

Notes:

- Use the Lengths in the Below Table, Unless Noted Otherwise.
- For Bars with Low Cover or Spacing, Increase Length by 50%. If Bars are Enclosed in Stirrups or Ties, Increase Applies when Bar Cover or Clear Bar Spacing is less than db. If Bars are not Enclosed in Stirrups or Ties, Increase Applies when Bar Cover is less than db or Clear Bar Spacing is less than 2db.
- For Top Bars Increase Length by 30%. A Top Bar is a Horizontal Bar with more than 12 Inches of Fresh Concrete Cast Below it.

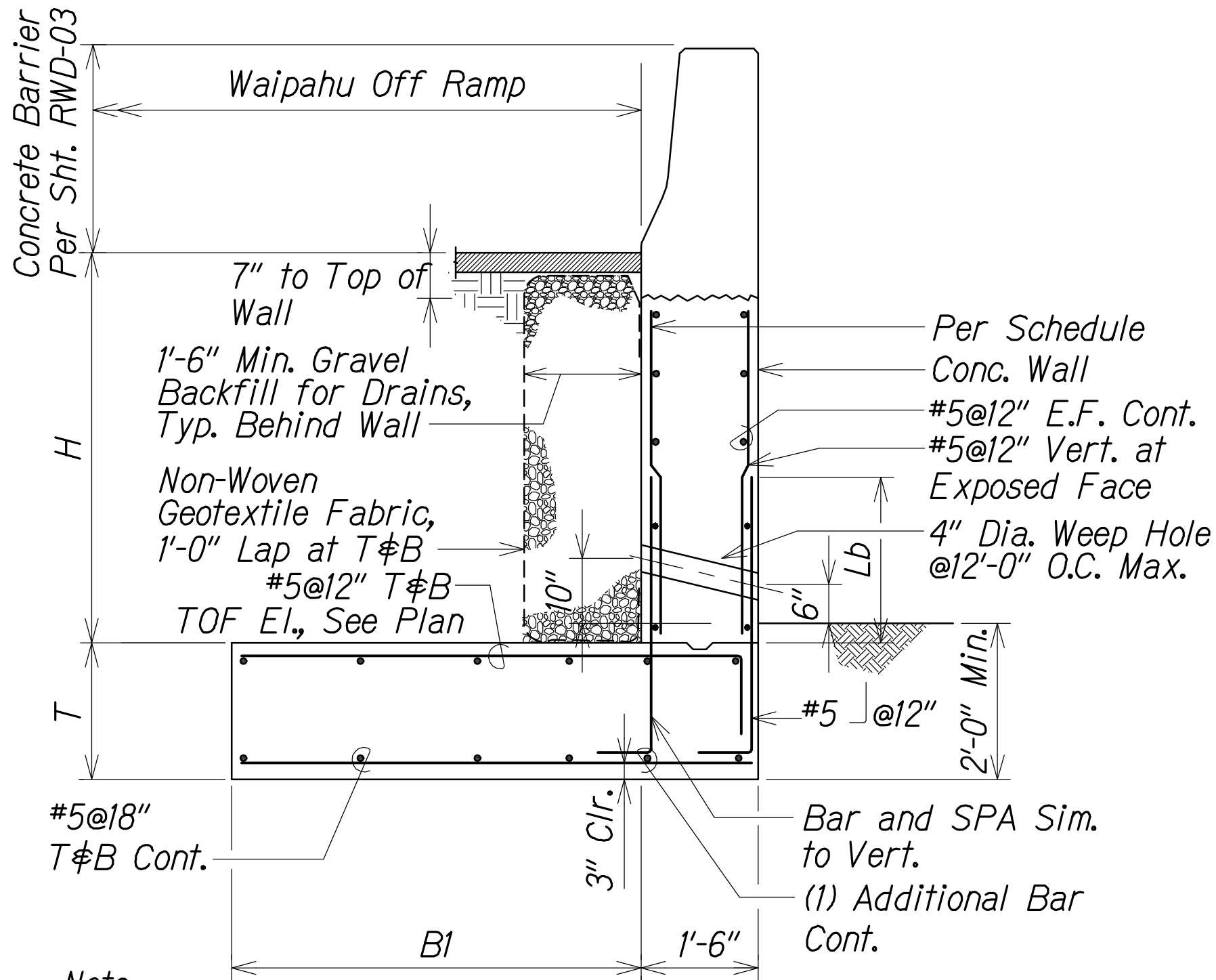
F'c = 4,000 p.s.i								
Size	$L_a^{(2,3,4)}$	$L_d^{(2,3,4)}$	L_{dh}	L_c	L_{cl}	$L_{ds}^{(4,5,6)}$	$L_{bs}^{(4,5,6)}$	L_{dhs}
3	15	19	8	8	12	15	20	6
4	19	25	10	10	15	19	24	8
5	24	31	12	12	19	23	30	10
6	29	37	15	15	23	28	36	11
7	42	54	17	17	27	32	42	13
8	48	62	19	19	30	37	48	15
9	54	70	22	22	34	42	54	17
10	61	79	25	25	39	47	61	19
11	67	87	27	27	43	52	67	21

