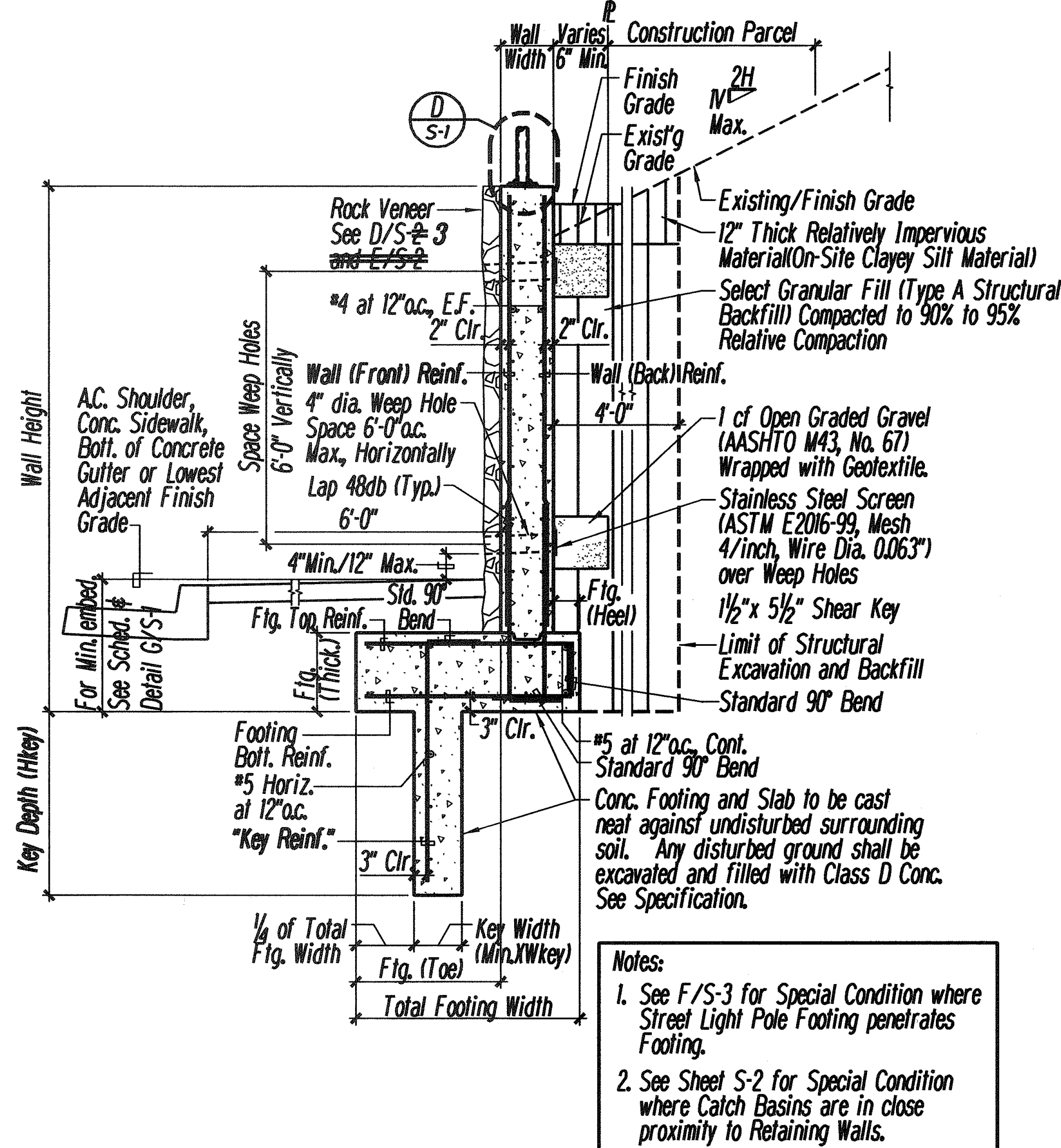


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | CMAQ-076-1(K8)     | 2004        | 44        | 127          |



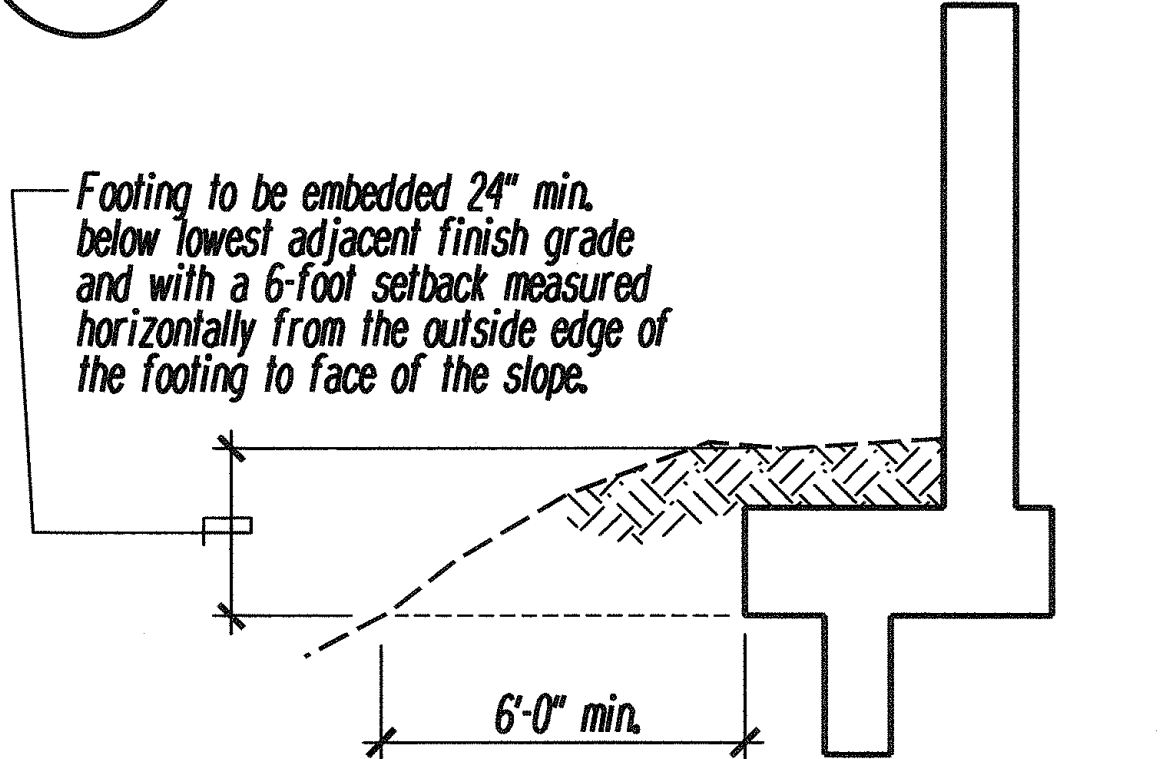
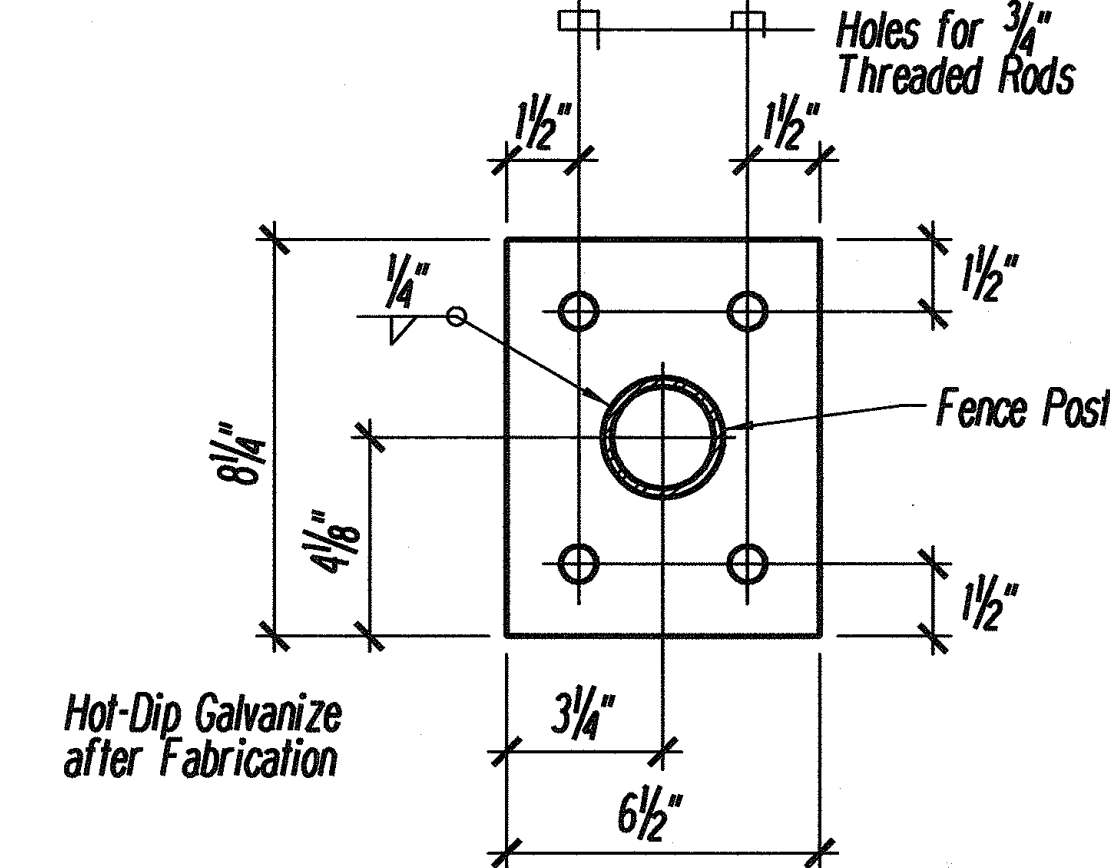
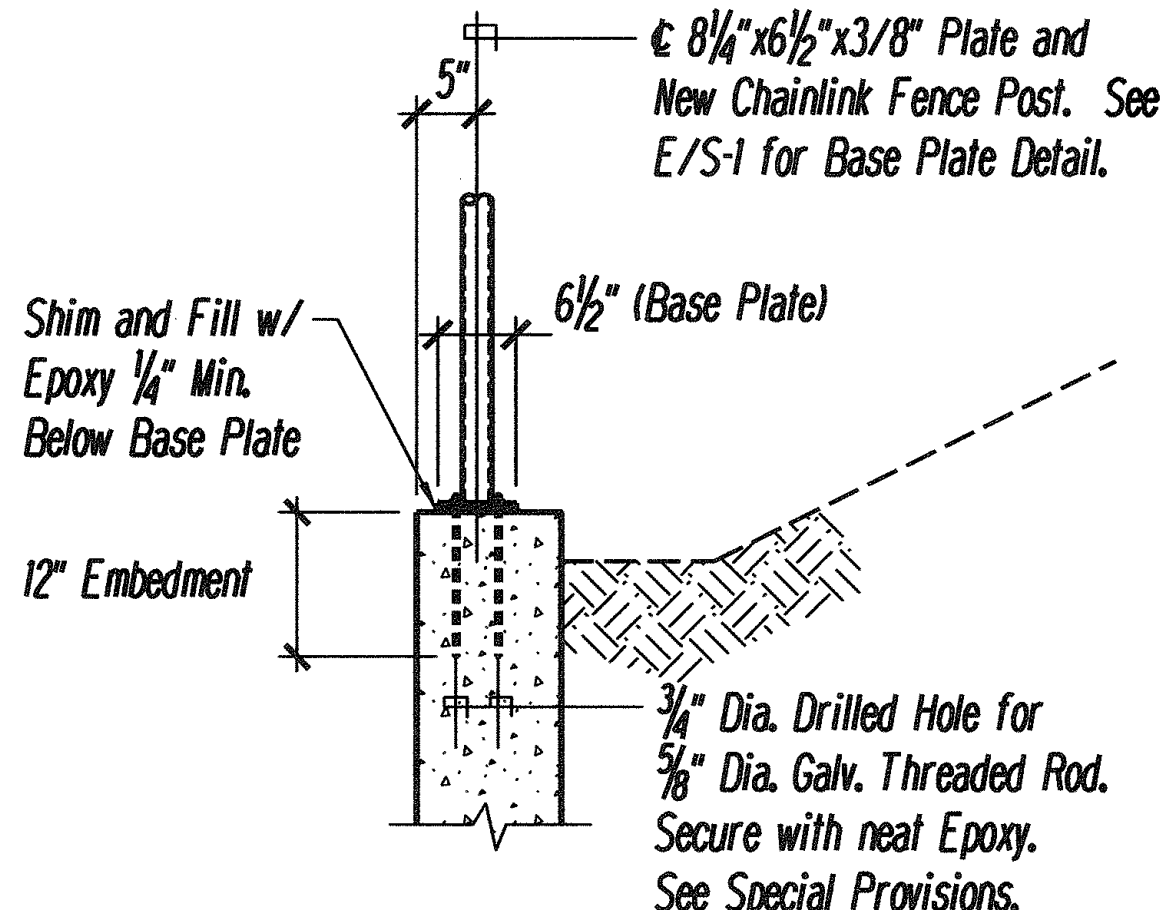
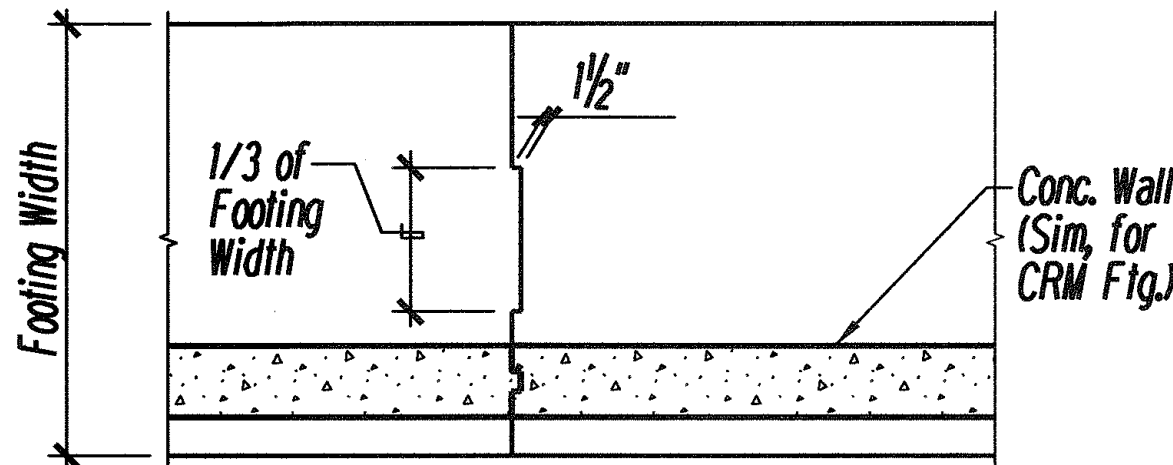
### CONCRETE CANTILEVER RETAINING WALL SCHEDULE \*\*\*

