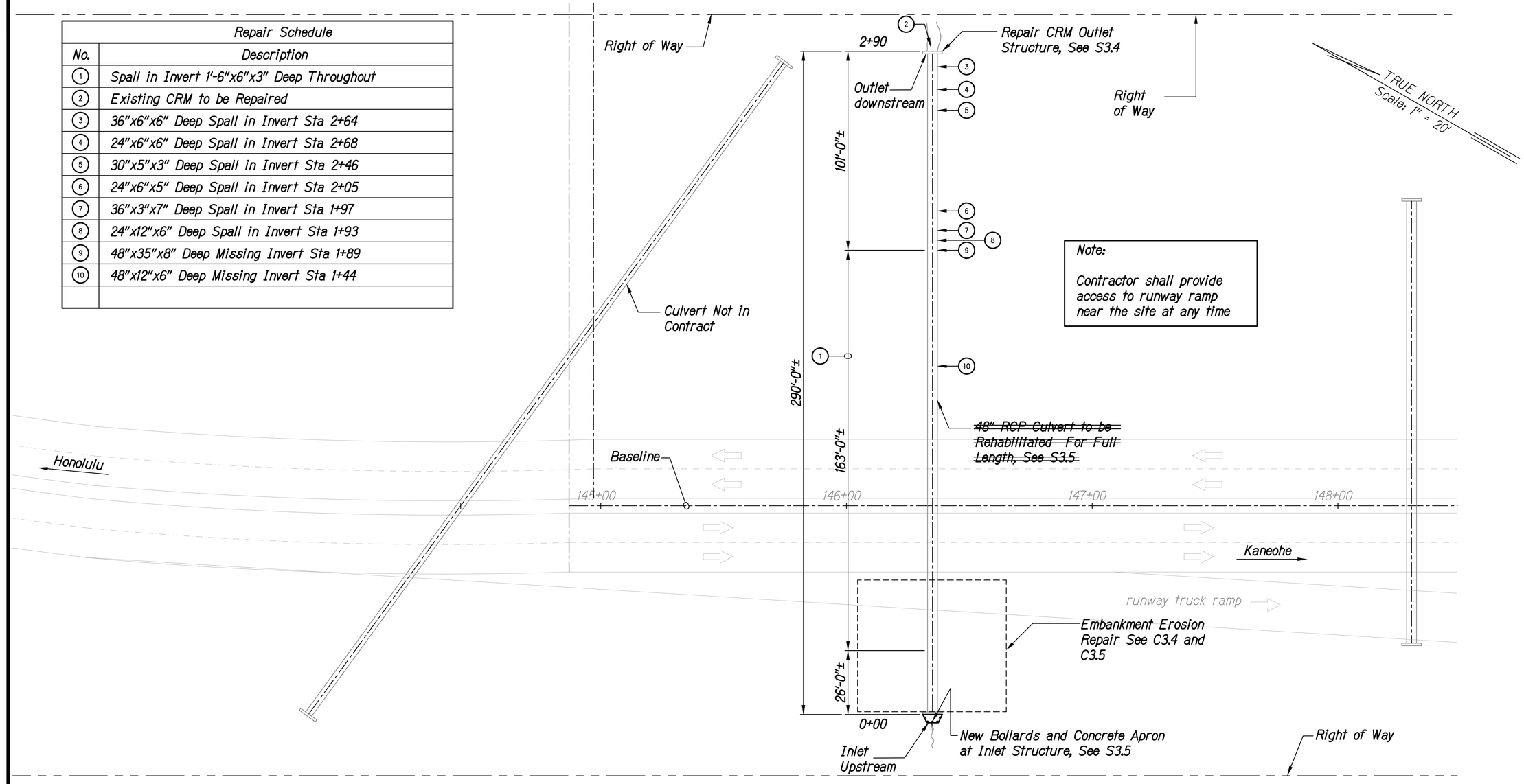
| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 22 | 62 |