Abbreviations:

- db Bar Diameter
 L_d Tension Development Length
 L_{dt} Tension Development Length For a Top Bar (See Note 3)
 L_a Class A Lap Splice Length
 L_{at} Class A Lap Splice Length For a Top Bar (See Note 3)
 L_b Class B Lap Splice Length
 L_{bt} Class B Lap Splice Length For a Top Bar (See Note 3)
 L_{dh} Tension Development Length For a Standard Hook
 L_c Compression Development Length
 L_{cl} Compression Lap Splice Length

REINFORCING BAR DEVELOPMENT TABLE

Not to Scale



Note:

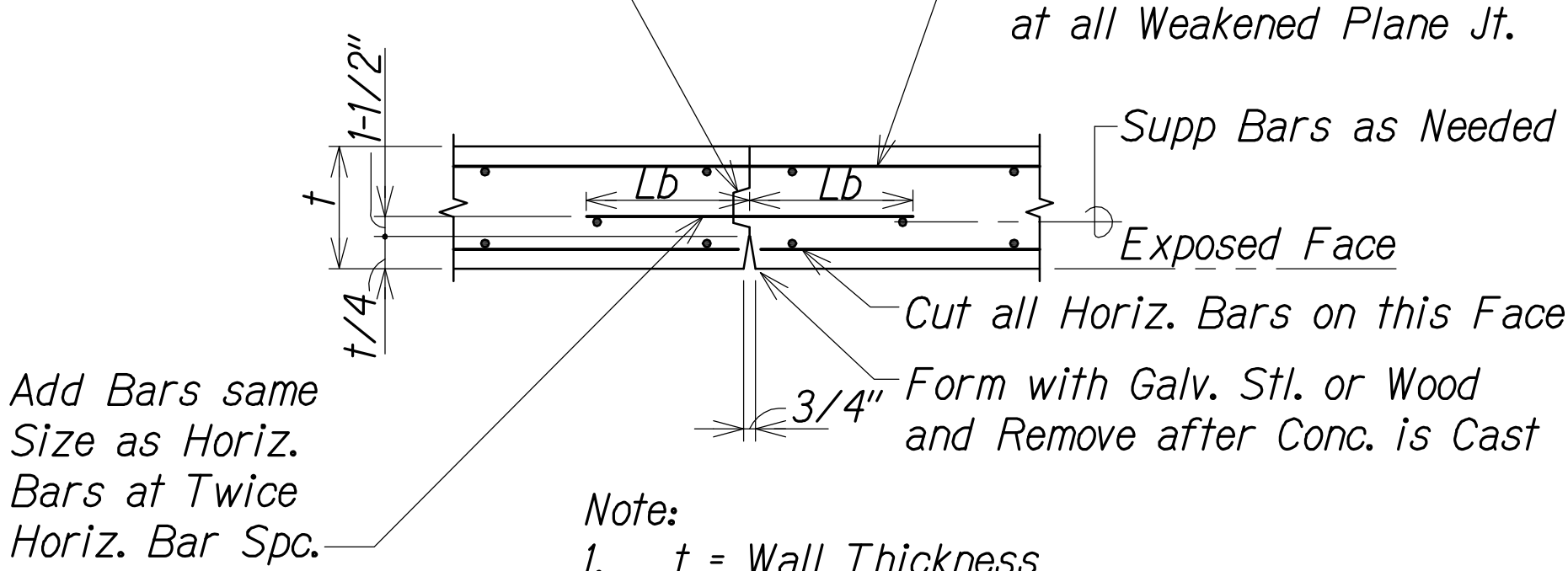
- Reinforcement Concrete Clear Cover Shall be 2" Typ. U.N.O.