| Wall Height                 | **    | Footing |        |      |                  |                  |       | Wall           |                |       |        | Key*             |  |  |
|-----------------------------|-------|---------|--------|------|------------------|------------------|-------|----------------|----------------|-------|--------|------------------|--|--|
|                             | Embed | Thick   | Toe    | Heel | Top Reinf.       | Bott. Reinf.     | Width | Front Reinf.   | Back Reinf.    | Wkey  | Hkey   | Reinf.           |  |  |
| 11'-0" < H ≤ 12'-0"         | 2'-0" | 16"     | 9'-9"  | 3"   | #5 ↗ at 12" o.c. | #7 ↗ at 12" o.c. | 1'-3" | #4 at 12" o.c. | #7 at 12" o.c. | 1'-3" | 5'-4"  | #6 ↗ at 12" o.c. |  |  |
| 10'-0" < H ≤ 11'-0"         | 2'-0" | 16"     | 8'-0"  | 4"   | #5 ↗ at 10" o.c. | #6 ↗ at 10" o.c. | 1'-2" | #4 at 12" o.c. | #6 at 10" o.c. | 1'-2" | 4'-9"  | #5 ↗ at 10" o.c. |  |  |
| 9'-0" < H ≤ 10'-0"          | 2'-0" | 16"     | 7'-4"  | 6"   | #5 ↗ at 12" o.c. | #6 ↗ at 12" o.c. | 1'-0" | #4 at 12" o.c. | #6 at 10" o.c. | 1'-0" | 4'-1"  | #5 ↗ at 12" o.c. |  |  |
| 8'-0" < H ≤ 9'-0"           | 2'-0" | 14"     | 6'-4"  | 6"   | #4 ↗ at 12" o.c. | #6 ↗ at 12" o.c. | 1'-0" | #4 at 12" o.c. | #5 at 9" o.c.  | 1'-0" | 3'-6"  | #5 ↗ at 12" o.c. |  |  |
| 7'-0" < H ≤ 8'-0"           | 2'-0" | 14"     | 5'-2"  | 6"   | #4 ↗ at 12" o.c. | #5 ↗ at 12" o.c. | 1'-0" | #4 at 12" o.c. | #5 at 12" o.c. | 1'-0" | 2'-10" | #4 ↗ at 12" o.c. |  |  |
| 6'-0" < H ≤ 7'-0"           | 2'-0" | 12"     | 4'-2"  | 8"   | #4 ↗ at 10" o.c. | #5 ↗ at 10" o.c. | 10"   | #4 at 12" o.c. | #4 at 10" o.c. | 9"    | 2'-3"  | #4 ↗ at 10" o.c. |  |  |
| 5'-0" < H ≤ 6'-0"           | 2'-0" | 12"     | 3'-3"  | 8"   | #4 ↗ at 12" o.c. | #4 ↗ at 12" o.c. | 10"   | #4 at 12" o.c. | #4 at 12" o.c. | 9"    | 1'-7"  | #4 ↗ at 12" o.c. |  |  |
| 4'-0" < H ≤ 5'-0"           | 2'-0" | 12"     | 2'-4"  | 8"   | #4 ↗ at 12" o.c. | #4 ↗ at 12" o.c. | 10"   | #4 at 12" o.c. | #4 at 12" o.c. | 9"    | 1'-10" | #4 ↗ at 12" o.c. |  |  |
| H < 4'-0"                   | 2'-6" | 12"     | 1'-11" | 8"   | #4 ↗ at 12" o.c. | #4 ↗ at 12" o.c. | 10"   | #4 at 12" o.c. | #4 at 12" o.c. | 9"    | 1'-0"  | #4 ↗ at 12" o.c. |  |  |
| Near Light Pole Sta. 114+88 | 2'-0" | 12"     | 4'-0"  | 8"   | #4 ↗ at 12" o.c. | #4 ↗ at 12" o.c. | 10"   | #4 at 12" o.c. | #4 at 12" o.c. | 9"    | 2'-1"  | #4 ↗ at 12" o.c. |  |  |

\* Key Based on Pavement or Slab Covering Soil in front of Wall and extending from face of Wall a distance equal to Wall Height.  
 \*\* Also See Note B.  
 \*\*\* See Sheet S-2 for Special Conditions where Catch Basins are in close proximity to Retaining Wall.  
 \*\*\*\* See Detail F/S-3 for Retaining Wall Detail at Street Light Pole Footing near Station 114+88, along Outbound Lane.

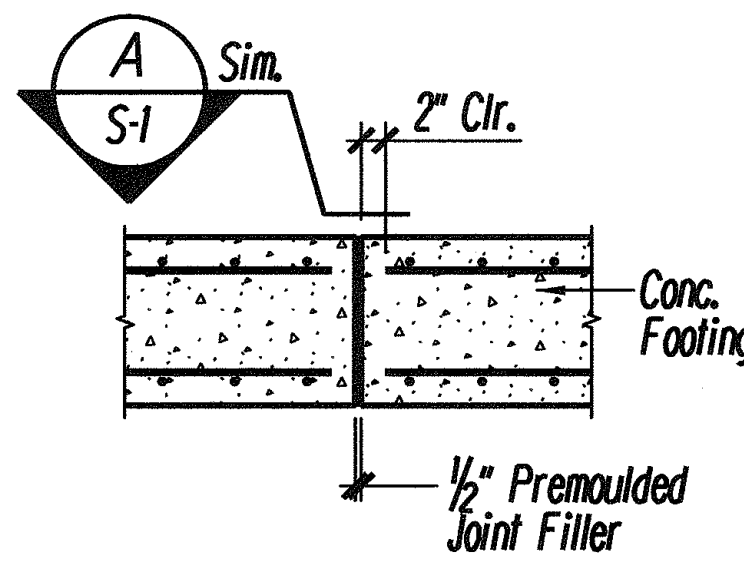
### GENERAL CONSTRUCTION NOTES FOR CONCRETE CANTILEVERED RETAINING WALLS

- Concrete: Minimum 28 day Compressive Strength for Reinforced Concrete  $f'_c$ : 3,000 psi.
- Reinforced Steel: Deformed Bars conforming to ASTM A615, Grade 60.
- Concrete Cover over Reinforcing Bars (Unless Noted Otherwise):
  - Concrete Deposited on or against Soil: 3"
  - All Others: 2"
- Dowels shall be of the same size and spacing and shall be in the same plane as the bars to which they are spliced, unless noted otherwise.
- Splices, Embedment lengths and continuing reinforcing around corners shall be 48 bars diameter, unless noted otherwise.
- Reinforcing shall be detailed in accordance with the latest edition CRSI'S "Placing Reinforcing Bars" and "Manual of Standard Practice" and the "ACI Detailing Manual", unless noted otherwise. Unless noted otherwise, reinforcing hooks shall follow standard details as defined by ACI.
- The construction shall conform to applicable portions of the current edition of the Standard Specifications for Road and Bridge Construction.

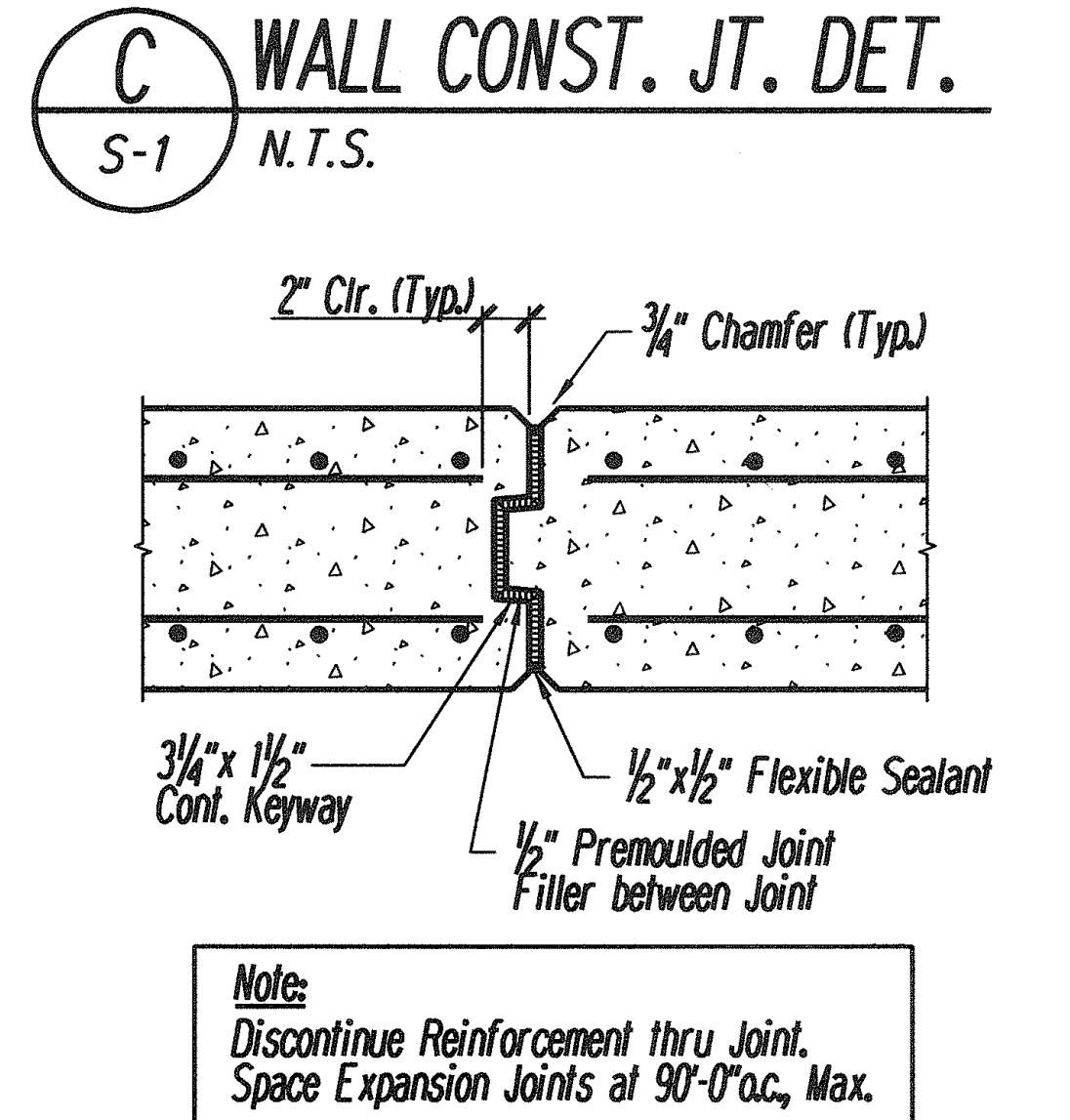
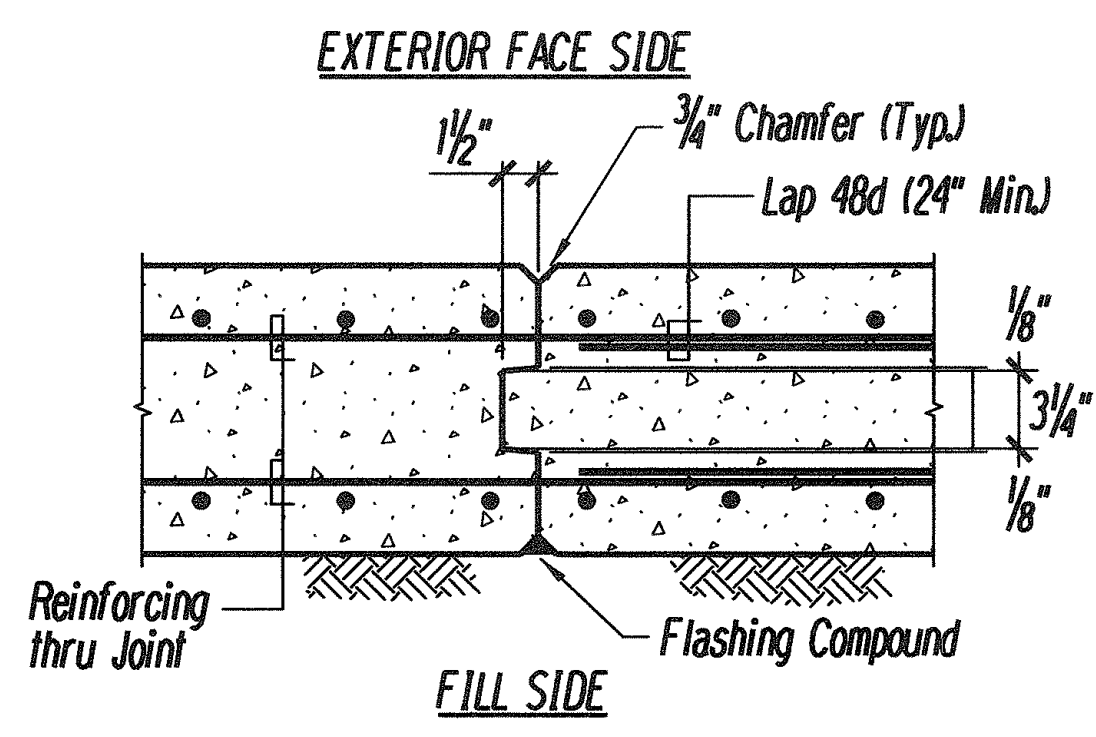


- For Sloping conditions at the Front Face of the Wall, the footing shall extend deeper to obtain a minimum 6-Foot Setback measured horizontally from the outside edge of the footing to the face of the slope. See Detail G/S-1.
- Unless otherwise noted, all exterior corners and edges shall have  $\frac{3}{4}$ " chamfers. All interior corners shall have  $\frac{3}{4}$ " Fillet.
- Design Soil Parameters shall be based on the Soil Report prepared by Geolabs, Inc.
 

