


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	ADD. 378	452

## STRUCTURAL GENERAL NOTES

- GENERAL SPECIFICATIONS: Hawaii Standard Specifications for Road and Bridge Construction, 2005, together with Special Provisions prepared for this contract.
- DESIGN SPECIFICATIONS:
  - AASHTO LRFD Bridge Design Specifications, 4th Edition, 2007, including subsequent interim revisions.
  - HDOT HWY-DB Memorandum dated April 15, 2008 with subject  title "Design Criteria for Bridges and Structures".
- LOAD:
  - Basic Wind Speed: 105 MPH
  - Seismic Load: Acceleration Coefficient = 0.085  
Seismic Performance Zone = 1  
Soil Profile Type 1 (S = 1.0)
- MATERIALS:
  - Minimum Concrete Compressive Strength (at 28 days)
    - All reinforced concrete = 4,000 psi.
    - All non-reinforced concrete = 3,000 psi
  - All reinforcing steel shall conform to ASTM A615, Grade 60, unless otherwise noted.
- REINFORCEMENT:
  - Unless otherwise noted, the covering measured from the surface of the concrete to the face of any reinforcing bars shall be as follows:
    - Formed surfaces exposed to earth and weather = 2" Clear.
    - Bottom and sides of footings and where concrete deposited on grade = 3" Clear.
  - Lap splice length for rebars shall be not less than 48 times bar diameter.
- STRUCTURAL STEEL:
  - Materials.
    - All structural bolts shall be hot-dip galvanized and conform to the following specifications:
      - ASTM A307, Grade A for bolts embedded in concrete.
      - ASTM A325, Type 1 for steel to steel connections.
    - Nuts shall be hot-dip galvanized and conform to the followings specifications:
      - ASTM A563, Grade DH for all galvanized bolts.
    - Washers, where required for ASTM A325 bolts, shall conform to ASTM F436, Type 1 and shall be hot-dip galvanized. Washers are required where bolt holes are slotted.
    - All rolled shape sections and miscellaneous plates, bars and rods shall conform to ASTM A572, Grade 50, hot-dip galvanized after fabrication.
    - Shop welds shall have a minimum ultimate strength of 60,000 psi. or equal to the min. ultimate strength of the material being welded.
    - Field welds shall have a minimum ultimate strength of 60,000 psi. or equal to the min. ultimate strength of the material being welded.
  - All ASTM A307 bolts shall be shear-bearing snug tight type with threads excluded from the shear plane unless otherwise noted.

- All ASTM A325 bolts shall be shear-bearing snug tight type with threads not required to be excluded from the shear plane unless otherwise noted.
  - All steel to steel connections shall be full welded unless noted otherwise.
- FOUNDATION:
    - The foundation design is based upon recommendations contained in the Geotechnical Engineering Exploration Report entitled "Geotechnical Engineering Exploration, Kaumualii Highway Widening, Phase 1A Vicinity of Anonui Street to Lihue, Island of Kauai, Hawaii, W.O. 3869-20(A)" dated July 17, 2008. The report shall be considered as a part of the construction documents and its recommendations shall be implemented unless otherwise directed by the Engineer. The Contractor may obtain a copy of the report at the State of Hawaii, Dept. of Transportation Highways Division upon written request to the engineer.
      - Design Soil Parameters
        - Retaining Wall Foundations
          - Bearing Pressure:  
Extreme Event Limit State = 9 KSF  
Strength Limit State = 5.4 KSF  
Service Limit State = 3 KSF
          - Coefficient Of Sliding Friction:  
Extreme Event Limit State = 0.46  
Strength Limit State = 0.36
          - Passive Pressure Resistance:  
Extreme Event Limit State = 350 PCF  
Strength Limit State = 175 PCF
        - Static Lateral Earth Pressures at Retaining Structures:
          - Active Condition, Level Backfill = 40 PCF; (82 PCF below groundwater)
          - At-Rest Condition, Level Backfill = 60 PCF; (92 PCF below groundwater)
        - Dynamic (Seismic) Lateral Earth Pressures at Retaining Structures:
          - Level Backfill = 3H PSF (Rectangular Distribution)
          - Sloping Backfill = 10H PSF (Rectangular Distribution)
      - Bottom of footings shall be as indicated on the drawings and shall bear on firm on-site soils or property compacted fill.
      - All fill and backfill material shall be placed in loose lifts not exceeding 8 inches and compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557-91 procedure "C".
      - Any loose or soft soil encountered during excavation or subgrade compaction operations shall be removed to firm soil and replaced with properly compacted fill.
      - It is important that all backfill material next to footings and footing keys are properly compacted in order to provide proper lateral earth resistance for structures.
      - All bottom of footing excavations shall be compacted to 95% prior to placement of reinforcing steel.
      - The Engineer shall be notified to check all footing excavations prior to placement of reinforcing steel and concrete.

## 8. GENERAL CONSTRUCTION NOTES:

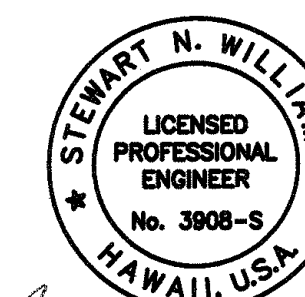
- See Standard Specifications and Special Provisions.
- All items noted incidental will not be paid for separately.
- Standard detail drawings refer to all structures in general, except for modifications as may be required for special condition. For such modifications, refer to the corresponding detailed drawings.
- The Contractor shall comply with all construction permits for this project. In addition, the contractor shall comply with all applicable laws of the Federal, State and County governments.
- Unless otherwise noted, all vertical dimensions are measured plumb.
- The contractor shall verify all site conditions before commencing with the work.
- The Contractor shall verify the location of all underground utility lines and notify the respective owners before commencing the work of excavation or drilling shafts.
- For concrete finish, refer to Standard Specifications.
- Unless otherwise noted, all exposed concrete edges shall be chamfered 3/4" x 3/4".

## 9. CONCRETE BOX CULVERT DRAIN LINES


- Concrete Box Culverts at Drain Lines No. 5, 7 and 8 are shown cast-in-place at sheet numbers D4.4/158; D5.5/165 and D6.1/169.
- Combined precast and cast-in-place alternates may be submitted for acceptance by the Engineer prior to construction. Combined precast and cast-in place alternates shall comply with the following:
  - Completed in place alternates shall conform to cast-in-place interior configuration and size shown on the drawings referenced at Note 9.A. above.
  - Completed in place alternates shall consist of a cast-in-place bottom slab and bottom fillets with 3 sided precast units above.
  - Precast units shall consists of combined top slab, top fillets and side walls.
  - The Contractor shall design combined precast and cast-in-place alternatives to the most current AASHTO Load and Resistance Factor Design Bridge Design Specifications with Subsequent interims. Refer to Notes 2.A. and 2.B. above. Calculations and shop drawings shall be sealed and signed by a Structural Engineer currently licensed in the State of Hawaii.

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ORIGINAL PLAN	
NOTE BOOK	
No.	

LE02 STATE DOT KAUMUALII-1 PHASE 1A REVISION PLANS, SH- GENNOTES.dwg 2/20/08



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*Stewart N. Williams*  
Mitsunaga & Associates, Inc.  
Expiration Date of License 4-30-10

7/16/09	 Revised Notes
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>STRUCTURAL GENERAL NOTES</b>	
KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)	
Scale: NONE	Date: JULY 2009
SHEET No. S1 OF S11 SHEETS	

ADD. 378

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	379	452

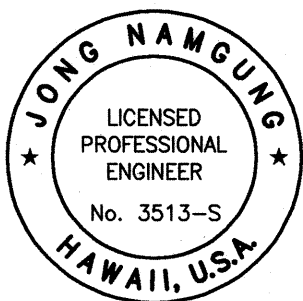
CMU RETAINING WALL NOTES:

- (A) See "Structural General Notes" shown on Sheet S1 for Structural Construction and Material requirements.
- (B) Construction shall conform to AASHTO Guide Specification for Structural Design of Sound Barriers, 1989, including subsequent interim revisions; Building Code Requirements for Masonry Structures (ACI 530); Specifications for Masonry Structures (ACI 503.1); and Chapters 17 and 21 of the International Building Code, 2003 as amended by the County of Kauai.
- (C) Concrete Masonry
- Concrete masonry units shall conform to ASTM C90.  $f'm=3,000$  PSI.
  - Mortar shall conform to ASTM C270, Type S, with a minimum 28 day compressive strength of 3,000 PSI.
  - Grout shall conform to ASTM C476, with a minimum 28 day compressive strength of 3,000 PSI.
  - Reinforcing steel in masonry shall be lapped 48 diameters minimum.
  - Horizontal joint reinforcing shall conform to ASTM A82. Provide reinforcing at 24" O.C., lap 8" minimum at all splices.
  - All walls shall be constructed in conventional running bond.
  - All cells shall be grouted solid. Reinforcing shall be secured against displacement prior to grouting by wire positions at intervals not exceeding 150 bar diameters or 6 feet.
  - The clearance between any masonry unit and reinforcing bar shall be 1/2" minimum to 1" maximum. The minimum clearance between parallel or intersecting reinforcing bars shall be 3/4".
  - When the grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout 1-1/2" below the top of the uppermost unit.
  - Prism Test Requirements: The specified compressive strength of masonry at the age of 28-days ( $f'm$ ) shall be verified on the basis of prisms tested 28-days after fabrication. Unless approved otherwise by the Engineer, and only as specified in Section 2105.2 of the International Building Code, 2003, as amended by the County of Kauai, verification by masonry prism testing shall meet the following:
    - A set of three masonry prisms shall be built and tested prior to the start of construction. Materials used for the construction shall be taken from those specified to be used in the project. Prism shall be constructed under the observation of the Engineer and tested by an Agency approved by the Engineer.
    - Full allowable stresses are used in this design. A set of three prisms shall be built and tested during construction for each 4,000 square feet (555.6 square yards) of wall area.

- (D) Concrete masonry units shall be manufactured with natural aggregates of basalt and limestone. Proportion shall be determined by the manufacturer.
- Size: 12"x8"x16".
  - Color: Color shall be accepted by the Engineer.
  - Texture: Split-face.
- (E) Unless accepted otherwise by the Engineer, cleanout openings shall be provided at the bottom of walls where the wall is in excess of 4 feet. After cell inspection, the cleanouts shall be sealed before filling with grout.
- (F) Place joint reinforcing in horizontal joints at spacings not exceeding 2 feet so that longitudinal wires are fully embedded in face shell mortar for their entire length. Place reinforcing in horizontal unit bond beams at spacings not exceeding 4 feet. Place and tie vertical reinforcements at top and bottom and interval not exceed 96 diameters of reinforcement or 4 feet.
- (G) Mortar joints shall be straight, clean and in thickness of 3/8 inch plus or minus 1/8 inch. Joints shall be concave.
- (H) After completion of the walls, apply a water-based, water repellent penetrating seal for masonry to all exposed surfaces.
- (I) Minimum concrete compressive strength at 28 days shall be 4,000 PSI.
- (J) All reinforcing bars shall conform to ASTM A615, Grade 60.
- (K) Horizontal joint reinforcing shall be Dur-O-Wal or approved equal, conform to ASTM A82. Provide reinforcing at 24" O.C.
- (L) Allowable tolerances for walls shall be:
- From Plumb: 1/4 inch for every 10 foot height or proportion thereof.
  - From Level: 1/4 inch for every 20 foot length or proportion thereof.
- (M) Soil Compacting Equipment: No vibratory compaction equipment shall be used in the CMU Retaining Wall construction.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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LIB2: STATE DOT\KAMUALII-1\PHASE1A REVISION\PLANS\ S02-CMUNOTE.dwg 3/16/09



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MITSUNAGA & ASSOCIATES  
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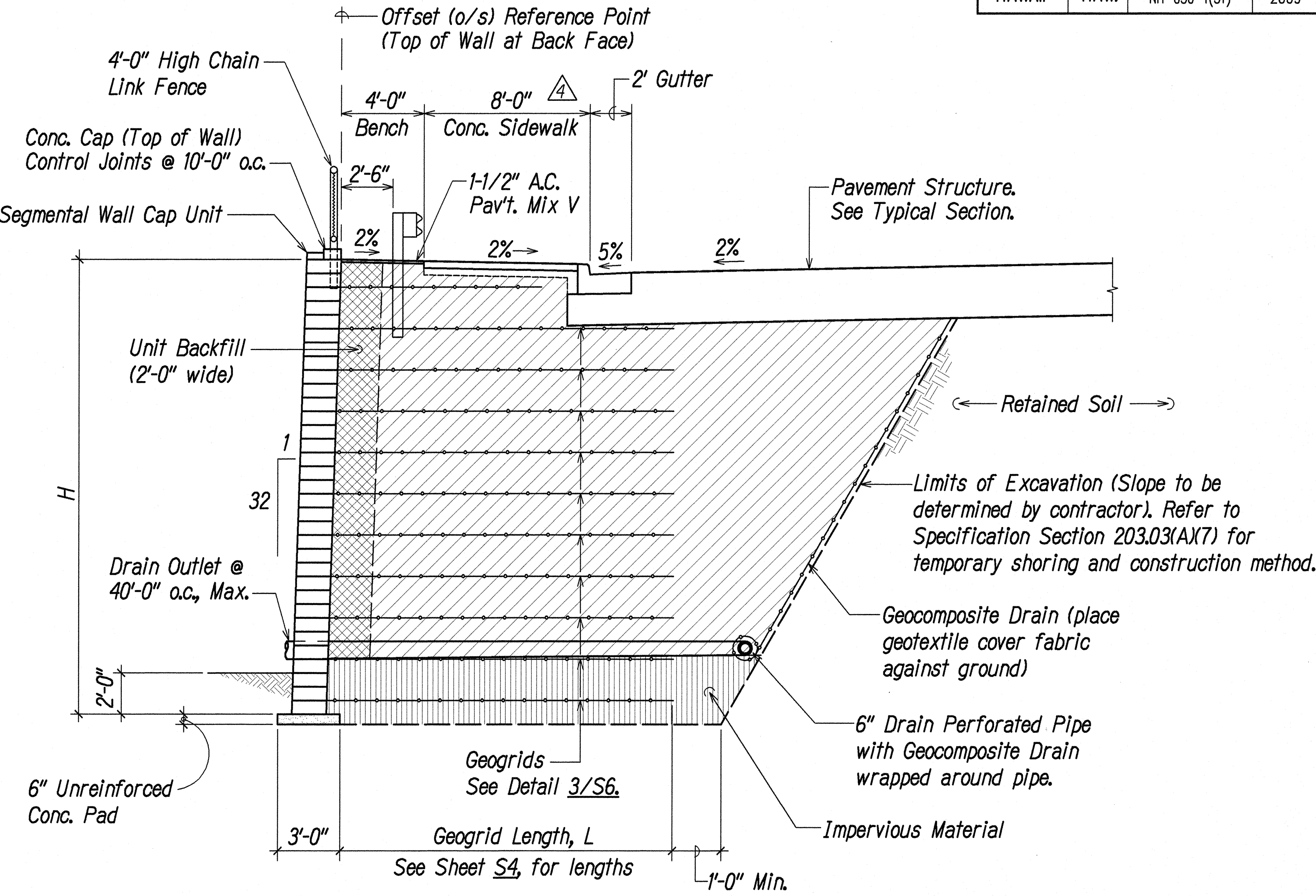
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>CMU RETAINING WALL NOTES</b>	
KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)	
Scale: NONE	Date: FEB. 2009
SHEET No. S2 OF S11 SHEETS	



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	C.O.380	452

**SEGMENTAL RETAINING WALL STRUCTURAL NOTES:**

- A. Segmental Concrete Facing Units:
- Units shall have a 28-day compressive strength of not less than 4,000 PSI.
  - Absorption = 8% maximum for standard weight aggregates.
  - Unit Depth = 21 inches minimum.
  - Unit Width to Height Ratio = 2.25 : 1
  - Unit Weight = 115 lb/unit minimum for standard weight aggregate
  - Inter-Unit Shear Strength = 1000 PLF minimum at 2 PSI normal pressure.
- B. Shear Connectors:
- Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degree F to +100 degree F. Shear connectors shall be 1/2 diameter thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods. Connectors shall have a minimum flexural strength of 128,000 PSI and short beam shear strength of 6,400 PSI.
  - Shear connectors shall be capable of holding the geogrid in the proper design position during grid pre-tensioning and backfilling.
  - The connection strength between the grogrid and the concrete facing units shall be determined per ASTM D6638.
- C. Geogrid:
- Geogrid structure shall consist of select high-density polyethylene, polyester or polypropylene resin. Geogrid shall be a geosynthetic reinforcement material having regular and defined open areas, and shall have a long-term design strength of 3,200 lb/ft as determined by ASTM D4395, D5262.
- D. Drainage Collection Pipe (6" Perforated Pipe):
- Install drainage collection pipe to maintain gravity flow of water from reinforced soil zone.
  - Daylight drainage collection pipe at face of wall, at a maximum spacing of 40 feet, on center. See Retaining Wall No. 1 Profile on Sheet S4 for approximate weep hole locations.
  - Minimum slope of perforated drainage pipes shall be 1.0%.



