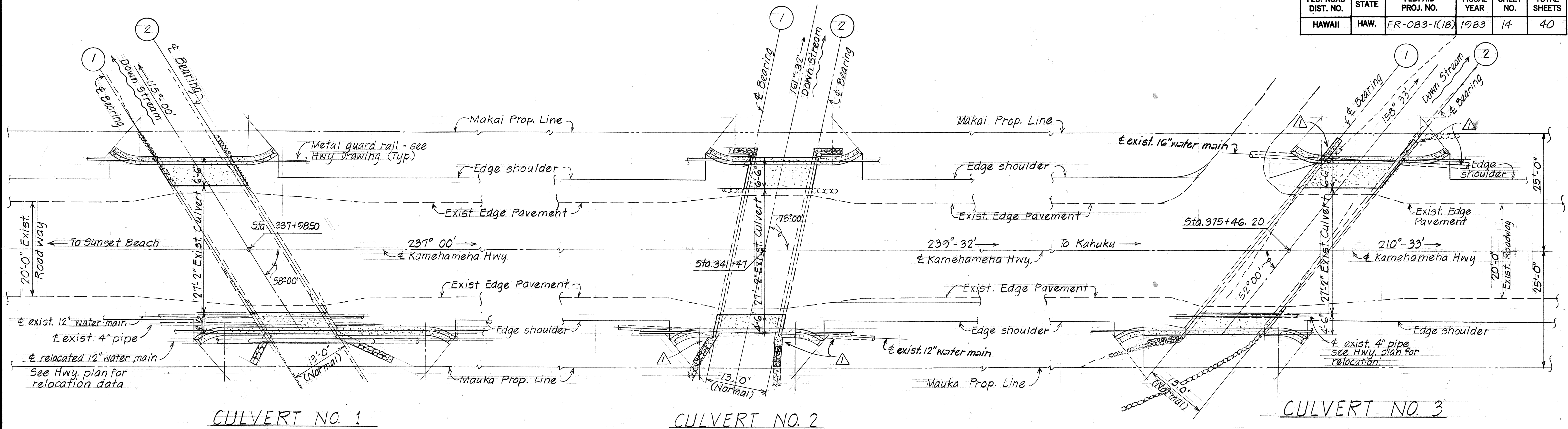


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 14        | 40           |



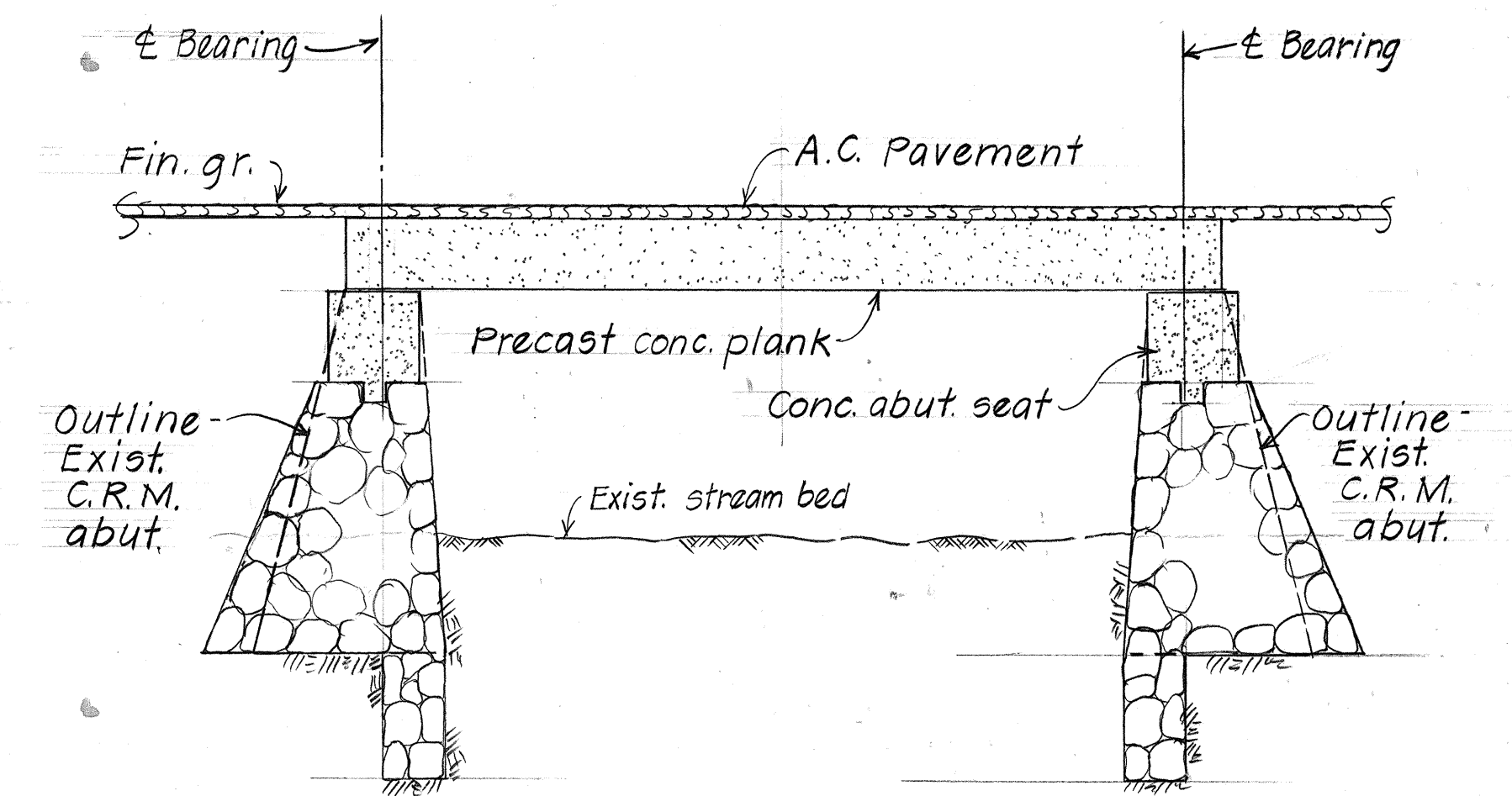
## GENERAL NOTES

- DESIGN SPECIFICATIONS:**  
(AASHTO) Standard Specifications for Hwy. Bridges (12th Edition) with subsequent interim Specifications, 1978 to 1982.
- DESIGN LOAD:** HS-20-44
- DESIGN STRESSES:**  
1.  $f_c = 1,200 \text{ psi}$  (0.4  $f'_c$ )  
2.  $f_s = 20,000 \text{ psi}$
- MATERIALS:**  
1. Reinforced Concrete - Class A  
2. Reinforcing Steel - ASTM A615 Grade 40  
3. Epoxy Grout - shall be high early strength type (1000 psi min. compressive strength @ 4 hrs.) approved by the Engineer & applied in strict accordance with the manufacturer's recommendations.  
4. Steel Shapes & Plates - ASTM A-36
- CONSTRUCTION REQUIREMENTS:**  
1. See Standard Specifications for Road & Bridge Construction, (Hawaii, 1976) & Special Provisions.  
2. All anchor bolts & structural steel shapes & plates shall be hot dip galvanized after fabrication.  
3. Preformed fabric pads shall be securely fastened to the abutments before placement of the precast planks.  
4. Remove, clean & repair top of existing abutment wall to receive concrete seat block as indicated and as directed by the Engineer. All work incidental to CRM work. Top surface of concrete seat block to receive trowel finish.  
5. If a segment of the existing CRM wall is found to be structurally unsound to build the abutment seat upon, as determined by the Engineer, the Contractor shall repair such defect as directed by the Engineer. Such repair will be incidental to CRM work.  
6. Repair of cracks in existing CRM abutment walls of Culvert #3, or any other deemed necessary by the Engineer, shall be as specified on Sheet #5.  
7. Reconstruct existing Dry Rubble Masonry wall as indicated on upstream side of Culvert #3. Reconstruction will be incidental to CRM work.  
8. The face of the existing slab to be epoxy bonded with the new slab shall be thoroughly wetted with clear water and scrubbed with a solution of not more than one part hydrochloric (muriatic) acid to nine parts water followed immediately by thorough rinsing with clear water.  
9. All items designated for removal shall be removed in such a manner as to preclude any damage to the existing structure. Large impacting or vibratory types of equipment will not be permitted in the removal operation. Small vibratory tools, approved by the Engineer, will be permitted.  
10. The Contractor shall be solely responsible for the protection of the adjacent property, utilities and existing and new structures from damage due to construction and shall repair any damage at his own expense to the satisfaction of the Engineer.  
11. The Contractor shall make provisions to close lane adjacent to new deck during epoxying operation, and may reopen the lane 4 hours after completion of epoxying operation.

## LOCATION PLANS Scale: 1" = 10'-0"

| INDEX     |                                                              |
|-----------|--------------------------------------------------------------|
| SHEET NO. | DESCRIPTION                                                  |
| 1         | INDEX, GENERAL NOTES, LOCATION PLAN                          |
| 2         | CULVERT NO. 1 - LAYOUT PLAN, PIPE DETAILS                    |
| 3         | CULVERT NO. 1 - ABUTMENT ELEVATIONS, ESTIMATED QUANTITIES    |
| 4         | CULVERT NO. 2 - LAYOUT PLAN, ABUTMENT ELEVATIONS             |
| 5         | CULVERT NO. 3 - LAYOUT PLAN                                  |
| 6         | CULVERT NO. 3 - ABUTMENT ELEVATIONS, TYP. ABUT. SECTIONS     |
| 7         | WAIALEE BRIDGE - NEW END POST CONNECTION                     |
| TD 1      | TYPICAL DETAILS - PRECAST CONC. PLANK, NORMAL DECK SECTION   |
| TD 2      | TYPICAL DETAILS - CONCRETE END POST (TRAFFIC TYPE)           |
| TD 3      | TYPICAL DETAILS - METAL GUARD RAIL CONNECTIONS               |
| 6A        | CULVERT NO. 2 & NO. 3 - CONC. ABUT. & CONC. WINGWALL DETAILS |
| ES 1      | EXISTING STRUCTURE DETAILS - CULVERT NOS. 1, 2, & 3          |

12. Where reinforcing bars are cut in the removal of existing concrete, all exposed ends shall be undercut a minimum of 1" below the surface of the concrete and patched with mortar. Cutting of reinforcing and patching with mortar shall be incidental to concrete removal.
- GENERAL:**  
1. All items noted incidental will not be paid for separately.  
2. The Contractor shall verify all dimensions in field before commencing with work.  
3. The Contractor shall verify the location of all existing utility lines near the structures, and notify their respective owners before commencing with work.  
4. The connection of guard rail to concrete end posts, including special end shoes and other incidentals shall be measured and paid for under Concrete Railing and End Post.