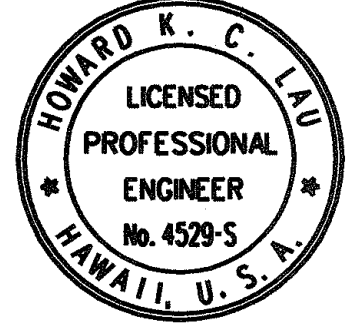
|                                   |                                |
|-----------------------------------|--------------------------------|
| Ultimate Bearing Capacity         | 7,500 psf                      |
| Strength Limit Bearing Capacity   | 3,750 psf                      |
| Extreme Event Coeff. of Friction  | 0.42                           |
| Strength Limit Coeff. of Friction | 0.36                           |
| Extreme Event Passive Pressure    | 350 psf/Ft.                    |
| Strength Limit Passive Pressure   | 175 psf/Ft.                    |
| Horiz. Active Pressure            | 64 psf (2H/V Sloping Backfill) |
| Vert. Active Pressure             | 32 pcf (2H/V Sloping Backfill) |
- Footings shall be cast Horizontal. Step Footing as Required. See Detail G/S-3.



NOTE: Discontinue Reinforcement thru Joint. Space Expansion Joints at 90'-0" o.c., Max.



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



SIGNATURE  
 APRIL 30, 2004  
 EXPIRATION DATE OF LICENSE  
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**CONC. WALL SECTIONS AND DETAILS**

FORT WEAVER ROAD WIDENING  
 NEAR LAULAI STREET

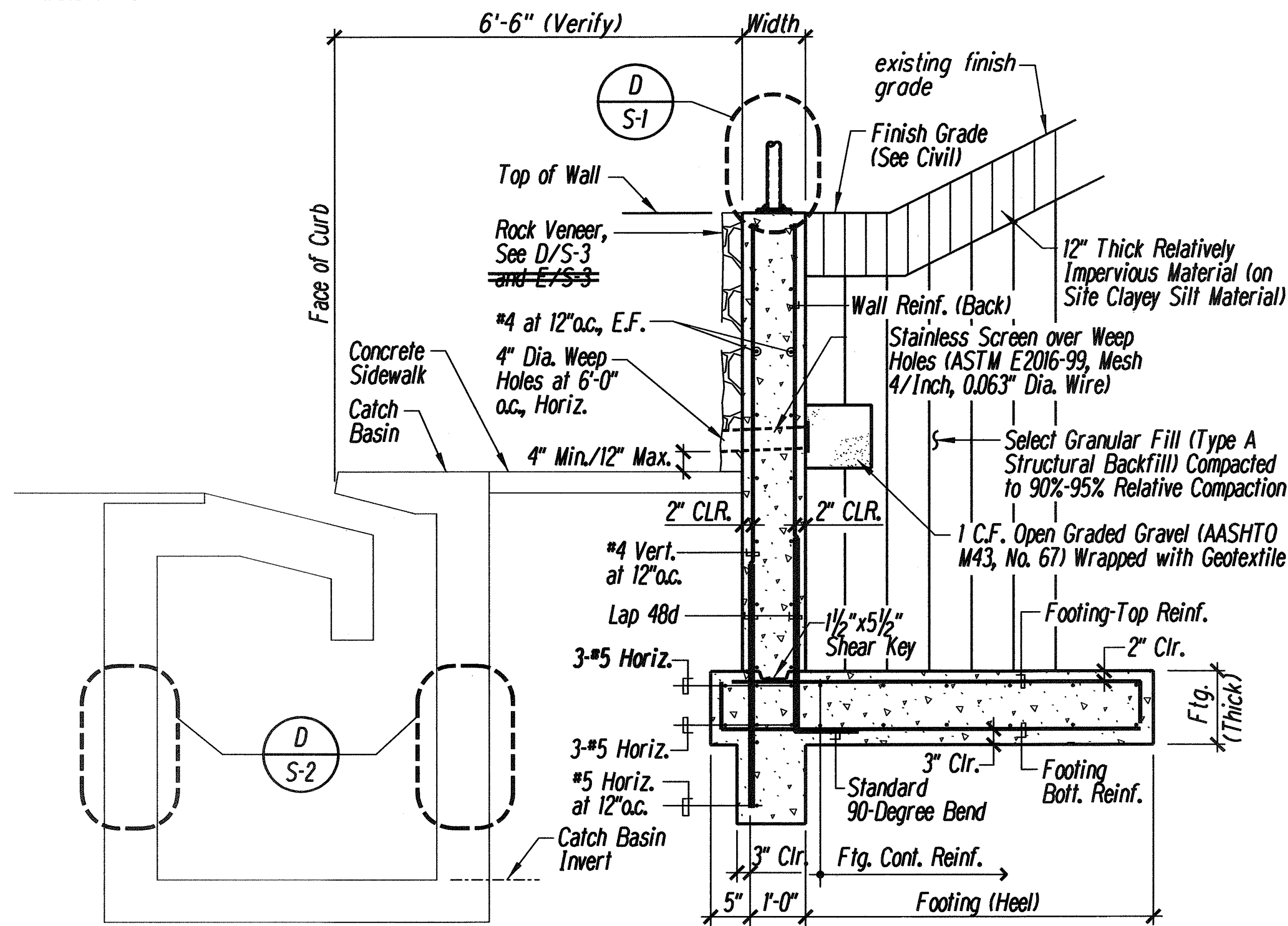
FEDERAL AID PROJECT NO. CMAQ-076-1(K8)

SCALE: AS NOTED DATE: October 2003

SHEET No. S-1 OF 3 SHEETS

|                   |      |          |
|-------------------|------|----------|
| ORIGINAL PLAN     | DATE | 10/20/03 |
| SURVEY PLOTTED BY | DATE |          |
| DRAWN BY          | DATE |          |
| NOTED BY          | DATE |          |
| CHECKED BY        | DATE |          |
| QUANTITIES BY     | DATE |          |
| NO.               | DATE |          |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | CMAQ-076-1(K8)     | 2004        | 45        | 127          |

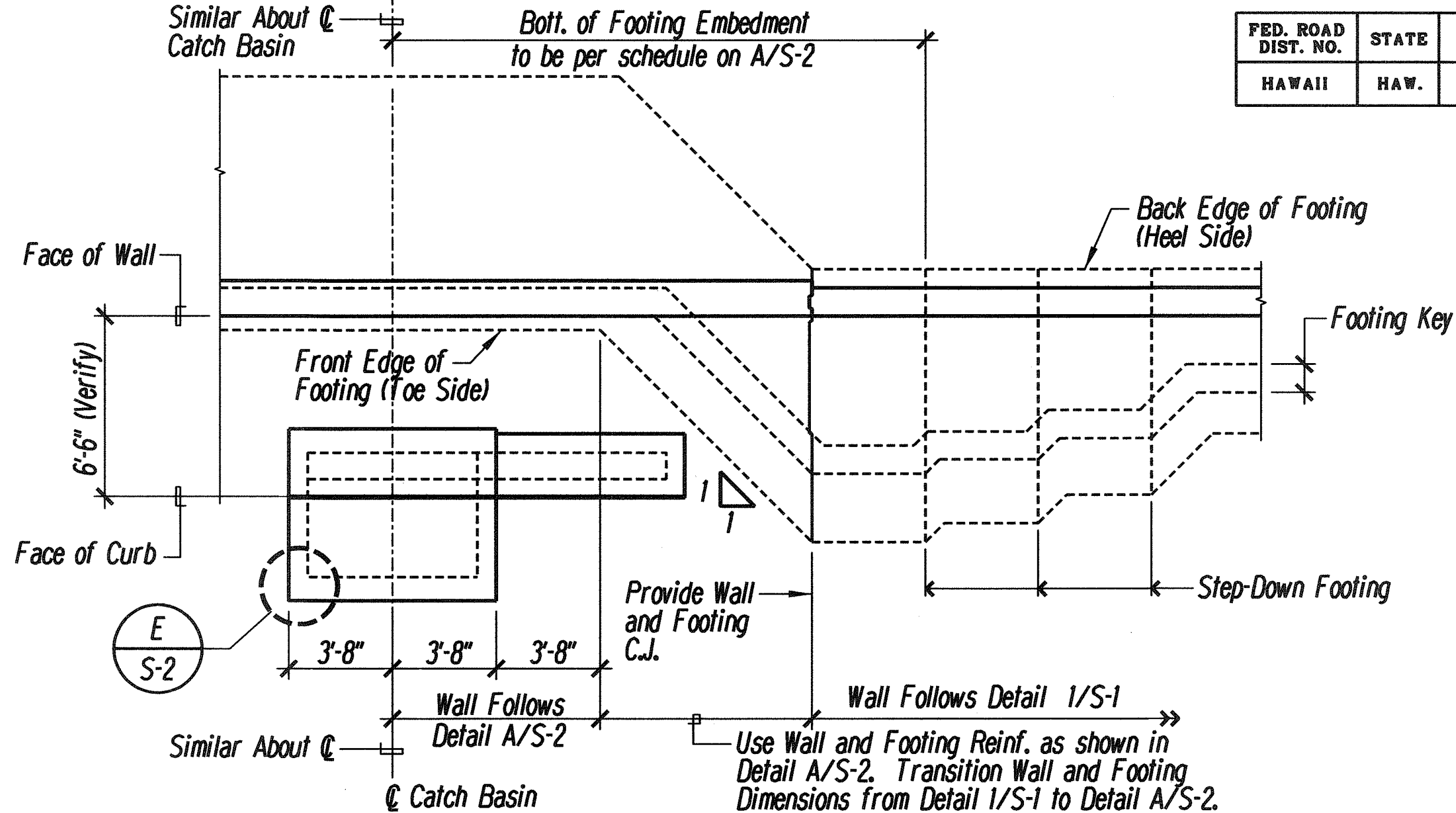


CONCRETE RETAINING WALL SCHEDULE NEAR CATCH BASINS

| Catch Basin |        |             | Retaining Wall |           |           |       |                |                |                    | Wall  |                  |
|-------------|--------|-------------|----------------|-----------|-----------|-------|----------------|----------------|--------------------|-------|------------------|
| Station     | Invert | Top of Curb | Top of Wall    | Embedment | Thickness | Heel  | Top Reinf.     | Bott. Reinf.   | Cont. Reinf.       | Width | Back Reinf.      |
| 116+50      | 35.2   | 44.2        | 49.2           | 6'-1"     | 1'-4"     | 7'-3" | #7 at 8" o.c.  | #5 at 8" o.c.  | #5 at 10" o.c. T&B | 1'-3" | #7 L at 8" o.c.  |
| 120+00      | 22.1   | 29.4        | 33.5           | 4'-5"     | 1'-2"     | 5'-6" | #6 at 10" o.c. | #5 at 10" o.c. | #5 at 12" o.c. T&B | 1'-0" | #6 L at 10" o.c. |

