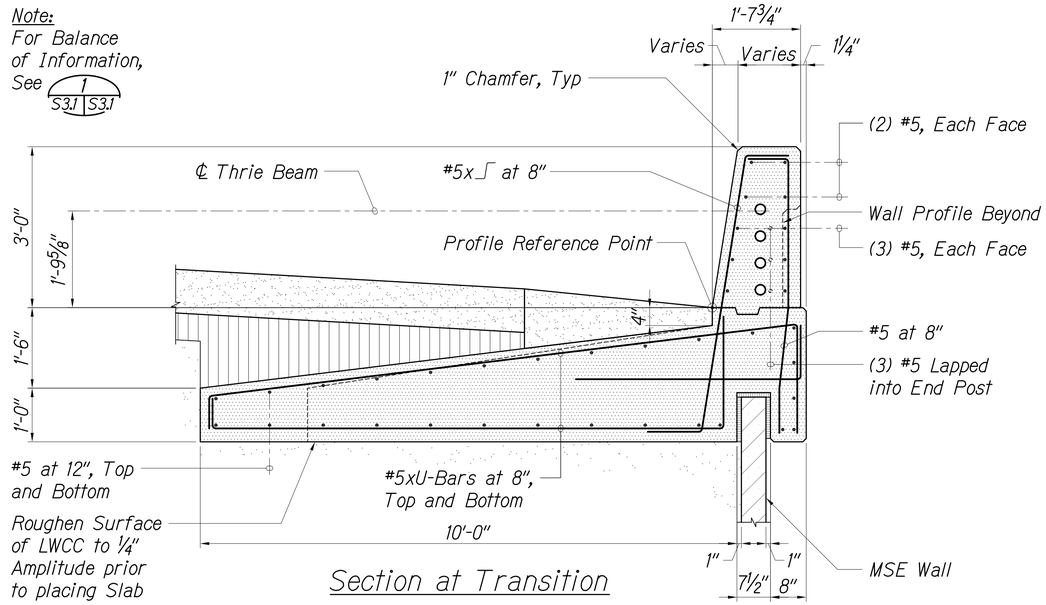
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

P:\1451-4500\4458 H001 - Kiewit Design build of H1 Widening\004 Drawings\Structural\AutoCAD_format\Phase 2\2020-02-06 - As-Built\4458_S3-1-S3-4.dwg 2/6/2020 11:21 AM BRYAN LUM
P:\1451-4500\4458 H001 - Kiewit Design build of H1 Widening\004 Drawings\Structural\AutoCAD_format\Phase 2\2020-02-06 - As-Built\4458_S3-1-S3-4.dwg, 2/6/2020 11:21:17 AM, Kyocera KM-8130.pc3

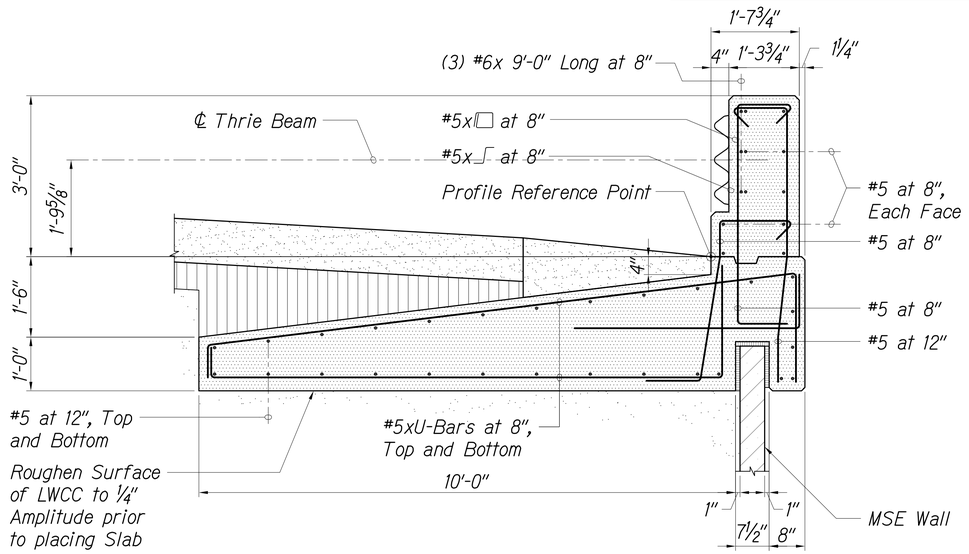
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	96	126