SCHEDULE			
H	B1	T	STEM REINFORCING
5'-6"	7'-9"	1'-6"	VERT
			#5 @ 12"

RETAINING WALL DETAIL

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

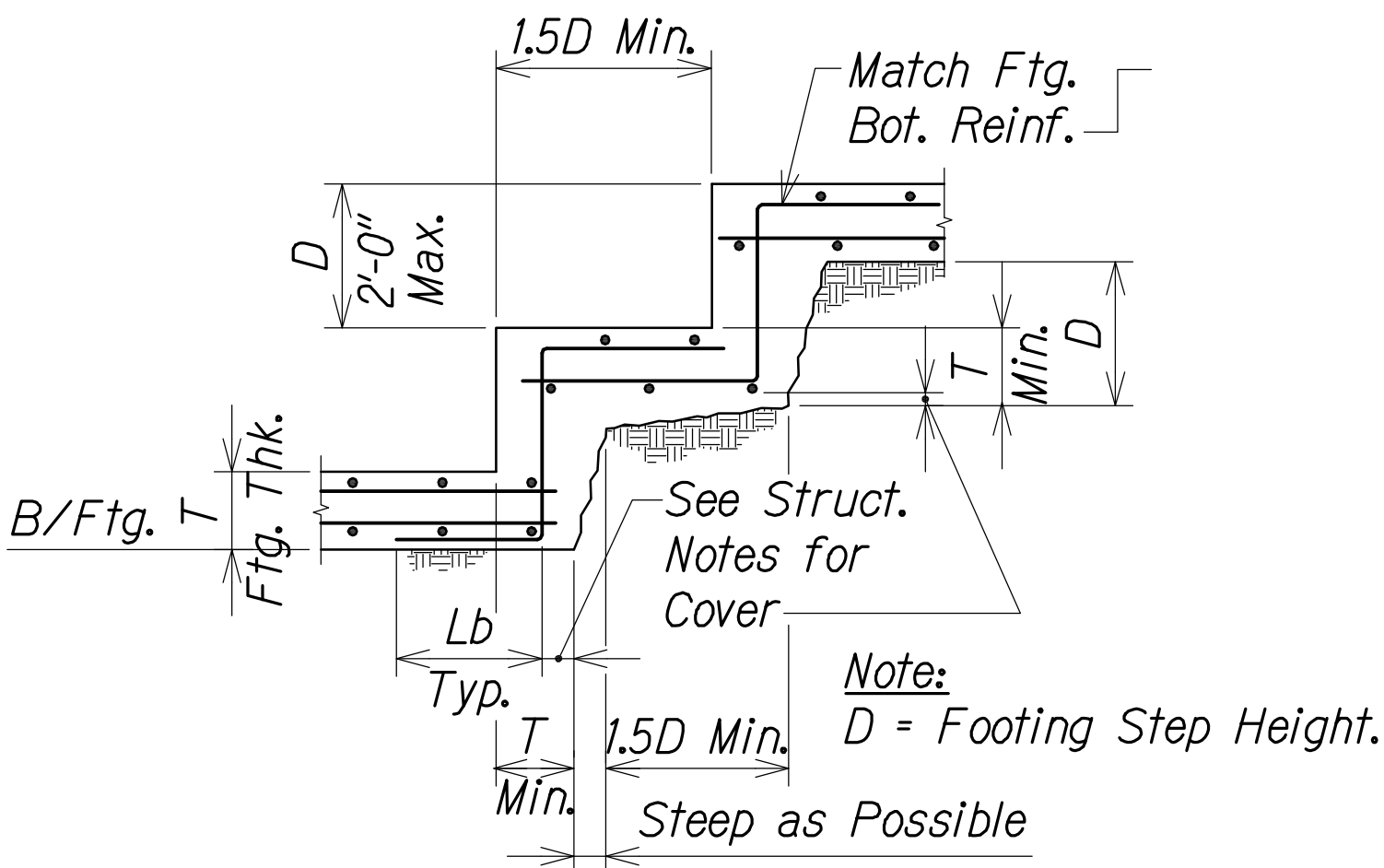
1-1/2"D x 3-1/2"W Key when Loc. at Const. Jt.



Double Layer Reinforcing Plan

TYPICAL CONCRETE WALL WEAKENED PLANE JOINT (WJ)

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

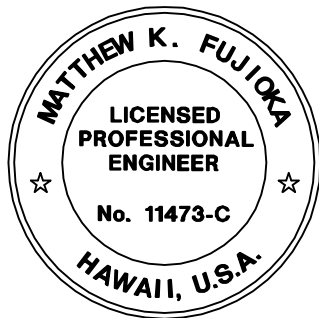


TYPICAL STEP FOOTING DETAIL

Not to Scale

LEGEND FOR AS-BUILT POSTINGS

- Squiggly line for as-built deletion
- Double line for as-built deletion
- Roadway Text for as-built posting