1 SEGMENTAL RETAINING WALL (SRW) TYPICAL SECTION  
Scale: 1/4" = 1'-0"

- Legend
- Select Granular Backfill
  - Unit Backfill
  - Impervious Material

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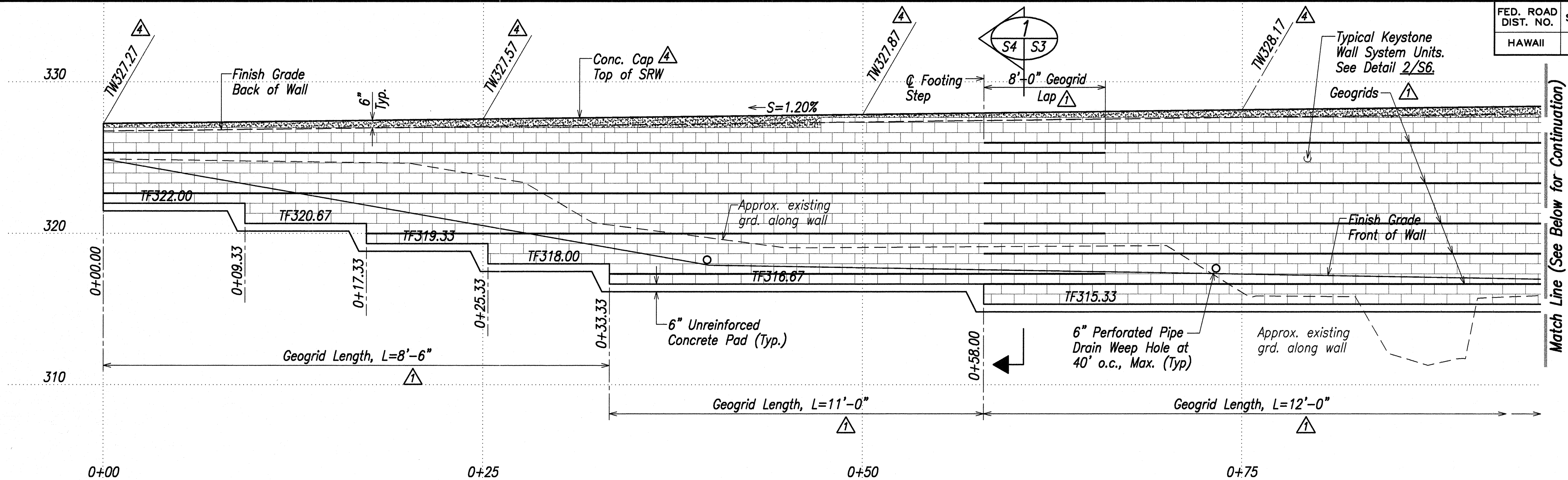
LIB2: STATE DOT KAUNALANI PHASE I A REVISION PLANS: COT-503-RET WALL-Struct-Notes.dwg

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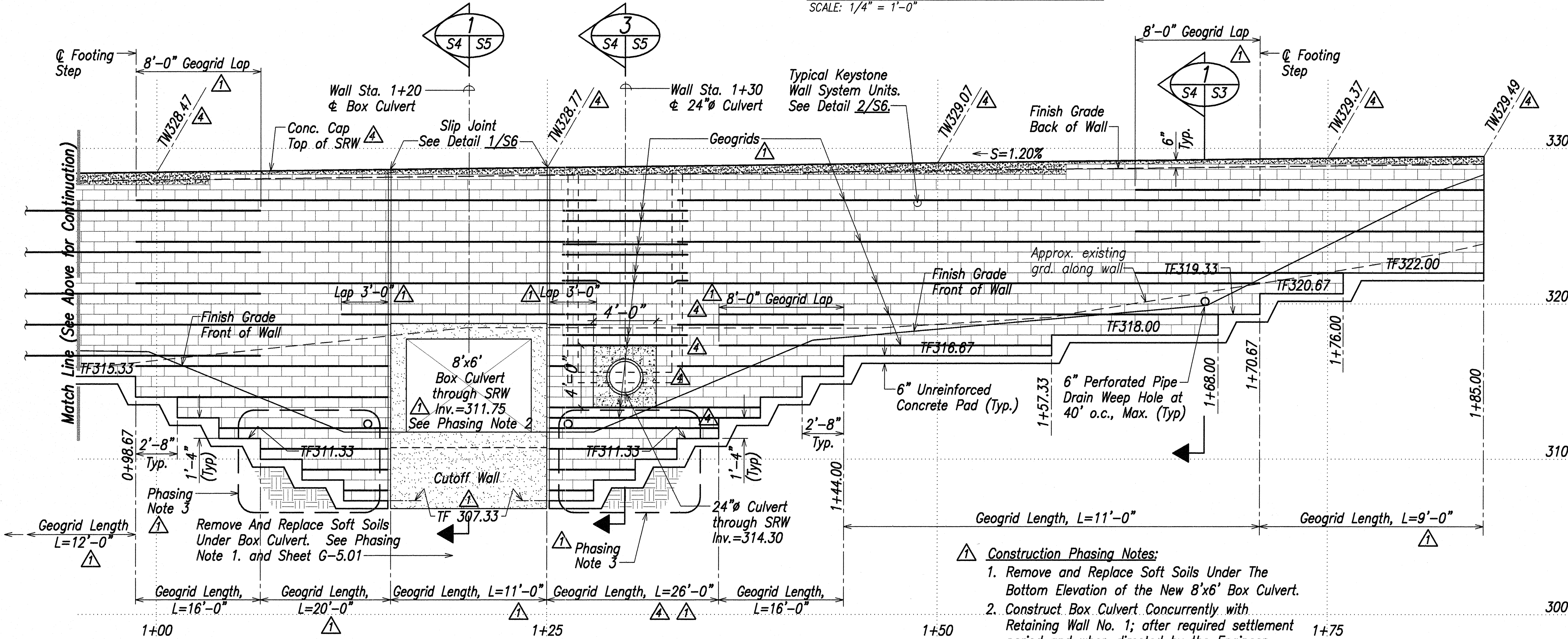
1/25/10	Added Conc. Curb, Gutter & Sidewalk (CGS). Removed Paved Shoulder and Grass Swale where replaced by CGS.
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION <b>SEGMENTAL WALL NO. 1</b> <b>STRUCTURAL NOTES &amp; SECTION</b> KAUNALANI HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31) Scale: 1/4" = 1'-0" Date: JAN. 2010 SHEET No. S3 OF S11 SHEETS	



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	C.O. ADD. 381	452



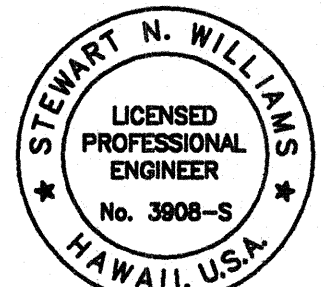
**PARTIAL PROFILE - RETAINING WALL NO. 1**  
SCALE: 1/4" = 1'-0"



**PARTIAL PROFILE - RETAINING WALL NO. 1**  
SCALE: 1/4" = 1'-0"

**Note:**  
Top of Wall (TW) grades are given at even 25-ft. stations and at end of wall.

- Construction Phasing Notes:**
1. Remove and Replace Soft Soils Under The Bottom Elevation of the New 8'x6' Box Culvert.
  2. Construct Box Culvert Concurrently with Retaining Wall No. 1; after required settlement period and when directed by the Engineer.
  3. Portions of Free-Draining Granular Fill with non-woven geotextile required by Phasing Note 1 above will require excavation for Construction of Retaining Wall No. 1.



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Mitsunaga & Associates, Inc.  
Expiration Date of License: 1-30-10

DATE	REVISION
1/25/10	4 Revised Top of Wall Grades. Revised Geogrid and Geogrid Length at Sta. 1+25 to Sta. 1+36.
7/16/09	1 Revised Footing Configuration and Geogrid; Added Phasing Notes.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SEGMENTAL WALL NO. 1**  
**WALL ELEVATION**

KAUMUALI HIGHWAY WIDENING  
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge  
FEDERAL-AID PROJECT NO. NH-050-1(31)

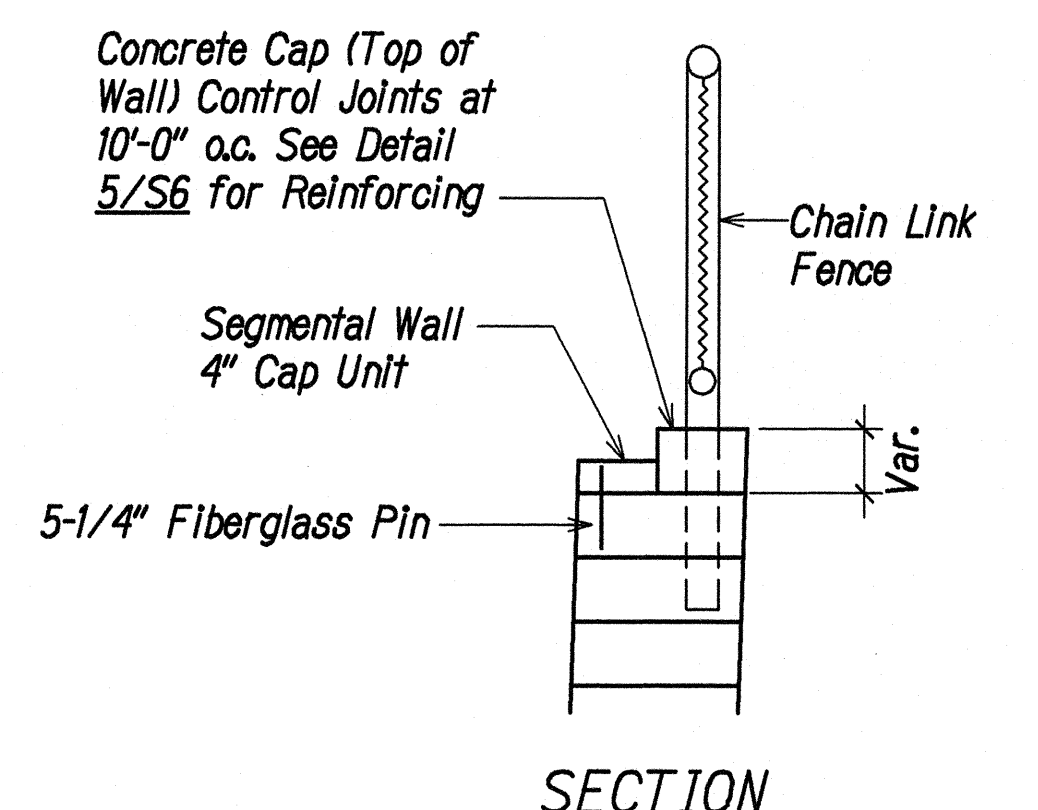
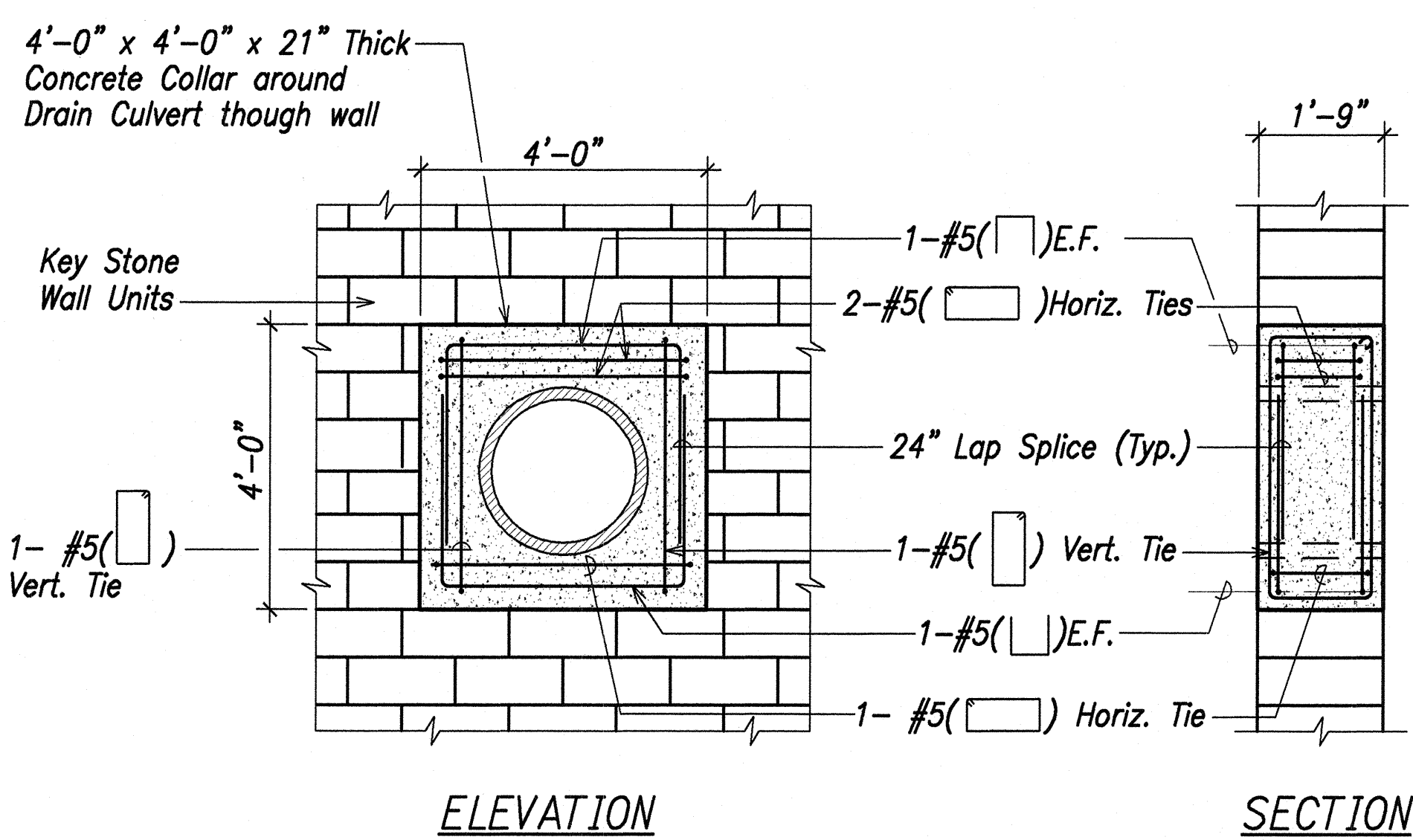
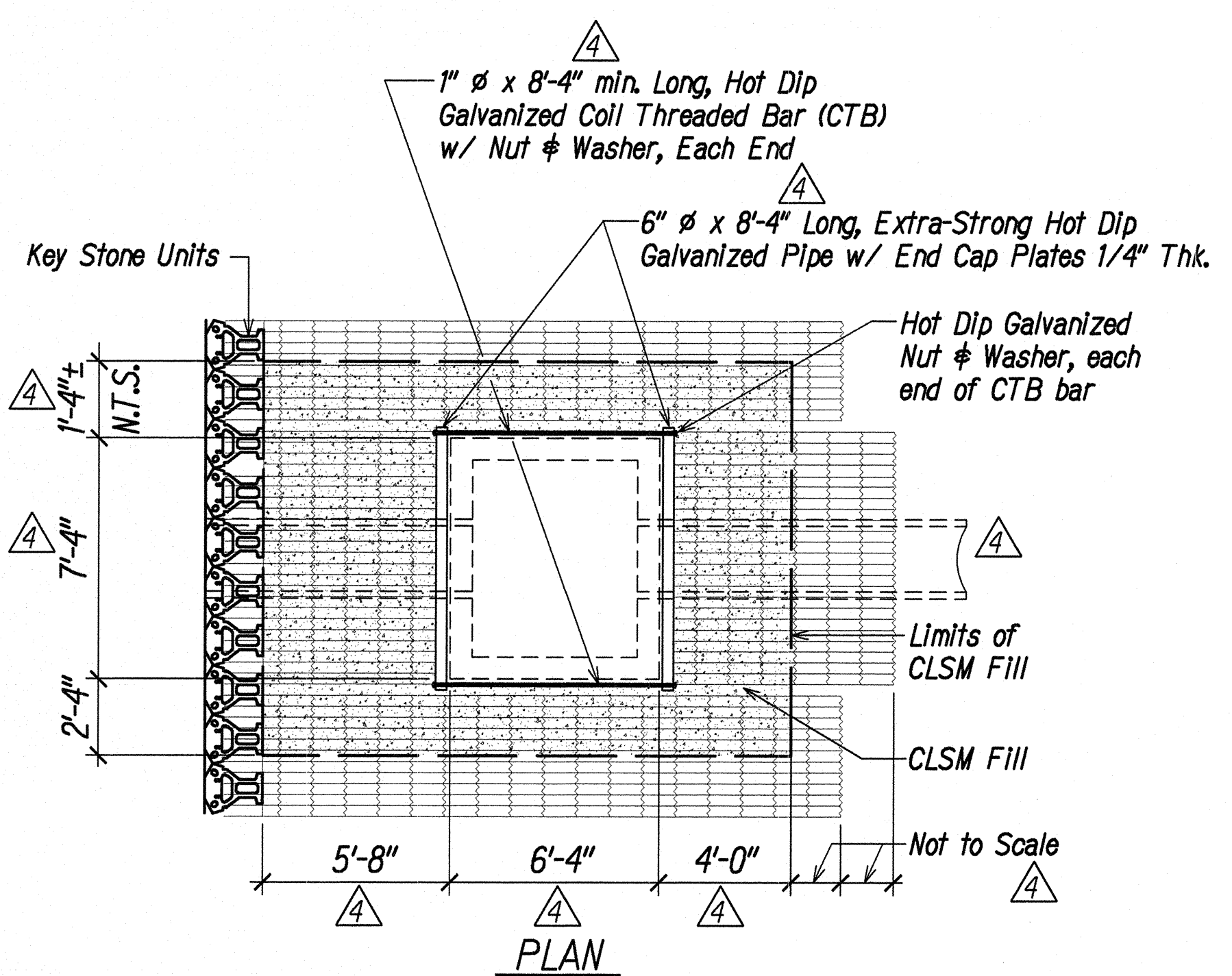
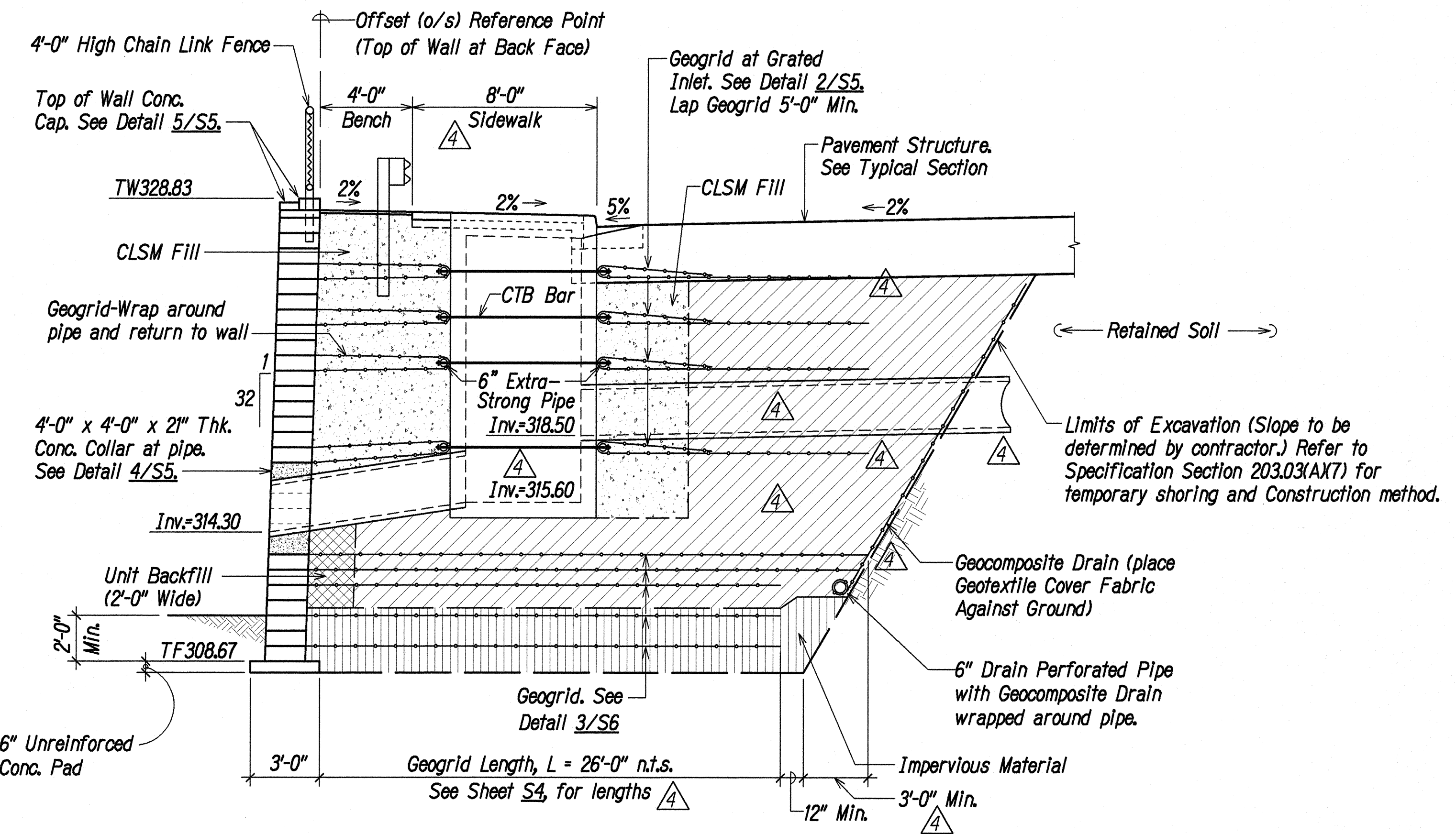
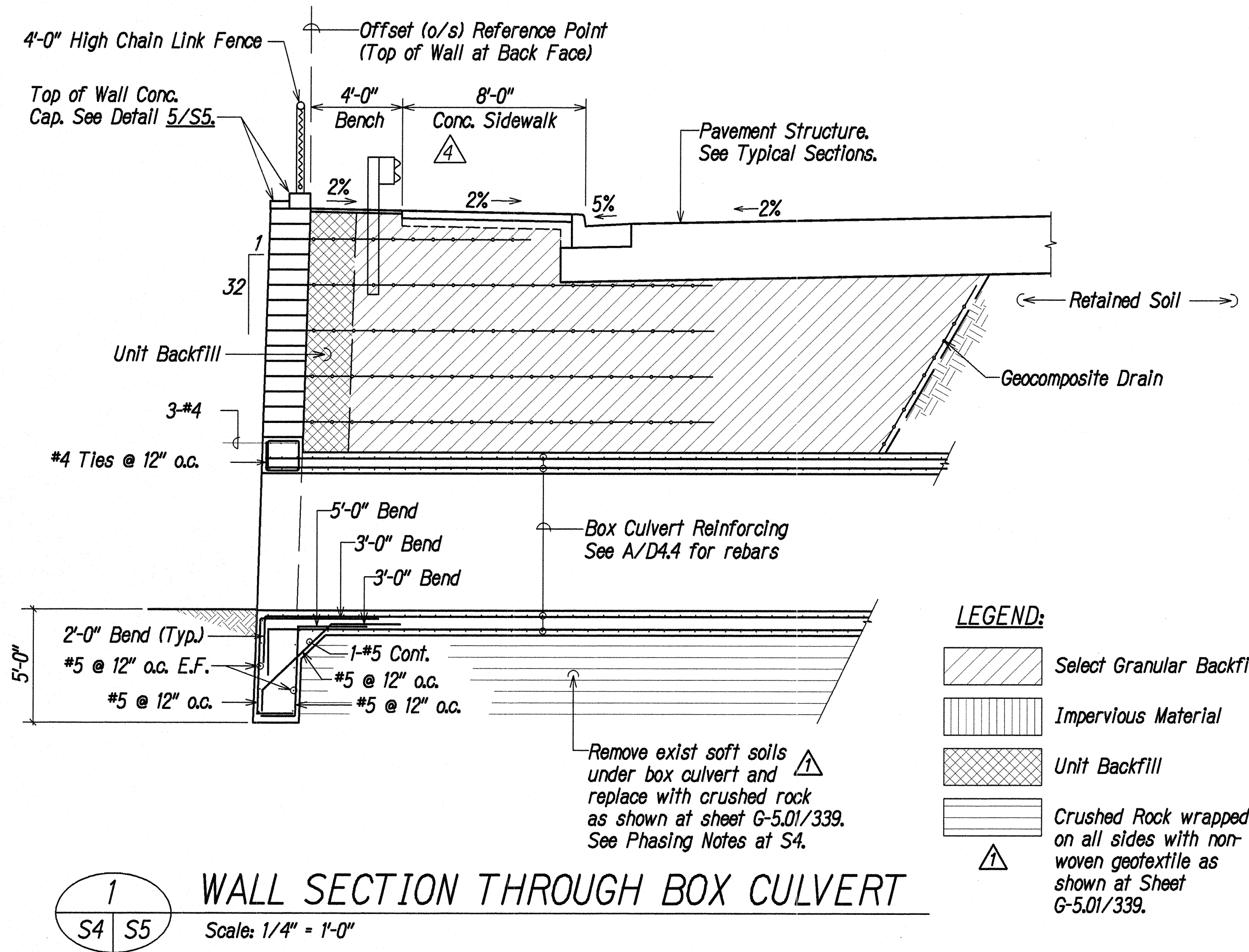
Scale: 1/4" = 1'-0" Date: JAN. 2010