| Repair Schedule | |
|---|---|
| No. | Description |
| 1 | Spall in Invert 1'-6"x6"x3" Deep Throughout |
| 2 | Existing CRM to be Repaired |
| 3 | 36"x6"x6" Deep Spall in Invert Sta 2+64 |
| 4 | 24"x6"x6" Deep Spall in Invert Sta 2+68 |
| 5 | 30"x5"x3" Deep Spall in Invert Sta 2+46 |
| 6 | 24"x6"x5" Deep Spall in Invert Sta 2+05 |
| 7 | 36"x3"x7" Deep Spall in Invert Sta 1+97 |
| 8 | 24"x12"x6" Deep Spall in Invert Sta 1+93 |
| 9 | 48"x35"x8" Deep Missing Invert Sta 1+89 |
| 10 | 48"x12"x6" Deep Missing Invert Sta 1+44 |
| | |




EXISTING CULVERT PLAN, MILE POST 6.70 (PALI HIGHWAY)

Scale: 1" = 20'-0"

1 S3.1 | S3.1

LEGEND FOR AS-BUILT POSTINGS

| | |
|---|---|
| ~~~~~ | Squiggly line for as-built deletion |
| ~~100.00~~ | Double line for as-built deletion |
| Roadway | Text for as-built posting |

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

EXPIRATION DATE OF THE LICENSE 4/30/2016

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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**CULVERT PLAN, MILEPOST 6.70 (PALI HIGHWAY)**

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1

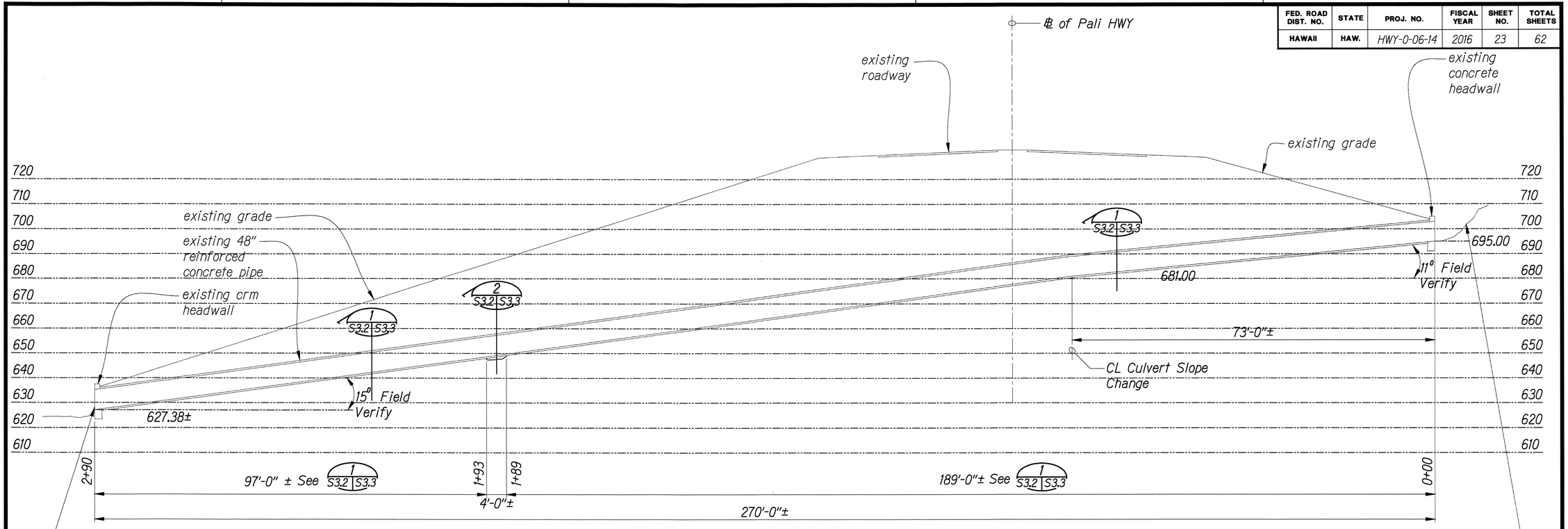
Project No. HWY-0-06-14

Scale: As Shown Date: March 2016

SHEET No. S3.1 OF 62 SHEETS

P:\Drafting\2019-06-04_2372 As-Builts\2015-02-04_2372 Culvert Inspections Pkg 1\2372_S3-1.dwg, 6/5/2019 2:35:55 PM, tamanaha