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Matthew K. Fujioa

APRIL 30, 2016

WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

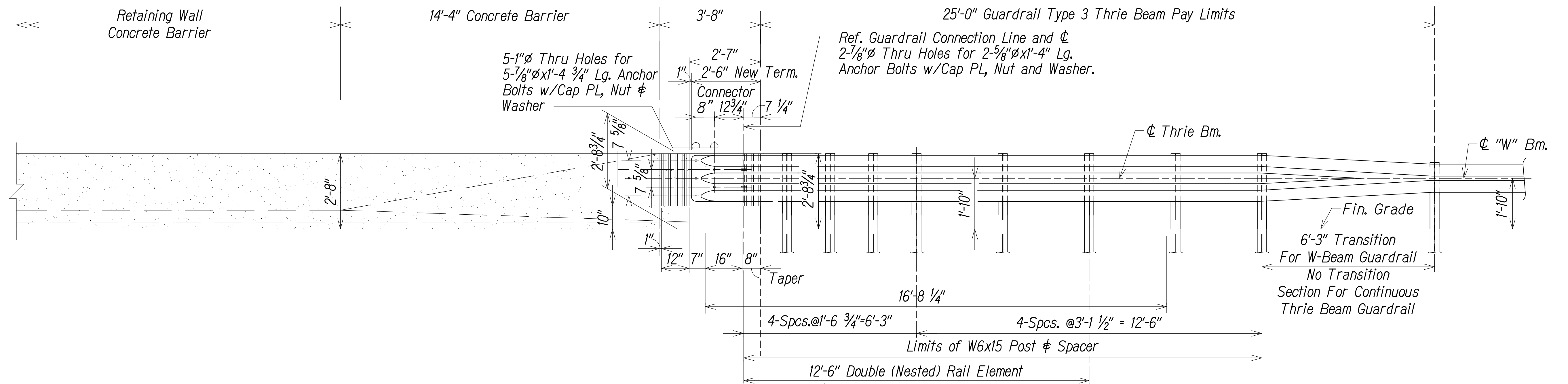
RETAINING WALL DETAIL

INTERSTATE ROUTE H-1
PM CONTRAFLOW LANE, PHASE 3
FEDERAL AID PROJECT NO. NH-HI-1 (260)

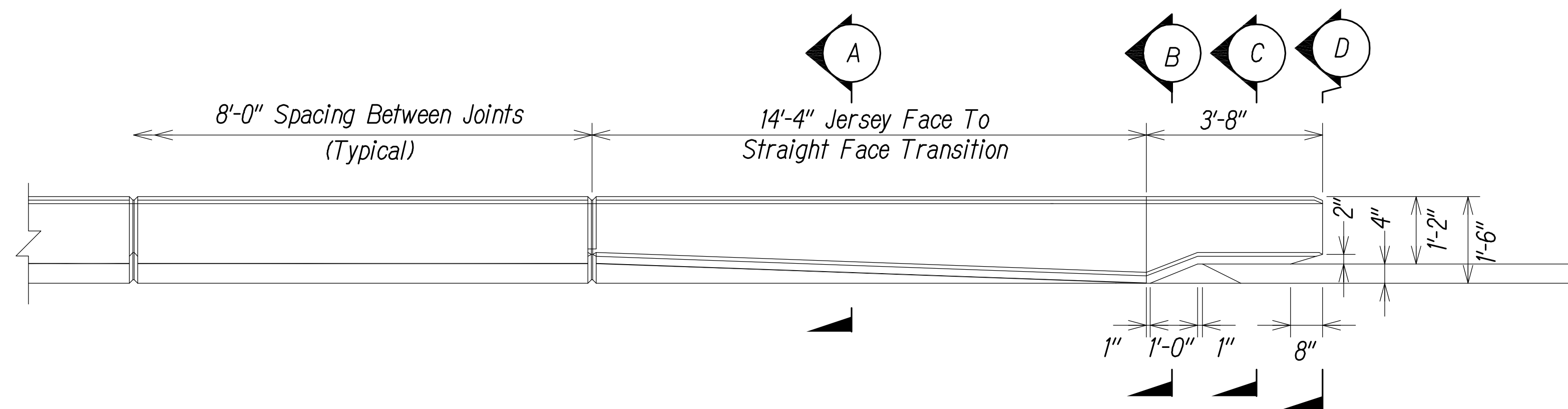
Scale: Date: December, 2014

SHEET No. RWD-02 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1 (260)	2014	64	200



ELEVATION
Not To Scale



PLAN
Not To Scale

Notes:

1. Attach Guardrail to Concrete Barrier with the Following:
 - 7/8" Dia. ASTM F1554 Grade 105 Bolts
 - Nuts AASHTO M291 Grade DH or AASHTO M292 Grade 2H
 - Washers ASTM F436
 - With Thin Slab Ferrule Inserts or Resin Bond Anchors
 - All Hardware shall be Hot-Dipped Galvanized



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.
Matthew K. Fujioa
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

LEGEND FOR AS-BUILT POSTINGS	
	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS

INTERSTATE ROUTE H-1
PM CONTRAFLOW LANE, PHASE 3
FEDERAL AID PROJECT NO. NH-HI-1 (260)

Scale: Date: December, 2014

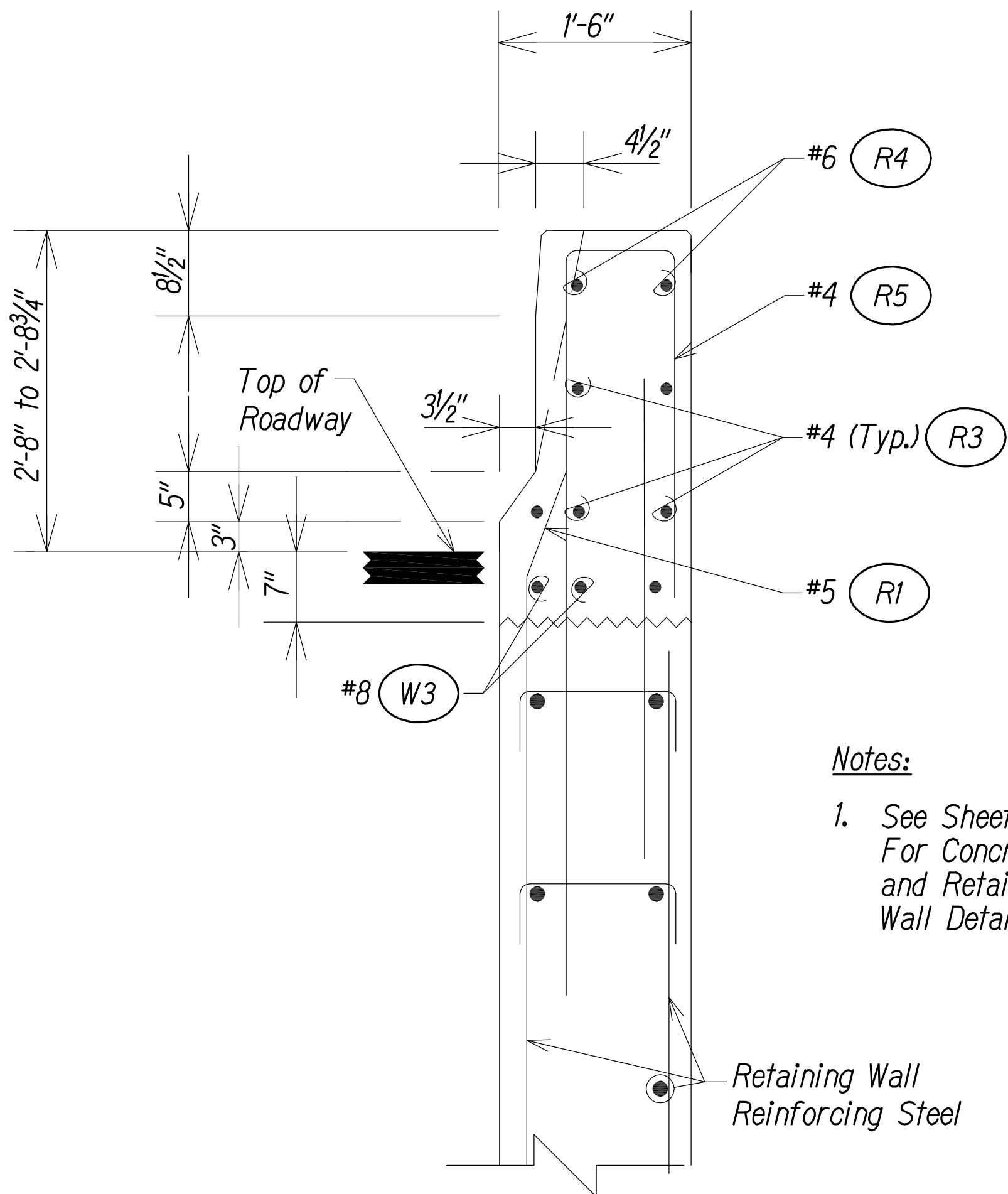