Note:
For Balance of Information, See 1 S3.1 | S3.1



Section at Transition



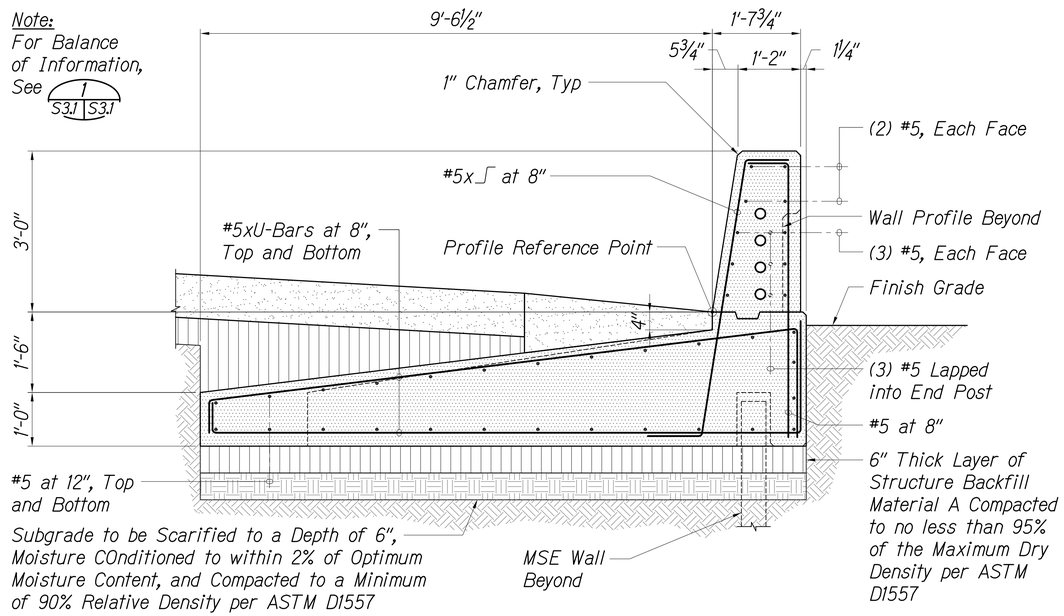
Section at Terminal Connection

RETAINING WALL NOS. 2 & 3 SECTIONS AT END POST

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

1 S3.3 | S3.3

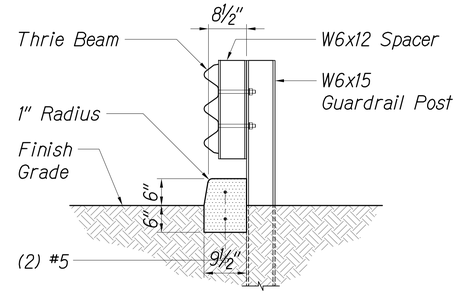
Note:
For Balance of Information, See 1 S3.1 | S3.1



RETAINING WALL NOS. 2 & 3 SECTIONS AT TRAILING END

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

2 S3.3 | S3.3



Section at Guardrail Post

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

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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NOS. 2 & 3
DETAILS - 3

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown Date: November 30, 2018

SHEET No. S3.3 OF 4 SHEETS

"AS-BUILT"

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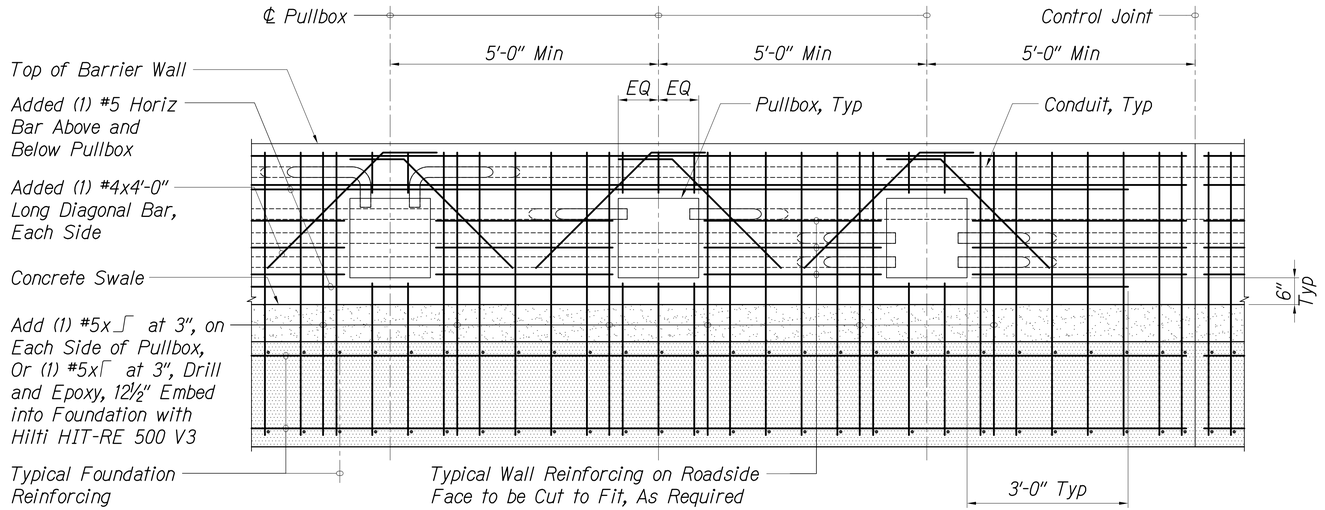
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	97	126