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UBS: STATE/NOT/KAUMUALI-1/PHASE1A REVISION/PLANS/001-304-Red Wall No-1 Profile 12/28/09



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1/25/10	<u>4</u>	Added Conc. Curb, Gutter & Sidewalk on Sections 1 and 3. Revised Dimensions on Detail 2, Revised Geogrid Length; added Geogrid below GDI at Section 3.
7/16/09	<u>1</u>	Revised Subgrade at Detail 1.
DATE	REVISION	

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SEGMENTAL WALL NO. 1**  
**WALL SECTIONS & DETAILS**

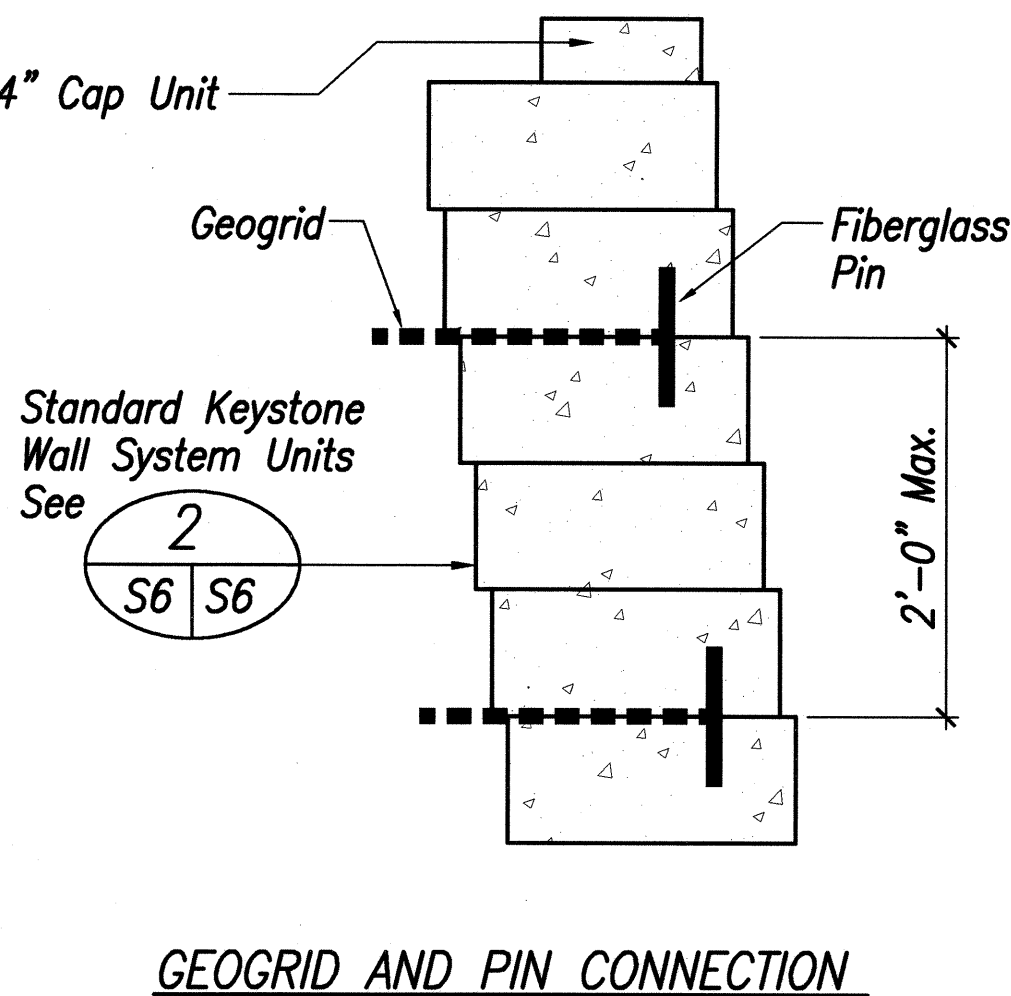
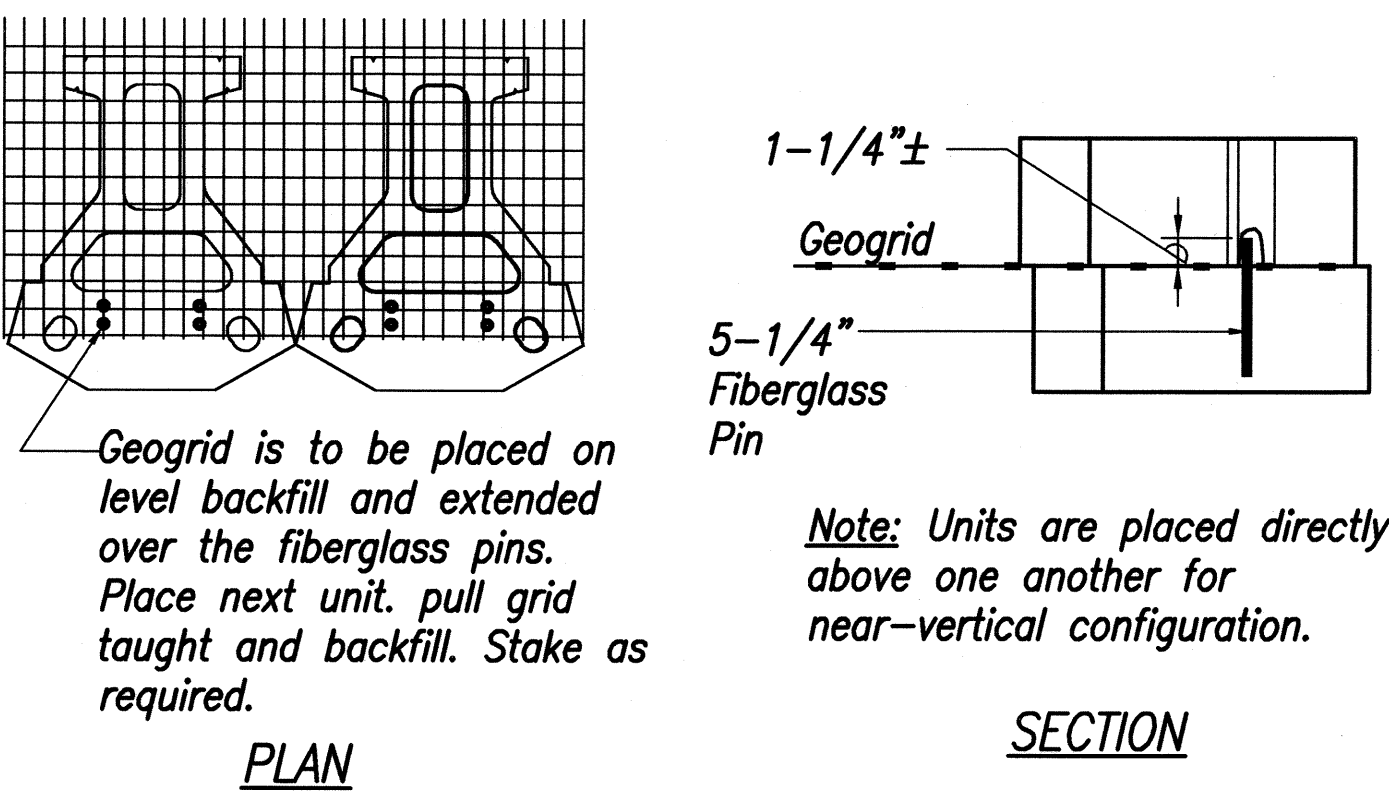
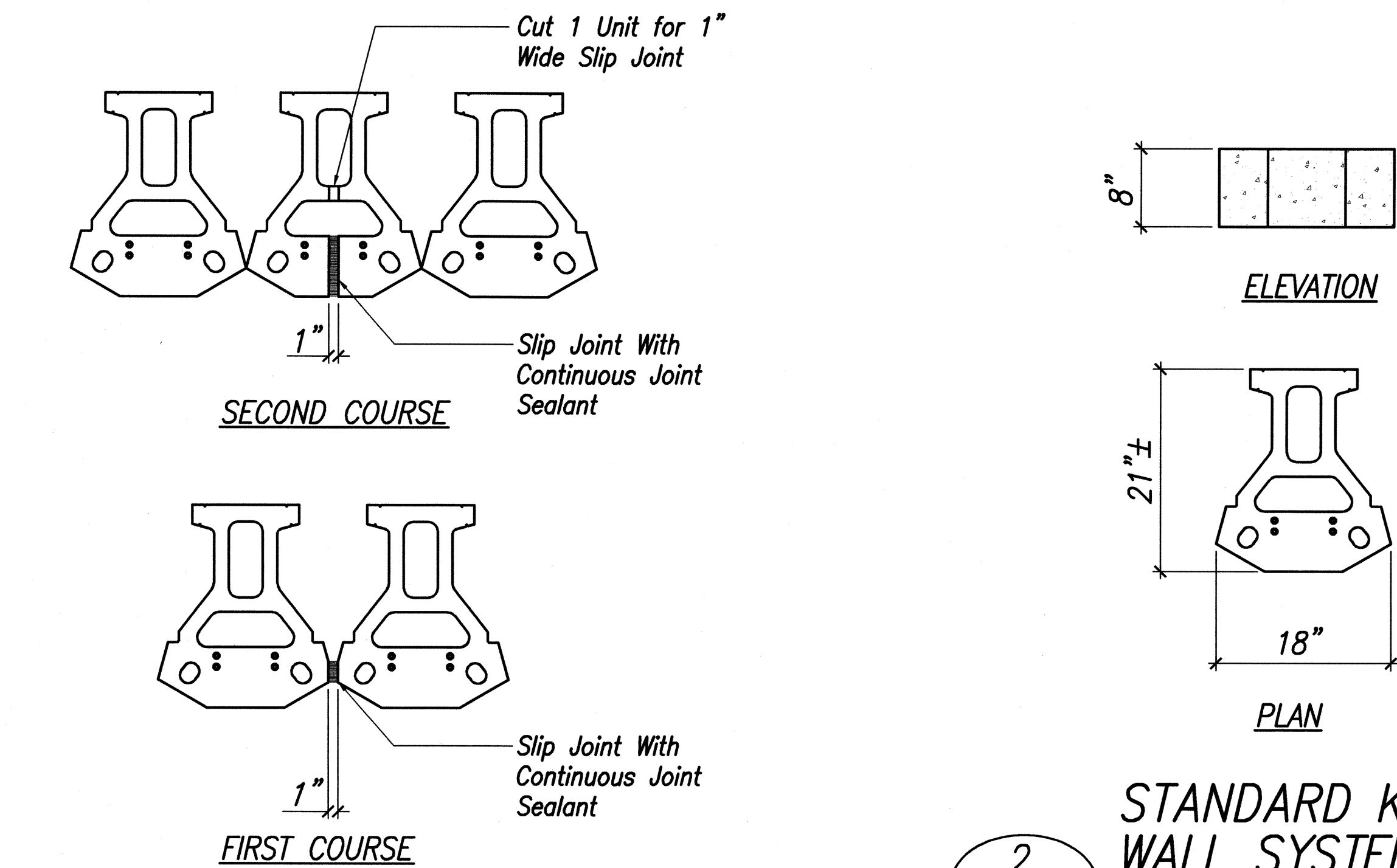
**KAUMUALII HIGHWAY WIDENING**  
**Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge**  
**FEDERAL-AID PROJECT NO. NH-050-1(31)**