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 23 | 62 |




EXISTING CULVERT LONGITUDINAL SECTION, MILEPOST 6.70 (PALI HIGHWAY) 1 S3.2 S3.2

Scale: 1" = 10'-0"

KENT KAZUO HAYASHIDA
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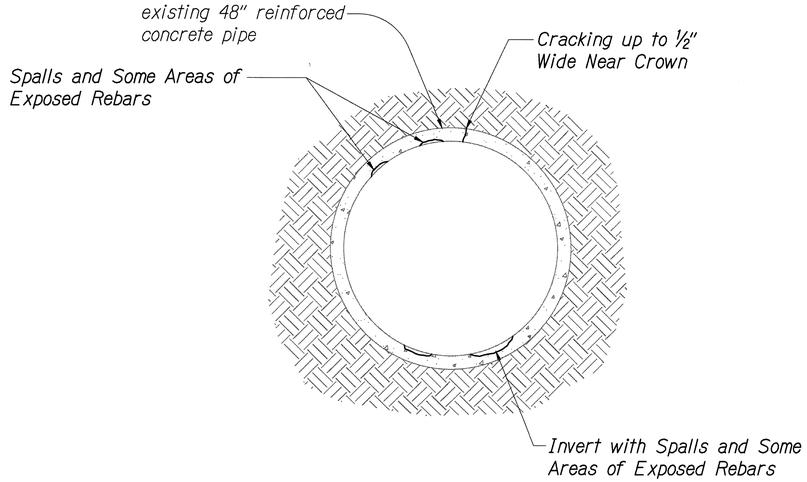
HIGHWAYS DIVISION

CULVERT LONG SECTION
M.P. 6.70 (PALI HWY)
CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14

Scale: As Shown Date: March 2016

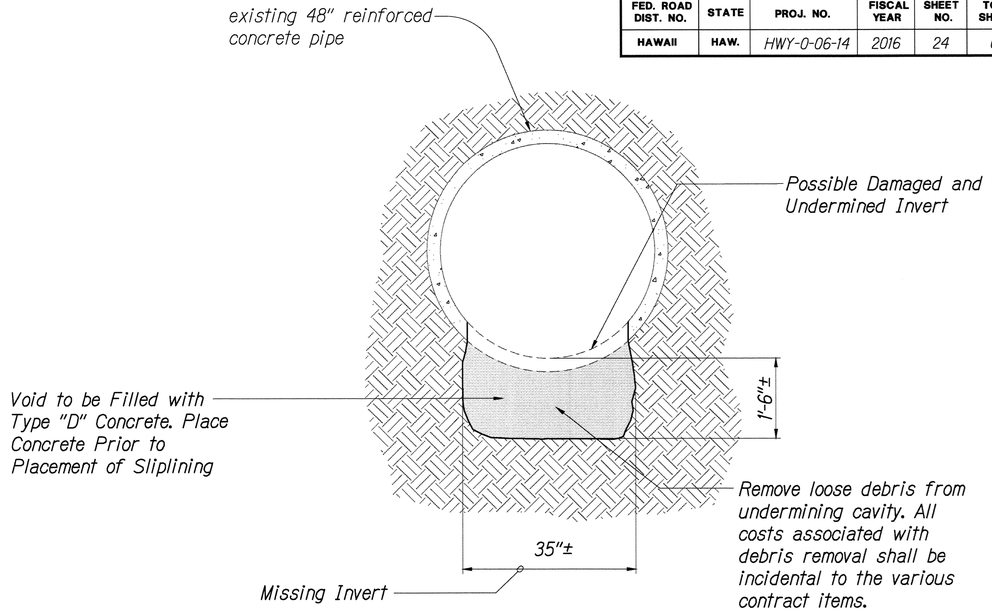
SHEET No. S3.2 OF 62 SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 24 | 62 |




EXISTING CULVERT SECTION AT SHOWING TYPICAL DETERIORATION 1 S3.2 | S3.3

Scale 1"= 1'-4"




EXISTING CULVERT SECTION AT STA 1+89 TO STA 1+93 2 S3.2 | S3.3

Scale 1"= 1'-4"

Note:
No Work Required For All Spalled Areas and Cracks.