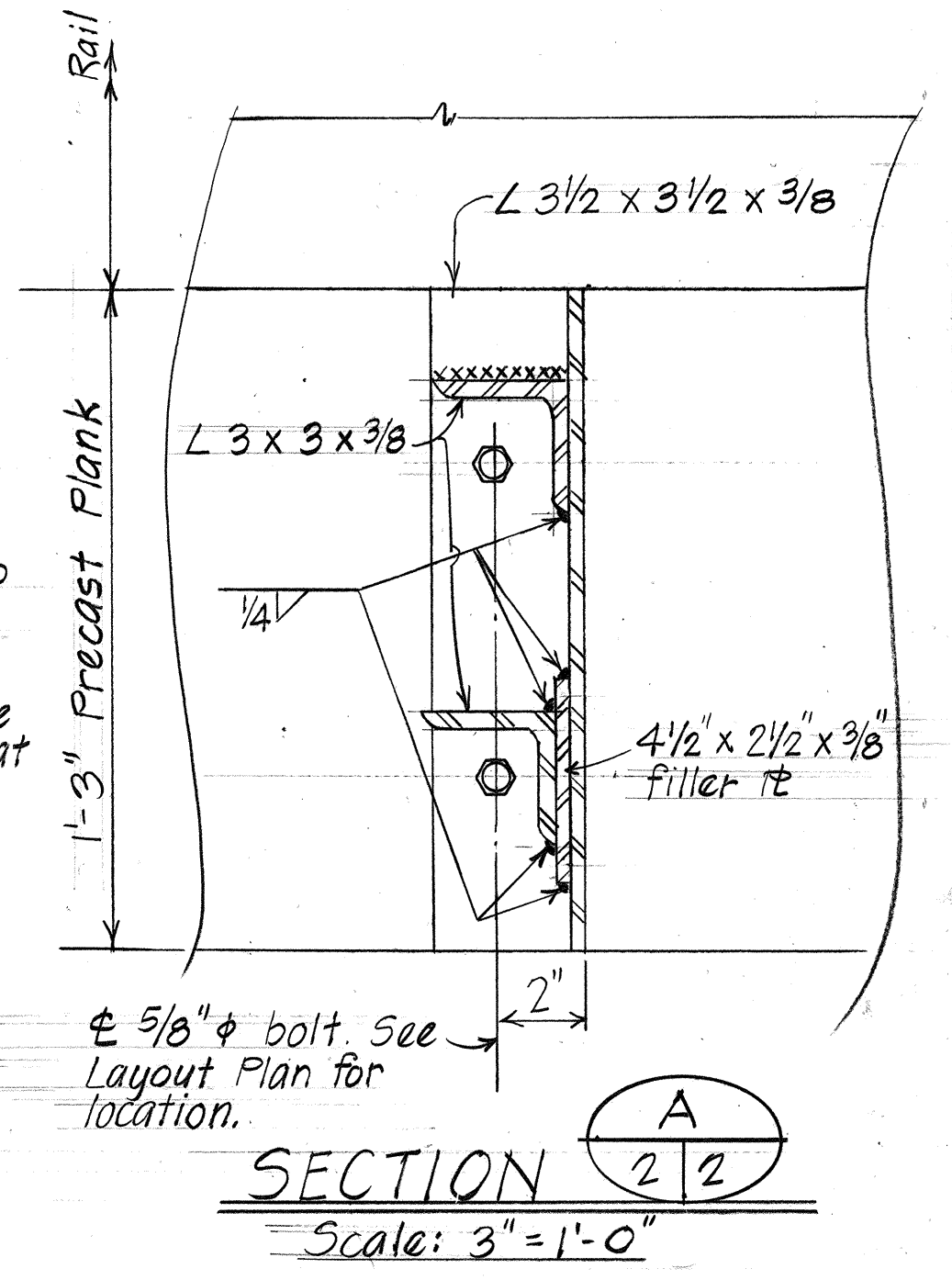
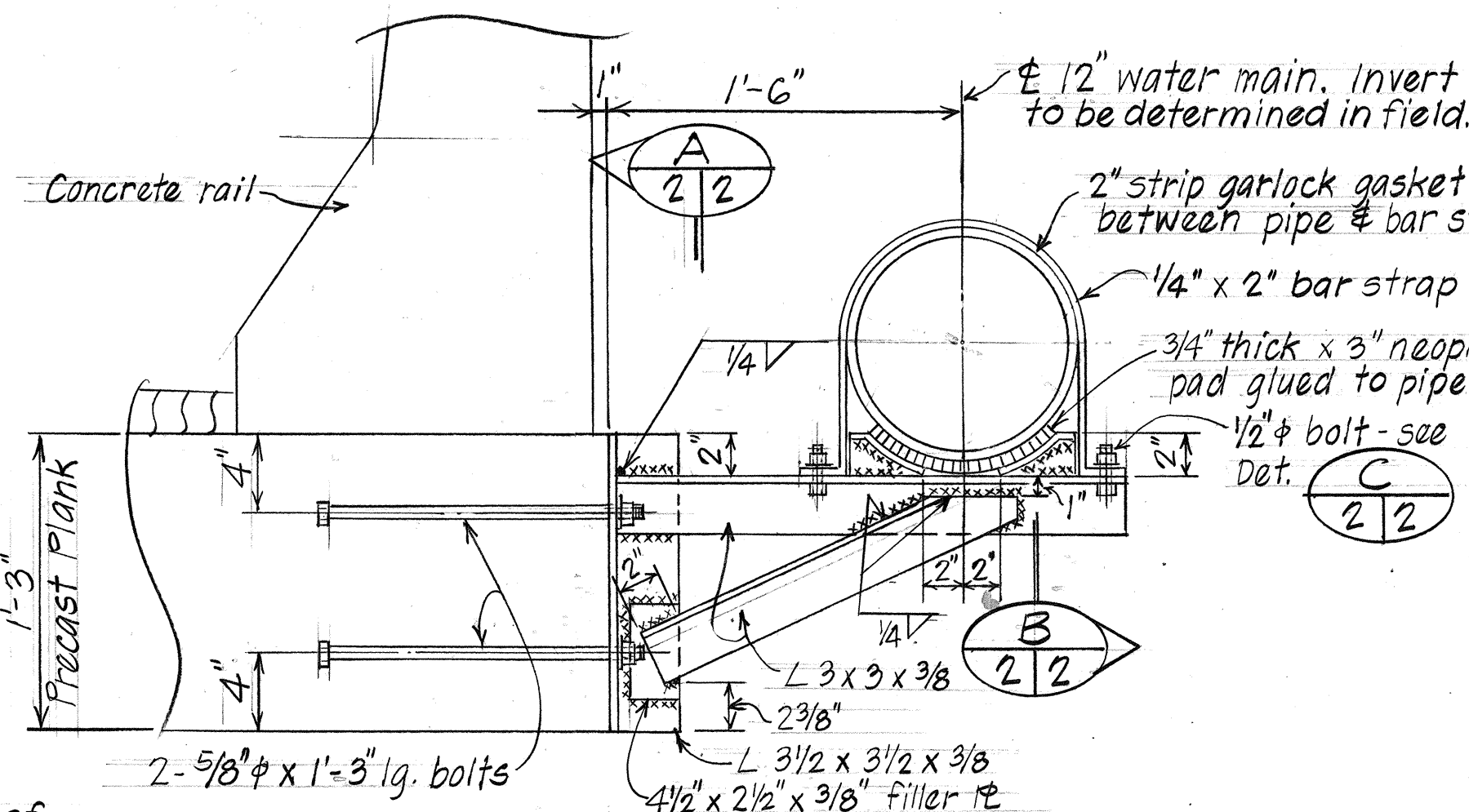
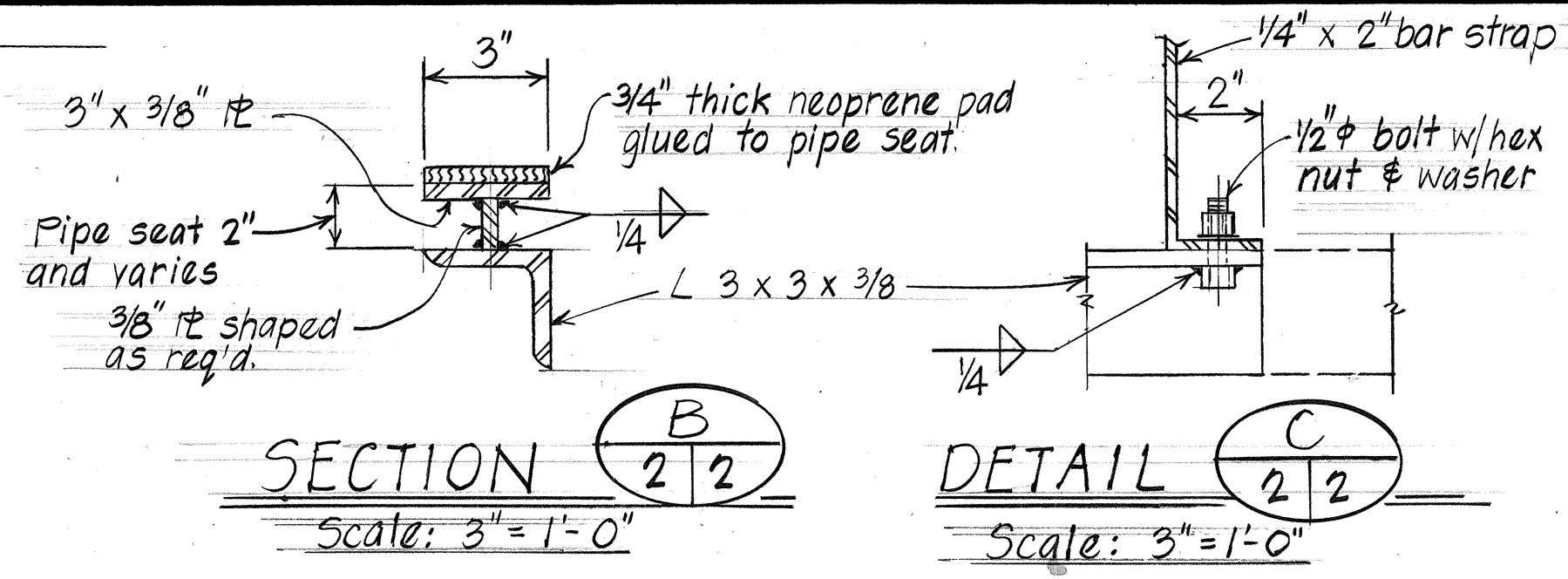
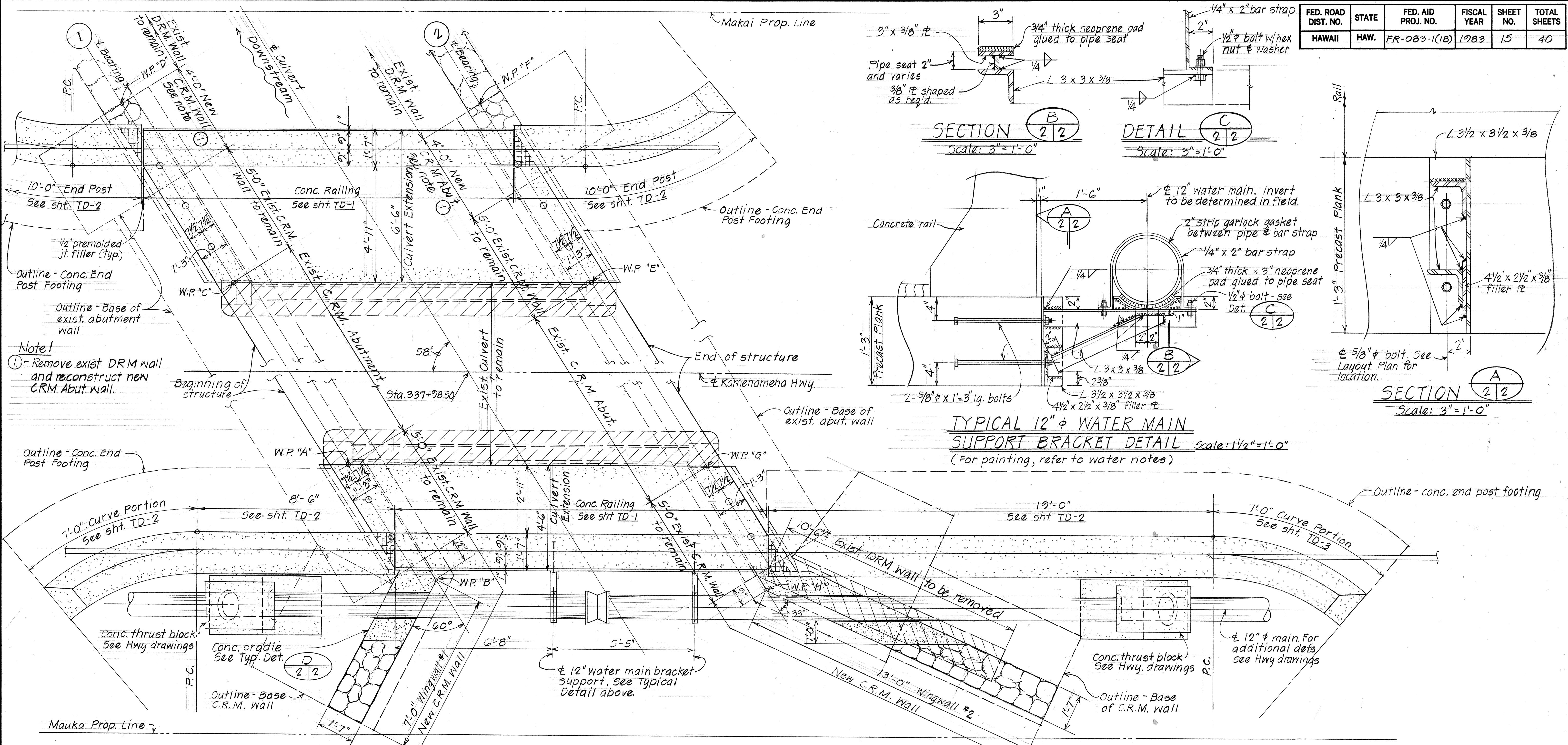
## LONGIT. SECTION ALONG CULVERT EXTENSION Scale: 3/8" = 1'-0"

| 2/2/83                                                                                                                                                                                                                                                                                                                              | Replace C.R.M. with reinf. conc. at Abut. & Wingwall due to exist. water main |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| DATE                                                                                                                                                                                                                                                                                                                                | REVISION                                                                      |
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>LAND TRANSPORTATION FACILITIES DIVISION<br><b>CULVERT NOS. 1, 2, &amp; 3</b><br>INDEX, GENERAL NOTES & LOCATION PLAN<br>KAM HWY RESURFACING<br>KAUNALA ST. TO VICINITY OF WAIALEE BRIDGE<br>Proj. No. FR-083-1(18)<br>Scale: As Noted Date: Feb, 1983<br>SHEET NO. 1 OF 7 SHEETS |                                                                               |

Replaces Sht. 14 (C.C.O. #2)

|                              |                              |
|------------------------------|------------------------------|
| ORIGINAL PLAN                | DATE: 12/82                  |
| DESIGNED BY: L.A. & C.R.Y.   | DESIGNED BY: L.A. & C.R.Y.   |
| CHECKED BY: L.A. & C.R.Y.    | CHECKED BY: L.A. & C.R.Y.    |
| QUANTITIES BY: L.A. & C.R.Y. | QUANTITIES BY: L.A. & C.R.Y. |
| NOTE BOOK                    | NOTE BOOK                    |

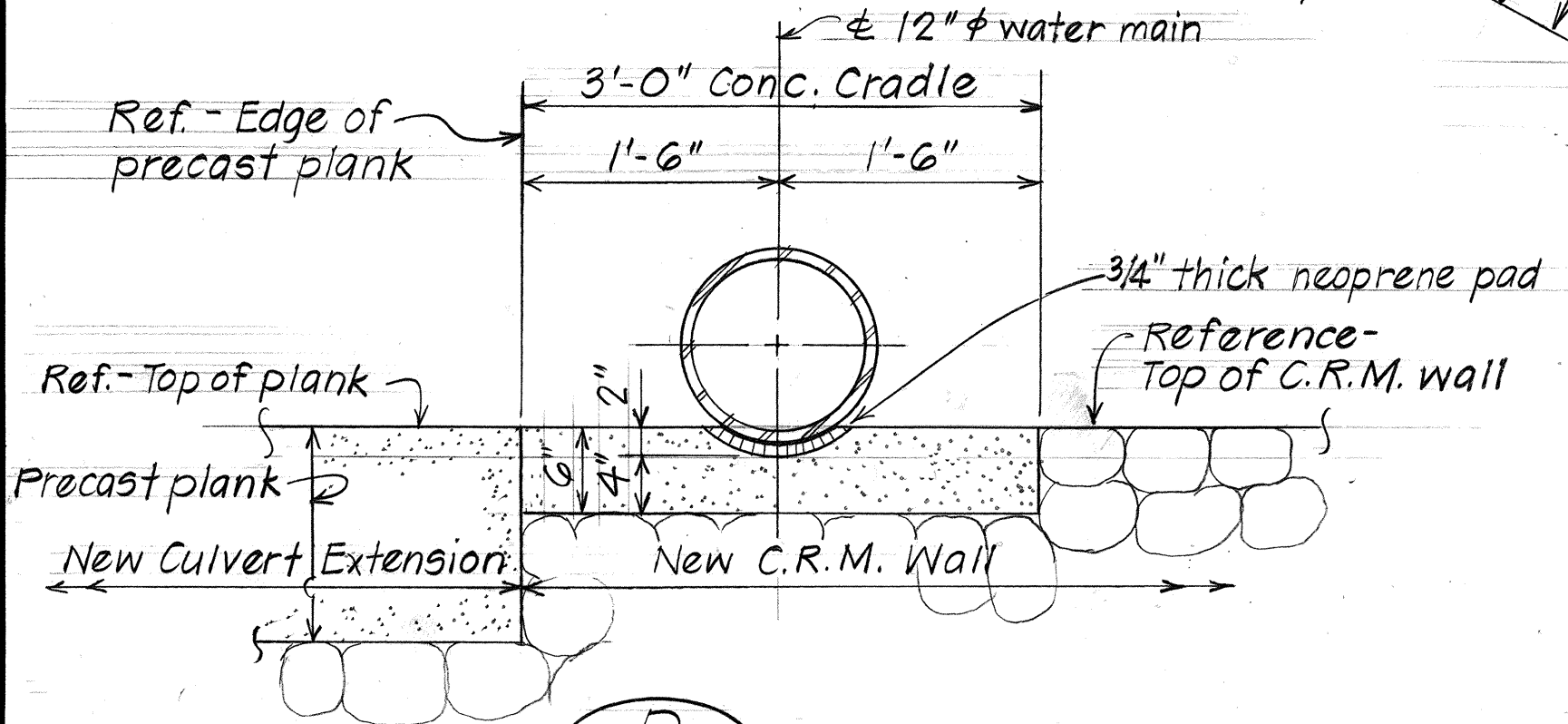
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 15        | 40           |



## LAYOUT PLAN - CULVERT NO. 1

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

**HATCHED AREA**  
 Hatched areas shown thus denote limits of structure removal.  
 Hatched areas shown thus denote limits of 2-layers 45# comp. roofing paper between deck & conc. rail.



APPROVED: \_\_\_\_\_ Date 2-16-83  
 For Chief, Planning & Engineering, BWS

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 LAND TRANSPORTATION FACILITIES DIVISION  
**CULVERT NO. 1 EXTENSION**  
 LAYOUT PLAN - PIPE DETAILS  
 KAM HWY RESURFACING  
 KAUNALA ST. TO VICINITY OF WAIALEE BRIDGE  
 Proj. No. FR-083-1(18)  
 Scale: As Noted Date: Feb, 1983  
**SHEET NO. 2 OF 7 SHEETS**

|               |           |       |
|---------------|-----------|-------|
| ORIGINAL PLAN | DATE      | 2/82  |
| DESIGNED BY   | TRACED BY | 12/82 |
| QUANTITIES BY | NOTED BY  | 1/83  |
| CHECKED BY    |           | 1/83  |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 16        | 40           |

### ESTIMATED QUANTITIES - CULVERT WIDENING

| ITEM NO. | ITEM                                              | CULVERT#1 | CULVERT#2 | CULVERT#3 | UNIT     | QUANTITY  |
|----------|---------------------------------------------------|-----------|-----------|-----------|----------|-----------|
| 202.0300 | REMOVAL OF PORTION OF EXIST. RAILINGS & CURB      | 2         | 2         | 2         | LUMP SUM | 6 C.Y.    |
| 202.0440 | REMOVAL OF EXISTING C.R.M.                        | 10        | 14        | 5         | LUMP SUM | 29 C.Y.   |
| 206.6100 | STRUCTURE EXCAVATION FOR CULVERTS                 | 70        | 80        | 28        | C.Y.     | 178 C.Y.  |
| 206.7000 | STRUCTURE BACKFILL FOR CULVERTS                   | 40        | 30        | 19        | C.Y.     | 89 C.Y.   |
| 401.0500 | A.C. PAVEMENT, MIX NO. II                         | 9         | 8         | 10        | TON      | 27 TON    |
| 407.1000 | EMULSIFIED ASPHALT FOR BITUMINOUS TACK COAT       | 16        | 14        | 18        | GAL.     | 48 GAL.   |
| 501.0100 | STRUCTURAL STEEL FOR RELOCATED 12 INCH WATER MAIN | 125       | —         | —         | LUMP SUM | 125 LB.   |
| 503.0200 | CLASS A CONCRETE (ALL)                            | 21        | 29        | 27        | C.Y.     | 77 C.Y.   |
| 503.1910 | PRECAST CONCRETE PLANKS (6'-6" WIDE)              | 109       | 95        | 118       | S.F.     | 322 S.F.  |
| 503.1911 | PRECAST CONCRETE PLANKS (4'-6" WIDE)              | 76        | 66        | 82        | S.F.     | 224 S.F.  |
| 507.6000 | CONC. RAILING AND END POST                        | 92        | 66        | 74        | L.F.     | 232 L.F.  |
| 508.0100 | CEMENT RUBBLE MASONRY                             | 30        | 31        | 6         | C.Y.     | 67 C.Y.   |
| 602.0400 | REINF. STEEL (ALL)                                | 1,200     | 1,500     | 1,700     | LUMP SUM | 4,400 LB. |
| 507.7600 | CONCRETE END POST FOR WAIALEE BRIDGE              | —         | —         | —         | Each     | 4         |

### ABUTMENT NO. 1

### ABUTMENT NO. 2

### ELEVATION - CULVERT NO. 1

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

Replaces Sht. 16  
(C.C.O. #2)

APPROVED: *R. Nagato*  
for Chief, Planning & Engineering, BWS

Date: 2-16-83

### NOTES:

- Match top of new conc. deck plank and top of exist. culvert slab.
- Match top of new C.R.M. wall and top of new conc. deck plank.
- Match top of new C.R.M. wall and top of exist. D.R.M. wall.
- Reconstruct new C.R.M. wall to match front face of exist. D.R.M. wall.
- Exact lengths to be determined by Engineer in field.