SHEET No. RWD-03 OF 5 SHEETS

QC/QA REVIEW	100%	DATE	JUL 12, 2015
BY			
BY			
BY			
BY			

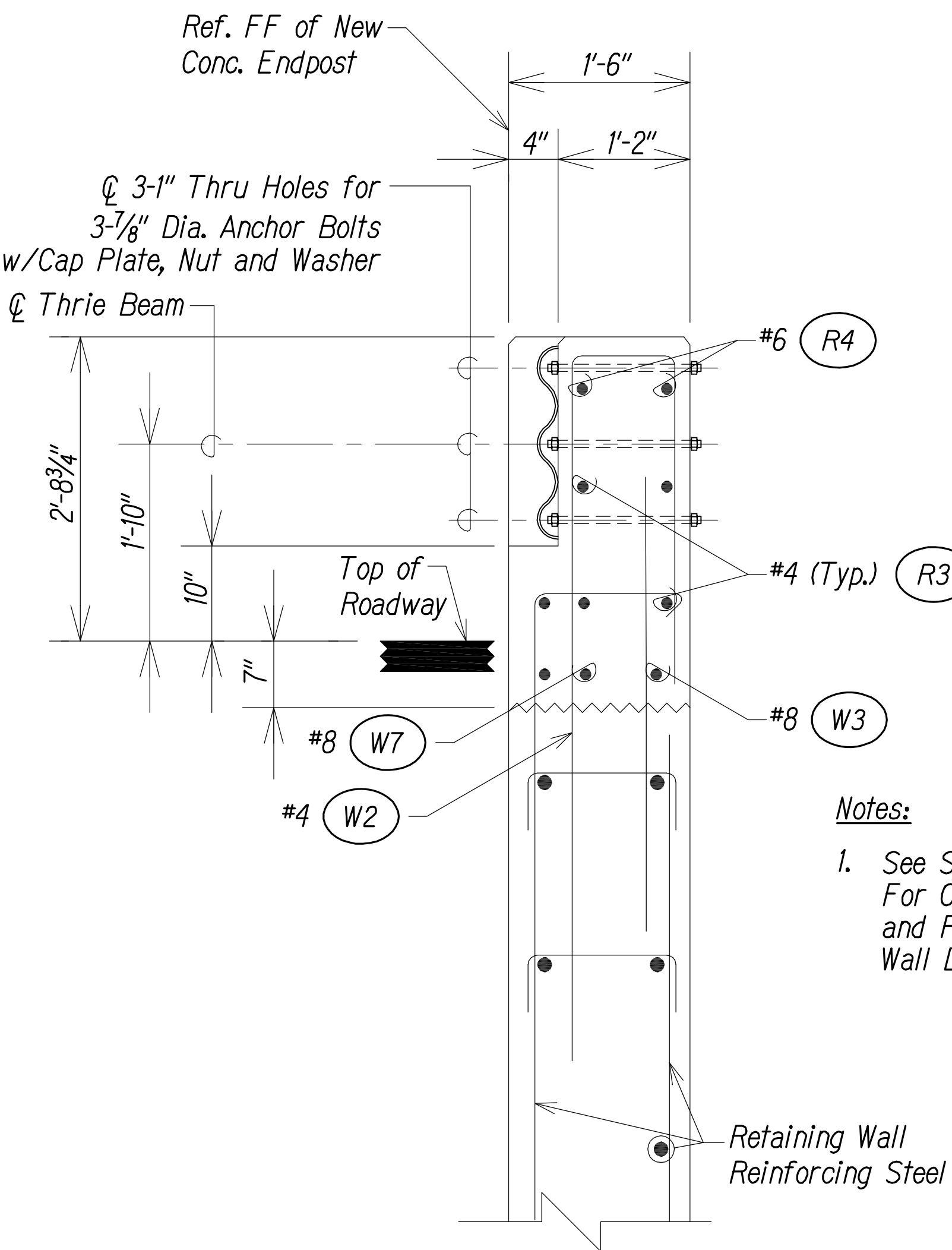
ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