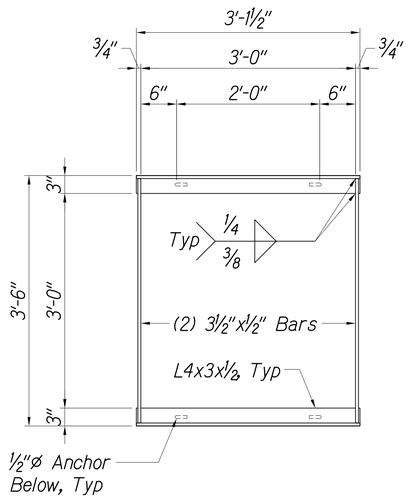


Roadside Elevation

RETAINING WALL NOS. 2 & 3 ELEVATION AT PULLBOXES

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

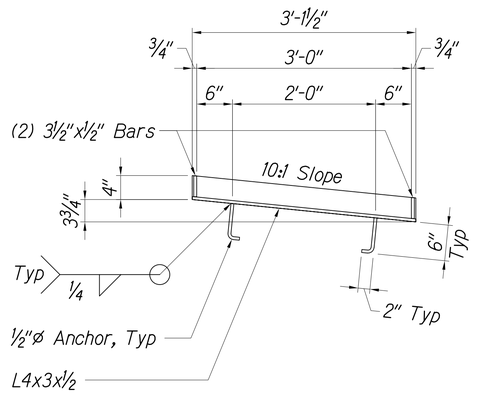
1 / S3.4 | S3.4



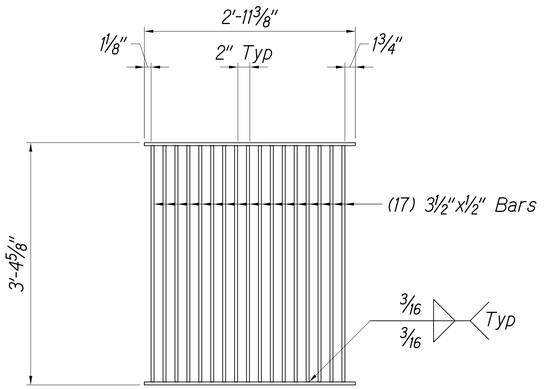
STEEL FRAME DETAIL

Scale: 1" = 1'-0"

2 / S3.4 | S3.4



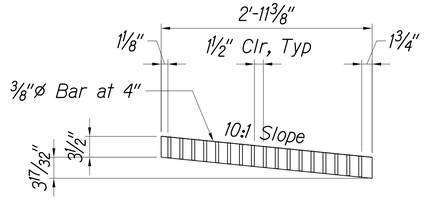
Section



STEEL GRATE DETAIL

Scale: 1" = 1'-0"

3 / S3.4 | S3.4



Section

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April 30, 2020
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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL NOS. 2 & 3 DETAILS - 4