9/2/83 Revise quantities

DATE REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION  
**CULVERT NO. 1 EXTENSION**  
ABUTMENT ELEVATIONS  
KAM HWY RESURFACING  
KAUNALA ST. TO VICINITY OF WAIALEE BRIDGE  
Proj. No. FR-083-1(18)

Scale: As Noted Date: Feb., 1983

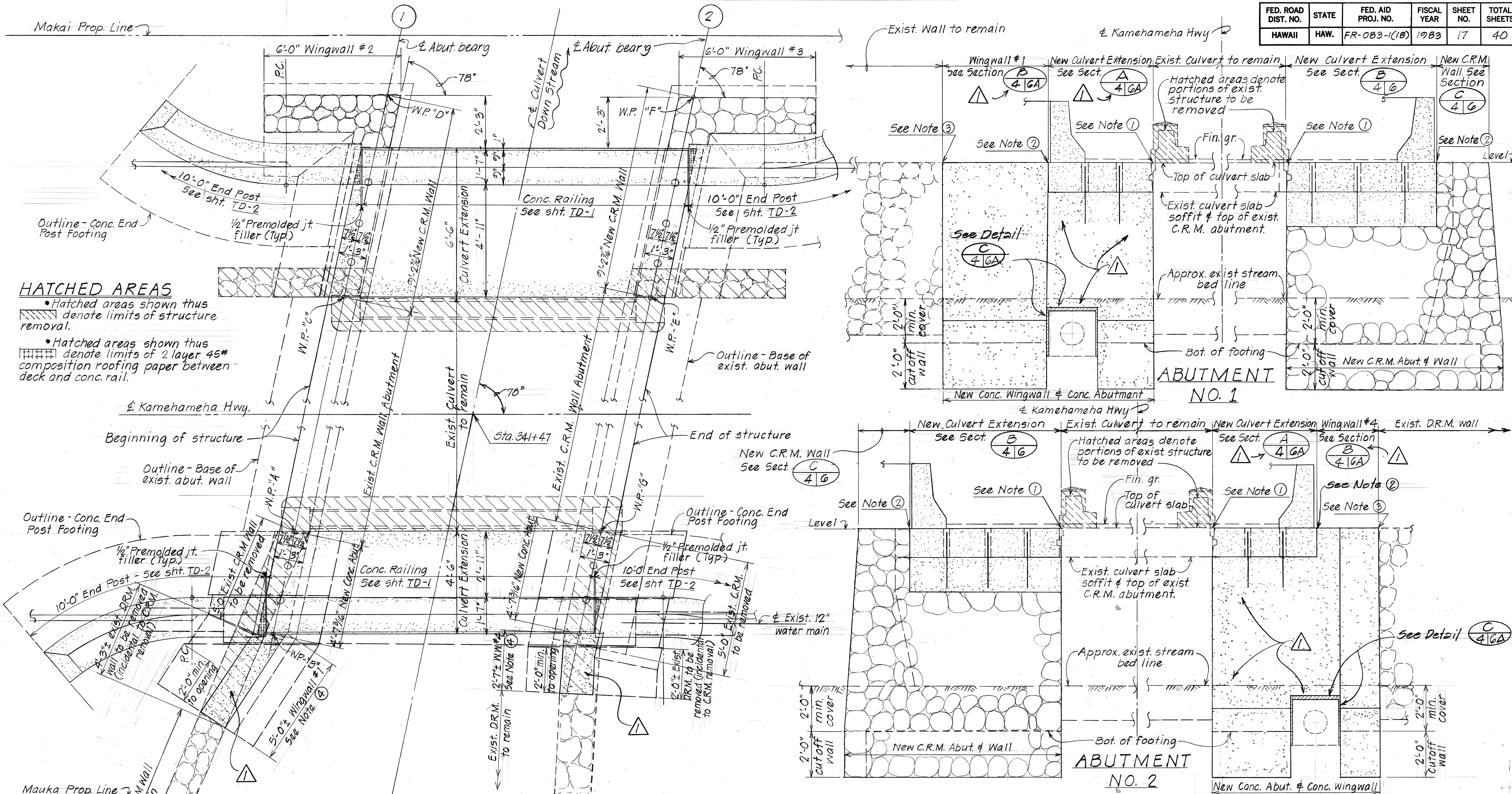
SHEET NO. 3 OF 7 SHEETS

CO 16

(16)

|                             |      |
|-----------------------------|------|
| ORIGINAL PLAN               | DATE |
| DESIGNED BY L.M.A.          | 2/83 |
| DESIGNED BY M.Y. & M.T.     | 2/83 |
| QUANTITIES BY L.M.A. & G.T. | 2/83 |
| CHECKED BY L.A. & C.R.T.    | 2/83 |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 17        | 40           |



**HATCHED AREAS**

- Hatched areas shown thus denote limits of structure removal.
- Hatched areas shown thus denote limits of 2 layer 45# composition roofing paper between deck and conc. rail.

**LAYOUT PLAN - CULVERT NO. 2**  
Scale: 1/2" = 1'-0"

- NOTES:**
- ① - Match top of new conc. deck plank and top of exist. culvert slab.
  - ② - Match top of new Wing wall and top of new conc. deck plank.
  - ③ - Match top of new Wing wall and top of exist. D.R.M. wall.
  - ④ - Reconstruct new Wing wall to match front face of exist. D.R.M. wall.

**ELEVATIONS**

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

|                                        |                                                                           |
|----------------------------------------|---------------------------------------------------------------------------|
| DATE                                   | REVISION                                                                  |
| 9/2/83                                 | Replace C.R.M. w/ reinf. conc. abut. & wingwall due to exist. water main. |
| APPROVED:                              | Date 9-20-83                                                              |
| For Chief, Planning & Engineering, BWS |                                                                           |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION

**CULVERT NO. 2 EXTENSION**

LAYOUT PLAN - ABUTMENT ELEVATIONS

KAM HWY RESURFACING  
KAUNALA ST. TO VICINITY OF WAIALEE BRIDGE  
Proj. No. FR-083-1(18)

Scale: As Noted Date: Feb. 1983

|                   |       |
|-------------------|-------|
| SURVEY PLOTTED BY | DATE  |
| PLAN              | 12/82 |
| DESIGNED BY       | 12/82 |
| QUANTITIES BY     | 1/83  |
| CHECKED BY        | 1/83  |
| ORIGINAL PLAN     |       |
| NOTE BOOK         |       |
| No.               |       |

Replaces Sht. 17  
(C.C.O. # 2)

**\*NOTE - EPOXY RESIN INJECTION PROCEDURE**

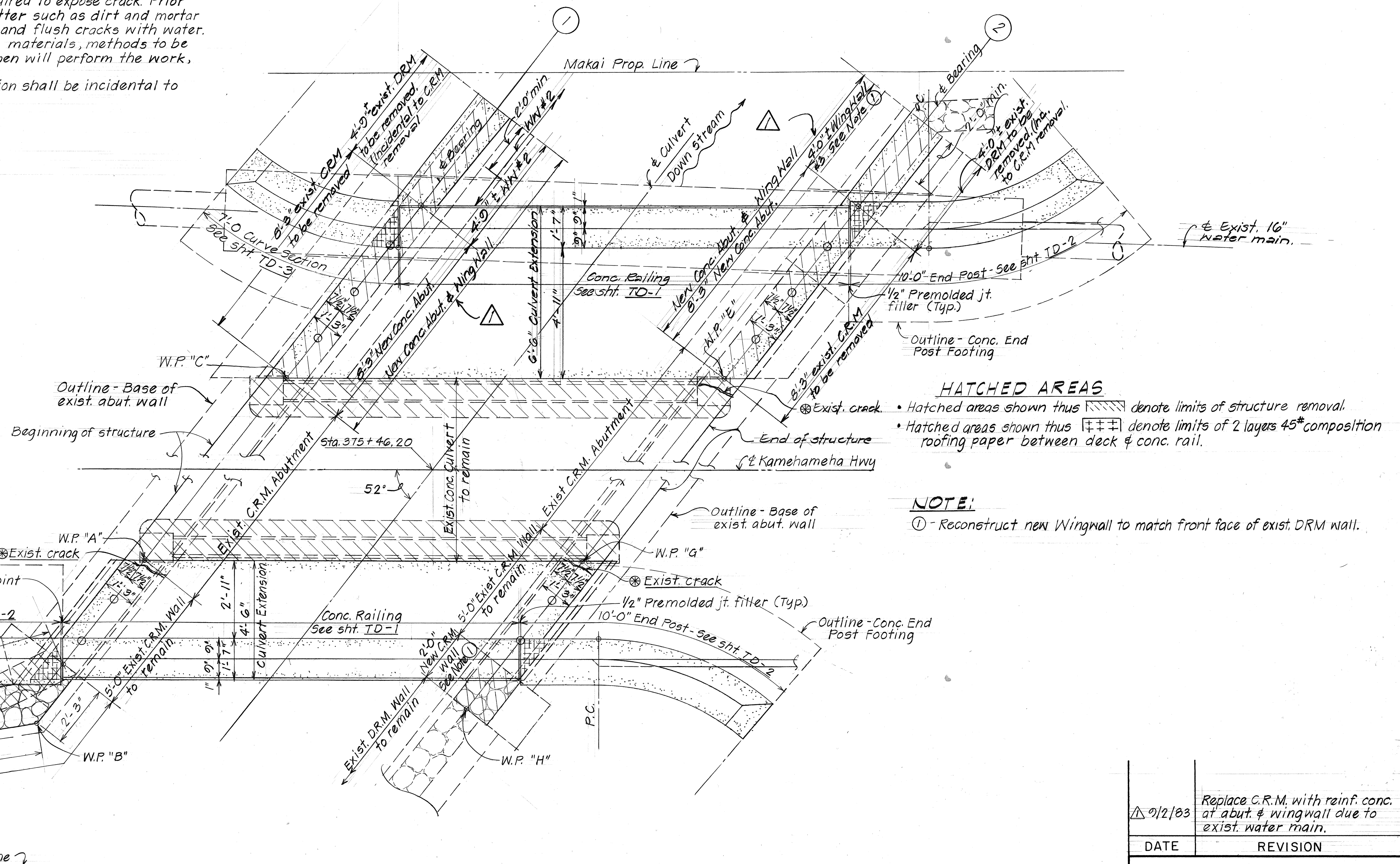
Existing cracks in abutment wall shall be repaired by the epoxy (2 compound) resin injection system. The injection equipment shall be capable of maintaining a pressure of 125 psi.

Remove earth on both sides of wall as required to expose crack. Prior to epoxy injection, clean cracks of all loose matter such as dirt and mortar pieces, and oil, grease or other contaminants and flush cracks with water.

Provide complete details of the equipment, materials, methods to be used and verification that experienced workmen will perform the work, for approval by the Engineer.

Cost of the epoxy injection and preparation shall be incidental to the C.R.M. work.

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 18        | 40           |



**HATCHED AREAS**

- Hatched areas shown thus denote limits of structure removal.
- Hatched areas shown thus denote limits of 2 layers 45# composition roofing paper between deck & conc. rail.

**NOTE:**

- ① - Reconstruct new Wingwall to match front face of exist. DRM wall.

**LAYOUT PLAN - CULVERT NO. 3**

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

|               |       |
|---------------|-------|
| ORIGINAL PLAN | DATE  |
| DESIGNED BY   | 12/82 |
| CHECKED BY    | 1/83  |
| NOTED BY      | 1/83  |
| QUANTITIES BY | 1/83  |
| CHECKED BY    | 1/83  |

Replaces Sht. 18 (C.C.O. #2)

APPROVED: Date 7-20-83

Chief, Planning & Engineering, BWS

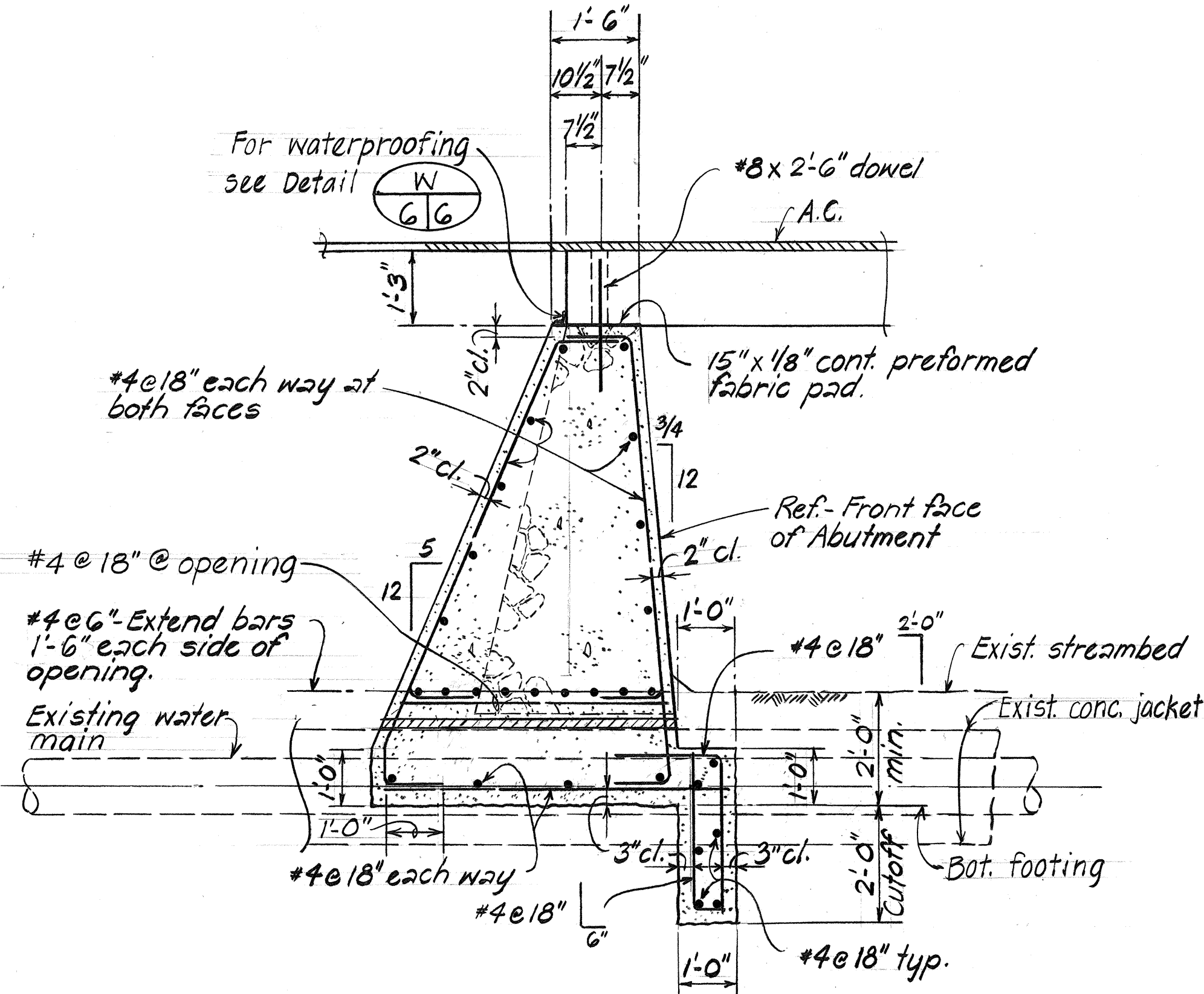
|                                                                                                                                                                                                                                           |                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| 0/2/83                                                                                                                                                                                                                                    | Replace C.R.M. with reinf. conc. at abut. & wingwall due to exist. water main. |
| DATE                                                                                                                                                                                                                                      | REVISION                                                                       |
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>LAND TRANSPORTATION FACILITIES DIVISION<br><b>CULVERT NO. 3 EXTENSION</b><br>LAYOUT PLAN<br>KAM HWY RESURFACING<br>KAUNALA ST. TO VICINITY OF WAIALEE BRIDGE<br>Proj. No. FR-083-1(18) |                                                                                |

Scale: As Noted Date: Feb, 1983

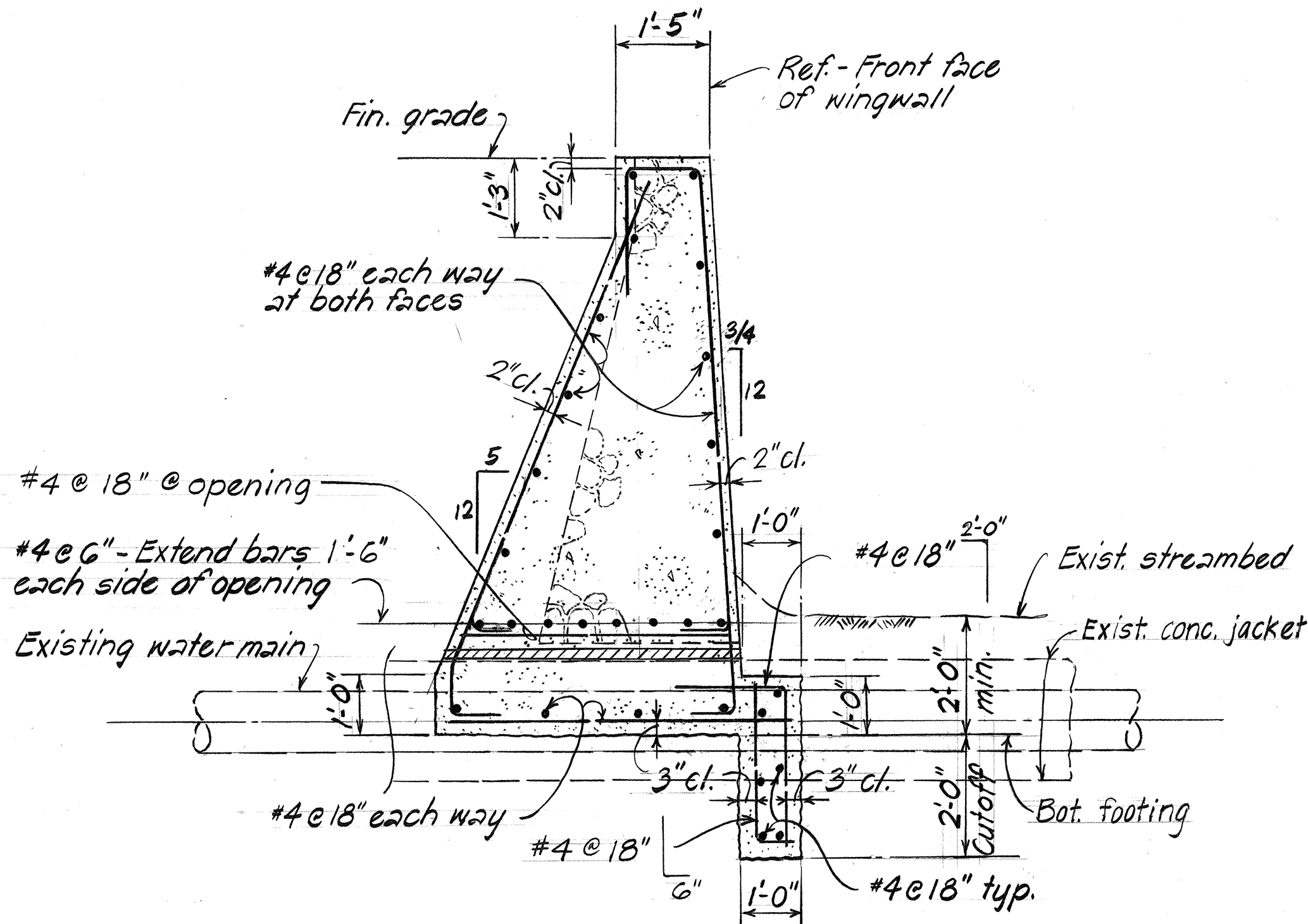
SHEET NO. 5 OF 7 SHEETS



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        |           |              |