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HIGHWAYS DIVISION

EX CULVERT M.P. 6.70 (PALI HWY) SECTIONS

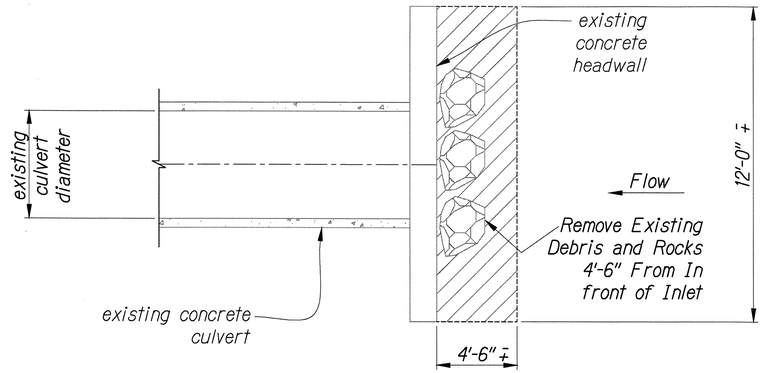
CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1

Project No. HWY-0-06-14

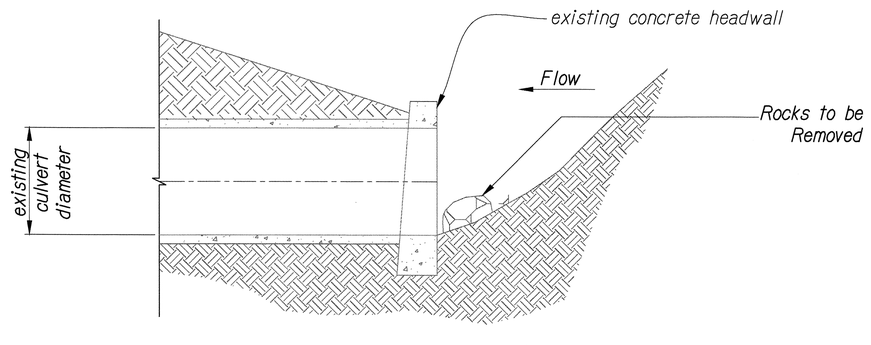
Scale: As Shown Date: March 2016

SHEET No. S3.3 OF 62 SHEETS

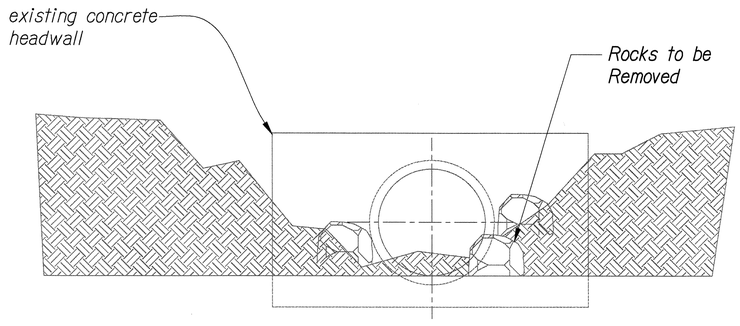
| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 25 | 62 |