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S3.4 OF 4 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
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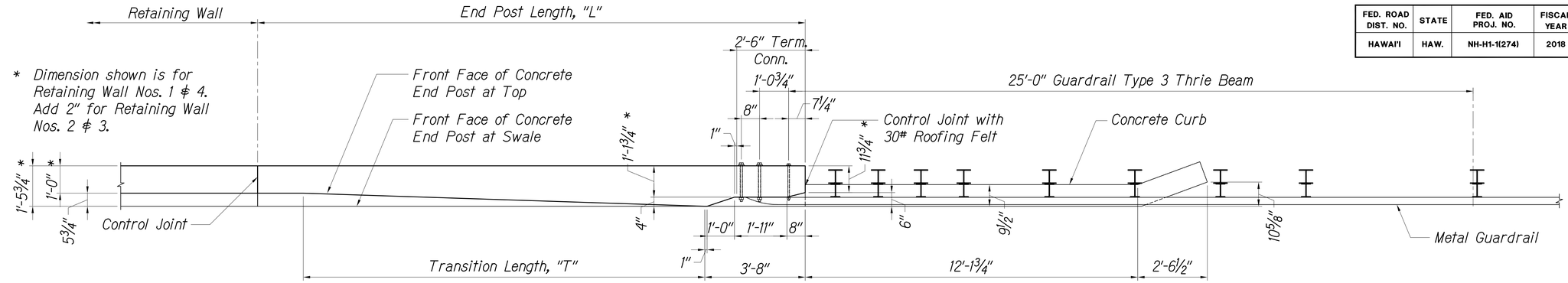
P:\4451-4500\4458 HDOT - Kiewit Design build of H1 Widening\004 Drawings\Structure\AutoCAD\Sorrel\Phase 2\2020-02-06 - As-Built\4458_S3-1-S3-4.dwg, 2/6/2020 11:23:39 AM, Hp Adobe PDF.pc3

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	98	126



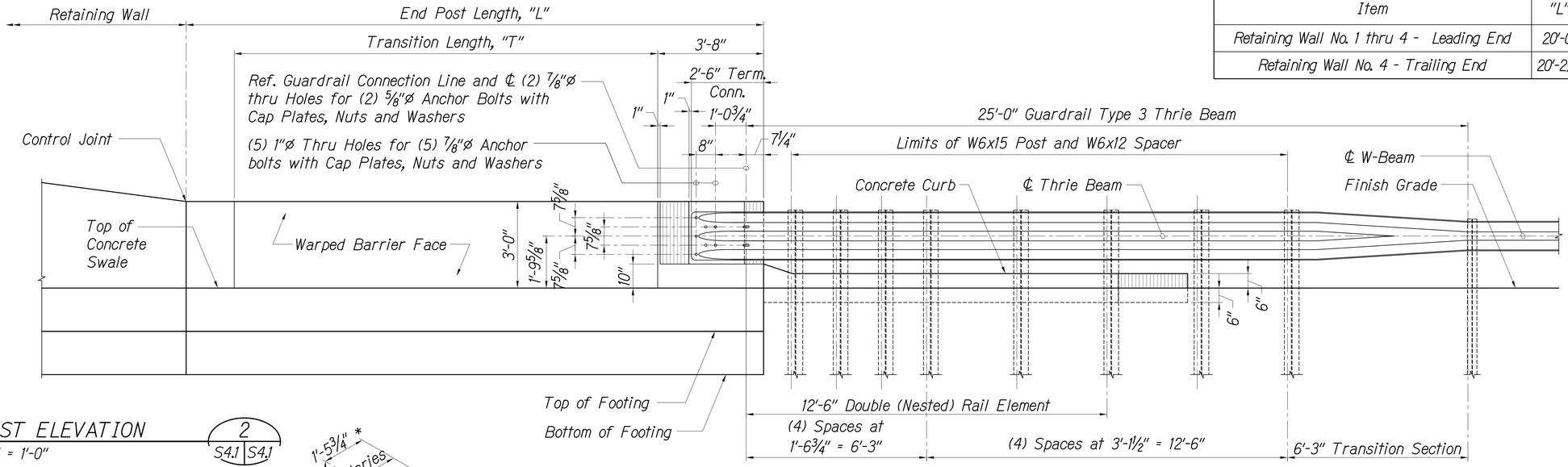
END POST PLAN

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

1 | S4.1 | S4.1

END POST DESIGN PARAMETERS

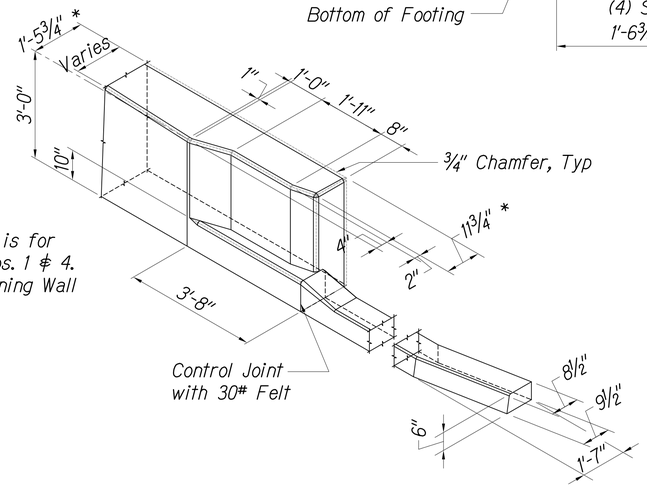
Item	"L"	"T"
Retaining Wall No. 1 thru 4 - Leading End	20'-0"	16'-4"
Retaining Wall No. 4 - Trailing End	20'-2¼"	6'-8¼"



END POST ELEVATION

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

2 | S4.1 | S4.1



* Dimension shown is for Retaining Wall Nos. 1 & 4. Add 2" for Retaining Wall Nos. 2 & 3.