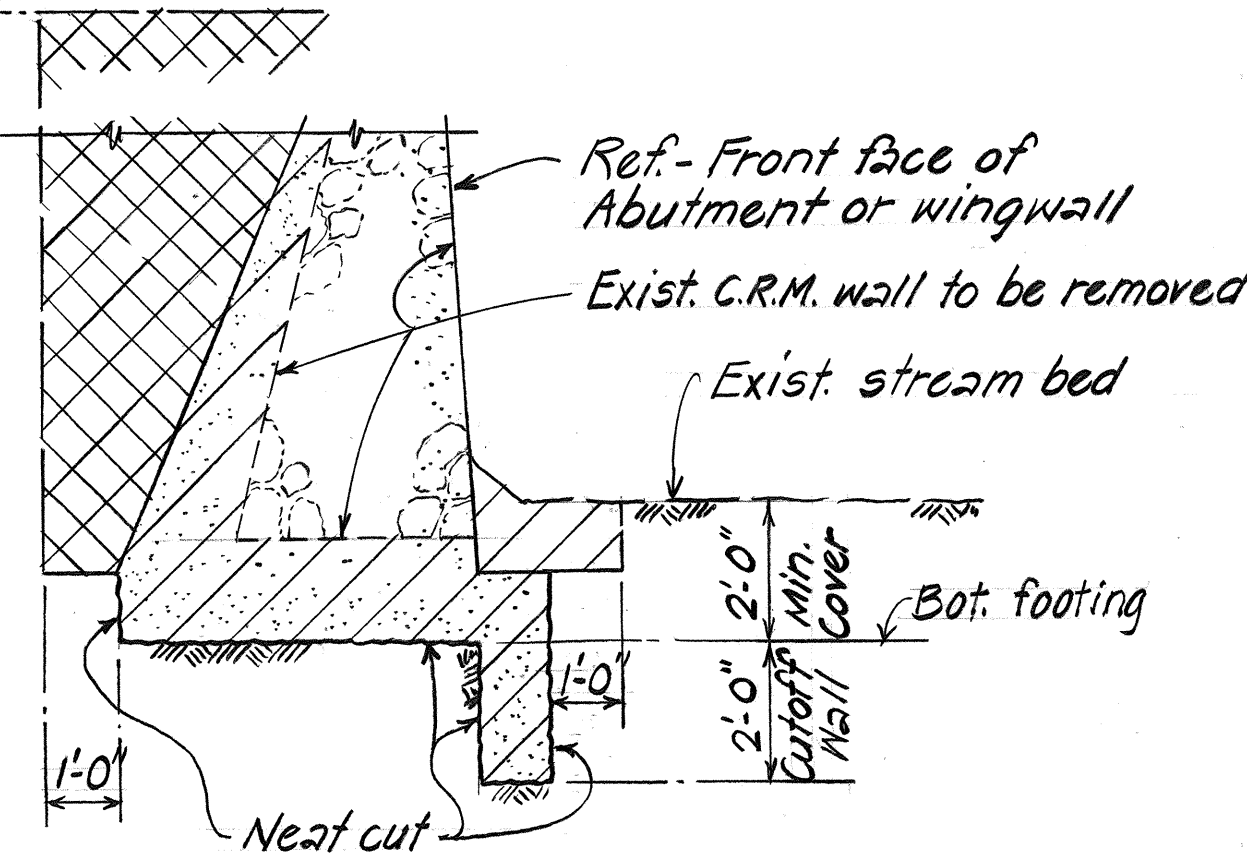
**SECTION A-4.6A**  
(AT CONCRETE ABUTMENT)  
Scale: 1/2" = 1'-0"



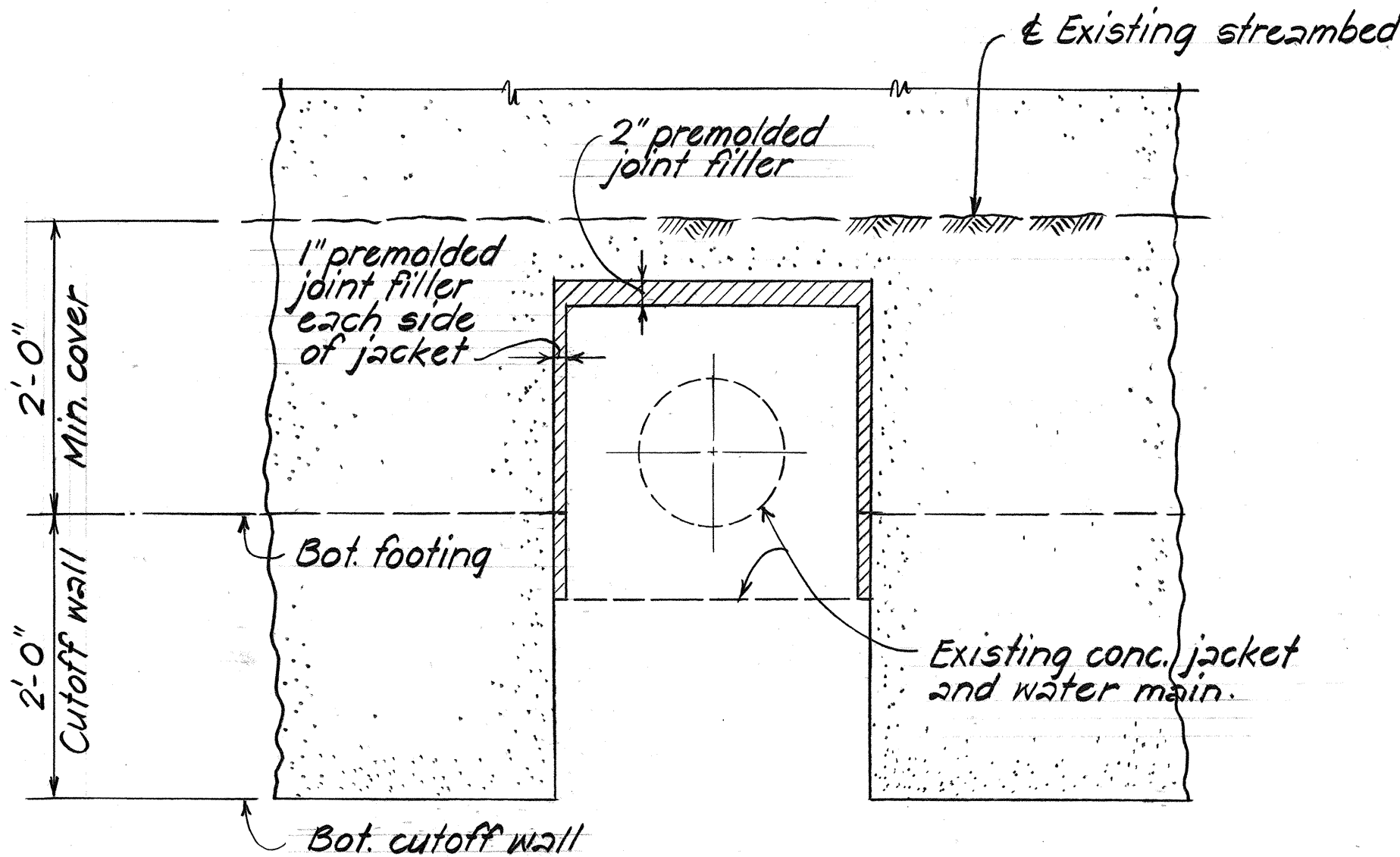
**SECTION B-4.6A**  
(AT CONCRETE WINGWALL)  
Scale: 1/2" = 1'-0"

For upper limits of payline (Fin. grade or bot. of base course), refer to the corresponding section on Sht. #6

**NOTE:**  
Hatched area shown thus denote limits of structure excavation payline. All other excavation shall be roadway excavation.  
Hatched area shown thus denote limits of structure backfill.



**TYPICAL EXCAVATION & BACKFILL**  
**PAY LIMITS AT CONC. ABUT. & CONC. WINGWALL**  
Not to Scale



**DETAIL C-4.6A**  
Scale: 1" = 1'-0"

|                   |      |
|-------------------|------|
| SURVEY PLATTED BY | DATE |
| DRAWN BY          | 2/83 |
| DESIGNED BY       | 2/83 |
| CHECKED BY        | 2/83 |
| ORIGINAL PLAN     |      |
| NOTE BOOK         |      |
| NO.               |      |

This Sht. together with Sht. C.O. 19, replaces Sht. 19 (C.C.O. #2)

APPROVED: Date 9-20-83

R. Magato  
Chief, Planning & Engineering, BWS

9/2/83 Conc. abut. & conc. wingwall details (New sheet)

DATE REVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION  
**CULVERT NO. 2 & NO. 3**  
CONC. ABUT. & CONC. WINGWALL DETAILS  
KAM HWY. RESURFACING  
KAUNALA ST. TO VICINITY OF WAIALEE BRIDGE  
Proj. No. FR-083-1(18)

Scale: As Noted Date: Sept. 1983

SHEET No. 6A OF 7 SHEETS

CO 19S-1

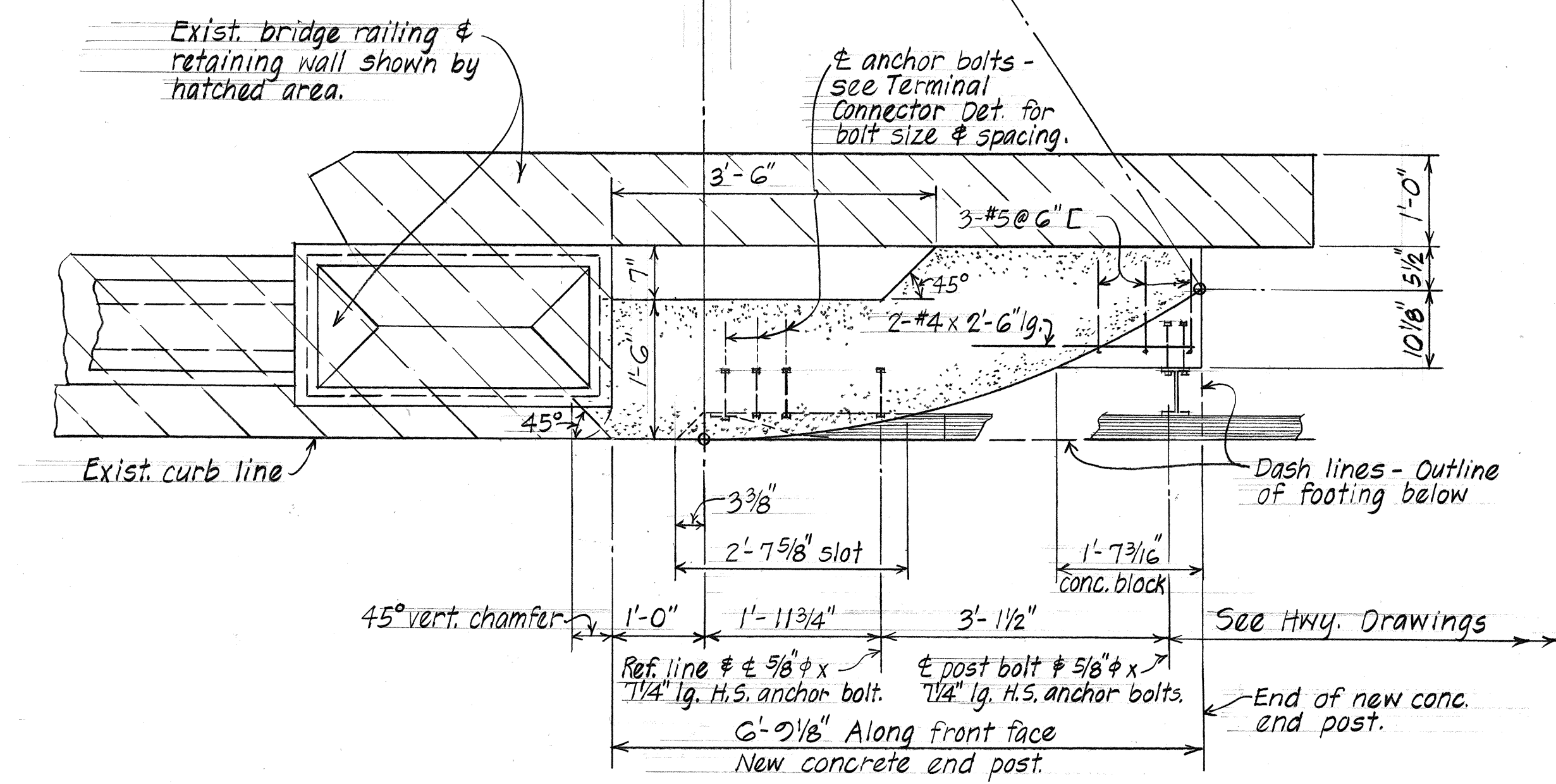
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 20        | 40           |

# GENERAL NOTES:

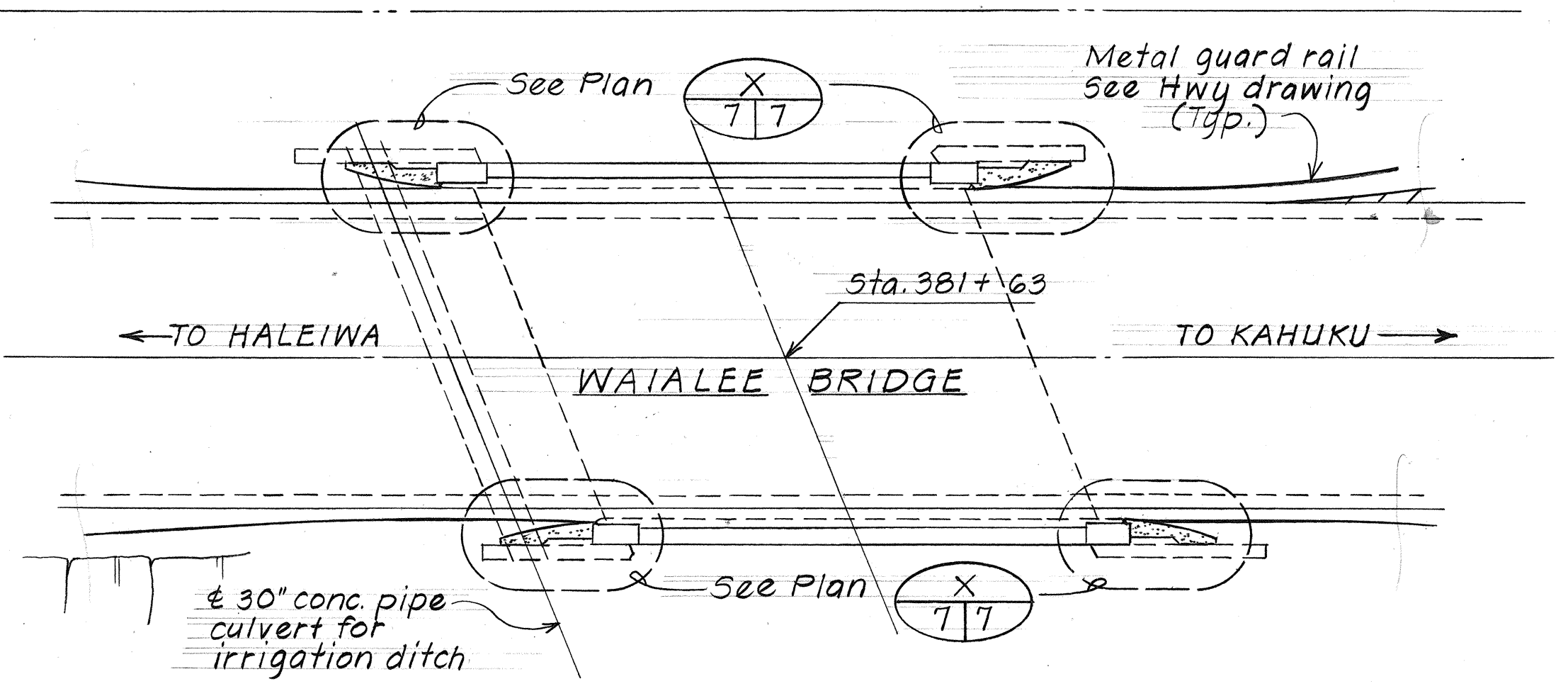
- See Standard Det. Shts. No. DT 500 and DT 501 for Spacer Block and Terminal Connector Details and information. These items shall be incidental to the concrete end post.
- Large impacting or vibratory type of equipment will not be permitted for drilling.
- The work necessary to construct the new concrete end post and connection of the guard rail shall include all labor, materials, tools, equipment and incidentals necessary to complete the work. This work will be measured and paid under Concrete End Post for Waialeale Bridge.