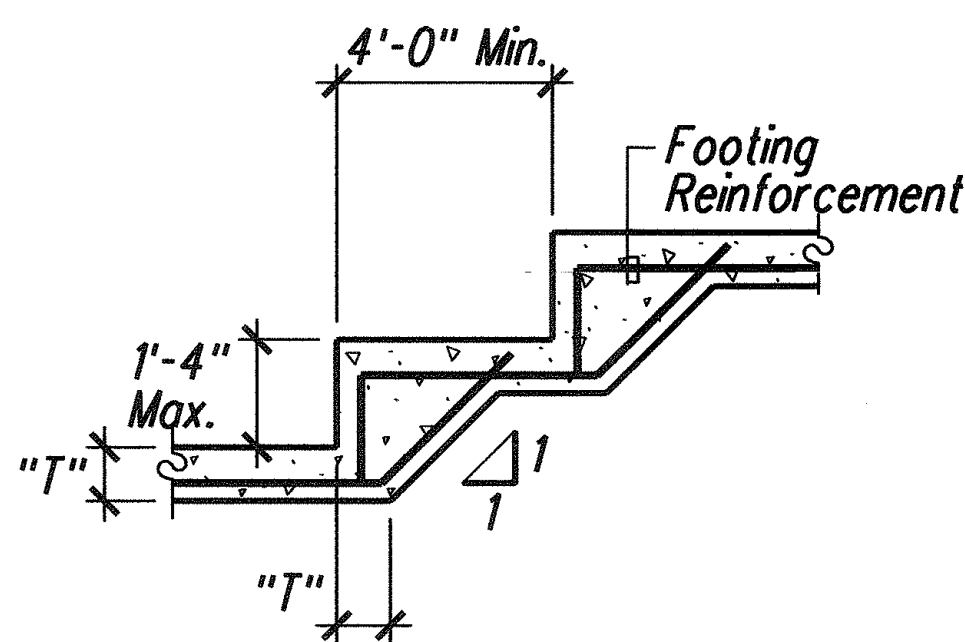
A CONCRETE RETAINING WALL DETAIL NEAR CATCH BASINS

S-2 Not to Scale



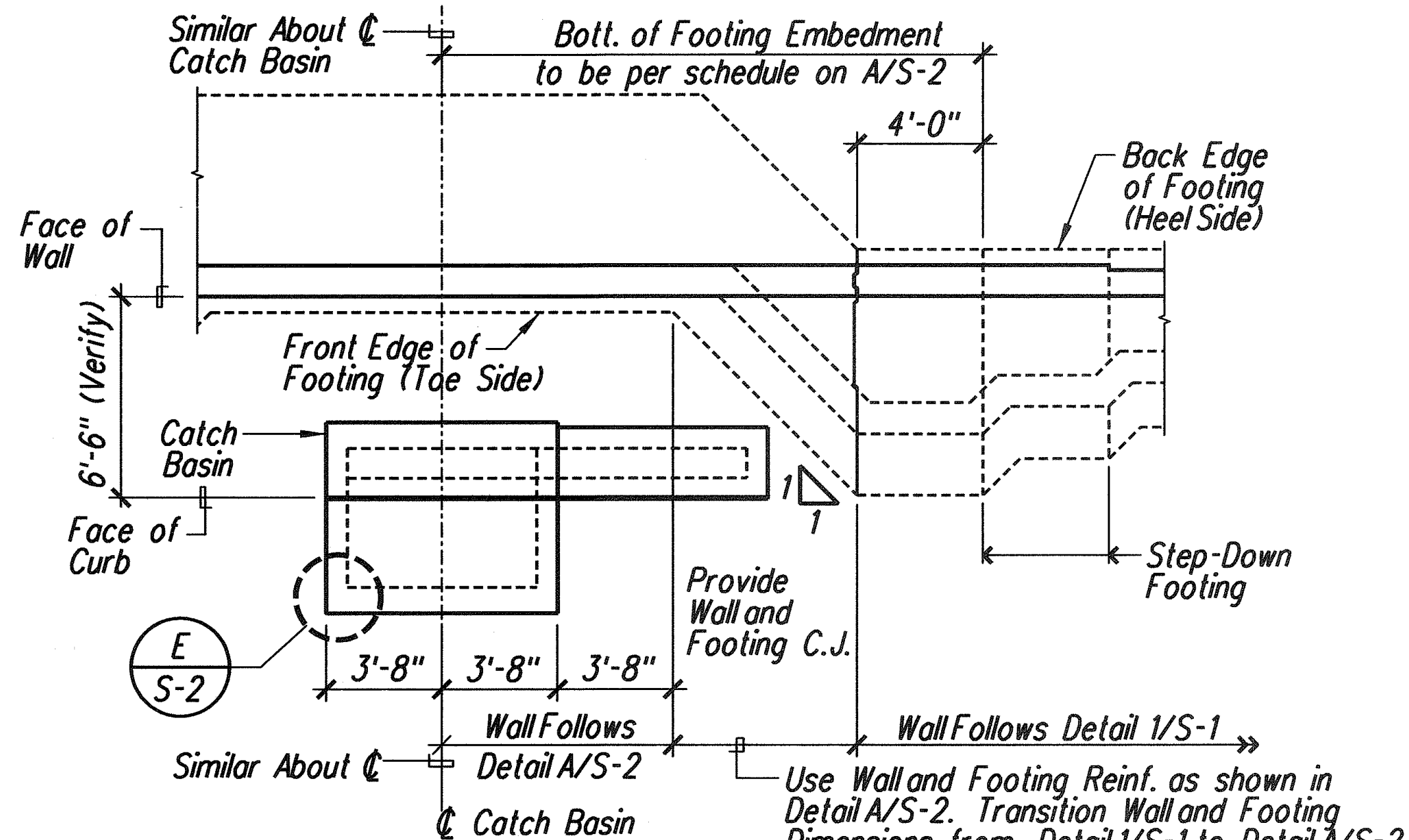
B WALL PLAN NEAR CATCH BASIN STA. A 116+50

S-2 Not to Scale



G STEPPED FOOTING DET.

S-2 Not to Scale

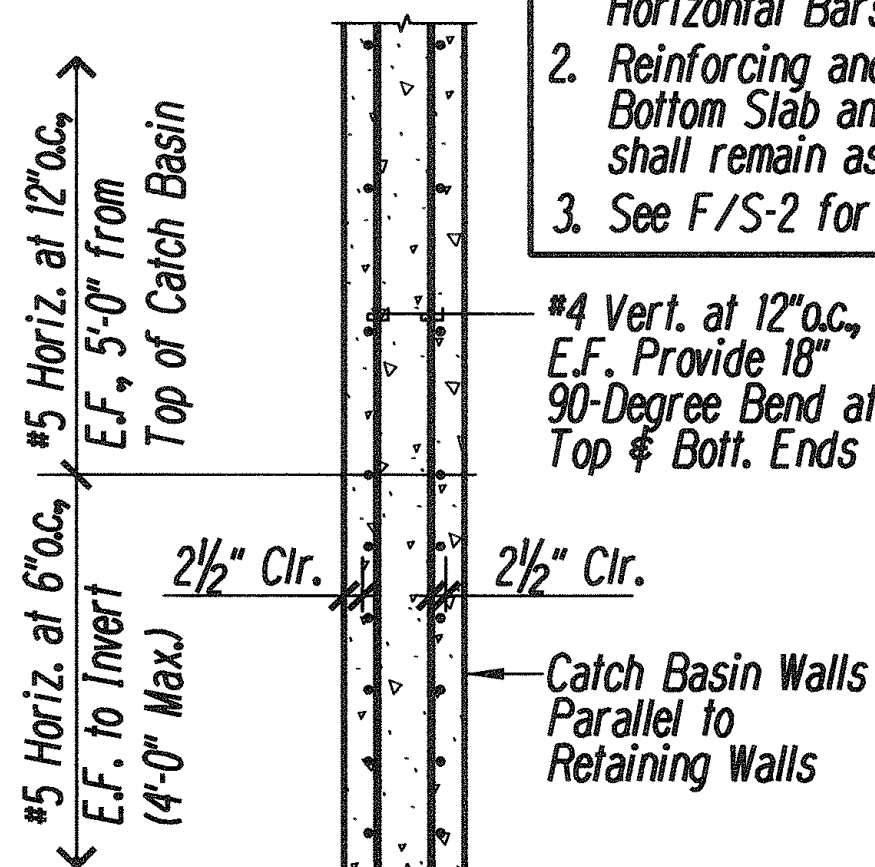


C WALL PLAN NEAR CATCH BASIN STA. A 120+00

S-2 Not to Scale

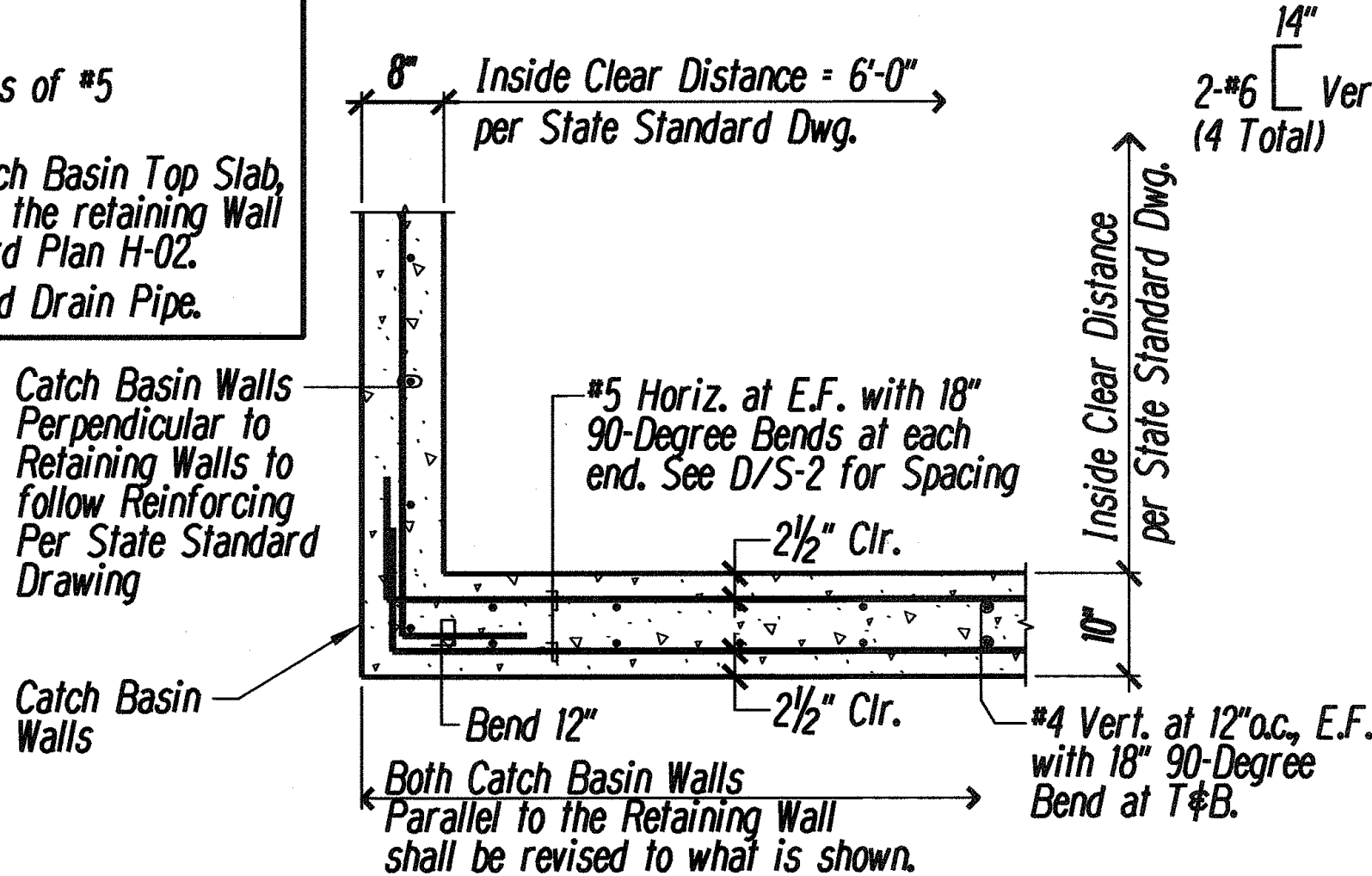
NOTE:

1. Provide 18" 90-Degree Bend at both ends of #5 Horizontal Bars.
2. Reinforcing and Concrete sizes for Catch Basin Top Slab, Bottom Slab and Walls Perpendicular to the retaining Wall shall remain as shown in State Standard Plan H-02.
3. See F/S-2 for Added Wall Reinf. around Drain Pipe.



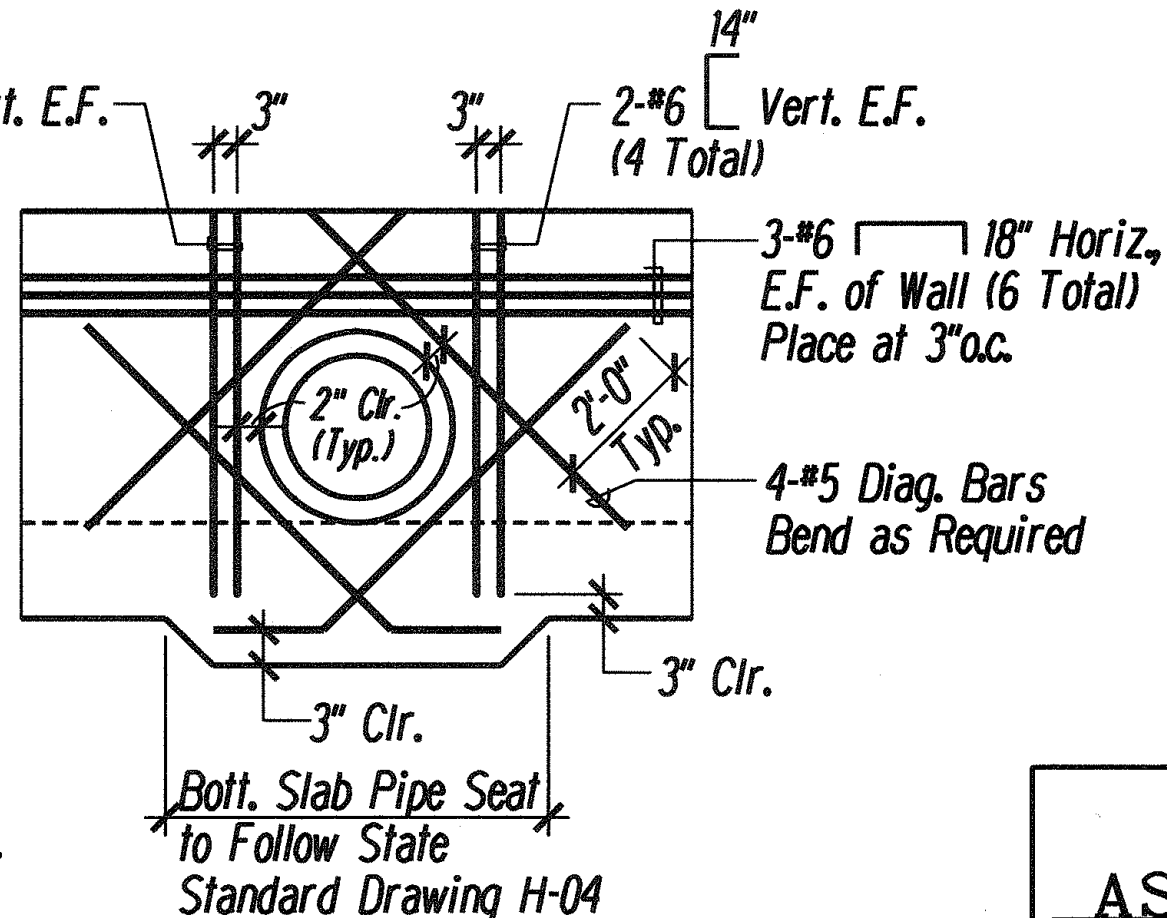
D CATCH BASIN WALL DET.

S-2 Not to Scale



E DETAIL

S-2 Not to Scale



ADDED WALL REINF. AROUND PIPE DET.