END POST DETAIL

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

3 | S4.1 | S4.1

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RETAINING WALL END POST DETAILS

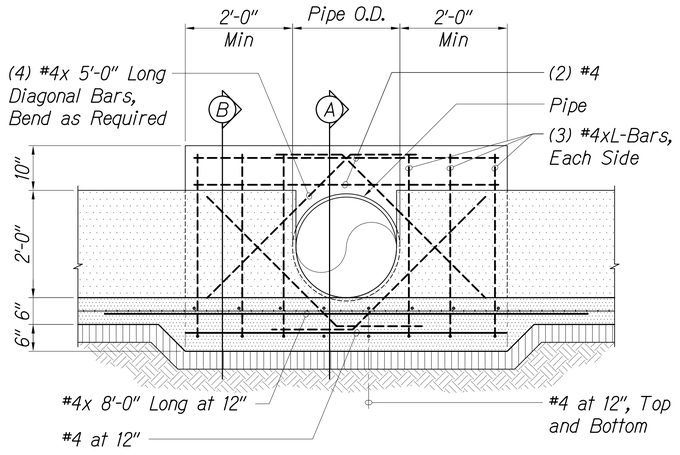
INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown Date: November 30, 2018

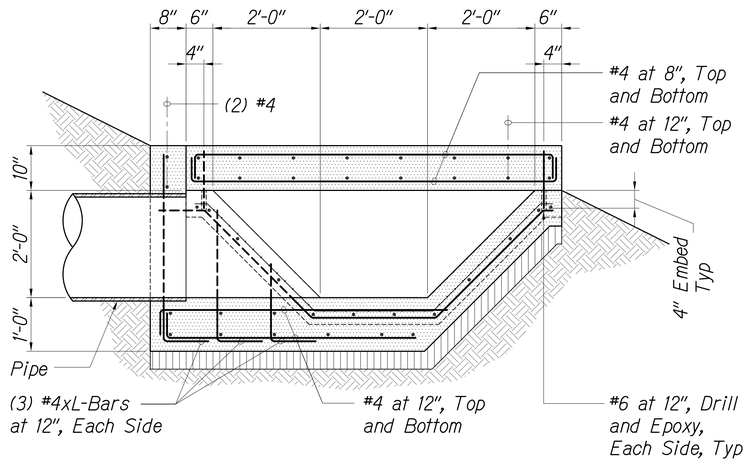
SHEET No. S4.1 OF 1 SHEETS

"AS-BUILT"

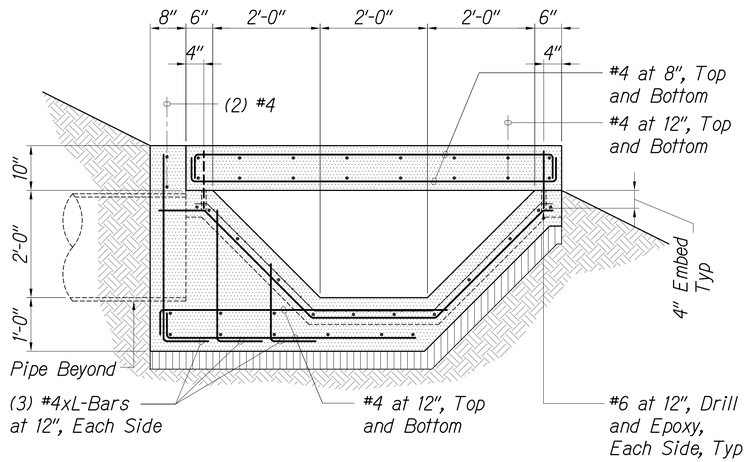
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	99	126