INLET PLAN




INLET SECTION

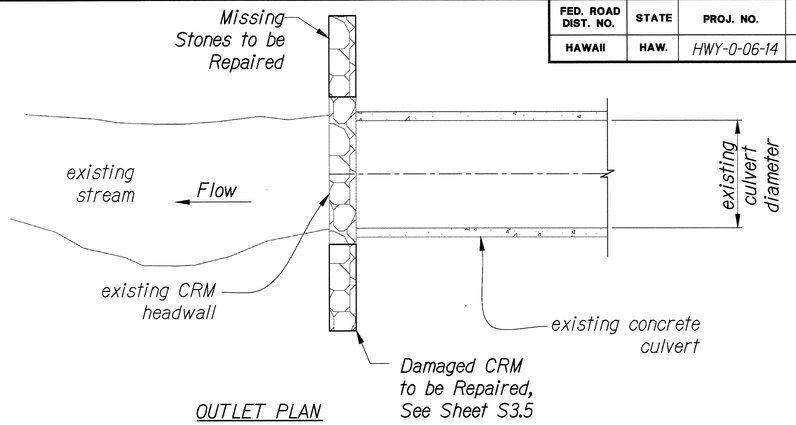



INLET ELEVATION

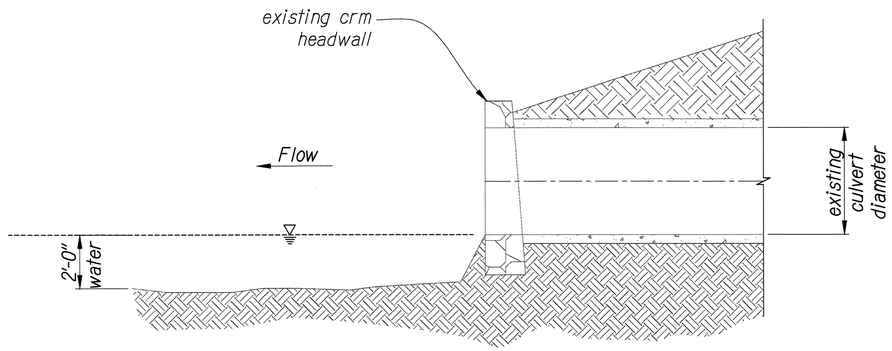
INLET STRUCTURE
EXISTING CONDITION

Scale: 1" = 4'-0"

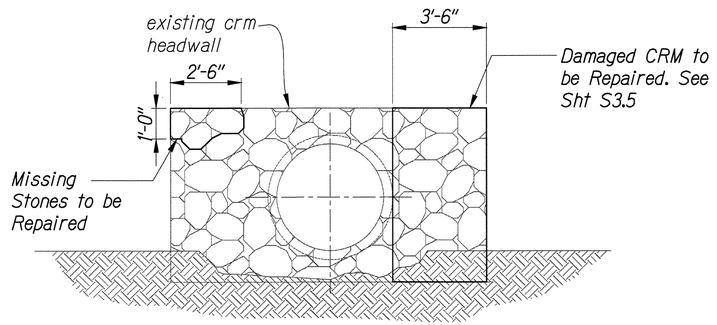
1
S3.4 | S3.4




OUTLET PLAN




OUTLET SECTION




OUTLET ELEVATION

OUTLET STRUCTURE
EXISTING CONDITION

Scale: 1" = 4'-0"