S-2 Not to Scale

LEGEND FOR AS-BUILT POSTINGS

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



SIGNATURE  
APRIL 30, 2004  
EXPIRATION DATE OF LICENSE  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

WALL DETAILS NEAR CATCH BASINS

FORT WEAVER ROAD WIDENING  
NEAR LAULANUI STREET

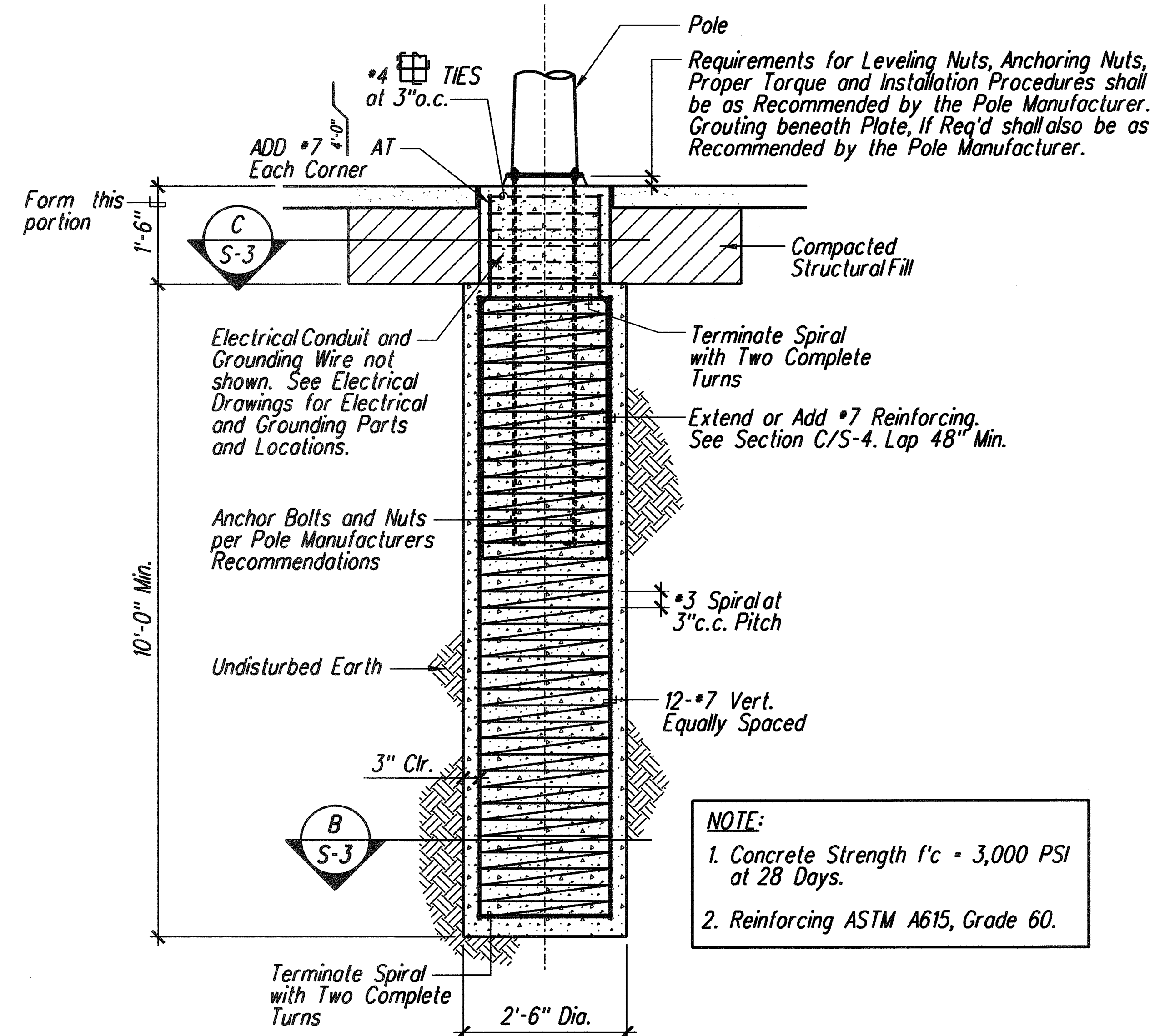
FEDERAL AID PROJECT NO. CMAQ-076-1(K8)

SCALE: AS NOTED DATE: October 2003

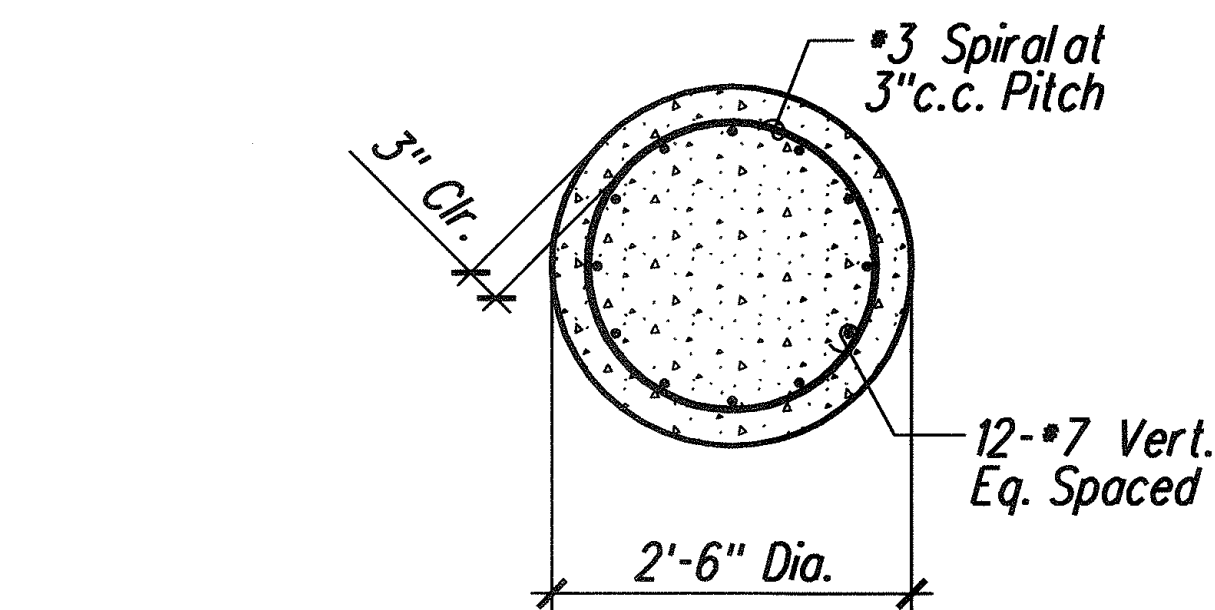
SHEET No. S-2 OF 3 SHEETS

"AS-BUILT"

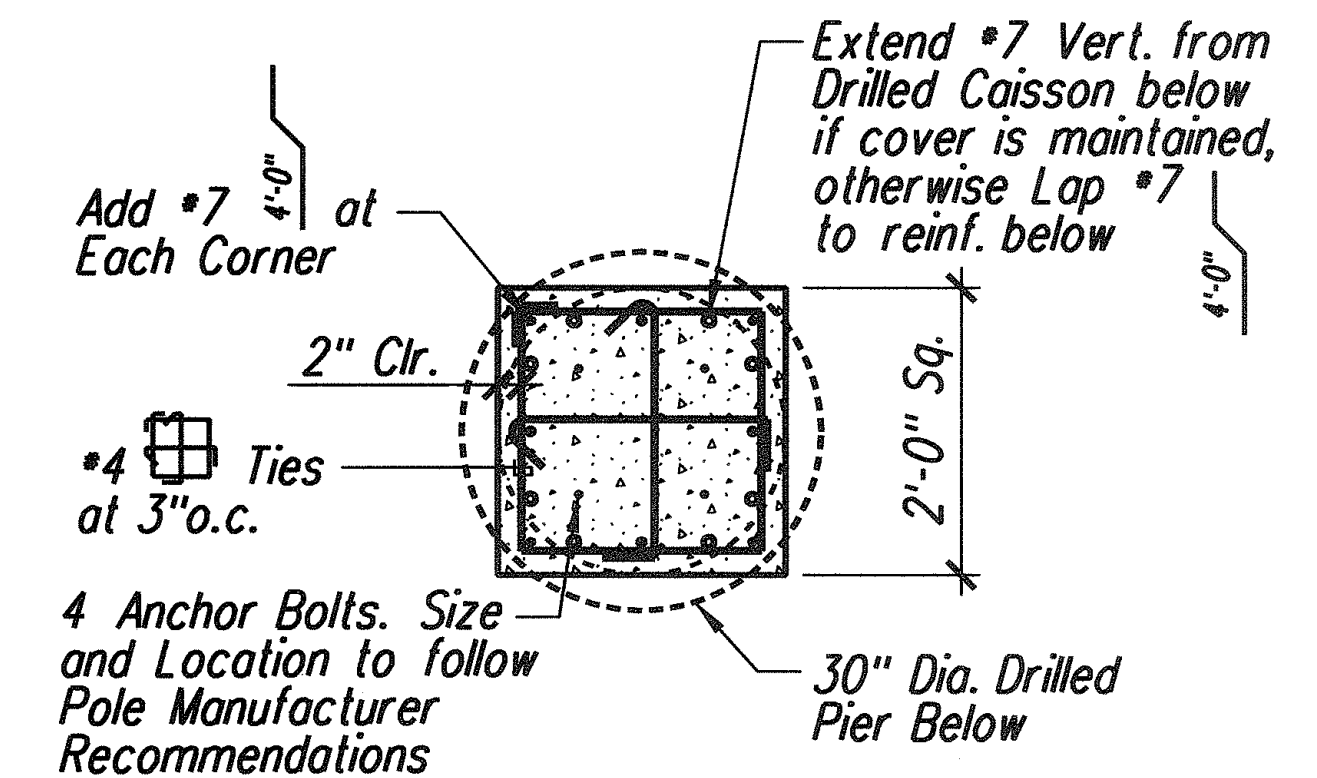
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | CMAQ-076-1(8)      | 2004        | 46        | 127          |



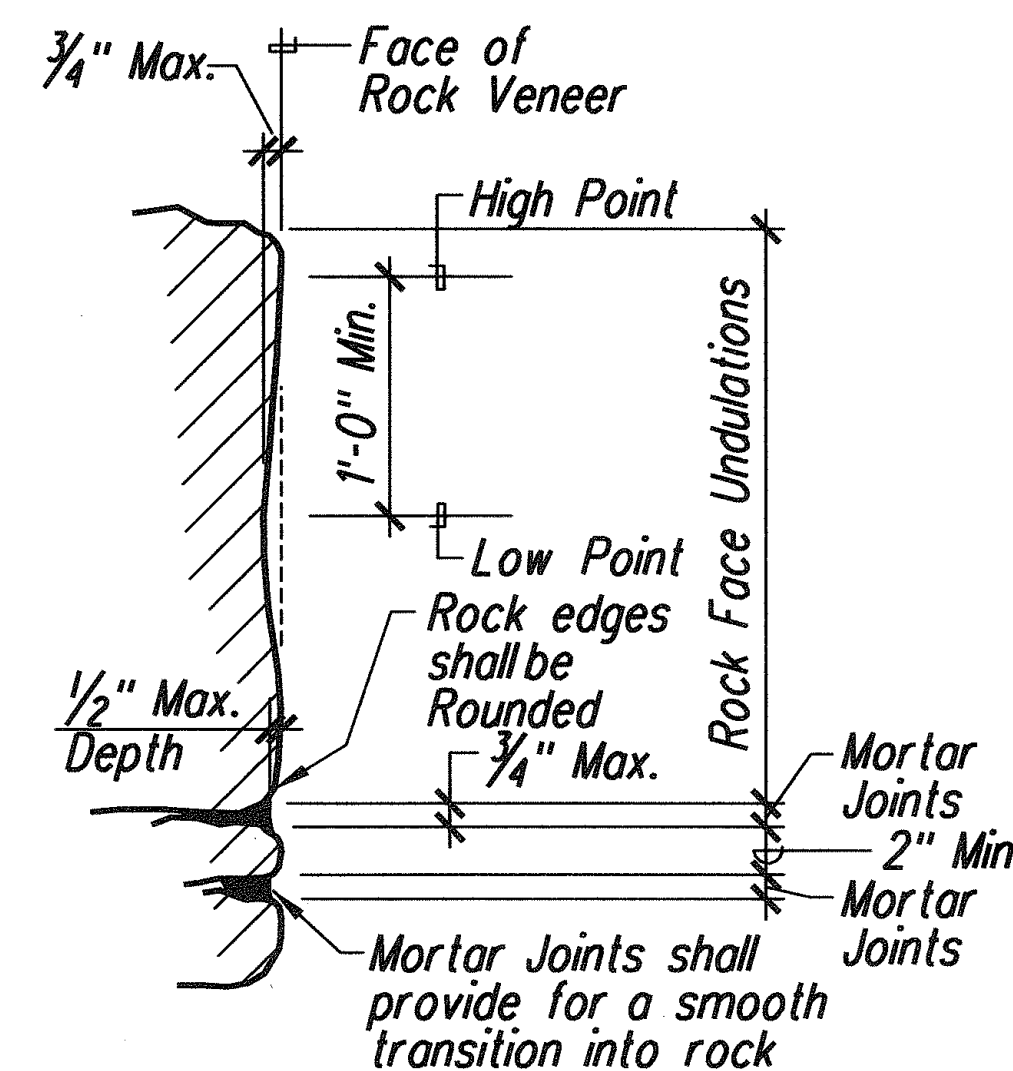
**A** TYPE III-45 SIGNAL /LIGHT POLE FOOTING  
S-3 Scale:  $\frac{3}{4}" = 1'-0"$