## Curve Data Along Front Face

$\Delta = 33^{\circ} 00' 31''$   
 $R = 10' - 0''$   
 $Lc = 5' - 9\frac{1}{8}''$

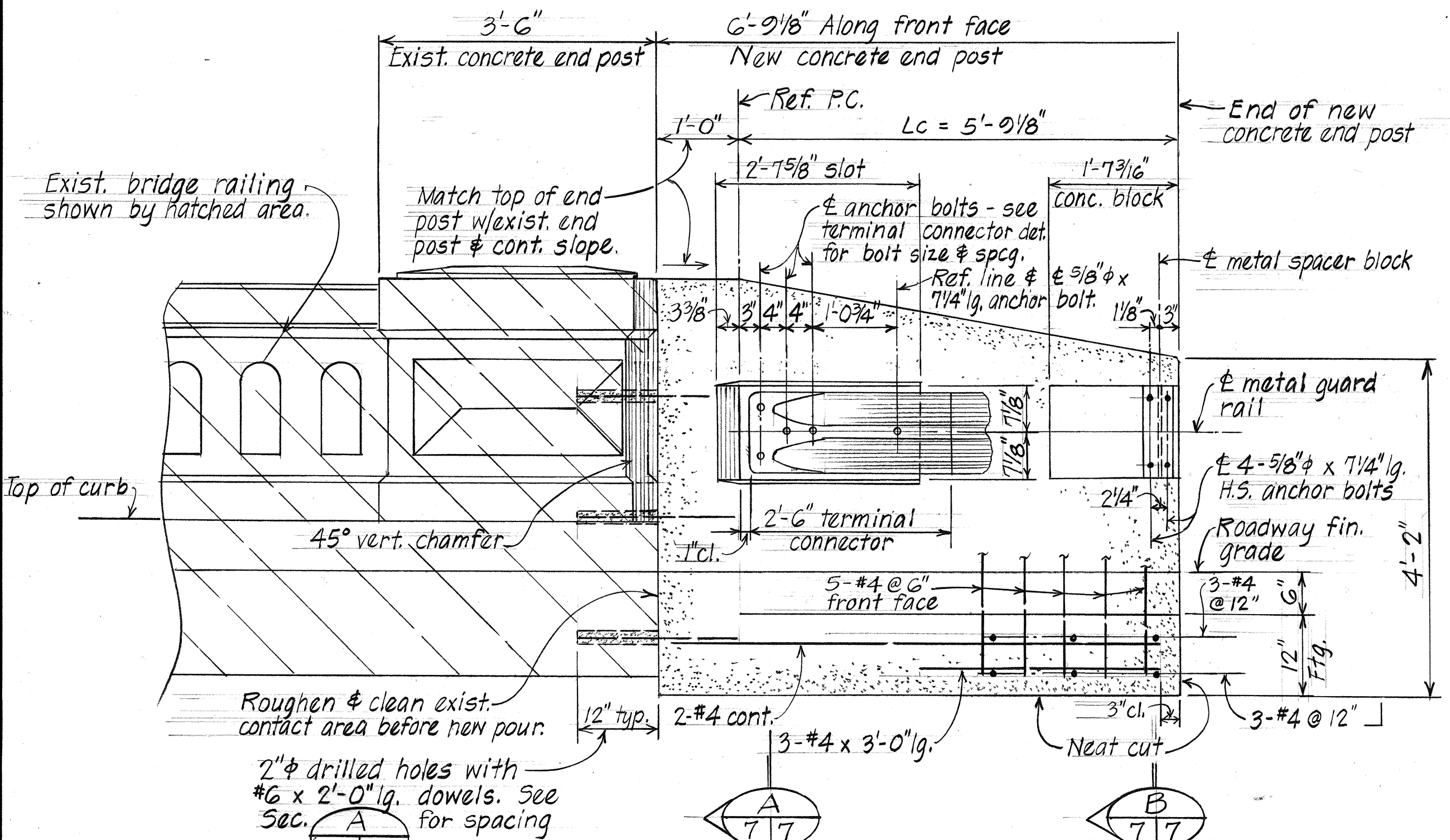


PLAN X 7/7

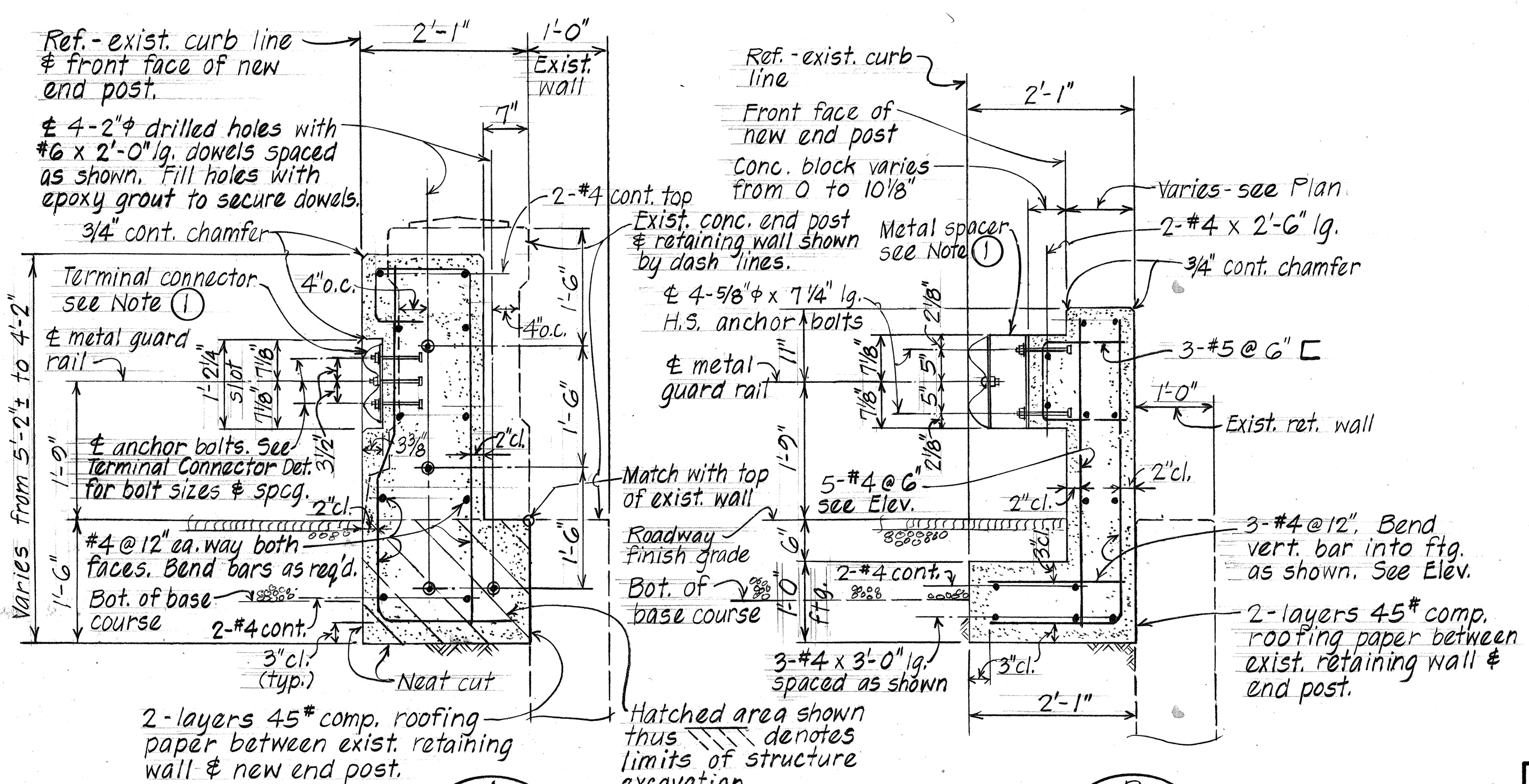


## LOCATION PLAN

Scale: 1" = 10'-0"



ELEVATION A 7/7



SECTION B 7/7

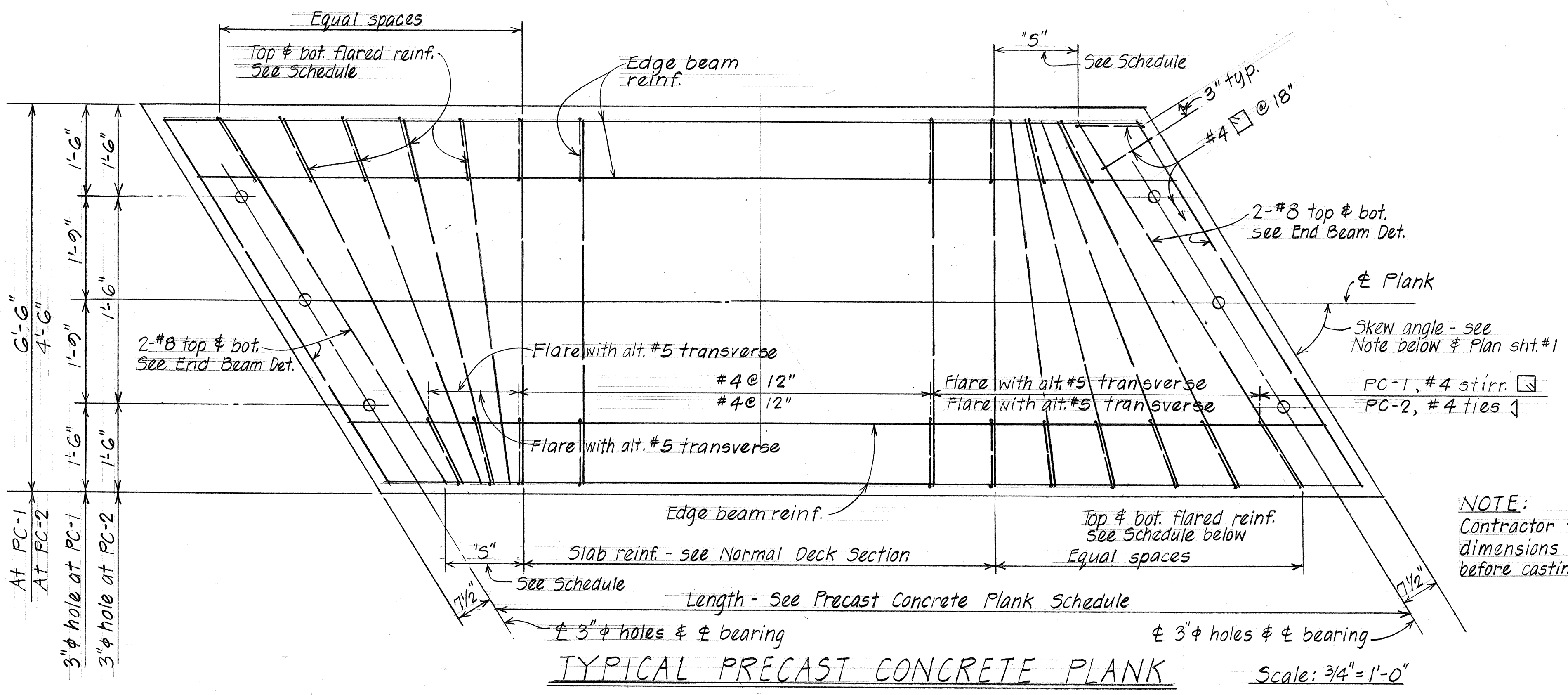
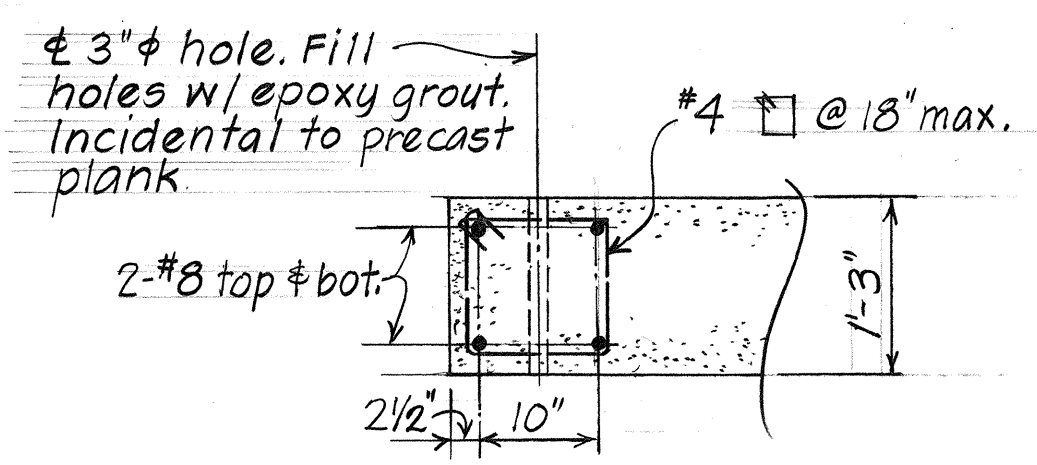
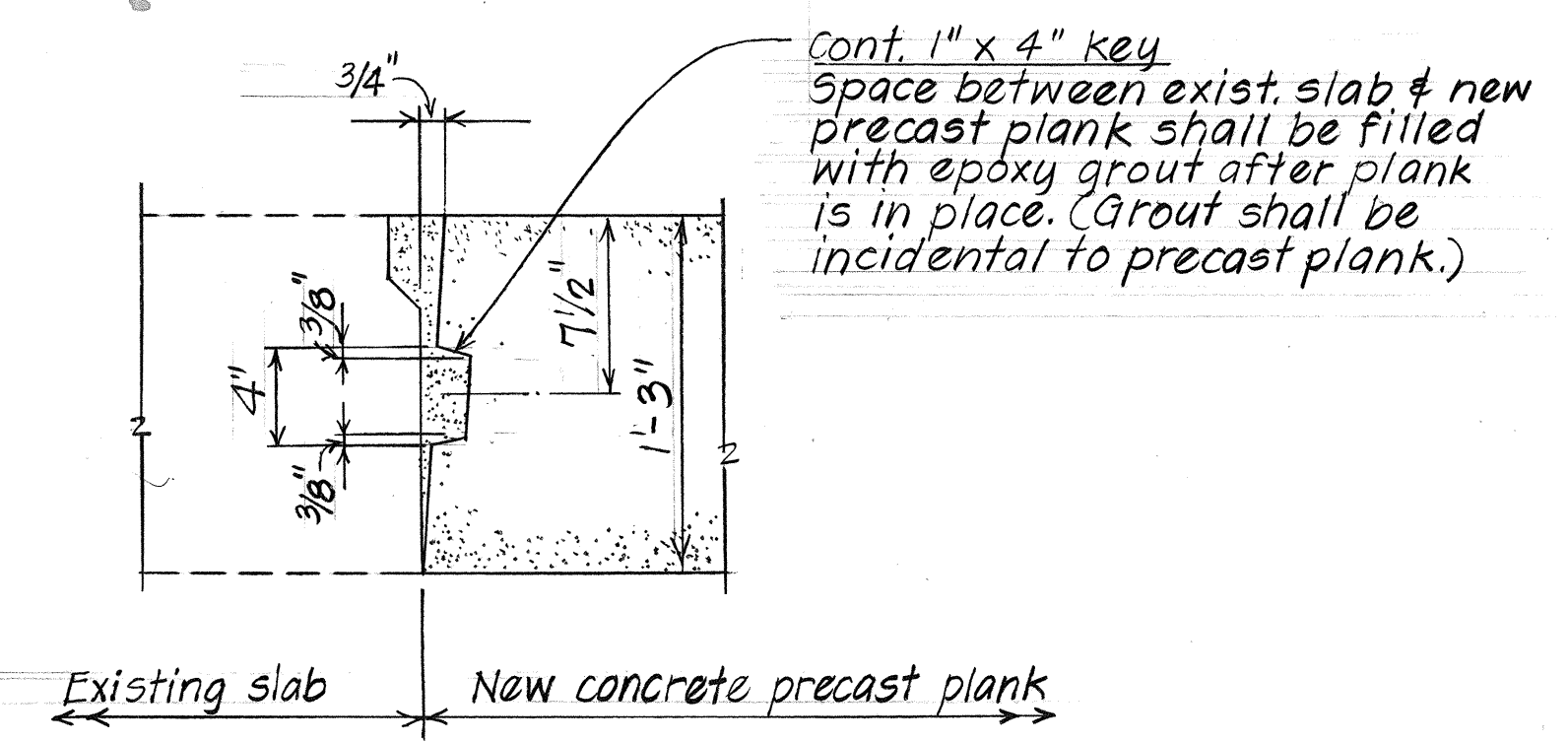
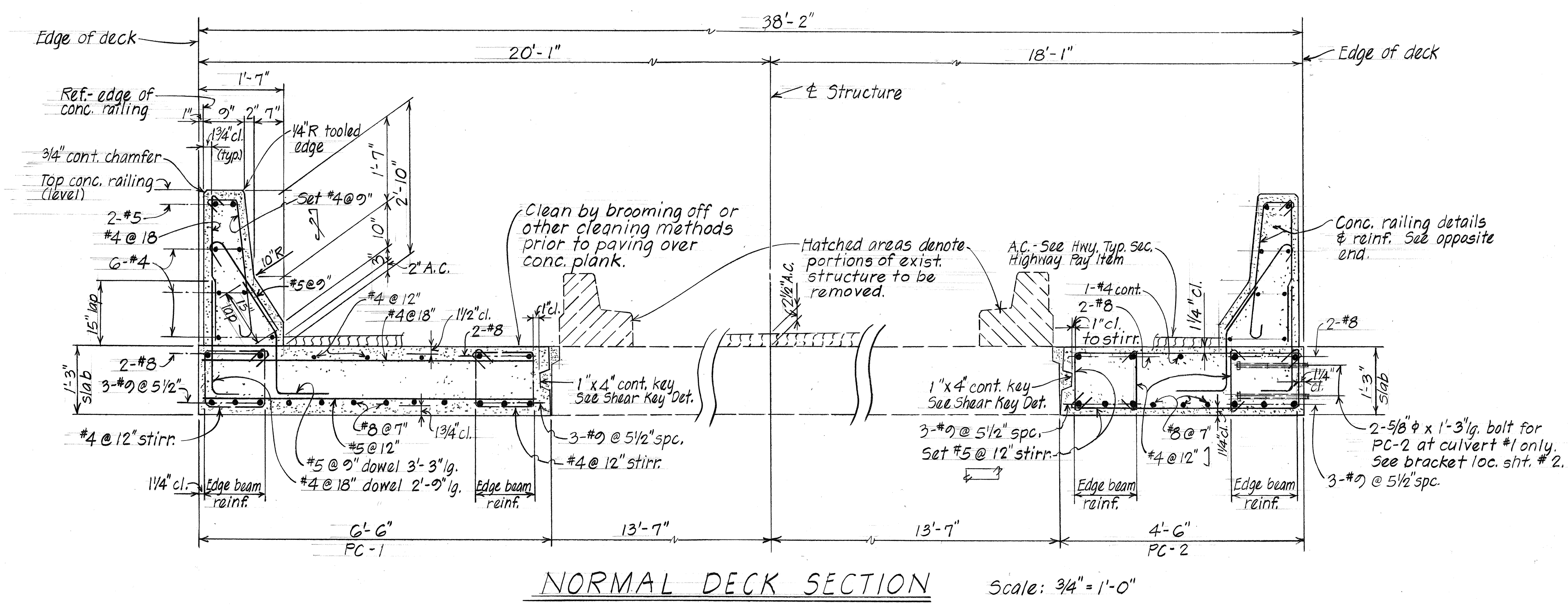
## TYPICAL NEW CONCRETE END POST & METAL GUARD RAIL CONNECTION DETAILS