Scale: AS NOTED Date: JAN. 2010

SHEET NO. S5 OF S11 SHEETS

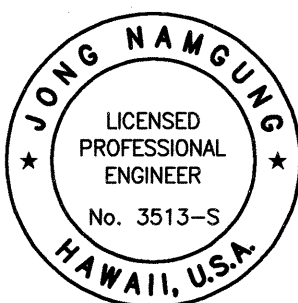
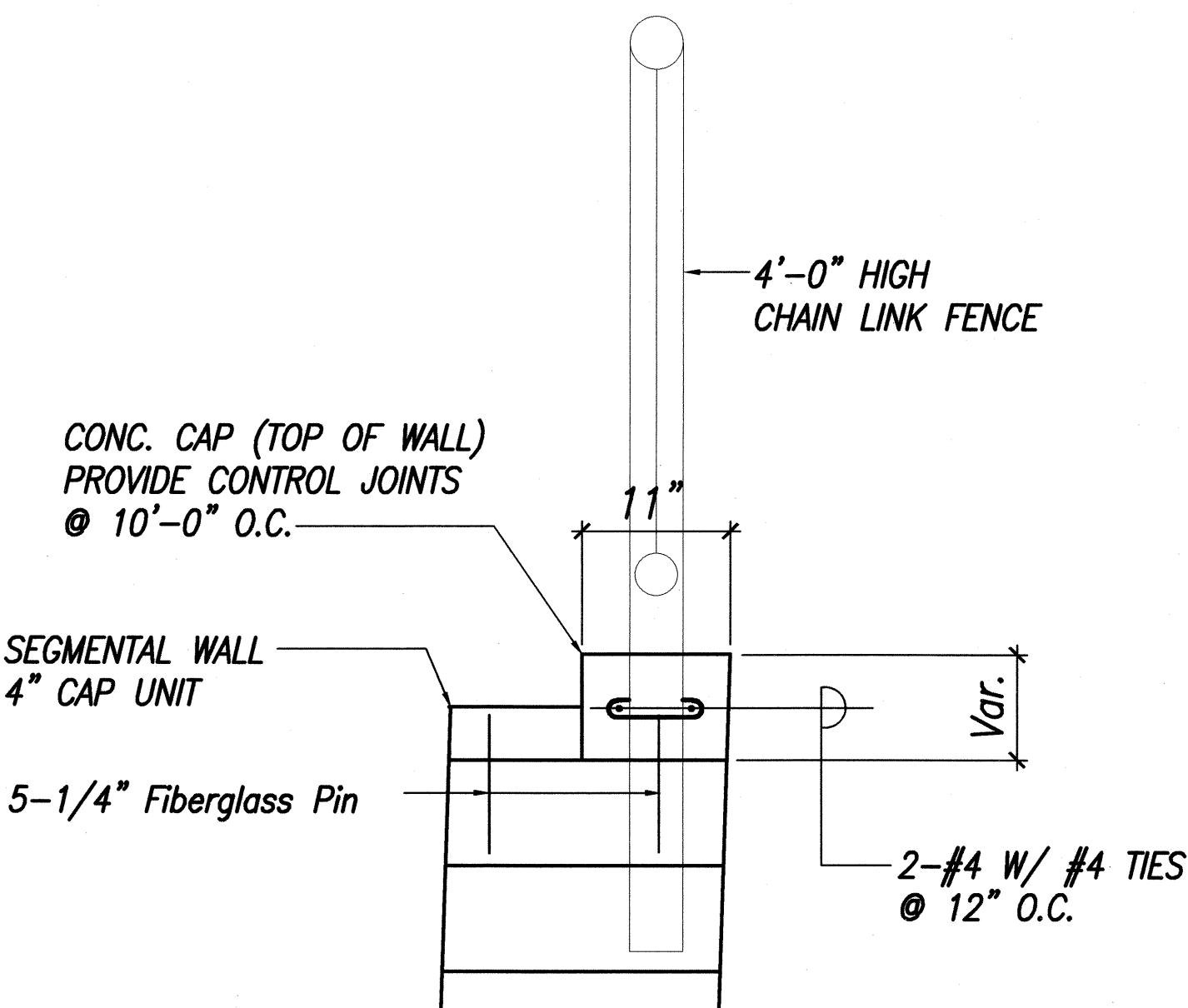
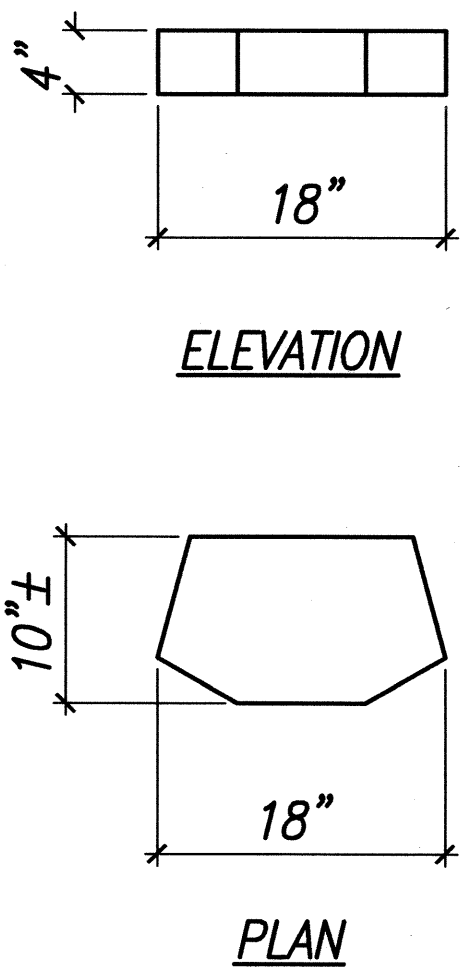
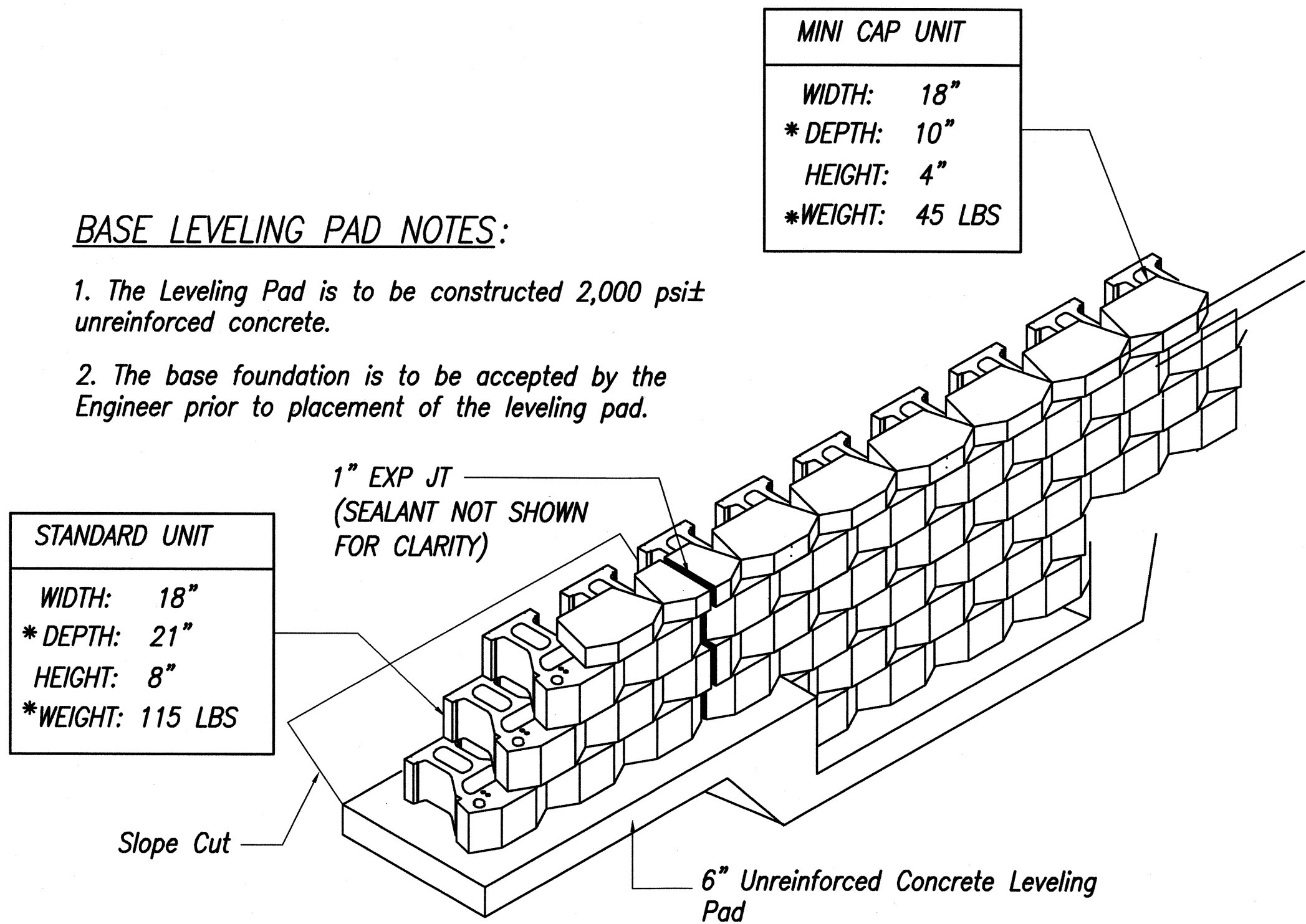


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	383	452



#### BASE LEVELING PAD NOTES:

1. The Leveling Pad is to be constructed 2,000 psi± unreinforced concrete.
2. The base foundation is to be accepted by the Engineer prior to placement of the leveling pad.



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SEGMENTAL WALL NO. 1**  
**WALL DETAILS**  
KAUMUALII HIGHWAY WIDENING  
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge  
FEDERAL-AID PROJECT NO. NH-050-1(31)  
Scale: AS NOTED Date: FEB. 2009

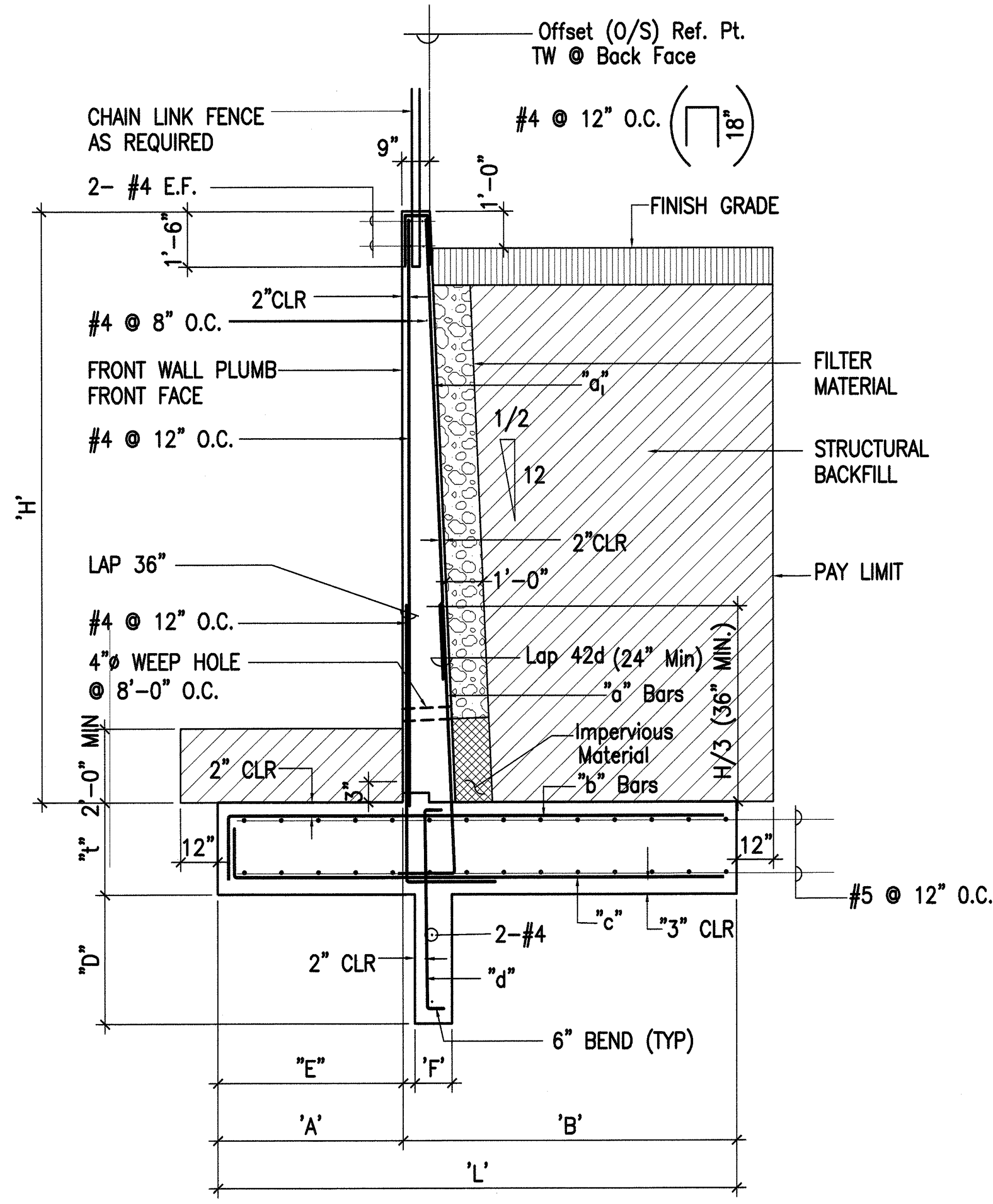
SHEET No. S6 OF S11 SHEETS

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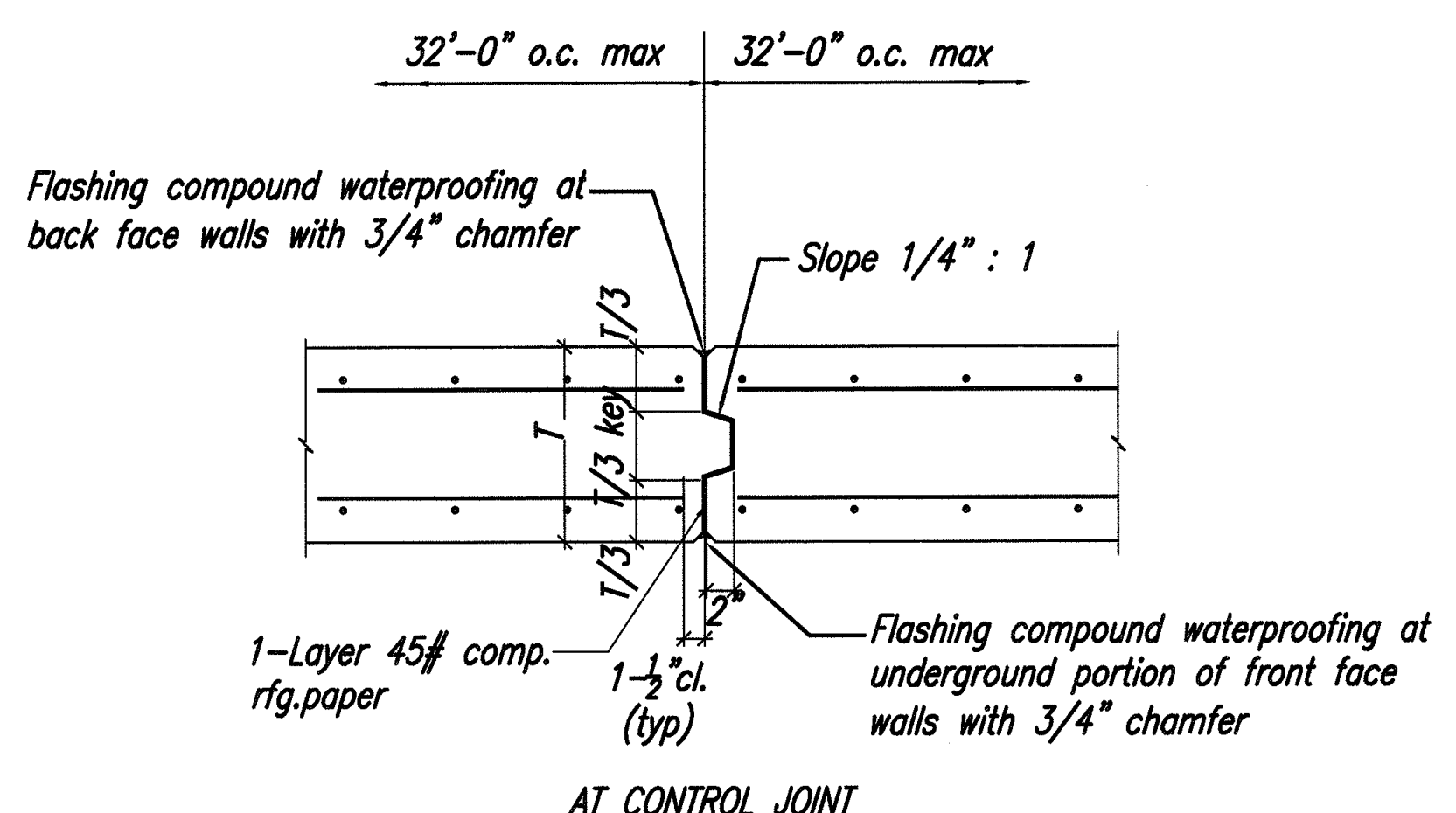
LIB: STATE/NOT/KAUMUALII HIGHWAY WIDENING/SEGMENTAL WALL NO. 1/2/2/09