Pipe Headwall Section



A-Section

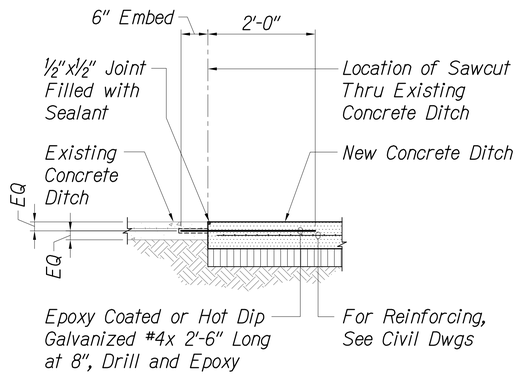


B-Section

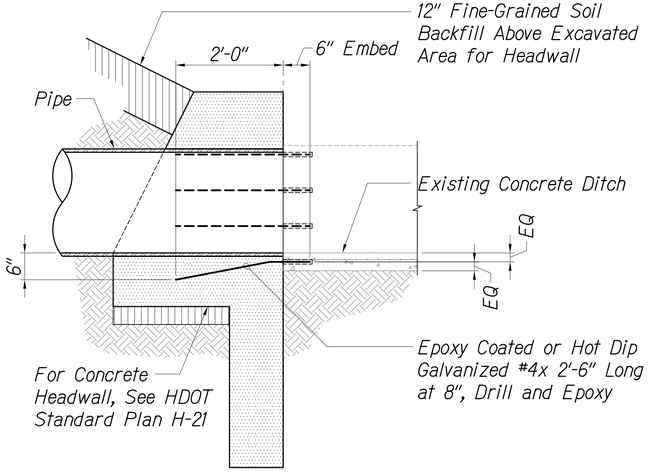
CONCRETE DITCH
PIPE HEADWALL AND AND CONCRETE TOP SLAB DETAIL

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

1
S5.1 | S5.1



Existing Ditch to New Ditch Section



Existing Ditch to New Concrete Headwall

CONCRETE DITCH
CONNECTION DETAILS

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

2
S5.1 | S5.1

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KEN KAZUO HAYASHIDA
LICENSED PROFESSIONAL ENGINEER
No. 6818-S
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE

April 30, 2020
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL CONCRETE DITCH DETAILS

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown Date: November 30, 2018

SHEET No. S5.1 OF 2 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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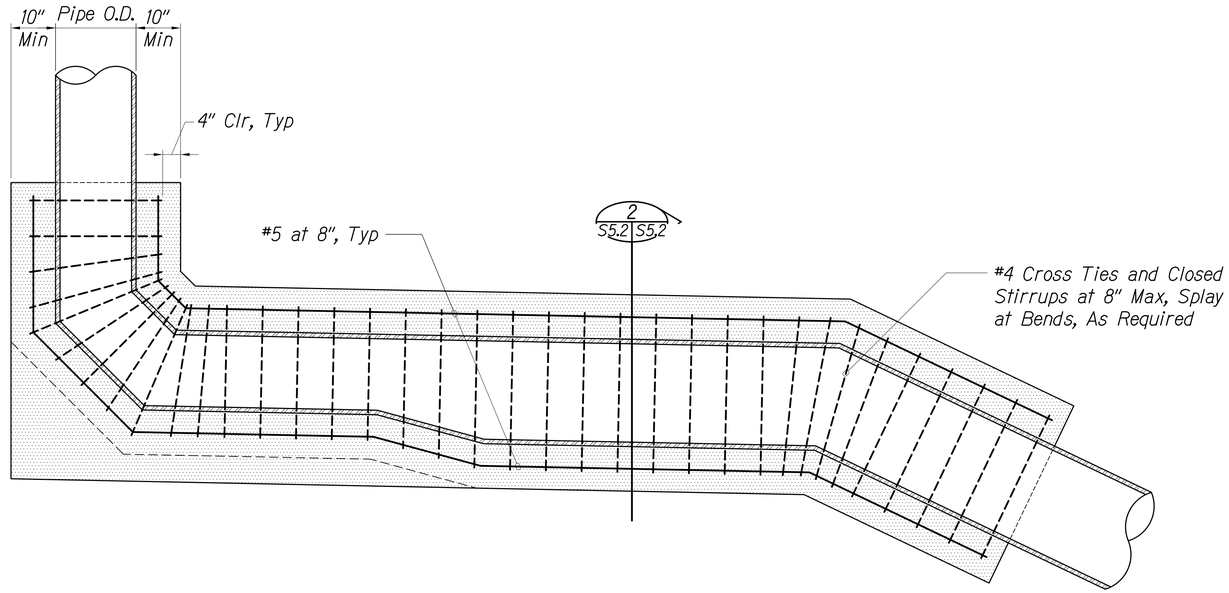
"AS-BUILT"