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

|                   |      |
|-------------------|------|
| DATE              | 1/83 |
| SURVEY PLOTTED BY | ...  |
| DRAWN BY          | ...  |
| CHECKED BY        | ...  |
| NOTED BY          | ...  |
| NO.               | ...  |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION  
**WAIALEALE BRIDGE**  
NEW END POST CONNECTION  
KAM HWY RESURFACING  
KAUNALA ST. TO VICINITY OF WAIALEALE BRIDGE  
Proj. No. FR-083-1(18)  
Scale: As Shown Date: Feb, 1983  
SHEET NO. 7 OF 7 SHEETS

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 21        | 40           |



NOTE:  
Contractor to verify dimensions & angles before casting planks.

| PRECAST CONCRETE PLANK SCHEDULE |                                |                          |              |                     |
|---------------------------------|--------------------------------|--------------------------|--------------|---------------------|
| ITEM<br>LOCATION                | Length<br>(Bearing to Bearing) | Flare Bars Spacing - "5" |              |                     |
|                                 |                                | PC-1                     |              | PC-2                |
|                                 |                                | Top Layer                | Bottom Layer | Top & Bottom Layers |
| Culvert #1<br>Sta. 337+98.50    | (15.33')                       | 4 spc. @ 6"              | 5 spc. @ 3"  | 4 spc. @ 3"         |
| Culvert #2<br>Sta. 341+47.00    | (13.29')                       | 2 spc. @ 6"              | 2 spc. @ 3"  | 2 spc. @ 3"         |
| Culvert #3<br>Sta. 375+46.20    | (16.50')                       | 5 spc. @ 6"              | 7 spc. @ 3"  | 5 spc. @ 3"         |

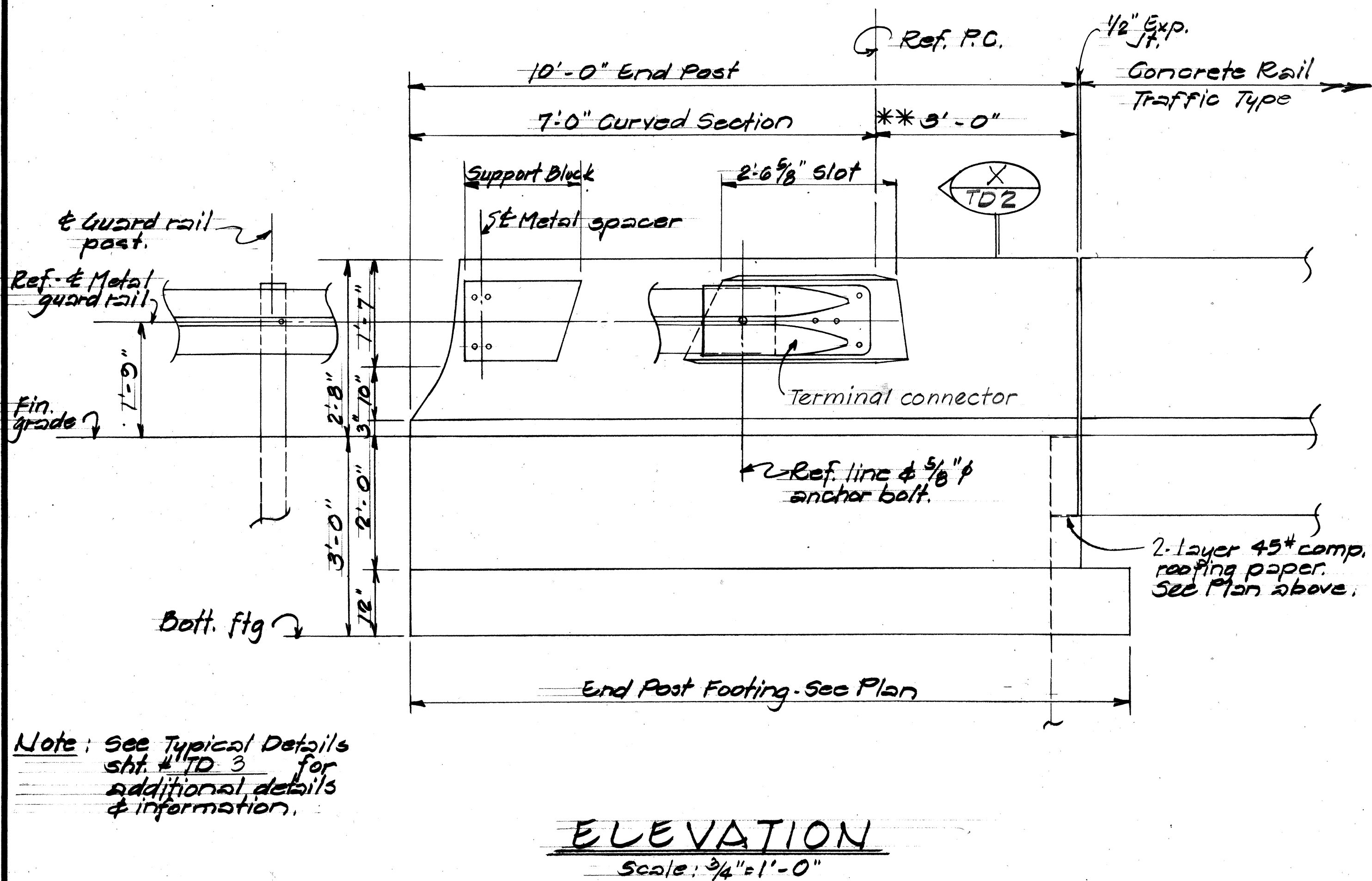
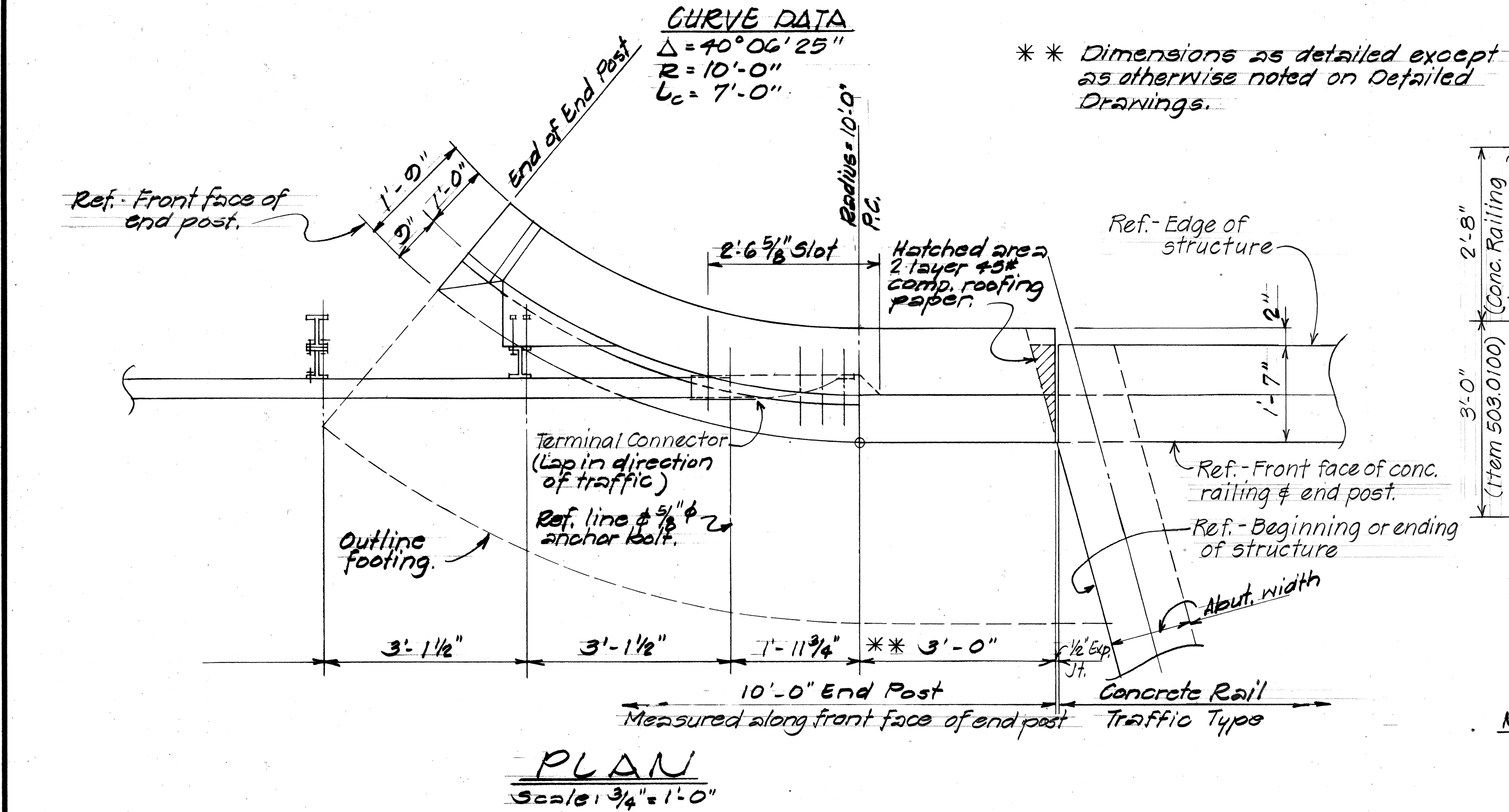
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION

TYPICAL DETAILS  
PRECAST CONCRETE PLANK &  
NORMAL DECK SECTION  
Proj. No. FR-083-1(18)

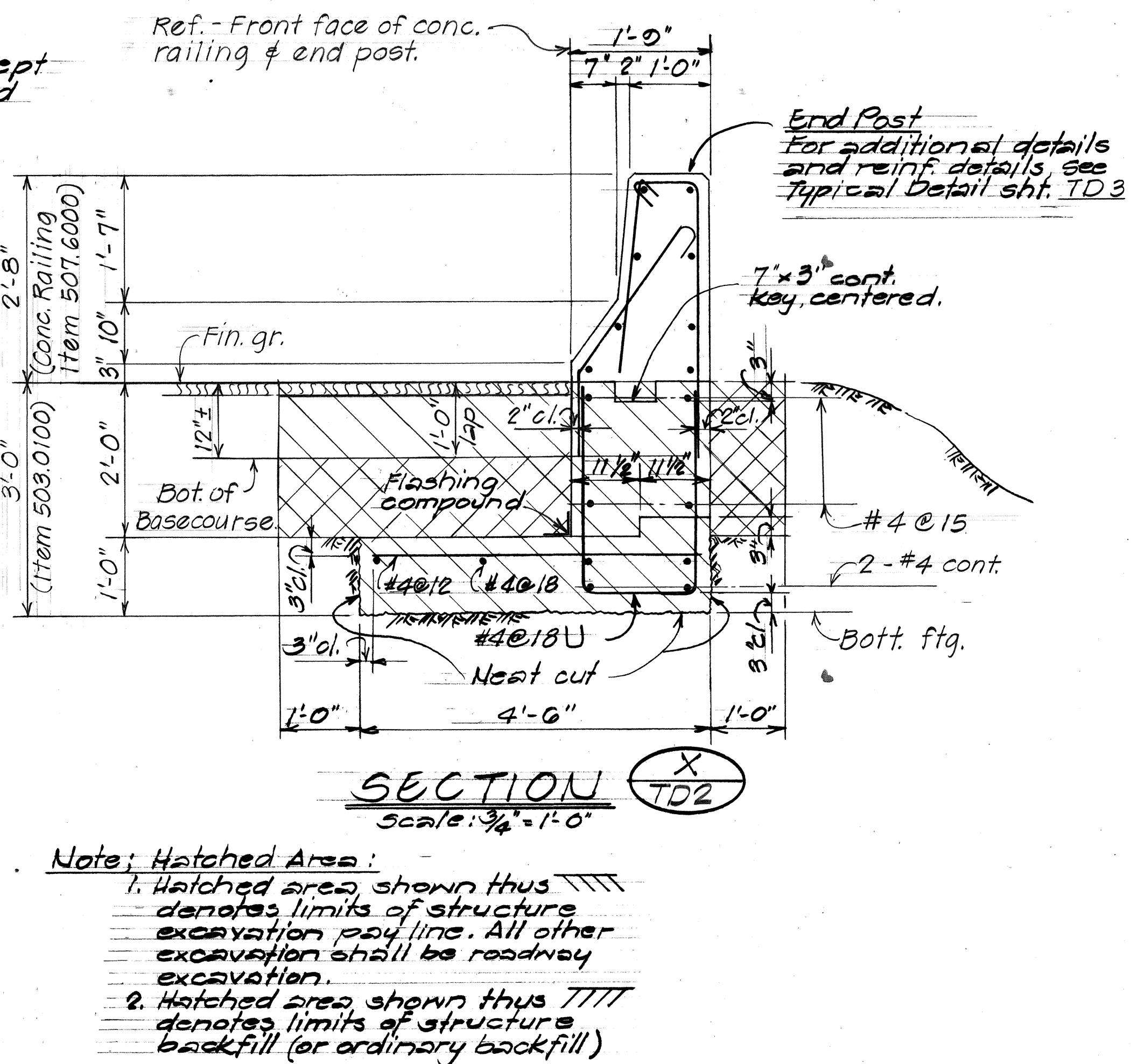
Scale: As Shown      Date: Feb, 1983  
SHEET NO. 21 OF 3 SHEETS

|               |       |
|---------------|-------|
| ORIGINAL PLAN | DATE  |
| DESIGNED BY   | 12/82 |
| TRACED BY     | 12/82 |
| QUANTITIES BY | 1/83  |
| CHECKED BY    | 1/83  |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 22        | 40           |



Note: See Typical Details sht. # TD 3 for additional details & information.