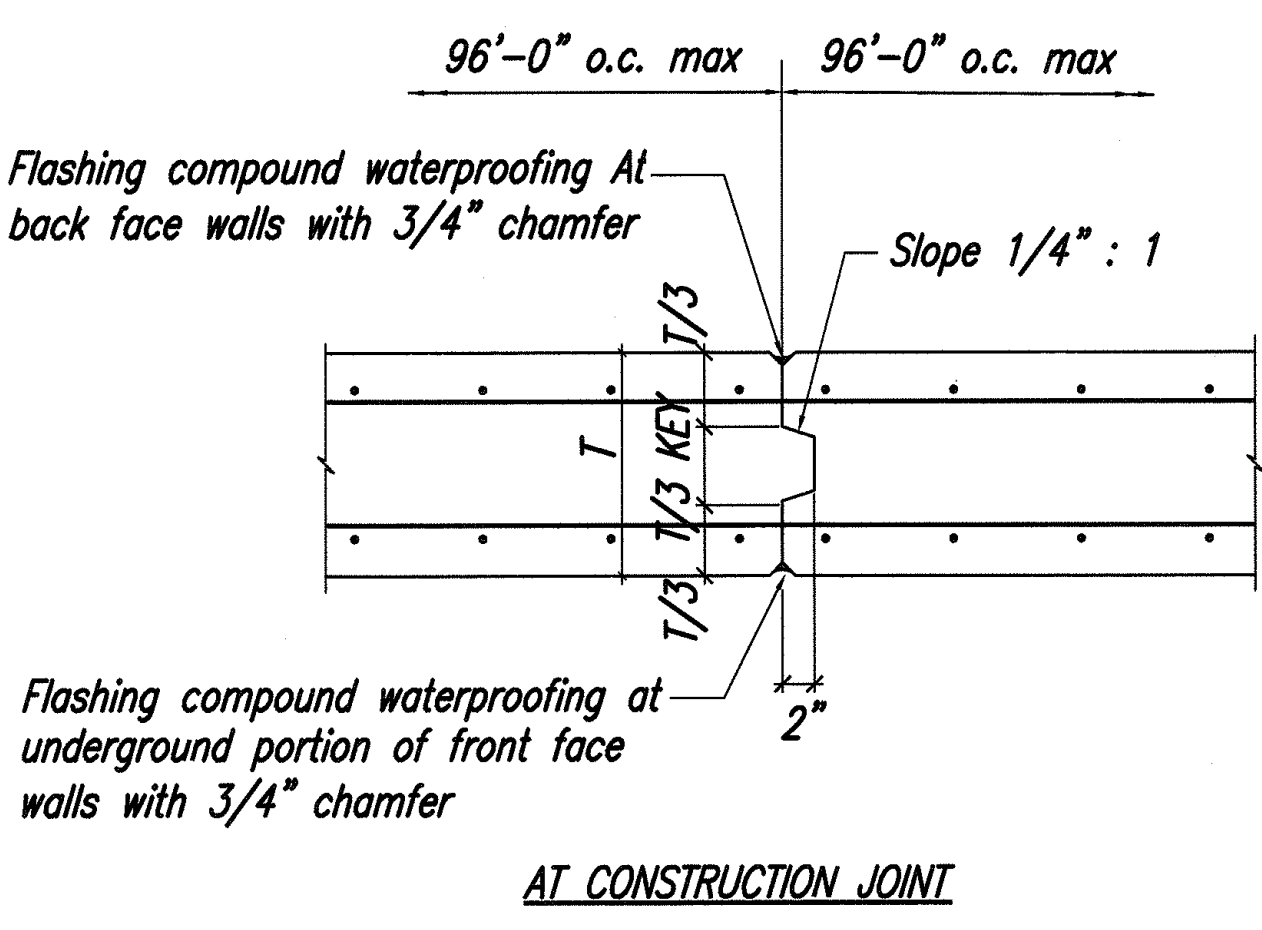
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	ADD. 384	452



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RW5 S7  
TYPICAL SECTION  
NOT TO SCALE

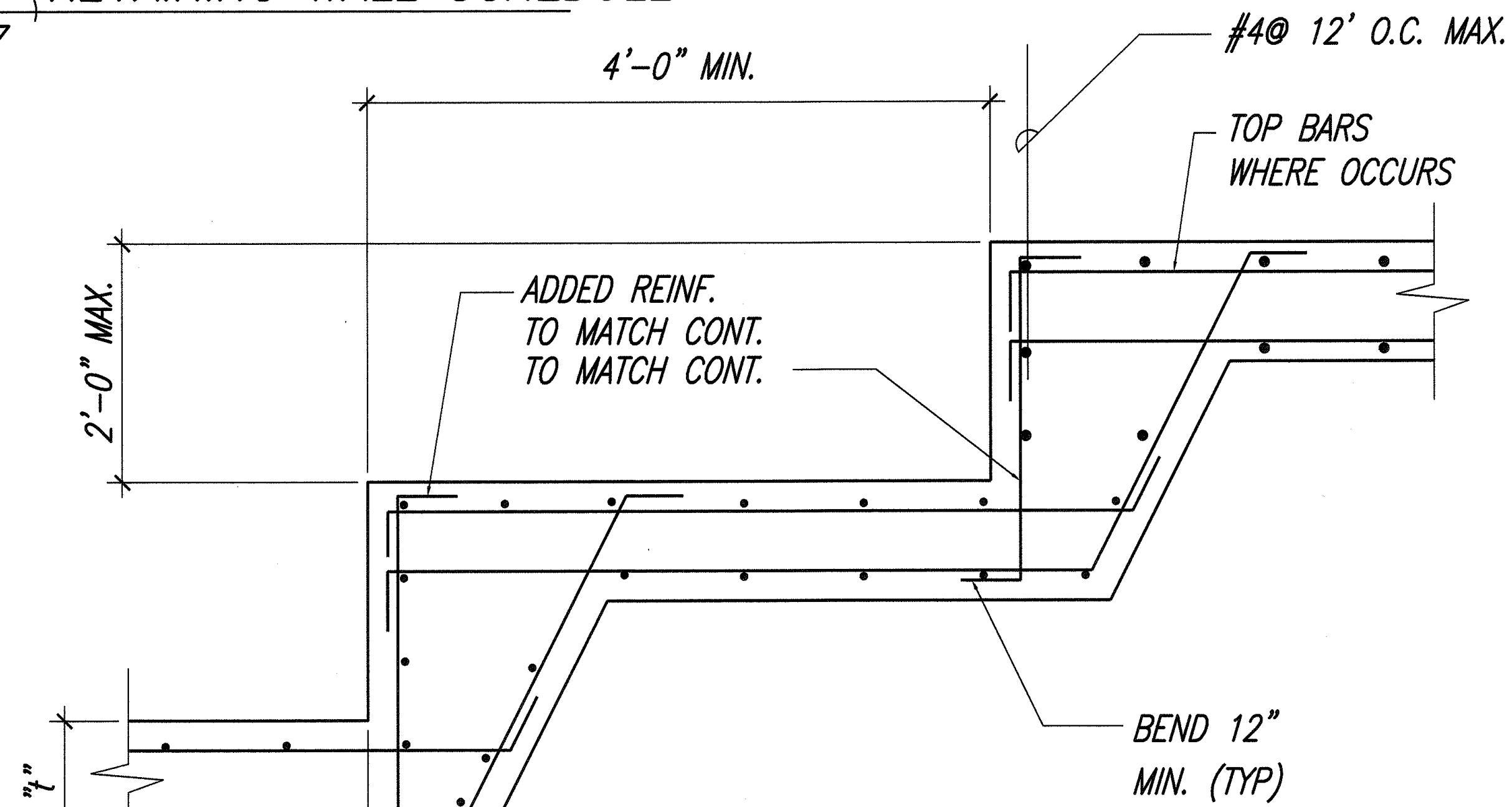


3  
RW5 S7  
TYPICAL RETAINING WALL CONTROL / CONSTRUCTION JOINT DETAIL  
NOT TO SCALE



H (MAX.)	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'
L (FTG. WIDTH)	5'-0"	6'-0"	7'-0"	8'-0"	8'-6"	9'-0"	10'-0"	11'-0"	12'-0"	13'-6"	14'-0"
A (TOE WIDTH)	1'-0"	1'-0"	1'-6"	2'-0"	2'-0"	2'-0"	2'-6"	3'-0"	3'-6"	4'-6"	5'-0"
B (HEEL WIDTH)	4'-0"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-0"
"t" (FTG. THICK)	1'-0"	1'-2"	1'-4"	1'-4"	1'-6"	1'-8"	1'-10"	2'-0"	2'-2"	2'-4"	2'-6"
D (KEY DEPTH)	1'-2"	2'-0"	2'-0"	2'-6"	2'-7"	2'-8"	2'-10"	3'-0"	3'-2" Δ	3'-4"	3'-6"
E (KEY LOCATION)	1'-9"	2'-0"	2'-6"	3'-0"	3'-0"	3'-4"	3'-4"	3'-4"	4'-4"	4'-4"	5'-0"
F (KEY WIDTH)	8"	8"	8"	10"	12"	12"	12"	1'-0"	1'-0"	1'-0"	1'-0"
"a" Bars	#4 @ 12"	#4 @ 10"	#4 @ 8"	#4 @ 6" Δ	#4 @ 4" Δ	#5 @ 6"	#5 @ 4"	#6 @ 6"	#6 @ 6"	#6 @ 4"	#6 @ 4"
"a <sub>i</sub> " Bars	#4 @ 12"	#4 @ 10"	#4 @ 8"	#4 @ 6" Δ	#4 @ 4" Δ	#5 @ 6"	#5 @ 4"	#6 @ 6"	#6 @ 6"	#6 @ 4"	#6 @ 4"
"b" Bars	#4 @ 12"	#4 @ 10"	#4 @ 8"	#4 @ 6"	#4 @ 6"	#5 @ 6"	#5 @ 6"	#6 @ 6" Δ	#6 @ 6"	#6 @ 4" Δ	#6 @ 4" Δ
"c" Bars	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 12"	#5 @ 6"
"d" Bars	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 10" Δ	#4 @ 10" Δ	#4 @ 8" Δ	#4 @ 6" Δ

2  
S7 S7  
RETAINING WALL SCHEDULE



4  
RW5 S7  
TYP. STEPPED FTG. DETAIL  
NOT TO SCALE

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

LIB2: STATE\DOT\KAUAI\1-PHASE\REVISED\PLANS\ 507-RET WALL SCHEDULE.dwg 2/25/09

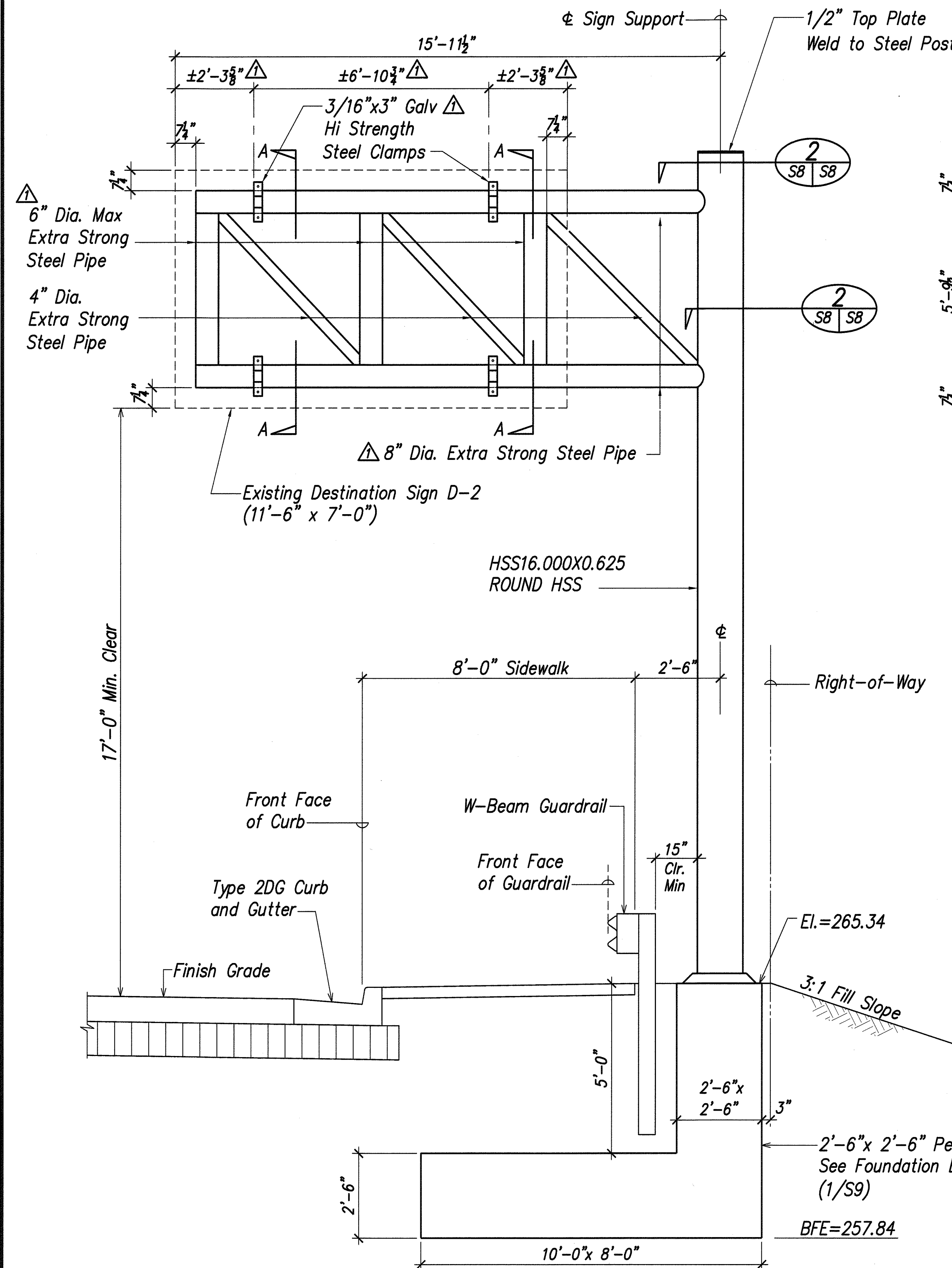
STEWART N. WILLIAMS  
LICENSED PROFESSIONAL ENGINEER  
No. 3908-S  
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.  
Mitsunaga & Associates, Inc.  
Expiration Date of License

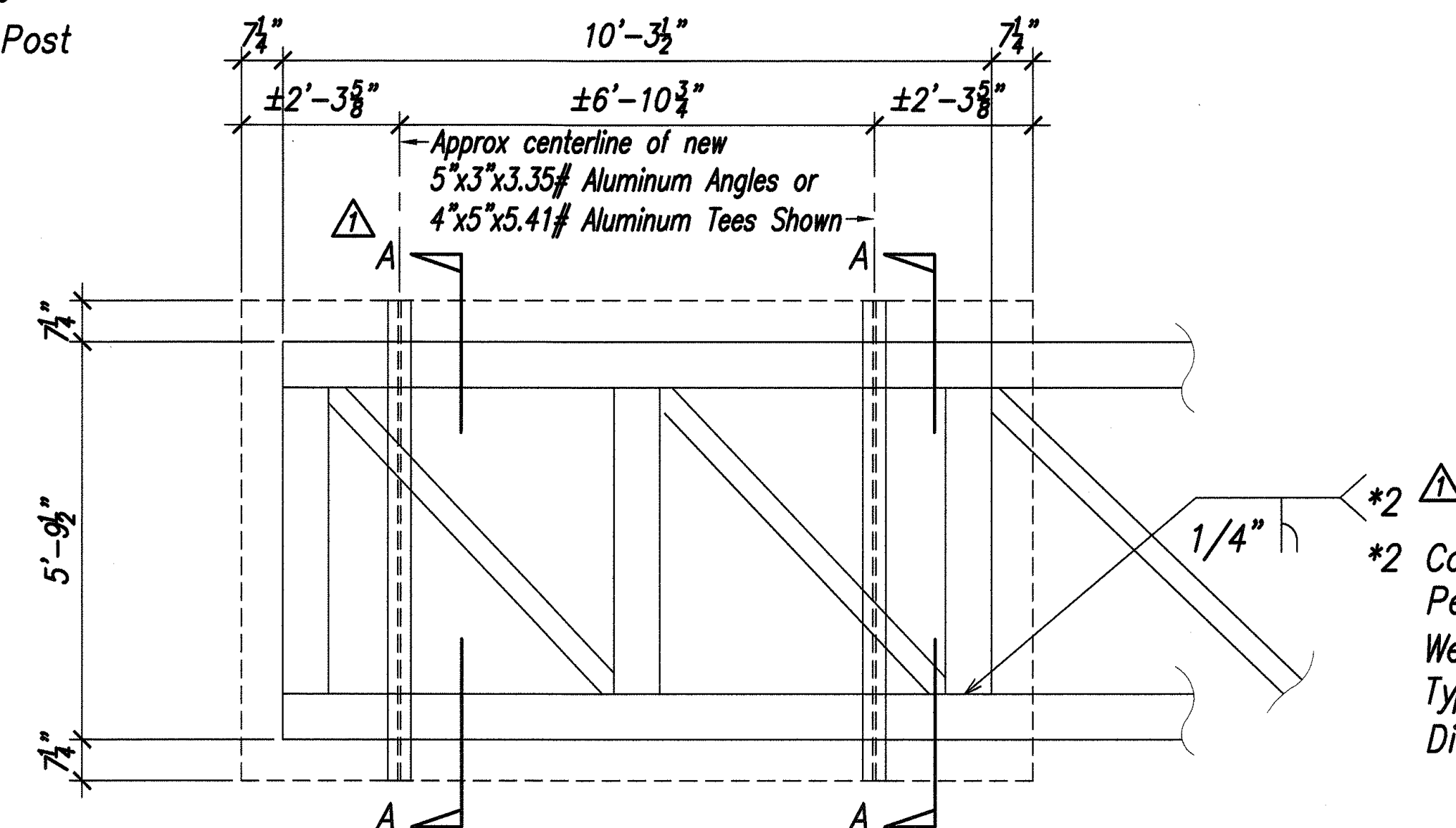
7/16/09	Δ Revised Schedule at Detail 2.
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>R.C. RETAINING WALL SECTION AND SCHEDULE</b>	
KAUAI HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)	
Scale: NONE	Date: JULY 2009
SHEET No. S7 OF S11 SHEETS	