THRIE BEAM GUARDRAIL TRANSITION AND CONNECTION TO RETAINING WALL
CONCRETE BARRIER END DETAIL

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-HI-1 (260)	2014	64A	200

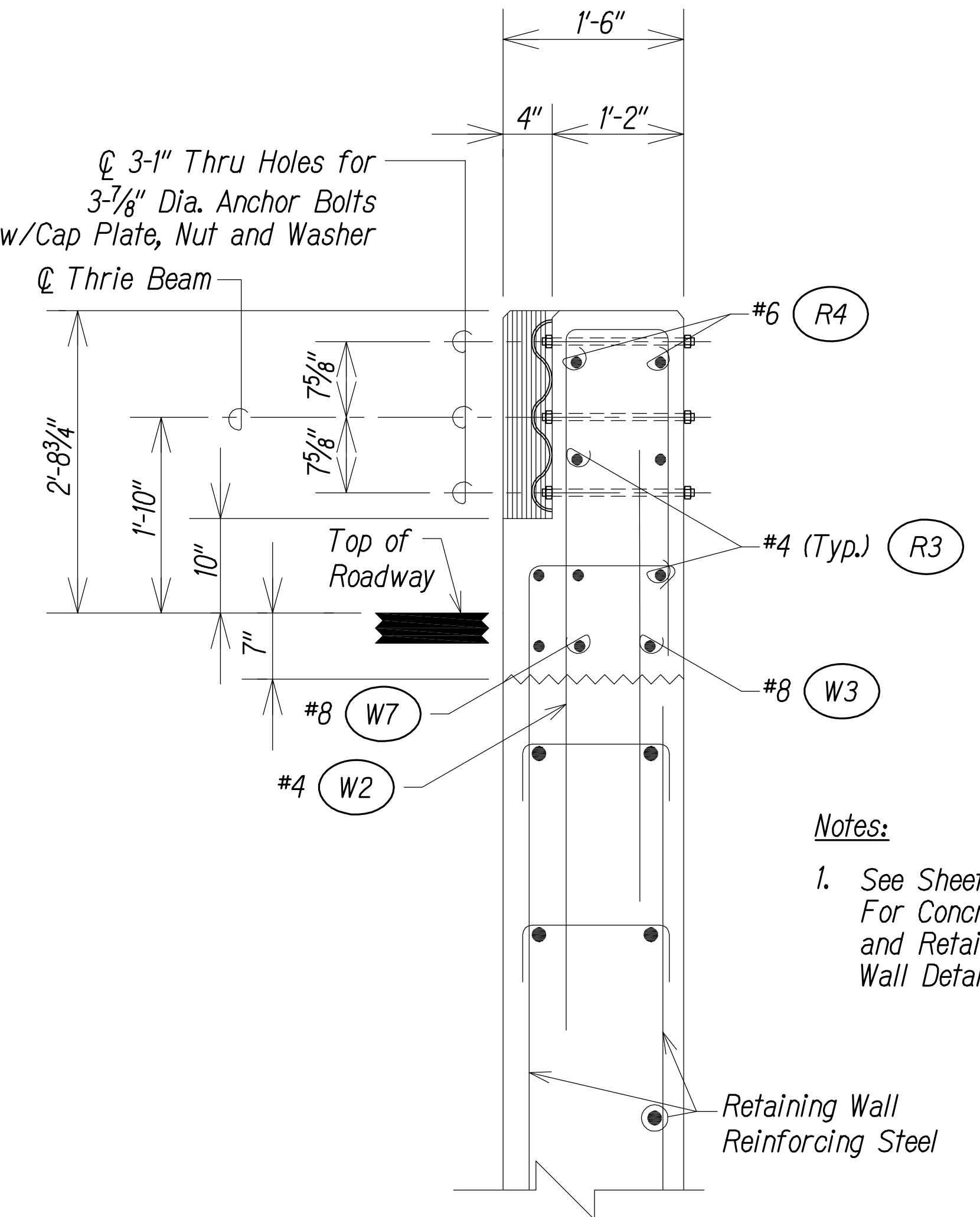


SECTION A



SECTION C

TYPICAL SECTIONS – ENDPOST DETAILS
NOT TO SCALE



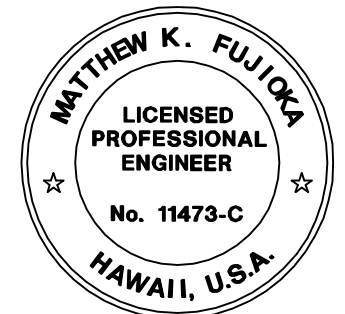
SECTION B

LEGEND FOR AS-BUILT POSTINGS

~~~~~ Squiggly line for as-built deletion

==±0±0== Double line for as-built deletion

Roadway Text for as-built posting



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.  
*Matthew K. Fujio*  
WILSON OKAMOTO CORPORATION APRIL 30, 2016 LIC. EXP. DATE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**GUARDRAIL DETAILS**

INTERSTATE ROUTE H-1  
PM CONTRAFLOW LANE, PHASE 3  
FEDERAL AID PROJECT NO. NH-HI-1 (260)

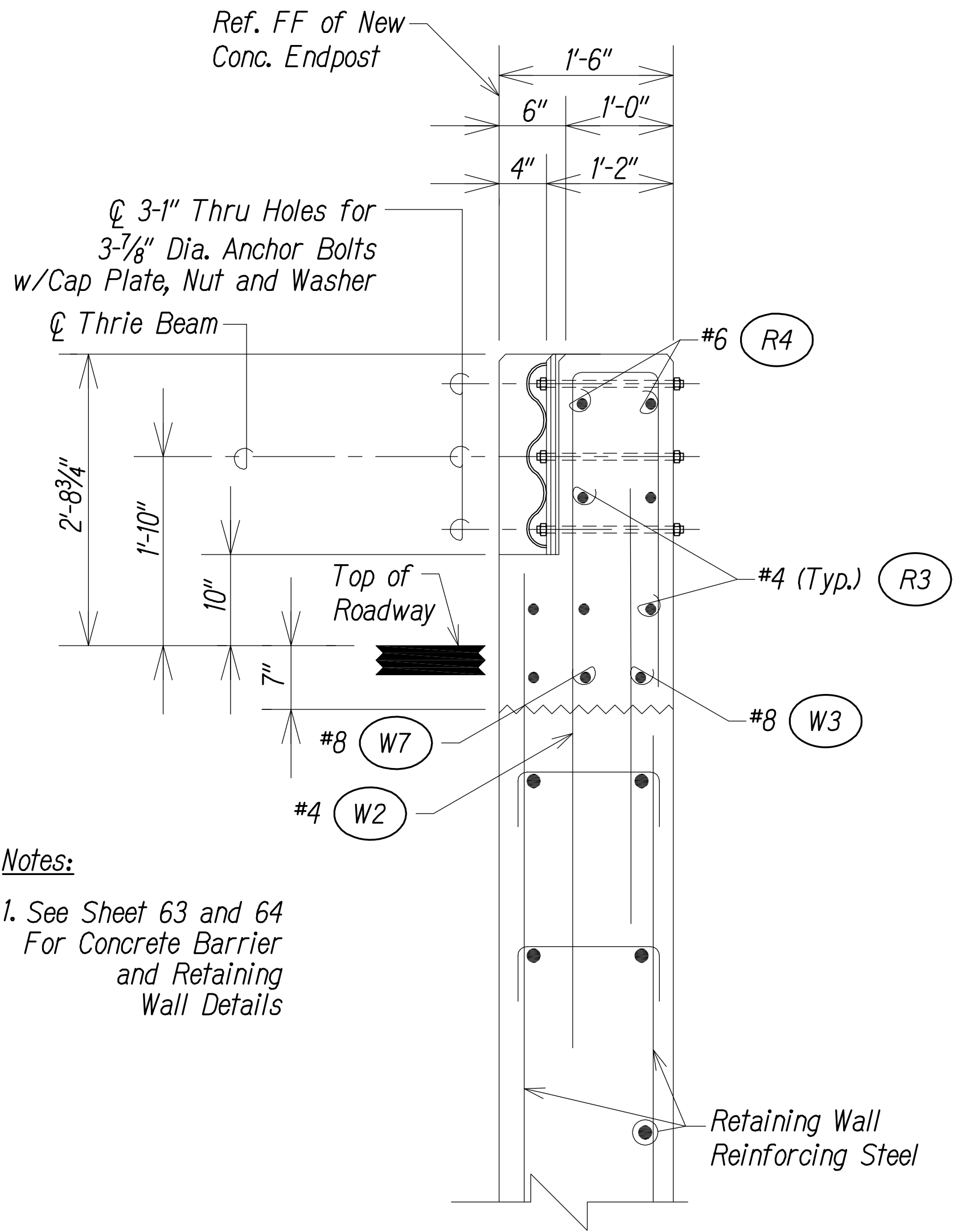
Scale: Date: December, 2014

SHEET No RWD-03A OF 5 SHEETS

|                     |       |                    |             |           |              |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
| HAWAII              | HAW.  | NH-HI-1 (260)      | 2014        | 64B       | 200          |