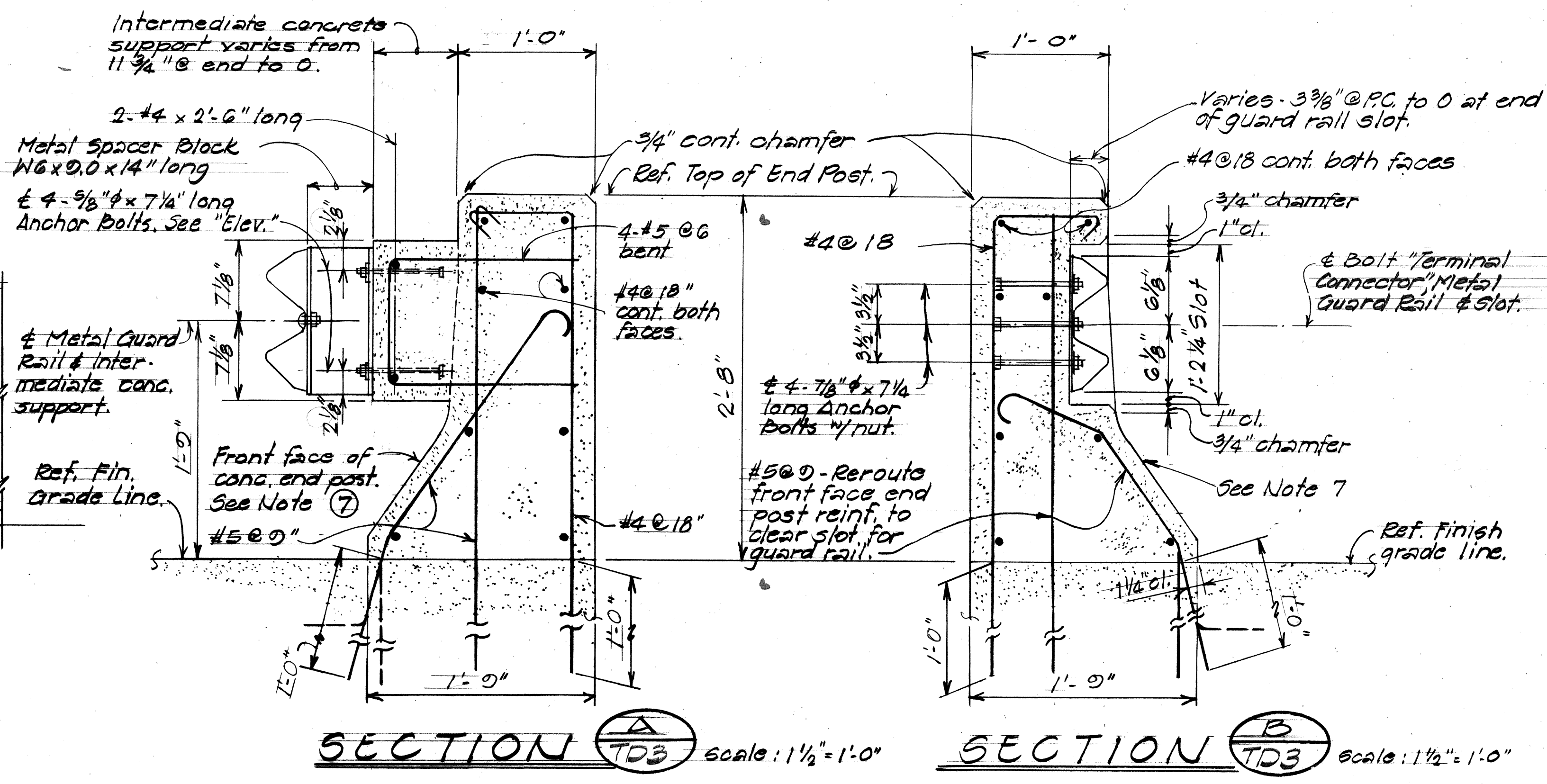
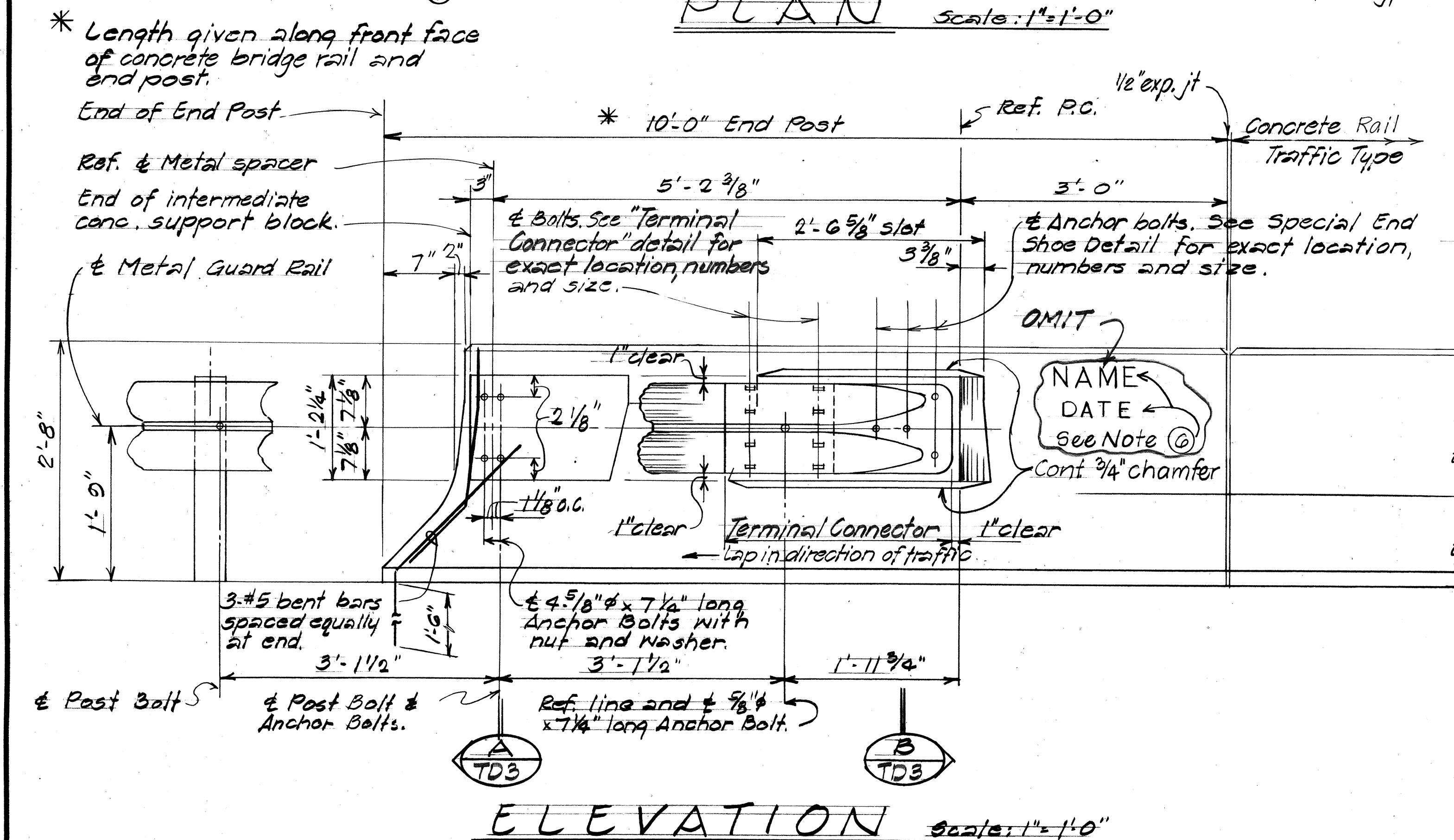
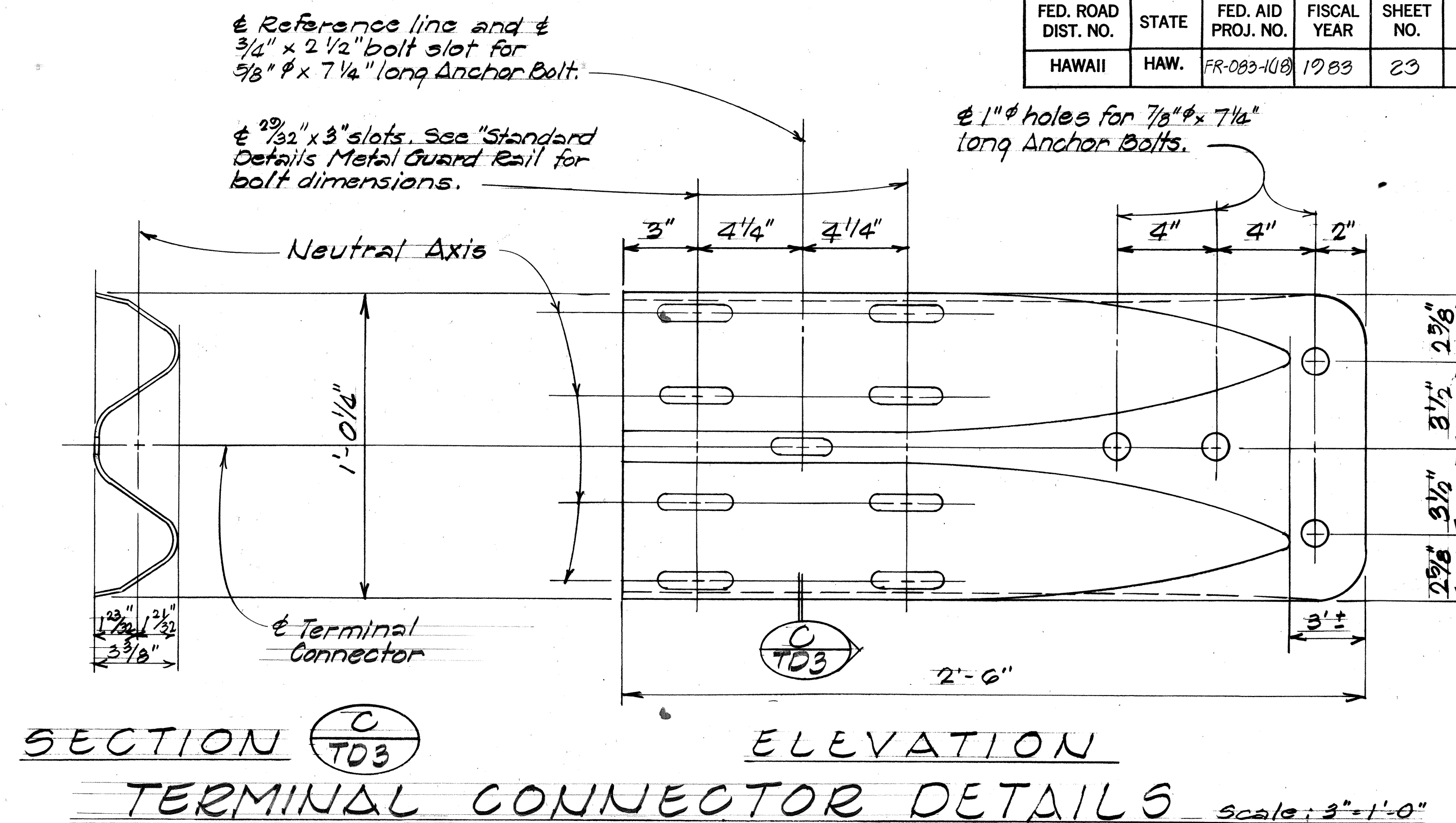
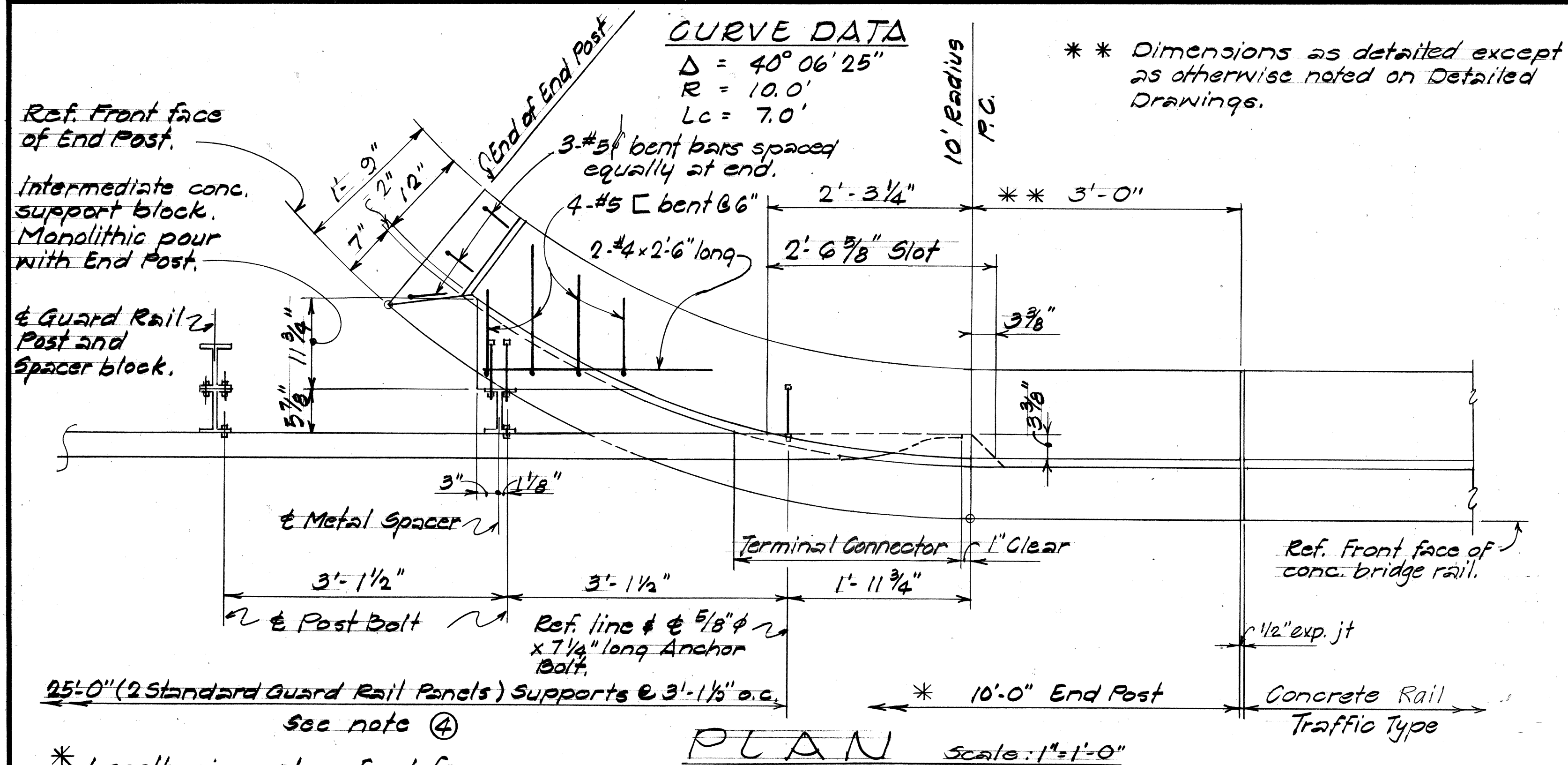
STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 LAND TRANSPORTATION FACILITIES DIVISION

**TYPICAL DETAILS**  
 CONCRETE END POST  
 (TRAFFIC TYPE)  
 Proj. No. FR-083-1(18)

Scale: As shown      Date: Feb., 1983  
 SHEET NO. TD2 OF 3 SHEETS

|                   |      |       |
|-------------------|------|-------|
| ORIGINAL PLAN     | DATE | 12/82 |
| SURVEY PLOTTED BY | DATE | 12/82 |
| DESIGNED BY       | DATE | 12/82 |
| CHECKED BY        | DATE | 1/83  |

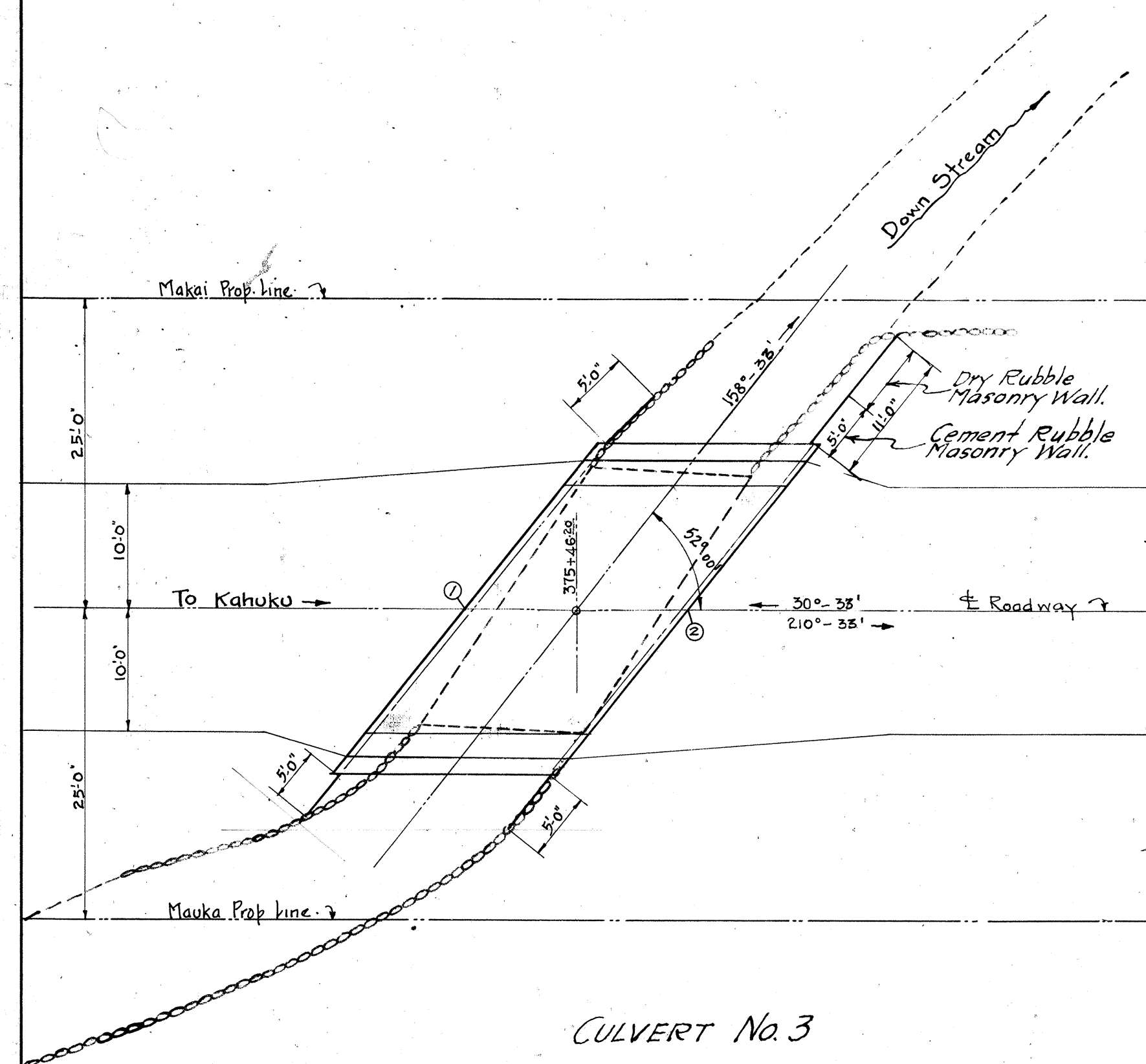
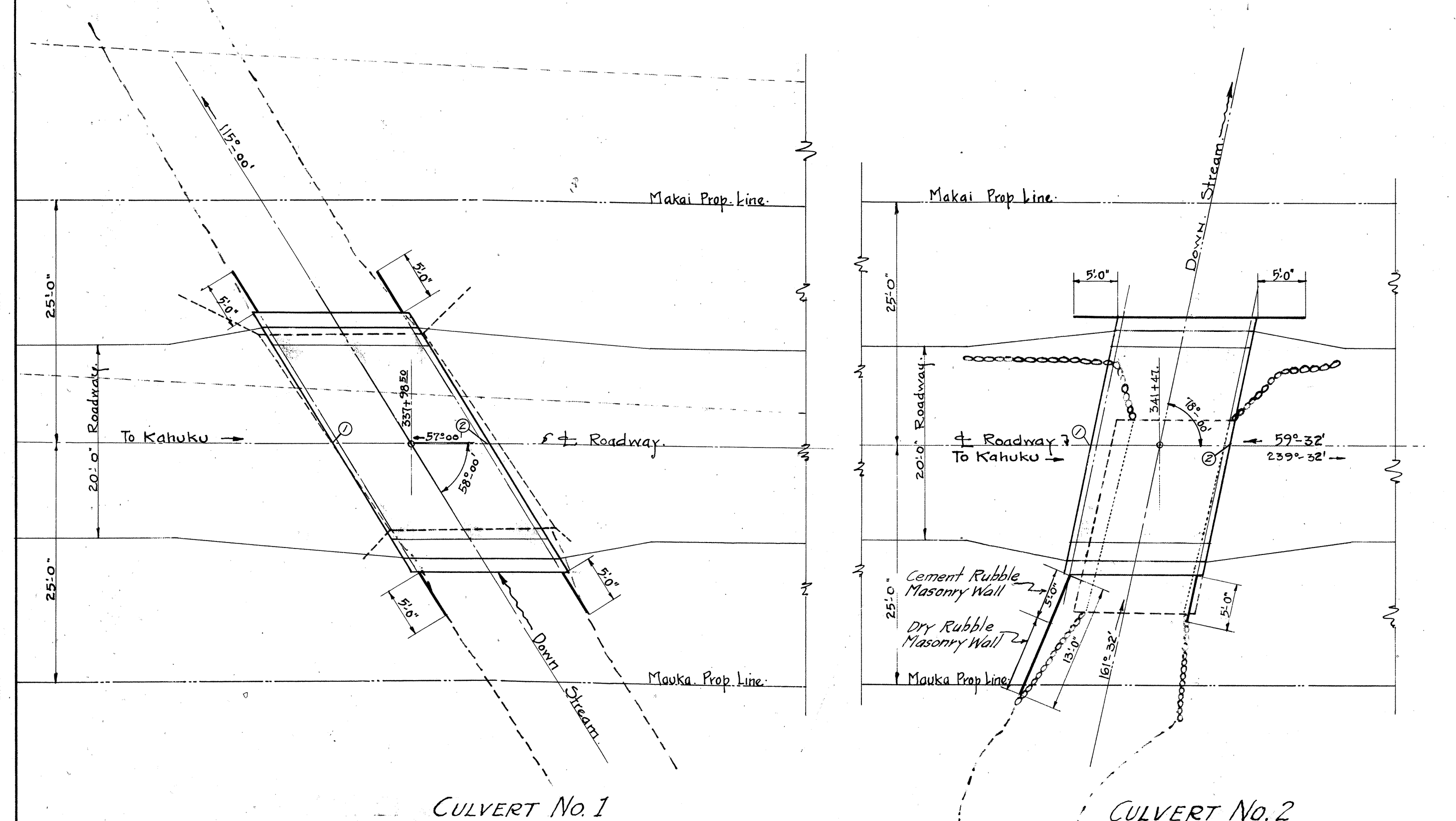
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FR-083-1(18)       | 1983        | 23        | 40           |