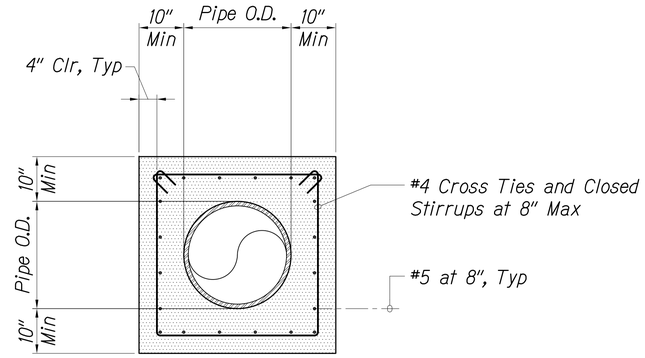
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	100	126



TYPICAL DRAINLINE COLLAR DETAIL

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

1
S5.2 S5.2



SECTION

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

2
S5.2 S5.2

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK	TRACED BY	
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL CONCRETE COLLAR DETAILS

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown Date: November 30, 2018

SHEET No. S5.2 OF 2 SHEETS

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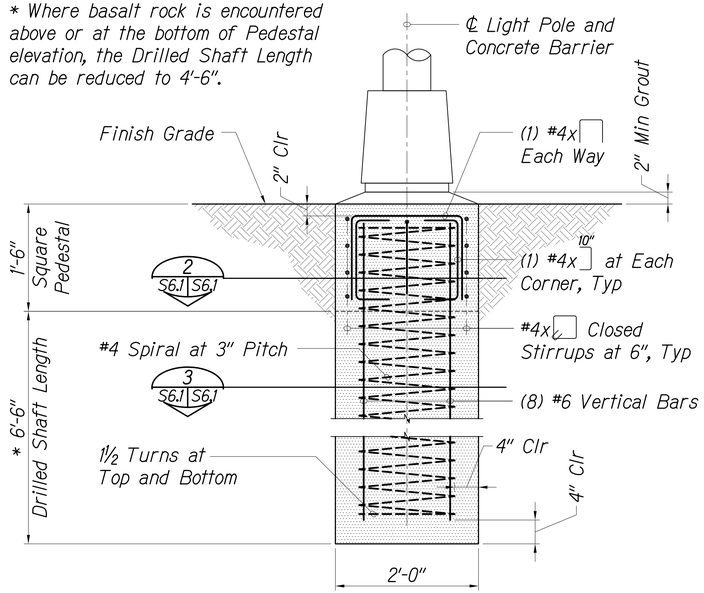
"AS-BUILT"

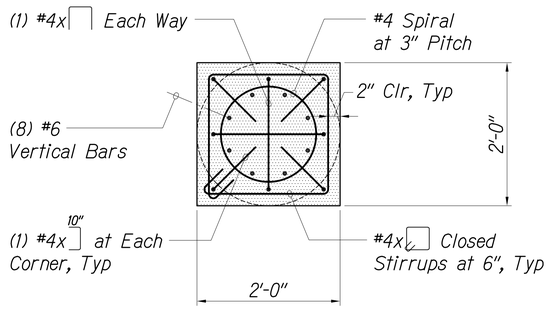
100

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	101	126

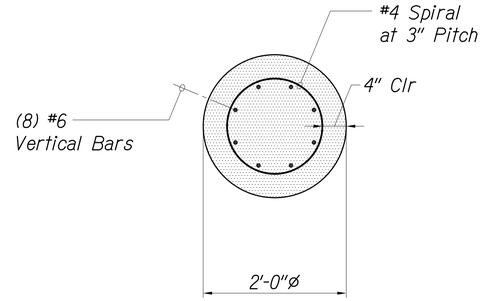
* Where basalt rock is encountered above or at the bottom of Pedestal elevation, the Drilled Shaft Length can be reduced to 4'-6".