**B** SECTION  
S-3 Scale:  $\frac{3}{4}" = 1'-0"$

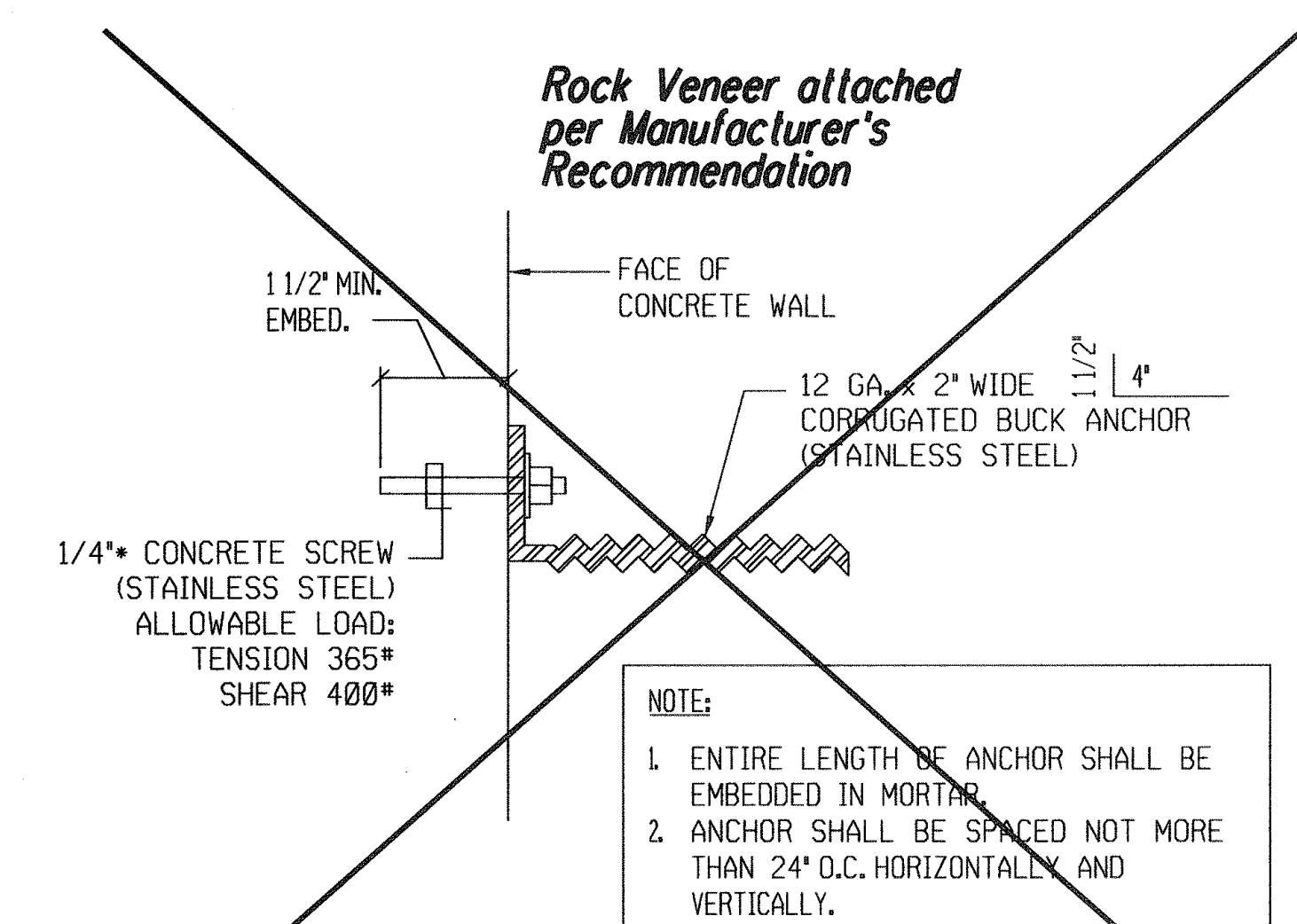


**C** SECTION  
S-3 Scale:  $\frac{3}{4}" = 1'-0"$

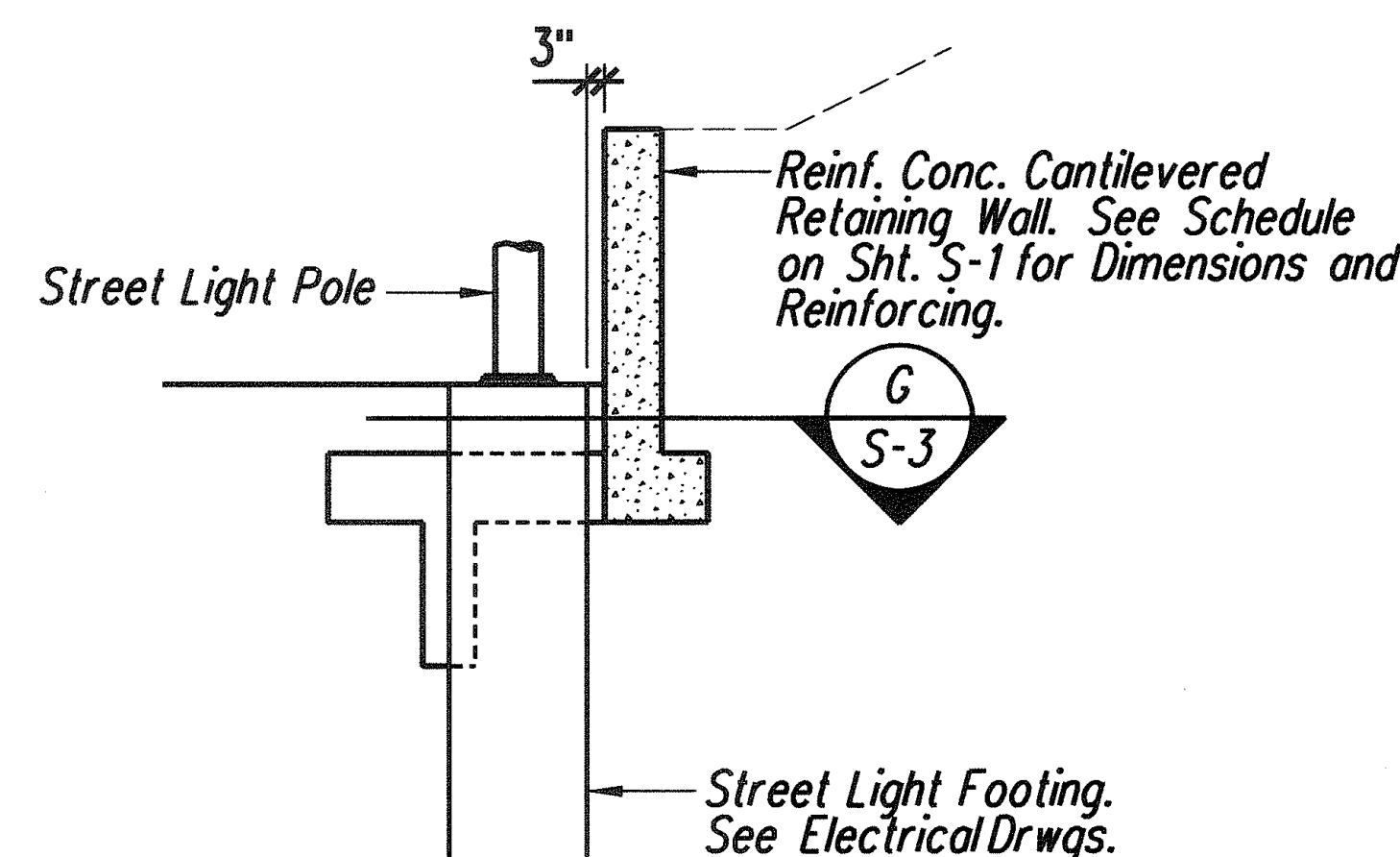


- Note:
1. Rock Face Undulations can be horizontal or vertical. Rock undulations shall be gradual with a maximum relief of less than  $\frac{3}{4}$ " over a distance of 12" in any direction.
  2. No Mortar joint shall feature any long upward-sloping edges or ridges that could contribute to wheel or tire climb.
  3. Surface differential across joints shall be 0.2" or less.
  4. Maximum thickness of the rock veneer shall be  $4\frac{1}{2}$ ".
  5. Rock Veneer shall meet NCHRP 350 TL-2 Requirements.

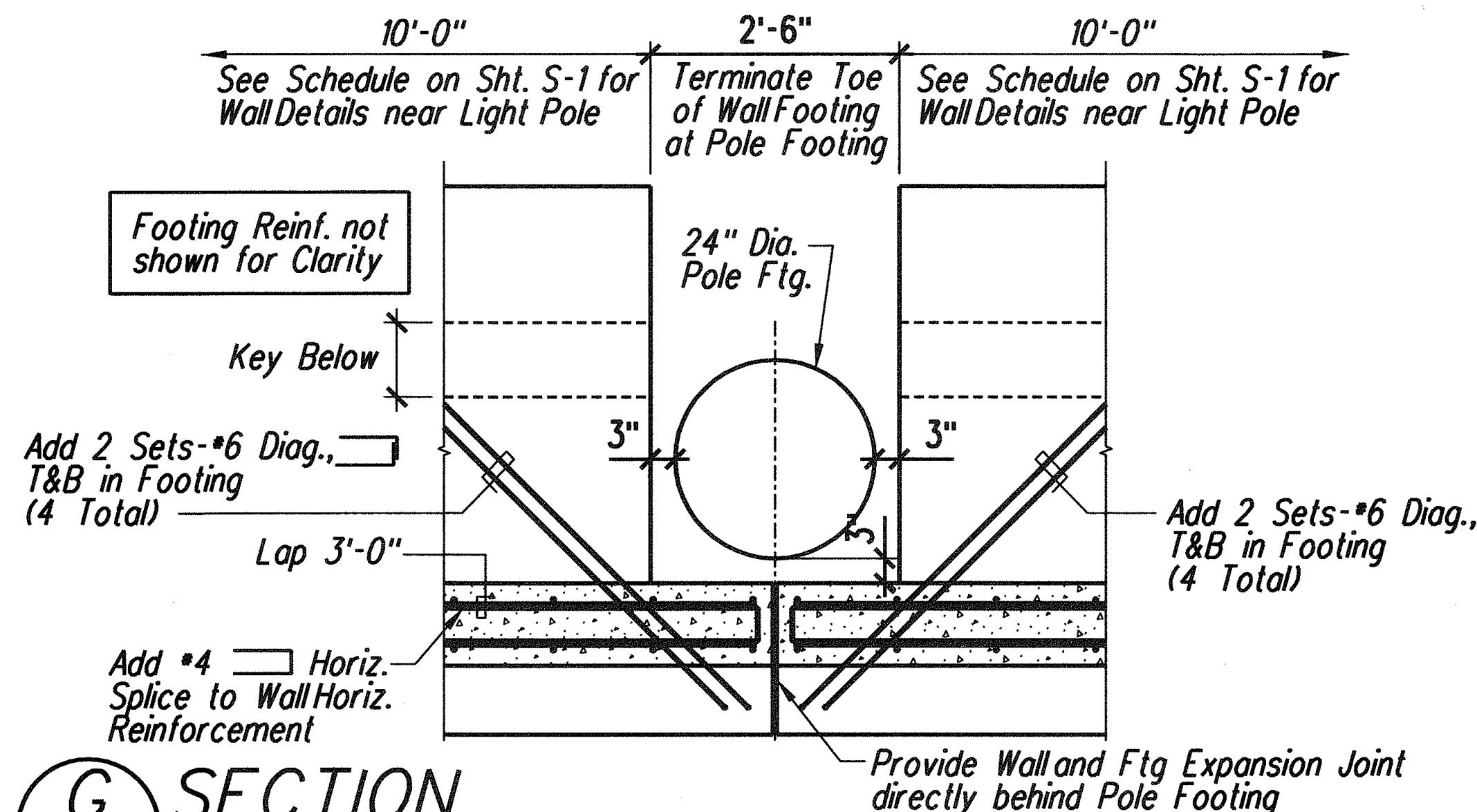
D ROCK VENEER ROUGHNESS CRITERIA  
S-3 Not to Scale




 ROCK VENEER ANCHOR  
 NOT TO SCALE

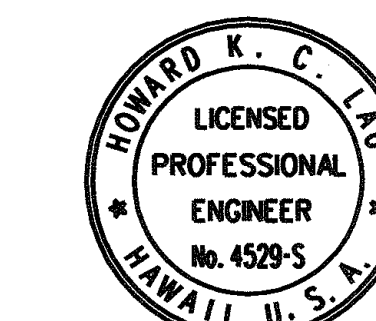


POLE FOUNDATION THRU  
WALL FTG NEAR STATION 114+88  
S-3 Scale:  $\frac{3}{8}" = 1'-0"$



**G** **SECTION**  
S-3 Scale:  $\frac{3}{4}" = 1'-0"$

| <u><b>LEGEND FOR</b></u>                                                              |                                     |
|---------------------------------------------------------------------------------------|-------------------------------------|
| <u><b>AS-BUILT POSTINGS</b></u>                                                       |                                     |
|  | Squiggly line for as-built deletion |
|  | Double line for as-built deletion   |
| <b>Roadway</b>                                                                        | <b>Text for as-built posting</b>    |



SIGNATURE \_\_\_\_\_  
**APRIL 30, 2004**  
 EXPIRATION DATE OF LICENSE \_\_\_\_\_  
 THIS WORK WAS PREPARED BY \_\_\_\_\_  
 ME OR UNDER MY SUPERVISION \_\_\_\_\_