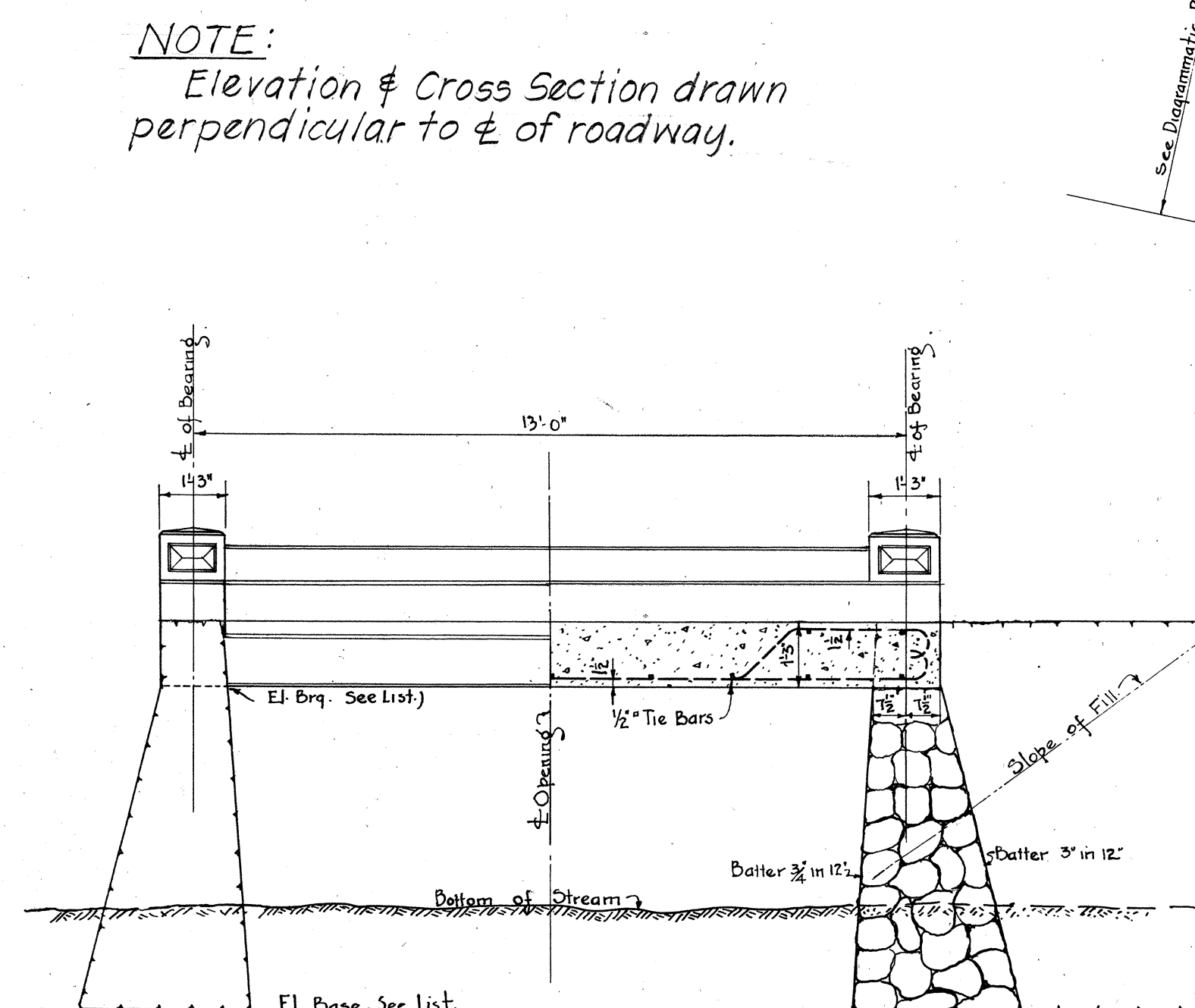
- NOTES:**
- All Anchor Bolts shall be High Strength bolts conforming to the requirements of ASTM A325.
  - All "Terminal Connector" including anchor bolts, nuts and washers, shall be galvanized.
  - "Terminal Connector" shall be fabricated from 10 gage steel conforming to the requirements of AASHTO M180.
  - First 25'-0" of guard rail adjoining "Terminal Connector" shall be galvanized steel.
  - Anchor Bolt length given from under bolt head.
  - Place name of structure as shown. For location, see "Plan" on Contract Drawing. Date shown will be year structure is completed. Letter size and detail see Standard Drawing DD-100.
  - Front face of End Post to match front face of typical conc. bridge rail.

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 LAND TRANSPORTATION FACILITIES DIVISION  
**TYPICAL DETAILS**  
 METAL GUARD RAIL CONNECTION  
 AT CONCRETE END POST  
 CONCRETE BUILDING TRAFFIC TYPE  
 Proj. No. FR-083-1(18)  
 Scale: As shown Date: Feb, 1983  
 SHEET No. 703 OF 3 SHEETS

| LOCATION, DIMENSIONS, & ELEVATIONS |          |                |            |            |         |         |                 |                 |                  |                  | STEEL SCHEDULE |       |      |      |        |        |        |      |      |        |        |       |          |        | APPROX. QUANTITIES |        |        |        |        |           |           |           |            |         |             |
|------------------------------------|----------|----------------|------------|------------|---------|---------|-----------------|-----------------|------------------|------------------|----------------|-------|------|------|--------|--------|--------|------|------|--------|--------|-------|----------|--------|--------------------|--------|--------|--------|--------|-----------|-----------|-----------|------------|---------|-------------|
| LOCATION                           | STATION  | FACE DOWN STRK | A          | B          | EL. (1) | EL. (2) | EL. TOP E. ABUT | EL. TOP W. ABUT | EL. BOT. E. ABUT | EL. BOT. W. ABUT | SIZE           | NO OF | 2" C | 1" C | 1/2" C | SIZE   | NO OF  | 2" C | 1" C | 1/2" C | SIZE   | NO OF | CONCRETE | C.R.M. | STEEL<br>LBS       | D.R.M. |        |        |        |           |           |           |            |         |             |
| CULVERT 1                          | 337+98.8 | 115° 00'       | 32'-0 1/2" | 16'-10"    | 36.65   | 37.00   | 35.07           | 35.42           | 26.50            | 26.50            | 3/4"           | 32    | 12'  | 2'6" | 15'    | 8'-10" | 15'    | 26'  | 12'  | 18'8"  | 3/4"   | 37    | 12'      | 16'-0" | 12'                | 18'    | 1 1/2" | 13     | 31'-6" | 25 Cu Yds | 68 Cu Yds | 1,722 LBS | 18 Tons    |         |             |
| "                                  | 2        | 341+47.        | 161° 31'   | 27'-9 1/2" | 14'-7"  | 39.28   | 39.20           | 37.70           | 37.62            | 31.50            | 31.50          | 3/4"  | 32   | 12'  | 20'-1" | 15'    | 7'-6"  | 15'  | 20'  | 12'    | 16'-4" | 3/4"  | 37       | 12'    | 13'-6"             | 12'    | 15'-6" | 1 1/2" | 13     | 27'-3"    | 20 Cu Yds | 48 Cu Yds | 882 Tons   | 16 Tons | 7.2 Cu Yds. |
| "                                  | 3        | 375+46.2       | 198° 32'   | 34'-6"     | 18'-1"  | 12.41   | 12.41           | 10.46           | 10.83            | 7.00             | 7.00           | 3/4"  | 32   | 12'  | 2'6"   | 15'    | 10'-0" | 15'  | 26'  | 12'    | 20'-0" | 3/4"  | 37       | 12'    | 17'-0"             | 12'    | 19'0"  | 1 1/2" | 13     | 34'-0"    | 26 Cu Yds | 28 Cu Yds | 1,300 Tons | 19 Tons | 1.6 Cu Yds. |

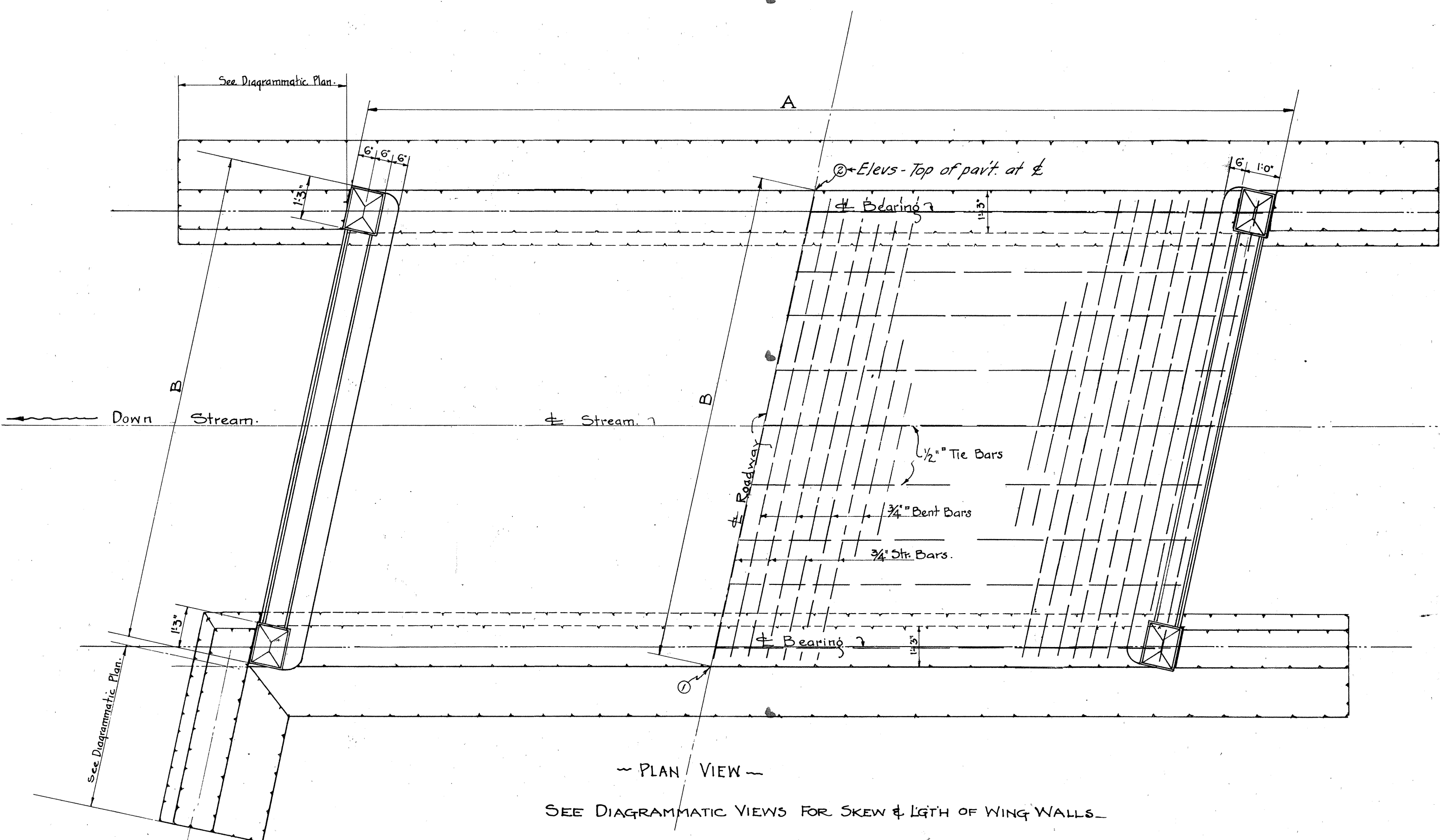


— DIAGRAMMATIC LAYOUT OF CULVERTS  
SEE DETAIL OPPOSITE.  
Scale - 1" = 10'-0" -



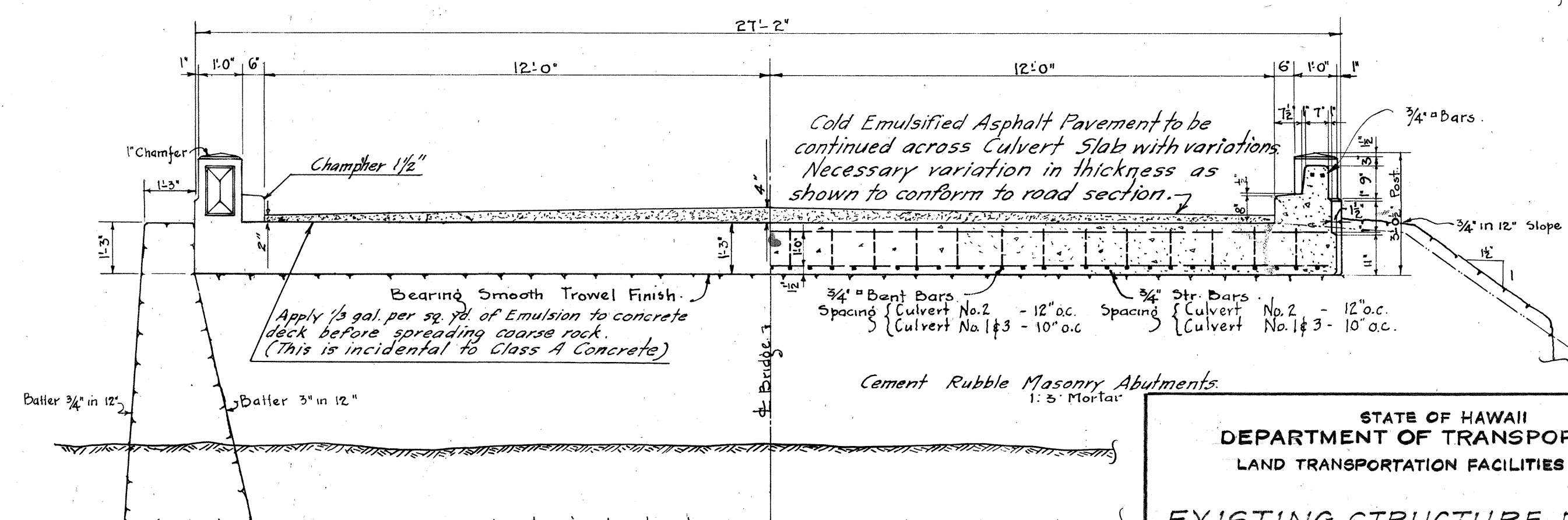
HALF LONGITUDINAL ELEVATION      HALF LONGITUDINAL SECTION  
SHOWING STRAIGHT WALL      SHOWING HEAD WALL

NOTE:- SECTION & ELEV. - PERPENDICULAR TO  $\Phi$  OF STREAM.



~ PLAN / VIEW ~

SEE DIAGRAMMATIC VIEWS FOR SKEW & LGTH OF WING WALLS.



HALF END VIEW  
SHOWING HEAD WALL.

~ TYPICAL DETAIL OF CULVERTS ~  
SCALE 3/8" = 1'-0"

EXIST CULVERT #1, #2, & #3  
for information only

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION

EXISTING STRUCTURE DETAILS  
CULVERT NOS. 1, 2, & 3

Proj. No. FR-083-1(18)

SHEET No. 591 OF 1 SHEETS