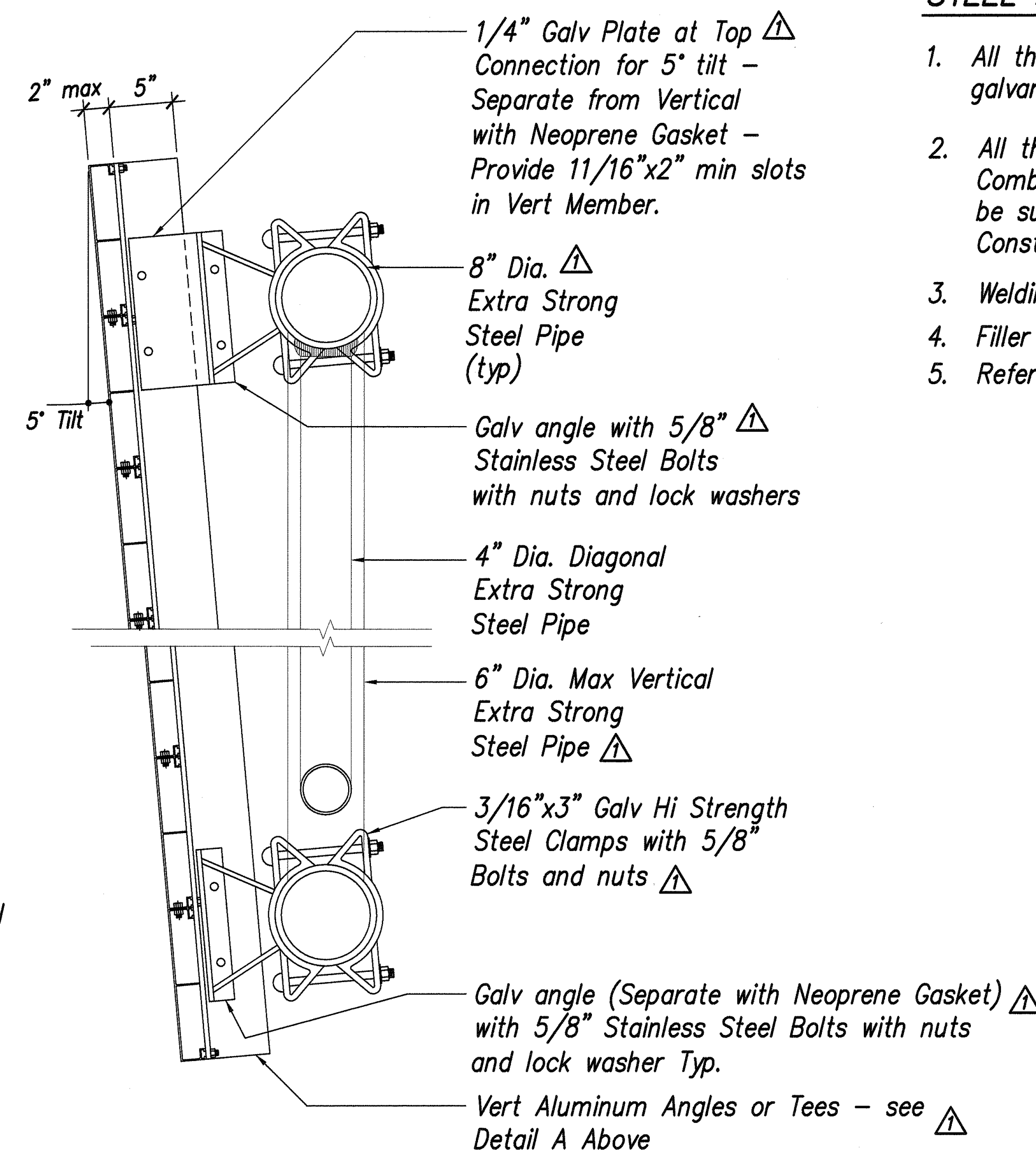
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	ADD. 385	452



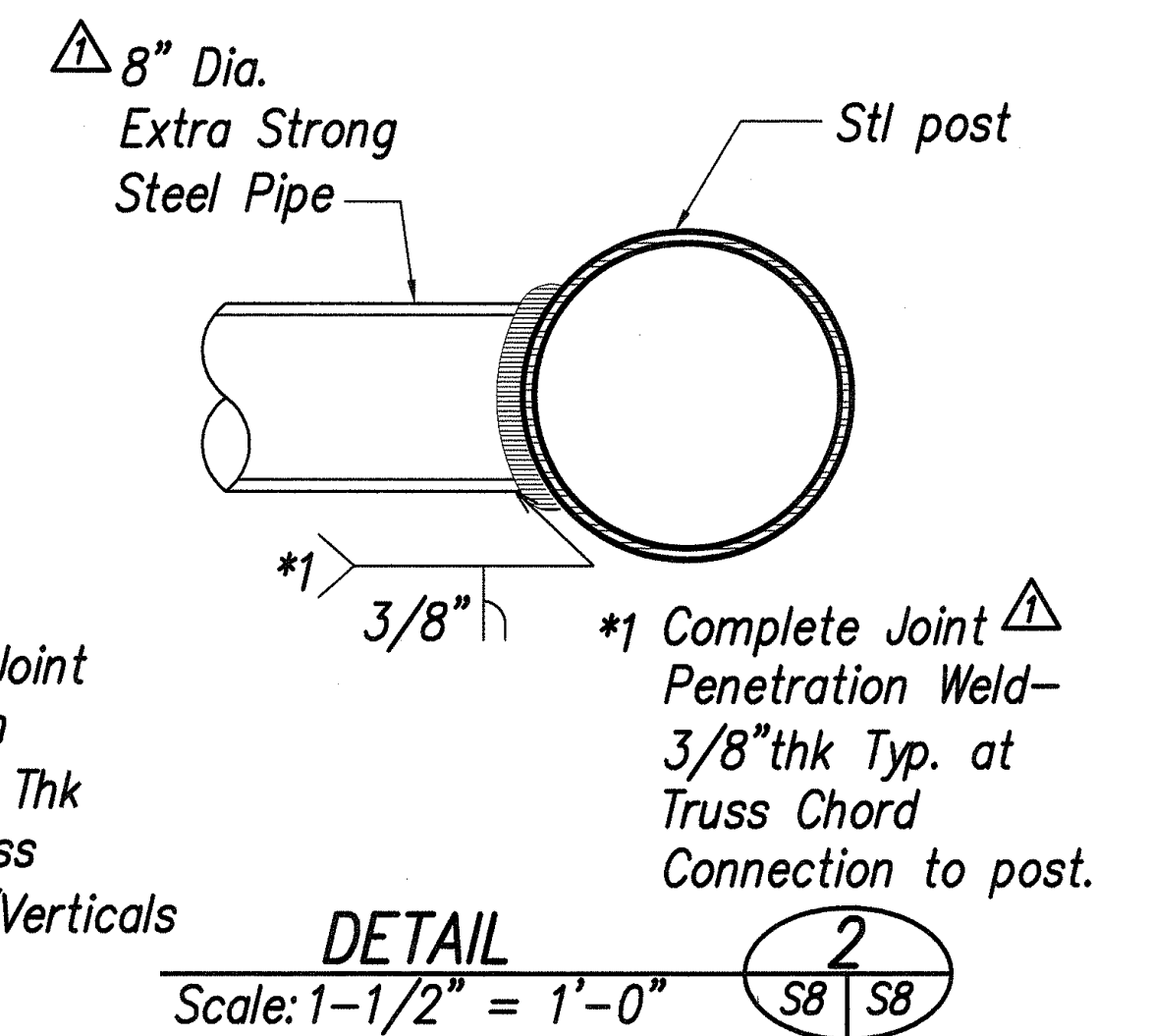
**ELEVATION OF DESTINATION SIGN D-2**  
Scale: 1/2" = 1'-0"



**SIGN FRAMING ELEVATION A**  
Scale: 1/2" = 1'-0"

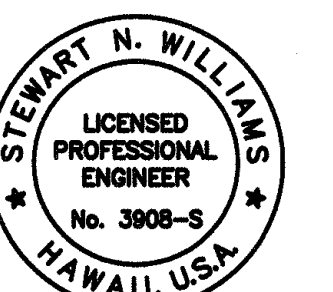


**SECTION A-A**  
Scale: 1-1/2" = 1'-0"



### STEEL FRAME NOTES

- All the steel members shall be hot-dip galvanized after fabrication.
- All the connection shall be welded connection. Alternate Combined High Strength Bolted/Welded Connections may be submitted for acceptance by the Engineer Prior to Construction.
- Welding Type: Full Penetration Weld.
- Filler material shall be E70XX.
- Refer to Sheet S1 for Structural General Notes.



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Mitsunaga & Associates, Inc.  
Expiration Date of License 4-30-10

7/16/09	Revised Sign Member Sizes and Connections
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<b>OVERHEAD SIGN SUPPORT &amp; FOUNDATION DETAILS</b>	
KAUAI HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)	
Scale: AS NOTED	Date: JULY 2009
SHEET No. S8 OF S11 SHEETS	

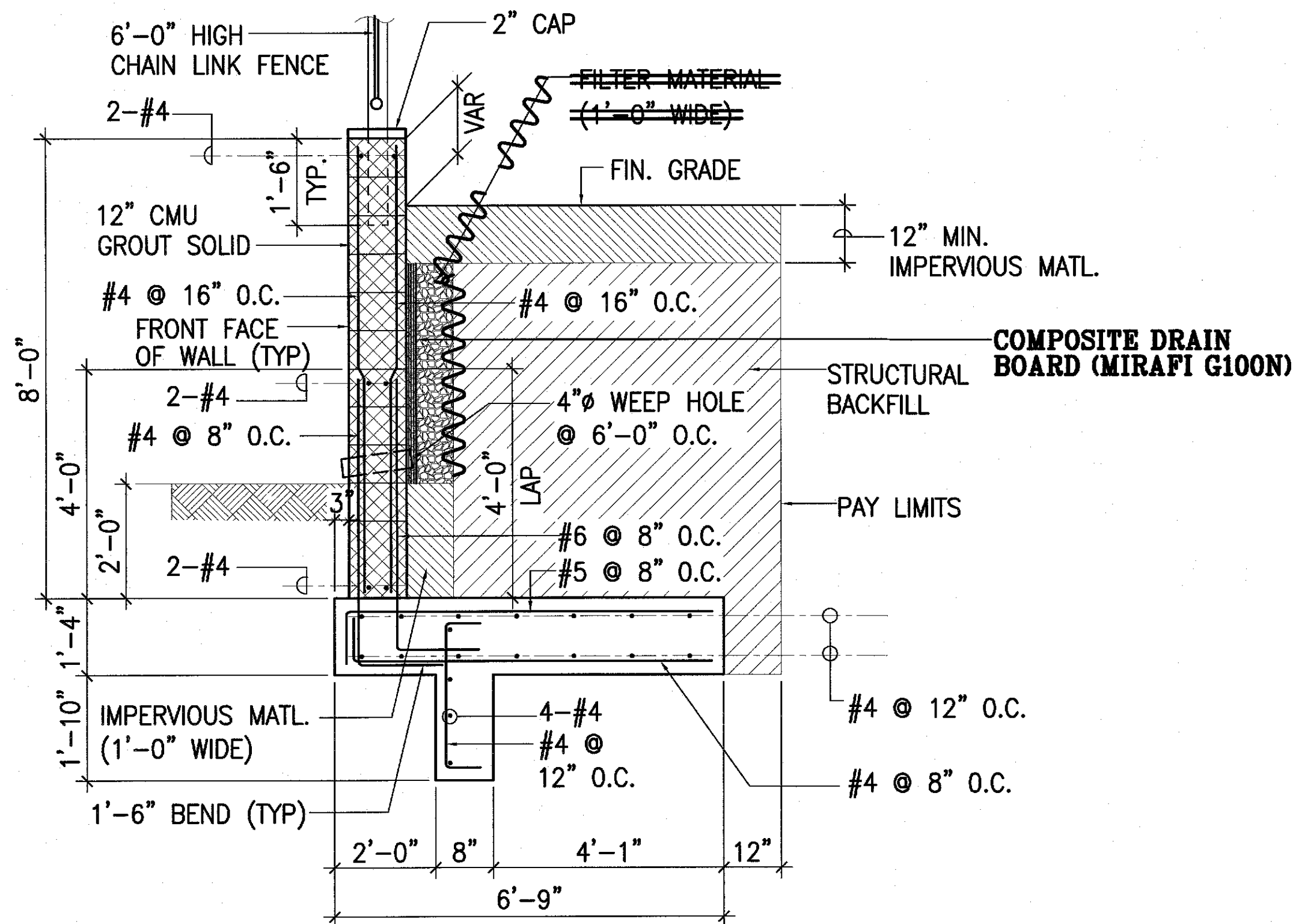
DESIGNED BY	DATE
CHECKED BY	
NOTED BY	
QUANTITIES BY	
ORIGINAL PLAN	

LIB2: STATE DOT\KAUAI\11-TYPHASE1A (REVISION\PLANS) S08-Sign.dwg 2/25/09

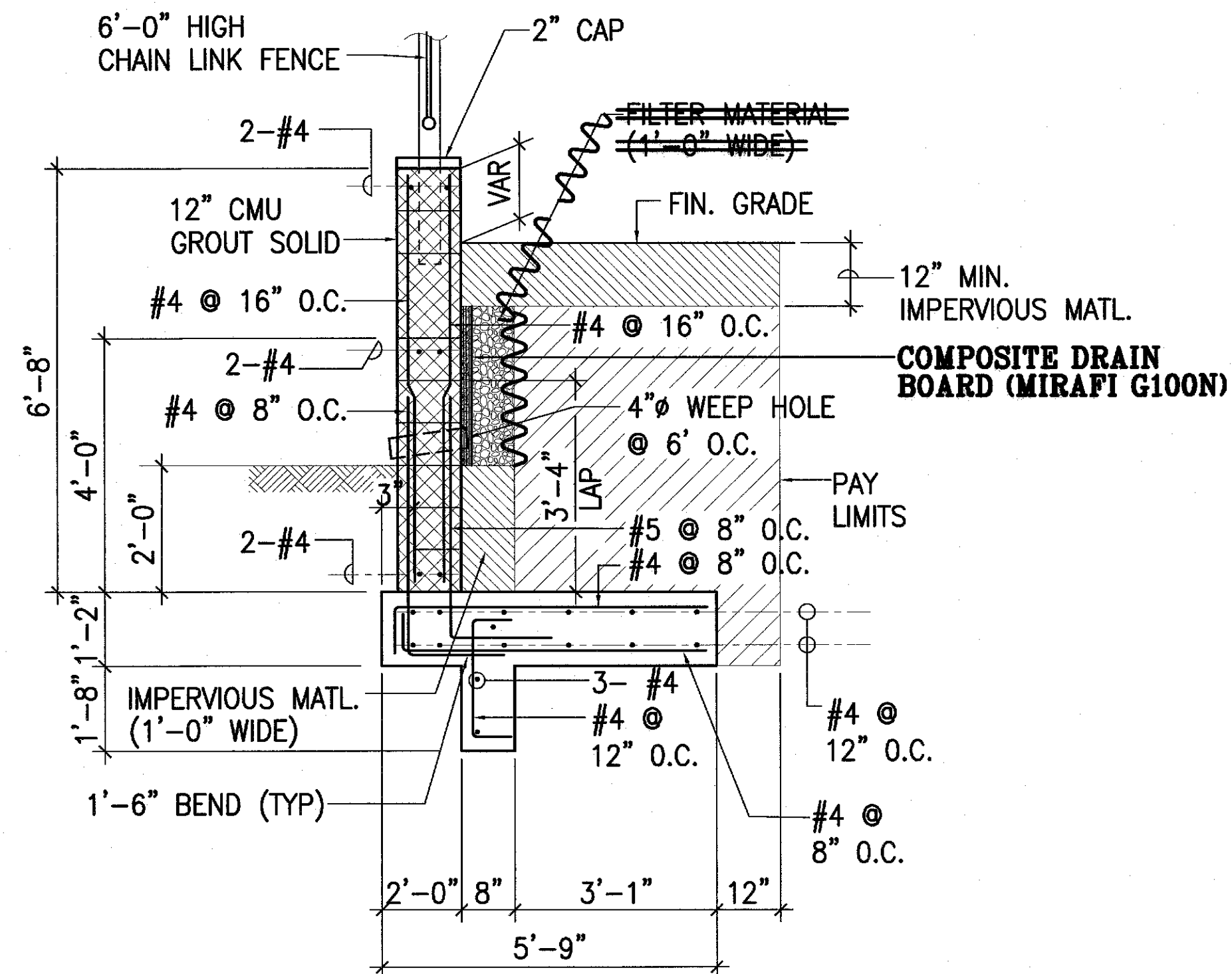




FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	387	452



1 8'-0" HIGH RETAINING WALL  
RW9 S10 SCALE: 1/2" = 1'-0"



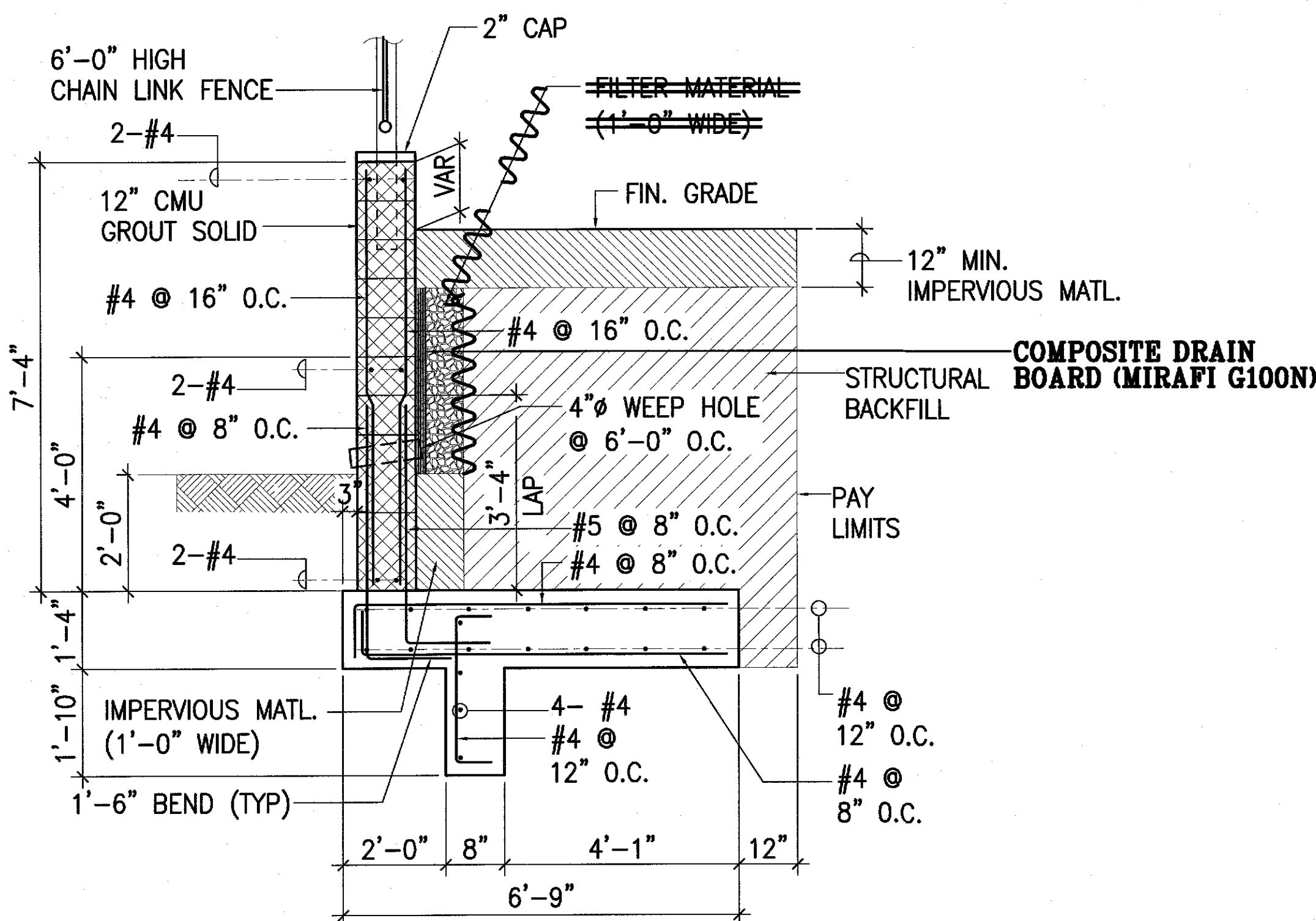
3 6'-8" HIGH RETAINING WALL  
RW9 S10 SCALE: 1/2" = 1'-0"