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

CONCRETE BASE FOR  
TYPE III-45 TRAFFIC SIGNAL

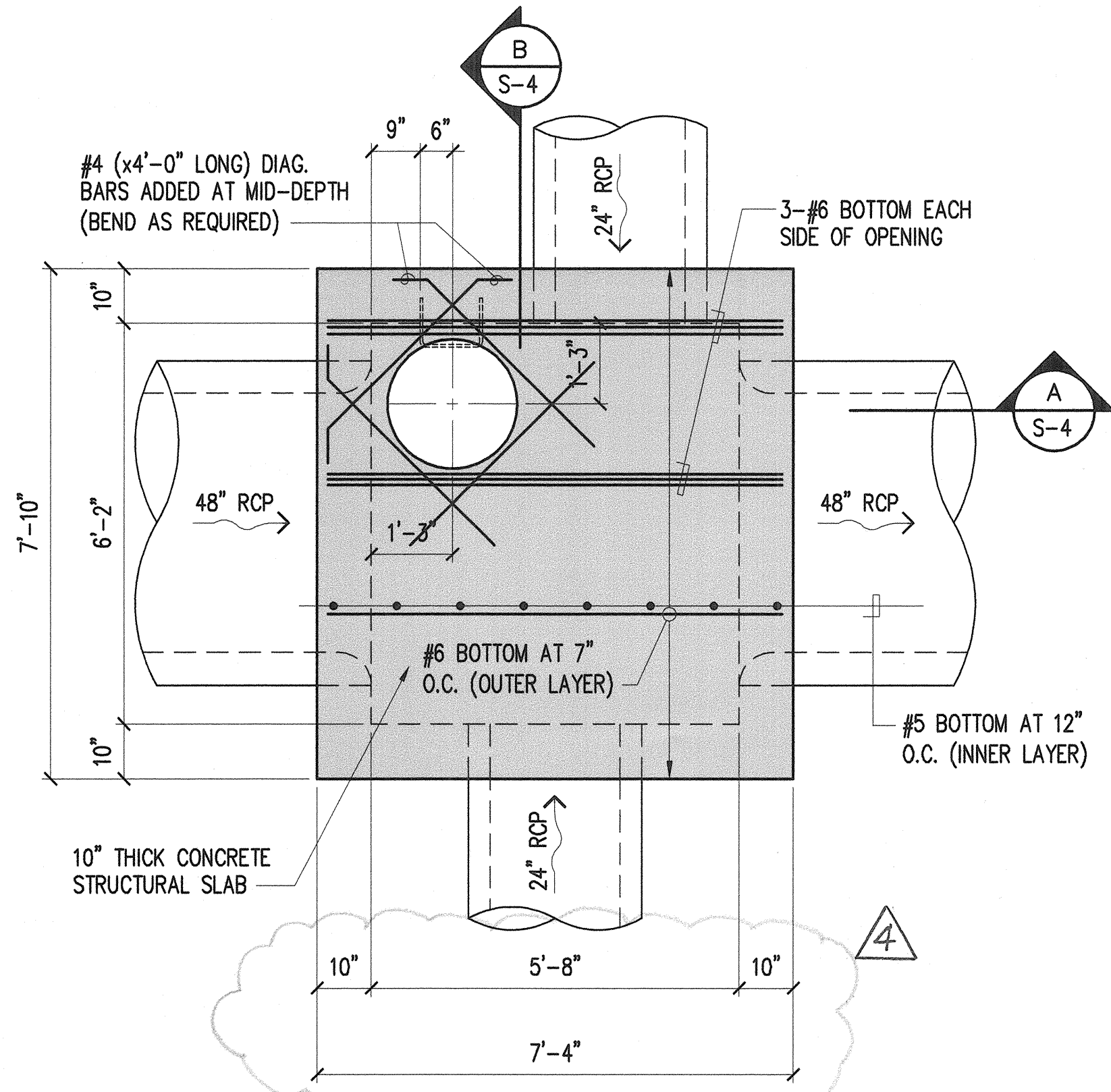
FORT WEAVER ROAD WIDENING  
NEAR LAULAUNUI STREET

FEDERAL AID PROJECT NO. CMAQ-076-1(8)

SCALE: AS NOTED DATE: October 2003

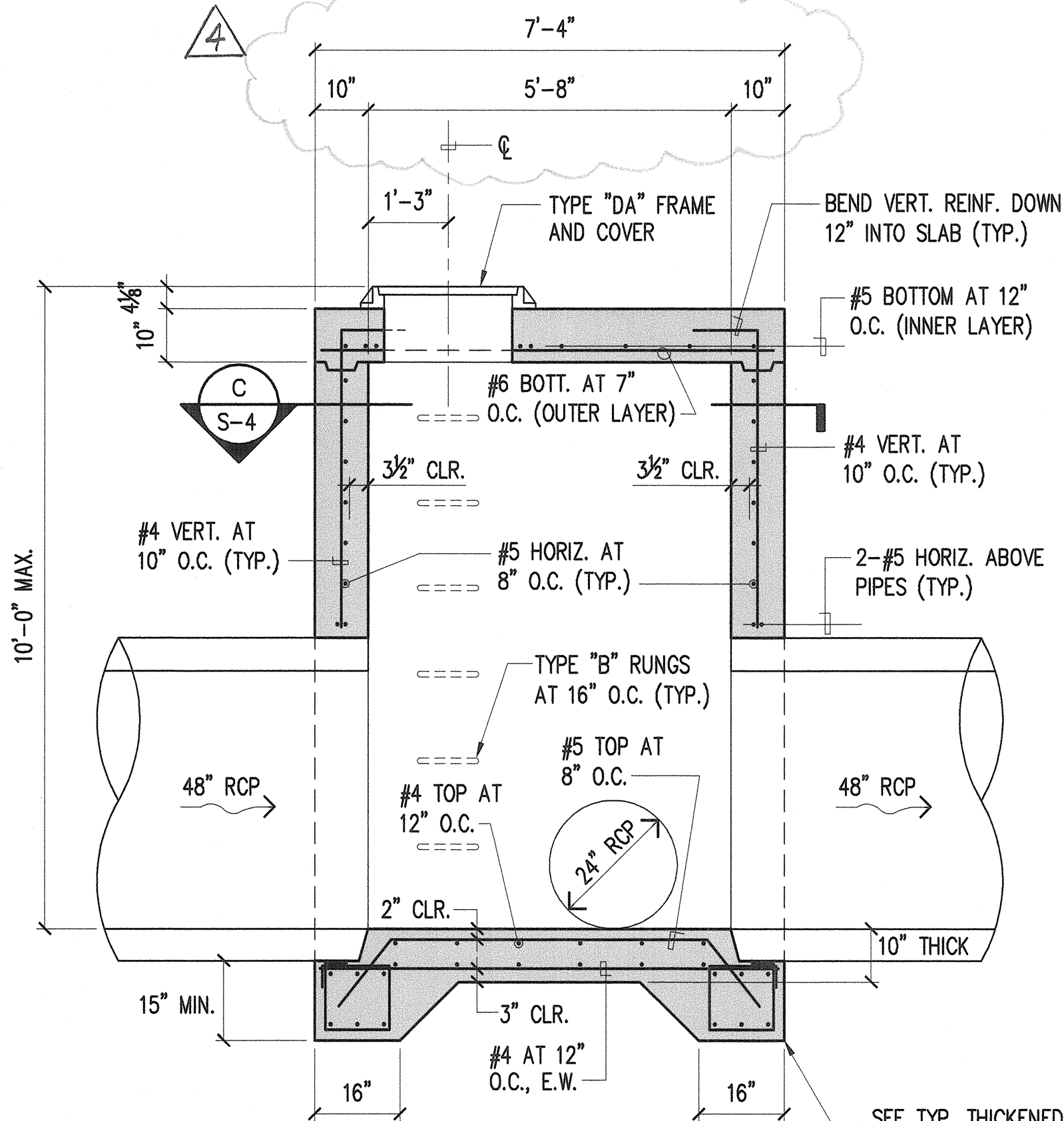
SHEET No. S-3 OF 3 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | CMAQ-076-1(8)      | 2004        | 46A       | 127          |



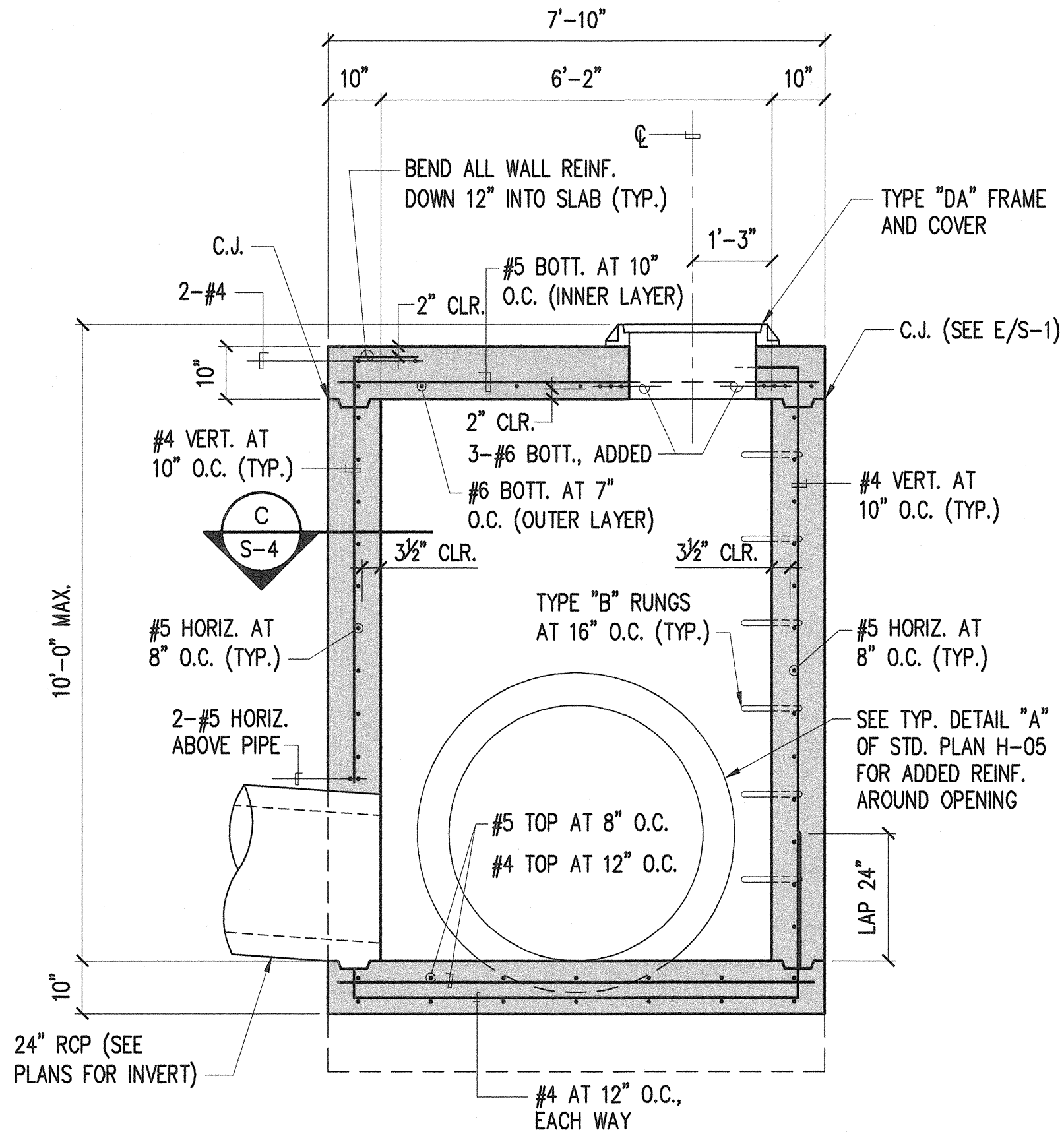
**SPECIAL DRAIN MANHOLE**  
**AT STA. 116+50 AND 120+00**

1  
S-4 SCALE: 1/2" = 1'-0"



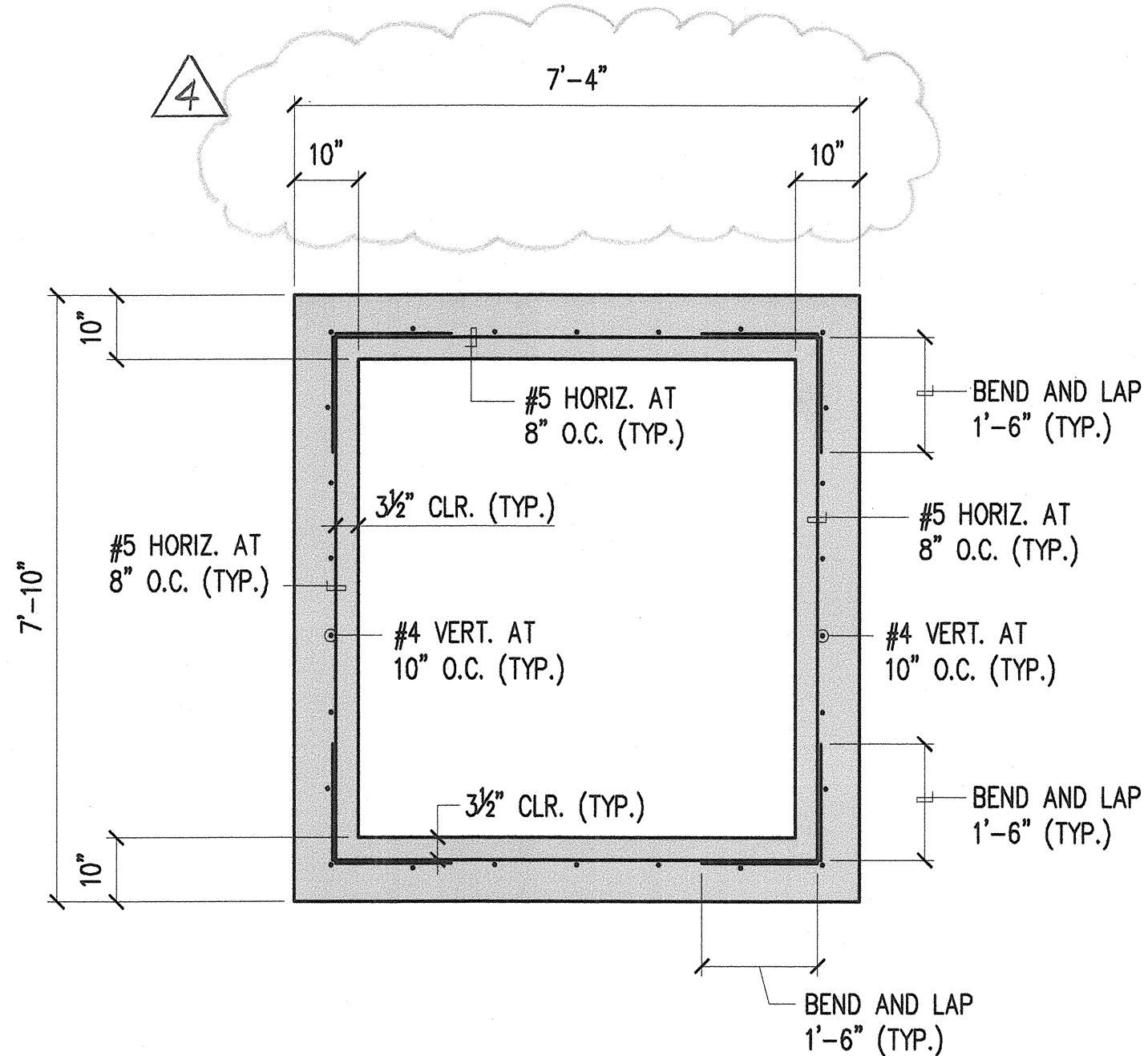
**SECTION**

A  
S-4 SCALE: 1/2" = 1'-0"



**SECTION**

B  
S-4 SCALE: 1/2" = 1'-0"



**SECTION**

C  
S-4 SCALE: 1/2" = 1'-0"