|                             |      |      |              |
|-----------------------------|------|------|--------------|
| QC/QA REVIEW                | 100% | DATE | JUL 12, 2015 |
| <input type="checkbox"/> BY |      |      |              |
| <input type="checkbox"/> BY |      |      |              |
| <input type="checkbox"/> BY |      |      |              |
| <input type="checkbox"/> BY |      |      |              |

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



Notes:  
1. See Sheet 63 and 64  
For Concrete Barrier  
and Retaining  
Wall Details

SECTION D

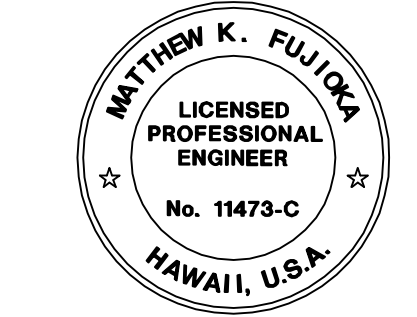
TYPICAL SECTIONS – ENDPOST DETAILS  
NOT TO SCALE

**LEGEND FOR AS-BUILT POSTINGS**

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting



THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION.  
*Matthew K. Fujioka*  
APRIL 30, 2016  
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**GUARDRAIL DETAILS**

INTERSTATE ROUTE H-1  
PM CONTRAFLOW LANE, PHASE 3  
FEDERAL AID PROJECT NO. NH-HI-1 (260)

Scale: Date: December, 2014

SHEET No RWD-03B OF 5 SHEETS