TYPICAL LIGHT POLE FOUNDATION — 1 S6.1 S6.1
Scale: 1" = 1'-0"



SECTION — 2 S6.1 S6.1
Scale: 1" = 1'-0"



SECTION — 3 S6.1 S6.1
Scale: 1" = 1'-0"

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KEN KAZUO HAYASHIDA — LICENSED PROFESSIONAL ENGINEER — No. 6818-S — HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL LIGHT POLE FOUNDATION DETAILS

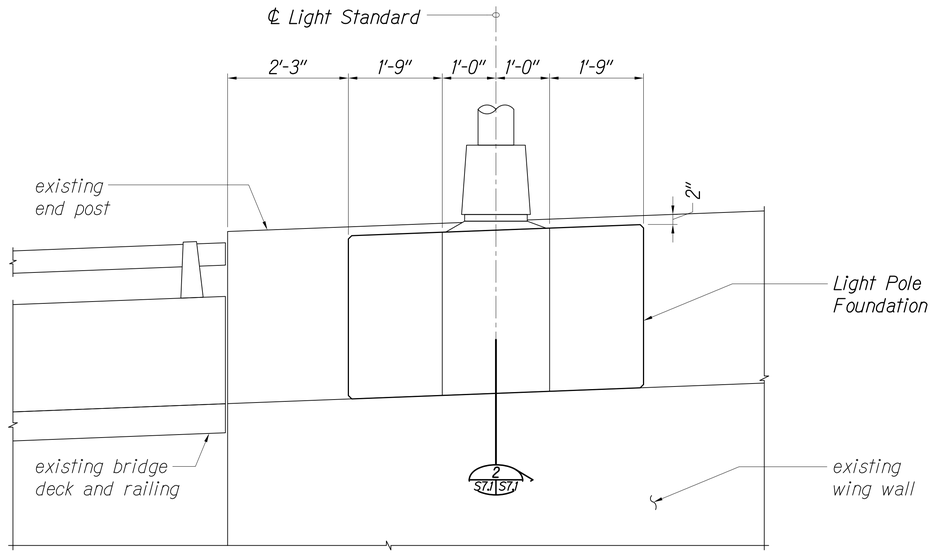
INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 – SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S6.1 OF 1 SHEETS

"AS-BUILT"

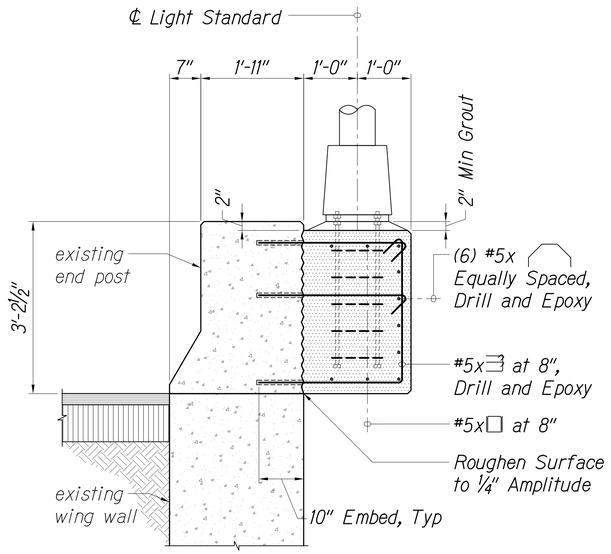
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAI'I	HAW.	NH-H1-1(274)	2018	101A	126



EXISTING BRIDGE END POST ELEVATION

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

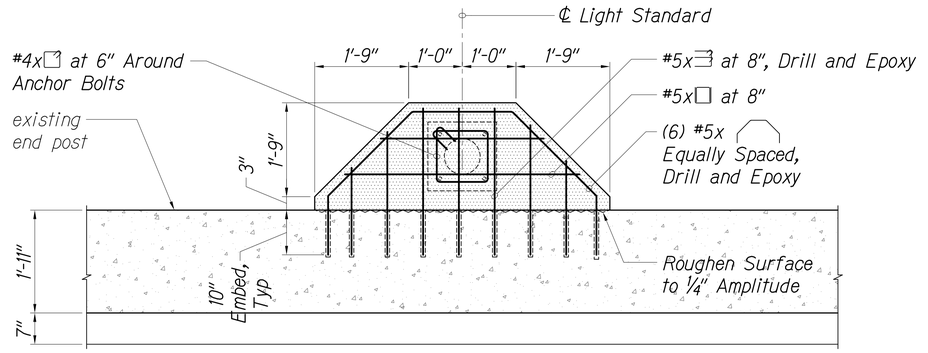
1
S7.1 S7.1



SECTION

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

2
S7.1 S7.1



Section - Plan View

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

END POST MOUNTED LIGHT POLE FOUNDATION

INTERSTATE ROUTE H-1
SHOULDER WORK AND PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION
VICINITY OF WAIMALU TO VICINITY OF HALAWA
PHASE 2 - SHOULDER WORK

Scale: As Shown — Date: November 30, 2018

SHEET No. S7.1 OF 1 SHEETS

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"AS-BUILT"

101A

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