#### FOUNDATION NOTES:

1. THE SOILS INVESTIGATION REPORT FOR FORT WEAVER ROAD WIDENING IS MADE A PART OF THESE PLANS. THIS SOILS INVESTIGATION REPORT WAS PREPARED BY GEOLABS-HAWAII. A COPY OF THIS REPORT IS ON FILE WITH THE CIVIL ENGINEER AND IS AVAILABLE ON REQUEST.
2. THE CONTRACTOR SHALL FOLLOW ALL RECOMMENDATIONS CONTAINED IN THE REPORTS BY FGE, LTD.
3. THE BOTTOM OF ALL EXCAVATIONS SHALL BE OBSERVED AND PROBED BY A GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF FOUNDATION CONCRETE. ANY HIGHLY COMPRESSIBLE, COHESIVE MATERIAL EXPOSED AT THE BOTTOM OF EXCAVATION SHALL BE REMOVED AND CLEANED OUT TO THE VERY STIFF TO HARD NATURAL GROUND, PROPERLY COMPACTED FILL, OR INTACT CORAL, AND THE RESULTING DEPRESSION BACKFILL INACCORDANCE WITH THE GRADING RECOMMENDATIONS.
4. SOIL DESIGN VALUES ARE:  
BEARING PRESSURE ..... 4,000 PSF  
AT-REST EARTH PRESSURE ..... .58 PCF

#### DESIGN LOADS:

1. LIVE LOAD AT DMH. .... HS 20-44 WITH 30% IMPACT PER STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES ADOPTED BY AASHTO

#### GENERAL NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL FIELD DIMENSIONS AND LOCATIONS OF DUCTS AND PIPES BEFORE POURING CONCRETE. COORDINATE INFORMATION SHOWN ON STRUCTURAL DRAWINGS WITH CIVIL DRAWINGS BEFORE COMMENCEMENT OF WORK. ALL DISCREPANCIES SHALL BE PROMPTLY REPORTED TO THE ENGINEER.
2. ALL OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE WORKING DRAWINGS AND/OR SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH ANY WORK SO INVOLVED.
3. ALL WORK SHALL CONFORM TO THE UNIFORM BUILDING CODE, LATEST EDITION, AS ADOPTED BY THE CITY AND COUNTY OF HONOLULU.
4. UNLESS SPECIFICALLY DETAILED ELSEWHERE, CONTRACTOR SHALL FOLLOW TYPICAL DETAILS ON THIS SHEET.
5. FOR TYPICAL ADDED REINF. AROUND PIPE PENETRATIONS, SEE TYPE DETAIL "A" OF STANDARD PLAN H-05.
6. FOR TYPICAL SECTIONS AT THICKENED EDGE SUPPORT BELOW PIPES, SEE DETAIL D/S-4.
7. REFER TO CIVIL PLANS FOR ALL PIPE PENETRATION SIZES AND LOCATIONS.

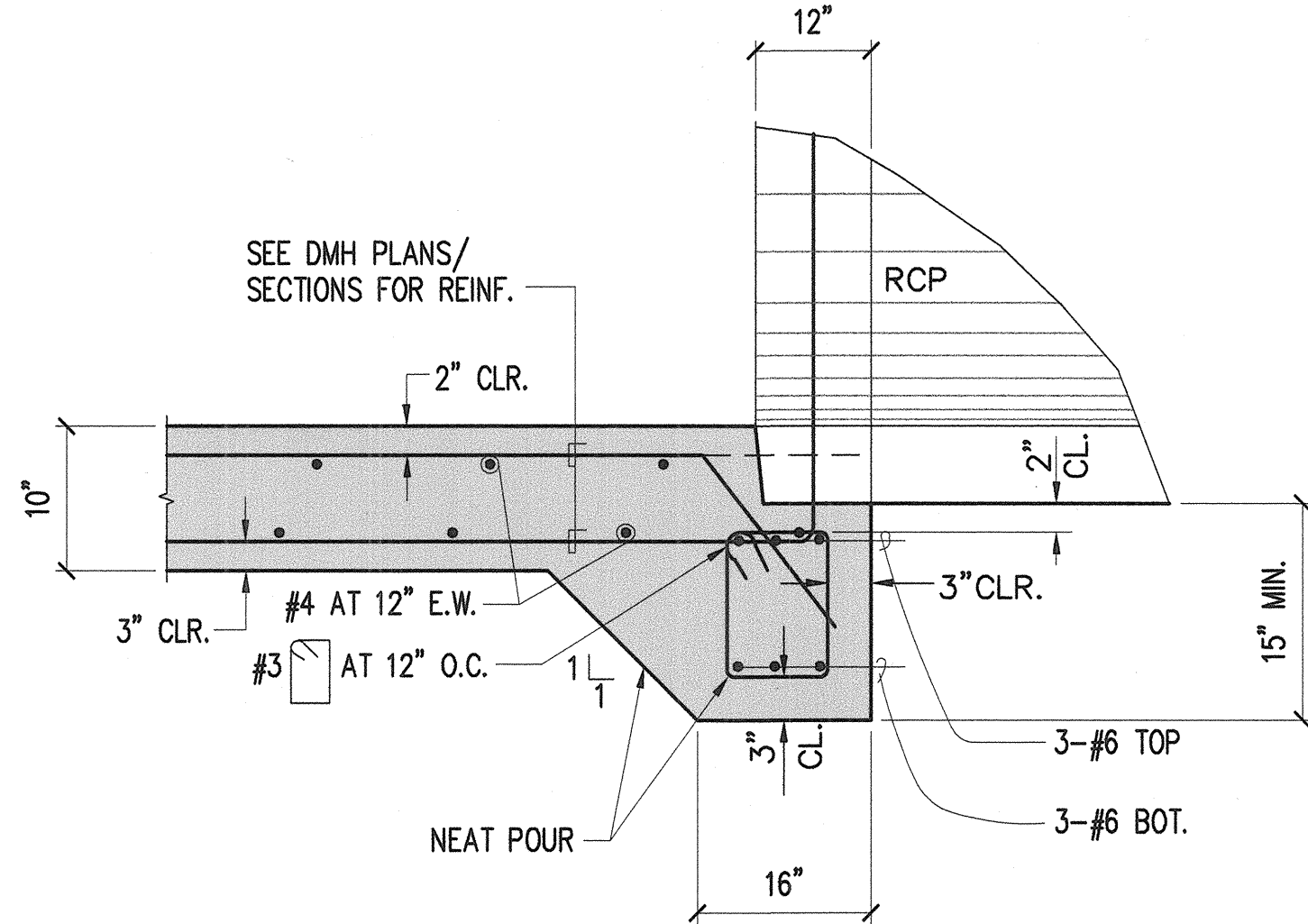
#### REINFORCING STEEL

1. UNLESS OTHERWISE INDICATED ON PLANS AND/OR SCHEDULE, ALL REINFORCING STEEL SHALL BE HIGH STRENGTH GRADE DEFORMED BARS WHICH SHALL CONFORM TO THE STANDARD OF ASTM A615 GRADE 60.
2. REINFORCING SHALL BE SPLICED ONLY AS SHOWN OR NOTED. SPLICES AT OTHER LOCATIONS SHALL BE APPROVED BY THE ENGINEER. UNLESS OTHERWISE NOTED ALL CONTINUOUS BARS IN WALLS, SLABS, AND FOOTINGS SHALL BE LAPPED 40 BAR DIAMETERS AT ALL SPLICES, CORNERS, AND INTERSECTIONS.
3. PROVIDE DOWELS IN FOOTINGS THE SAME SIZE AND NUMBER AND IN THE SAME LOCATION AS VERTICAL WALL REINFORCING. DOWELS SHALL HAVE A MINIMUM PROTECTION EQUAL TO STANDARD LAP SPLICES UNLESS OTHERWISE SHOWN.
4. ALL REINFORCING STEEL, ANCHOR BOLTS, AND OTHER INSERTS SHALL BE SECURED IN POSITION PRIOR TO PLACING CONCRETE.
5. MINIMUM CONCRETE PROTECTION FOR REINFORCING STEEL UNLESS OTHERWISE SHOWN: 3" CONCRETE CAST AGAINST EARTH 2" TOP BARS IN BOTTOM SLAB OR FOOTING 2" TOP AND BOTTOM BARS IN TOP SLAB 2" WALL - INTERIOR AND EXTERIOR

#### CONCRETE

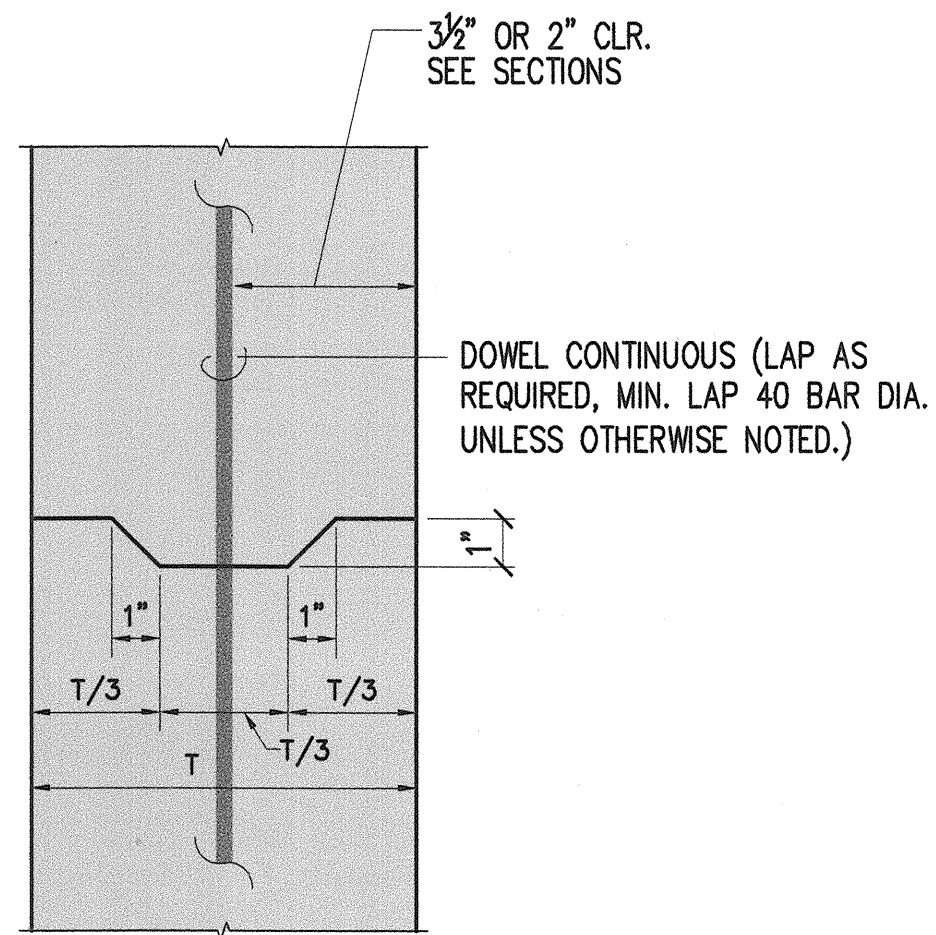
1. ALL CONCRETE WORK SHALL CONFORM TO ACI 318-95.
2. SLEEVES EXCEEDING ONE-THIRD THE SLAB OR WALL THICKNESS SHALL NOT BE PLACED IN STRUCTURAL CONCRETE UNLESS SPECIFICALLY DETAILED. PIPE MAY PASS THROUGH STRUCTURAL CONCRETE IN SLEEVES BUT SHALL NOT BE EMBEDDED THEREIN.
3. SECURE ALL BOLTS, ANCHORS, INSERTS, ETC. AND VERIFY ALL GROOVES, SLOTS, AND FINISHES PRIOR TO PLACING CONCRETE.
4. FORMS FOR SLABS SHALL BE CAMBERED 1" FOR EACH 14'-0" OF SPAN, FORMS FOR CANTILEVERED SLABS SHALL BE CAMBERED 1" FOR EACH 6'-0" OF CANTILEVER.
5. LOCATIONS OF ALL CONSTRUCTION OR COLD JOINTS SHALL BE APPROVED BY THE ENGINEER. ALL COLD JOINTS SHALL BE KEYED.
6. 48 HOURS PRIOR TO THE POURING OF ANY STRUCTURAL CONCRETE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO AN INSPECTION CAN BE MADE OF ALL FORMS AND REINFORCING STEEL.
7. 28-DAY COMPRESSIVE STRENGTH AND MAXIMUM AGGREGATE SIZE OF CONCRETE SHALL BE AS FOLLOWS.

|                               | STRENGTH (PSI) | MAX. AGGREGATE |
|-------------------------------|----------------|----------------|
| BOTTOM SLAB, FOOTING          | 3,000          | ¾"             |
| WALLS                         | 3,000          | ¾"             |
| TOP SLAB                      | 3,000          | ¾"             |
| ALL OTHER STRUCTURAL CONCRETE | 3,000          | ¾"             |



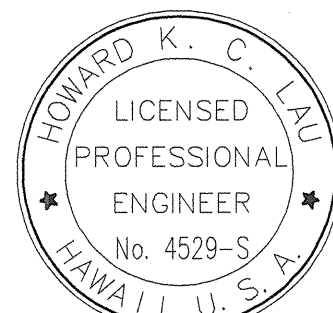
**TYPICAL SECTION THICKENED**  
**EDGE FOR CB AND DMH**

D  
S-4 NOT TO SCALE



**CONSTRUCTION JOINT (C.J.) DETAIL**

E  
S-4 NOT TO SCALE



SIGNATURE  
APRIL 30, 2006  
EXPIRATION DATE OF LICENSE  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION |                           |
|----------------------------------------------------------------------|---------------------------|
| <b>SPECIAL DRAIN MANHOLE DETAILS</b>                                 |                           |
| FORT WEAVER ROAD WIDENING<br>NEAR LAULAUNUI STREET                   |                           |
| FEDERAL AID PROJECT NO. CMAQ-076-1(8)                                | DATE: July 2004           |
| SCALE: AS NOTED                                                      | SHEET No. S-4 OF 4 SHEETS |

| Revision | Date     | Description                          |
|----------|----------|--------------------------------------|
| 4        | 07/21/04 | Revised Special Drain Manhole Detail |