**LEGEND FOR AS-BUILT POSTINGS**

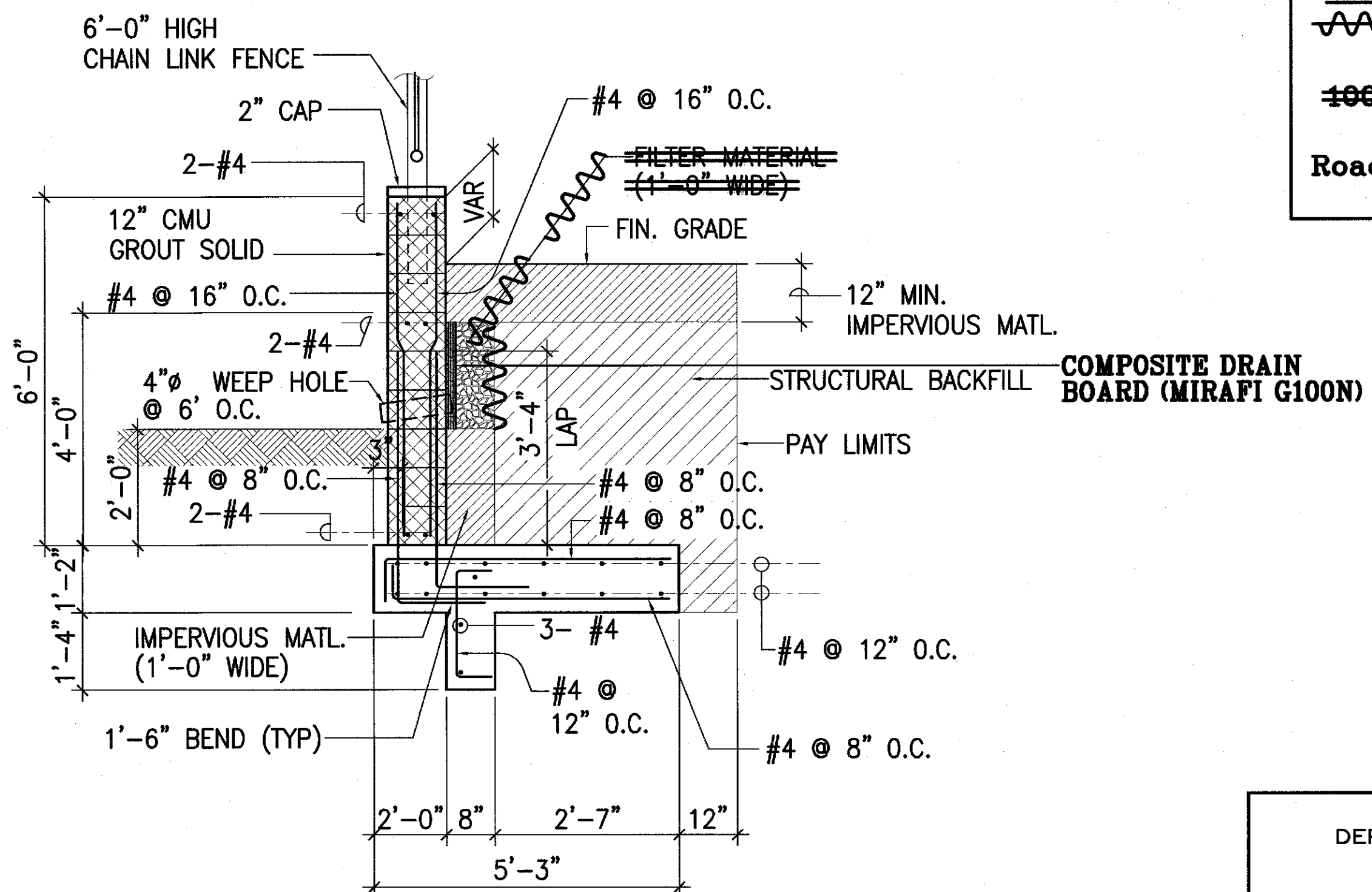
Squiggly line for as-built deletion

Double line for as-built deletion

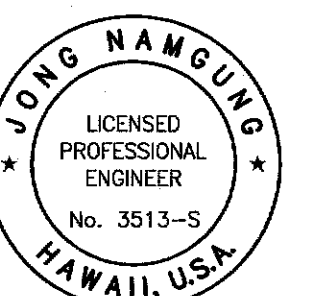
Roadway Text for as-built posting



2 7'-4" HIGH RETAINING WALL  
RW9 S10 SCALE: 1/2" = 1'-0"



4 6'-0" HIGH RETAINING WALL (5'-8" SIM)  
RW9 S10 SCALE: 1/2" = 1'-0"



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MITSUNAGA & ASSOCIATES  
LICENSE EXPIRES 4-30-16

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**CMU RETAINING WALL WALL SECTIONS**

KAUMUALI' HIGHWAY WIDENING  
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge  
FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NONE Date: JAN. 2010

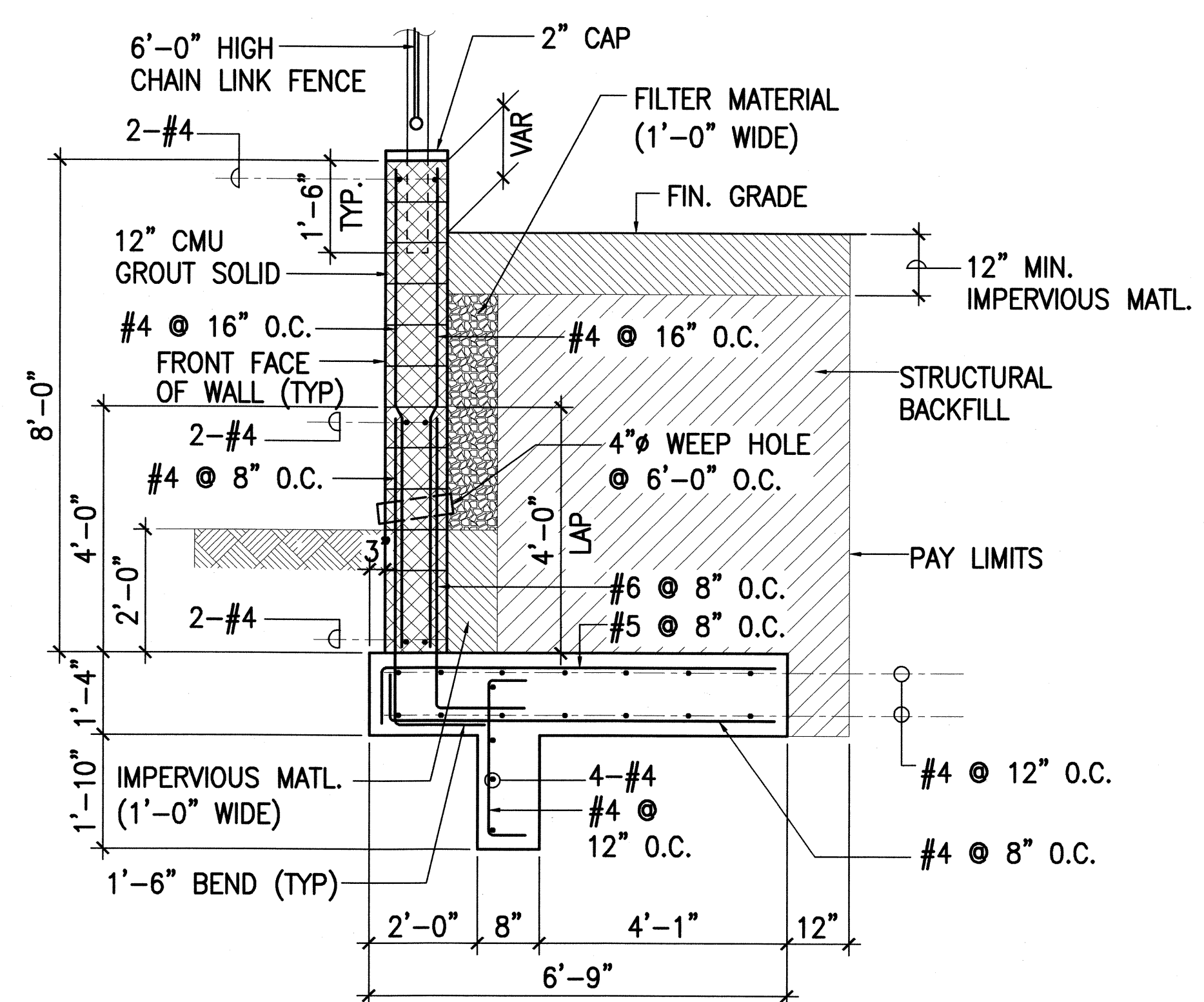
SHEET No. S10 OF S11 SHEETS

"AS-BUILT"

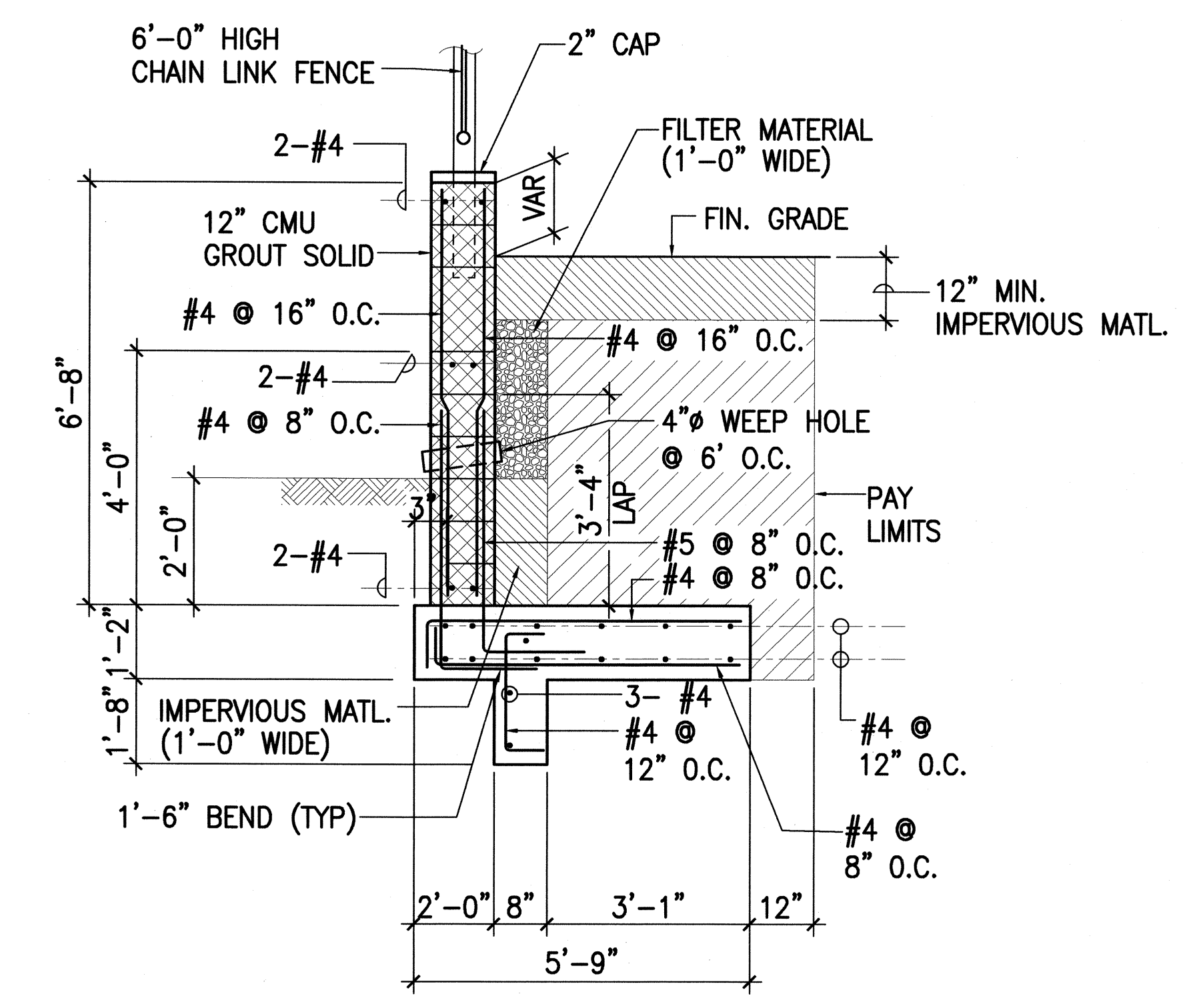
387



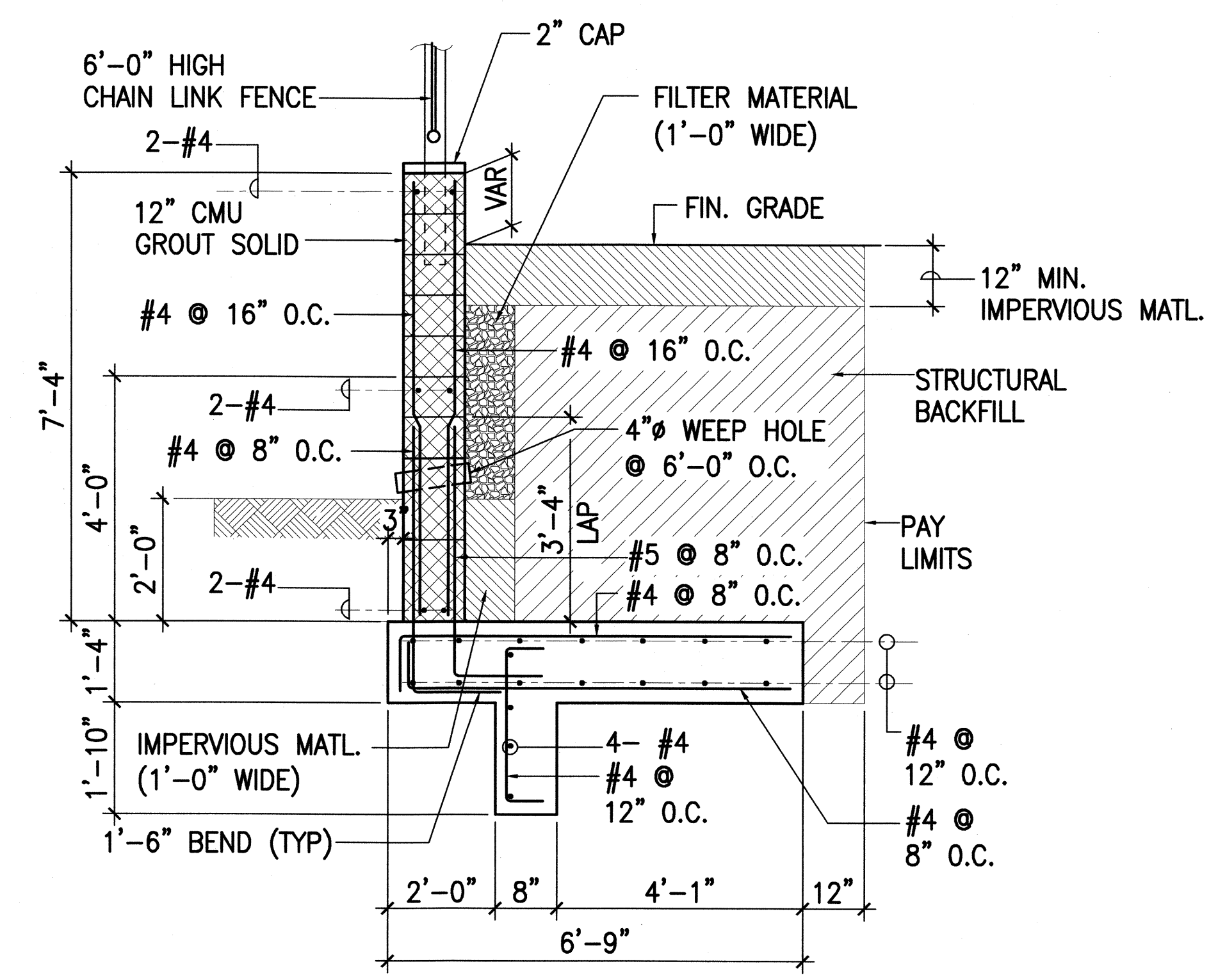
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	387	452



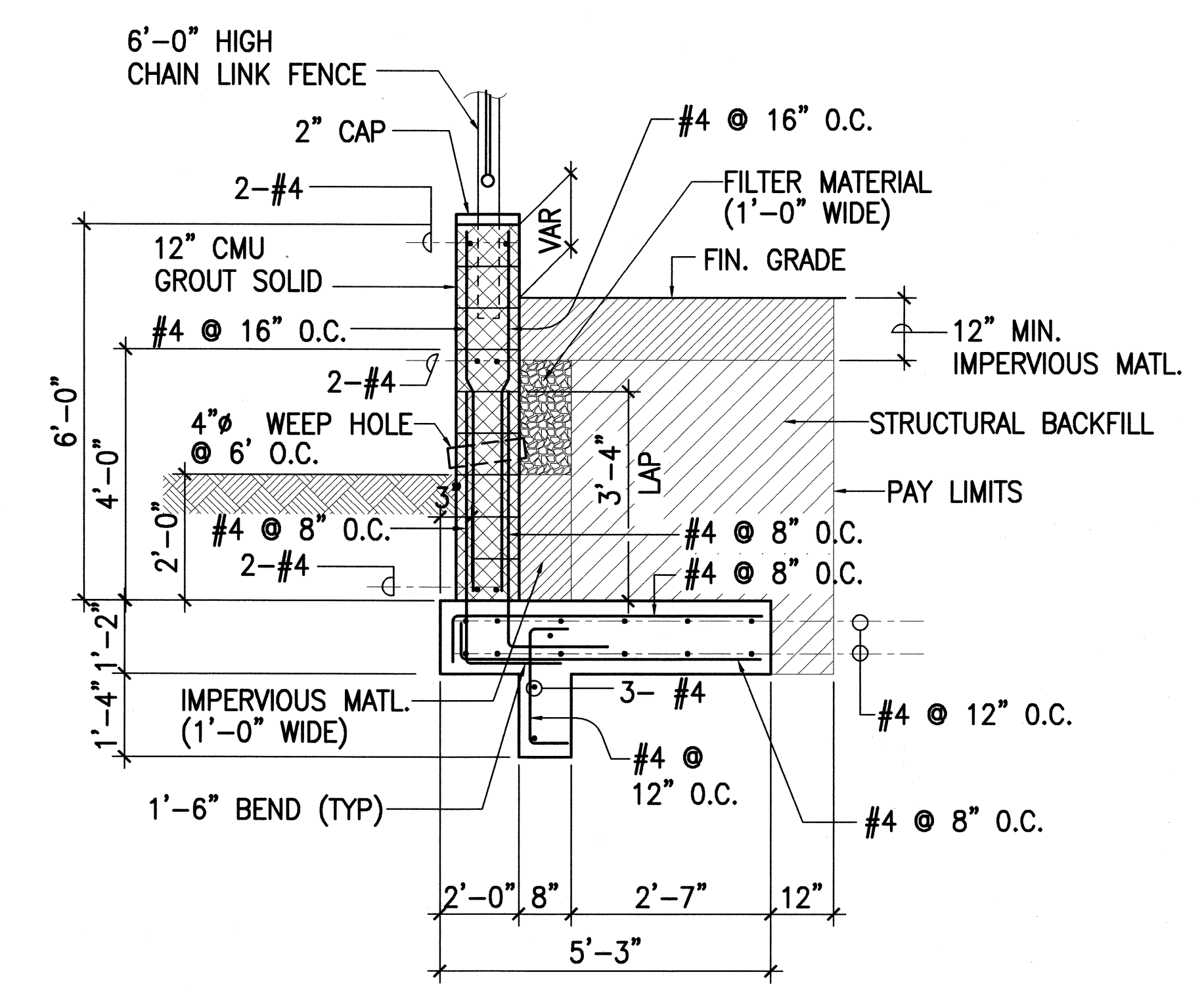
1 8'-0" HIGH RETAINING WALL  
RW9 S10 SCALE: 1/2" = 1'-0"



3 6'-8" HIGH RETAINING WALL  
RW9 S10 SCALE: 1/2" = 1'-0"



2 7'-4" HIGH RETAINING WALL  
RW9 S10 SCALE: 1/2" = 1'-0"

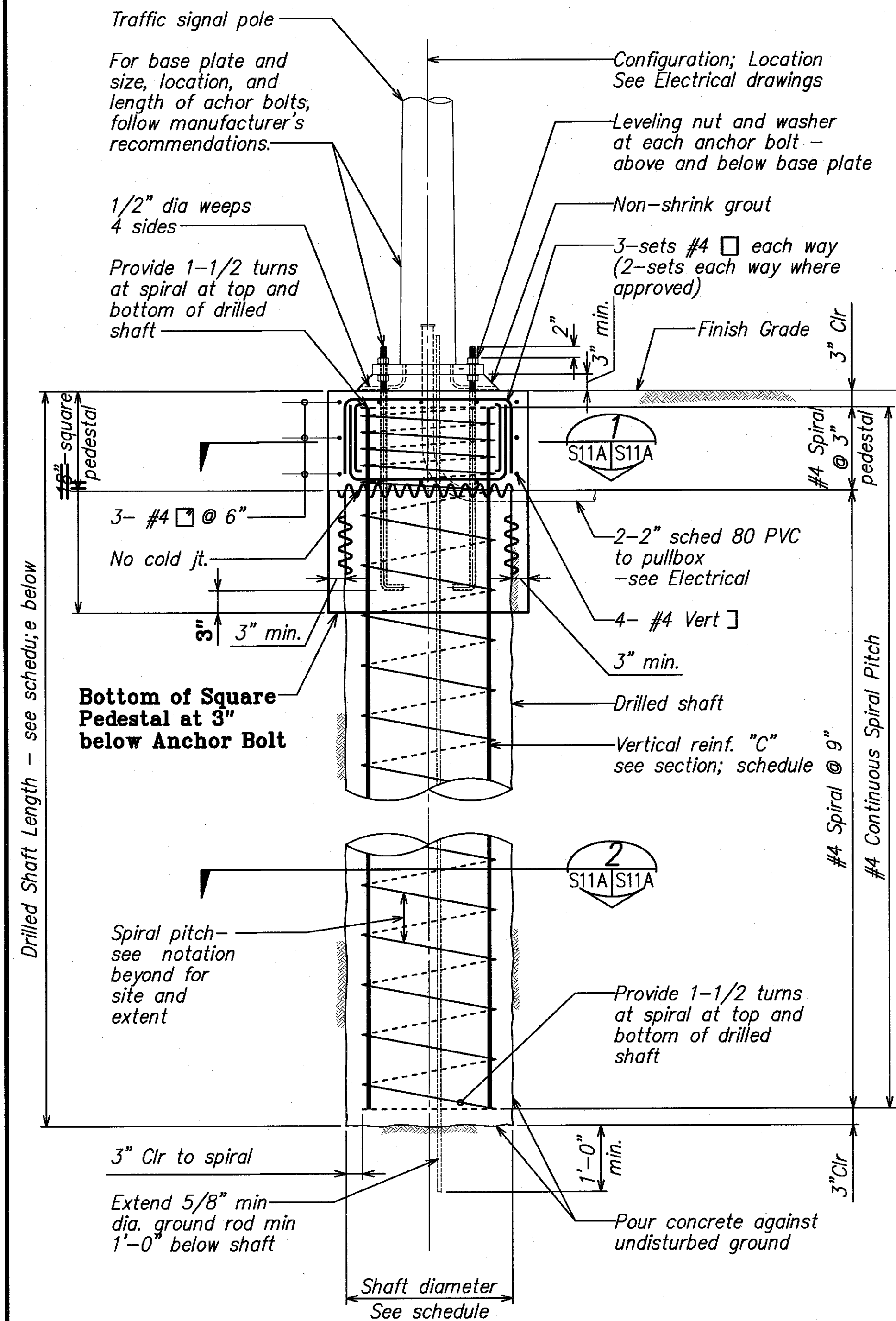


4 6'-0" HIGH RETAINING WALL (5'-8" SIM)  
RW9 S10 SCALE: 1/2" = 1'-0"

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

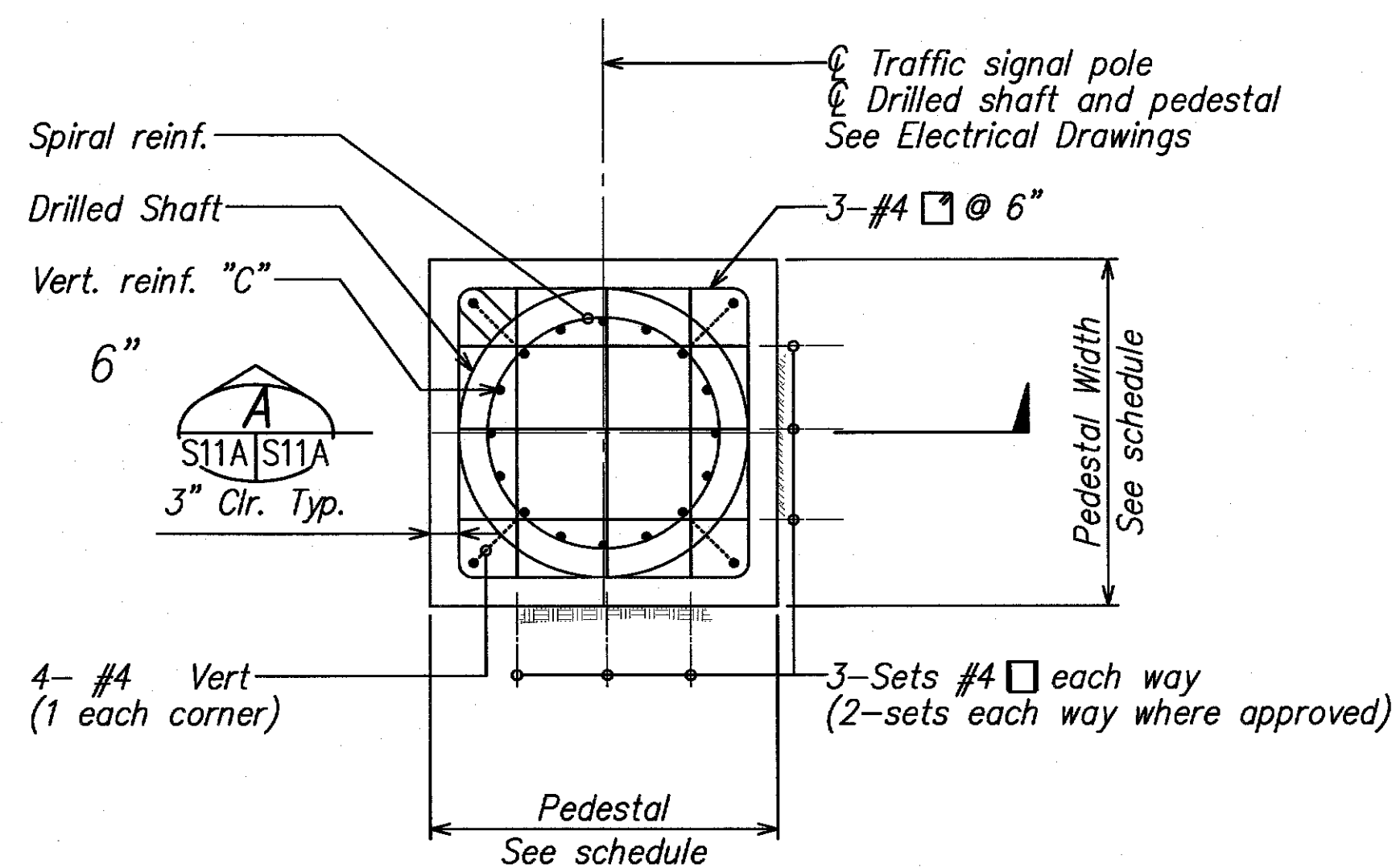
1002 STATE DOT KAUAI - VPHASE 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 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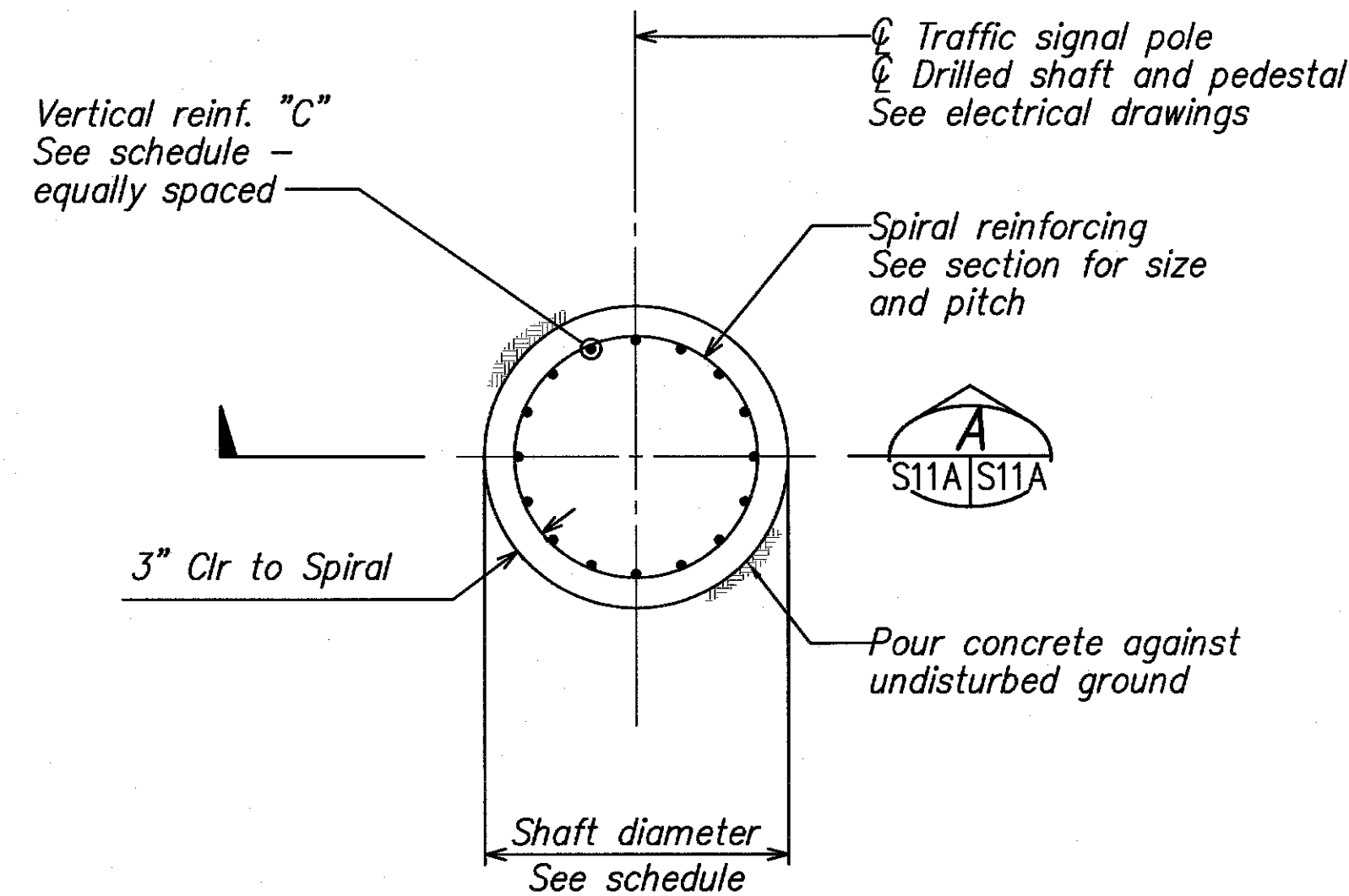


SECTION AT ALTERNATE DRILLED SHAFT FOUNDATION FOR TYPE II MAST ARM STANDARD  
Scale: 3/4" = 1'-0"

Level or 2H:1V Sloping Ground—Below Water Table					
Min Soil Type	Mast Arm Length	Shaft Dia	Shaft Length	Pedestal Width	Vert Reinf "C"
Sand & Gravel	30'	30"	11'-0"	36"	16-#6
	35'	30"	13'-0"	36"	16-#6
	40'	30"	15'-0"	36"	16-#6



PEDESTAL PLAN DETAIL  
Scale: 3/4" = 1'-0"

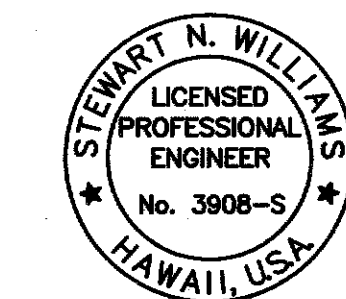


DRILLED SHAFT PLAN DETAIL  
Scale: 3/4" = 1'-0"

APPROVED:

COUNTY ENGINEER, DEPT. OF PUBLIC WORKS  
COUNTY OF KAUAI  
(FOR WORK WITHIN COUNTY R/W)

3-16-11  
DATE



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

MITSUNAGA & ASSOCIATES  
LICENSE EXPIRES 4-30-18

## TYPE II TRAFFIC SIGNAL FOUNDATION

- See Electrical drawings for Type II Traffic Signal Standard configurations, layouts and Pole Foundation details.
- For Alternate Drilled Shaft Foundations For Type II Mast Arm Standard, see details on this sheet.
- The recommendations of the traffic signal pole manufacturer shall be followed. Manufacturer shall select pole, anchor bolts, etc. based on criteria given in the contract documents.
- Materials for details on this sheet are as follows:
  - Concrete for drilled shaft and pedestal shall provide compressive strength  $f'_c=4,500$  psi (28 day strength) with a maximum water/cement (W/C) ratio of 0.45. See specifications for drilled shaft requirements.
  - All connection bolts shall be AASHTO M164 bolts and anchor bolts shall be AASHTO M134-105 bolts.
  - Aluminum members and surfaces in contact with structural steel shall be isolated with neoprene material as approved by the Engineer.
- The Contractor shall use templates while installing the anchor bolts. Anchor bolts shall be verified.
- Excavation and backfill shall be considered incidental to the cost of the traffic signal foundation.

## LEGEND FOR AS-BUILT POSTINGS

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

3/01/11 New Sheet

DATE REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

## TRAFFIC SIGNAL FOUNDATION

KAUMUALI HIGHWAY WIDENING  
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge  
FEDERAL-AID PROJECT NO. NH-050-1(31)

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

Date: JAN. 2010

SHEET No. S11A OF S11 SHEETS

"AS-BUILT"

C.O. 388 S-1