2
S3.4 | S3.4

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HIGHWAYS DIVISION

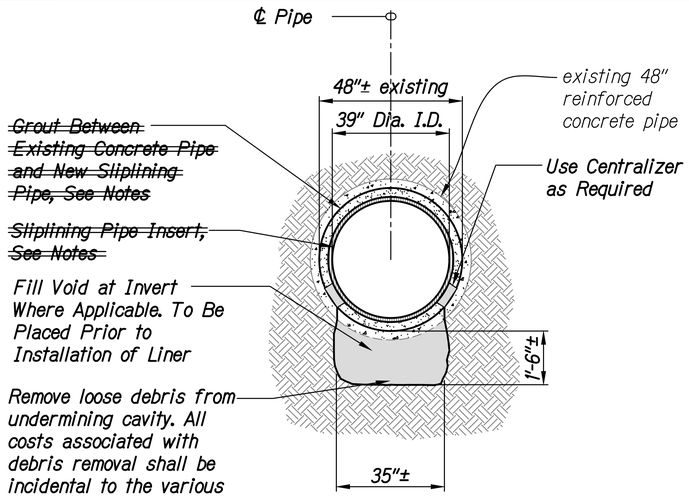
# EX CULVERT M.P. 6.70 (PALI)
# INLET/OUTLET STRUCTURES

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1

Project No. HWY-0-06-14

Scale: As Shown Date: March 2016

SHEET No. S3.4 OF 62 SHEETS



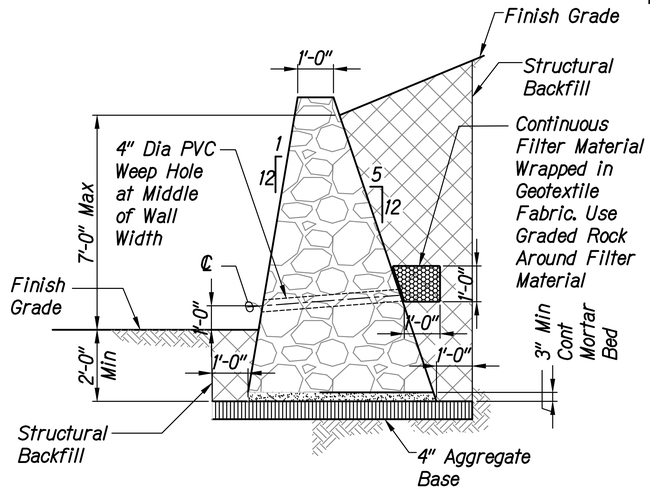

## TYPICAL PIPE REPAIR AND SLIPLINE DETAIL

1 S3.5 | S3.5

Scale: 1" = 2'-0"

*Notes:*

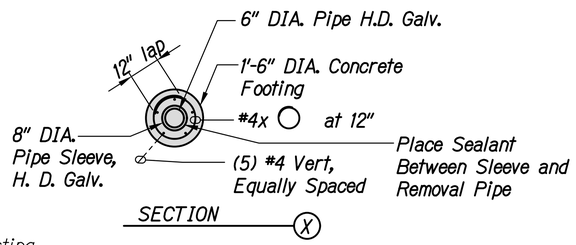
1. Contractor may use the following method for pipe rehabilitating :
   a. Sliplining pipe with High Density Polyethylene Pipe (HDPE)
   b. Sliplining pipe with Fiber Reinforced Polymer (FRP)
   c. Cured In Place Pipe (CIPP)
2. Contractor to provide shop drawings, grouting method and specification, and structural calculation stamped by licensed structural engineer in State of Hawaii to Engineer for review and approval of selected rehabilitation method.
3. Contractor to provide grout between the existing pipe and liner in sliplining rehabilitation method only CIPP rehabilitation method grouting is not required.
4. Contractor to measure existing culvert to verify size of host pipe prior to ordering the material for rehabilitation.




## OUTLET CRM WALL REPAIR

2 S3.4 | S3.5

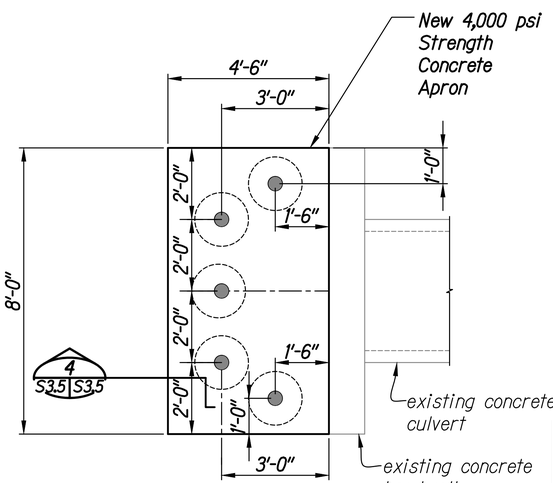
Scale: 1" = 2'-0"




SECTION (X)

*Cement Rubble Masonry (CRM) Notes:*

a. Stones shall be clean, hard, sound, and durable. Each stone, except stones for filling or pinning interstices, shall have a thickness of not less than 6 inches and a width of not less than one and one half times the thickness or 12 inches, whichever is greater.
b. Mortar shall be type "M" conforming to ASTM C270 and have a minimum compressive strength of 2,500 psi at 28 days.
c. Cement rubble masonry shall be constructed by experienced workmen.
d. Selected stones shall be roughly squared and pitched to lines at angles and ends of walls.
e. Stones shall be wet thoroughly before laying.
f. Stone joints shall overlap at least 6 inches and form a firm bond.
g. Stones for bottom course shall be large, flat and fully bedded in mortar.
h. Horizontal joints in the face of the wall shall not exceed 1 inch in thickness and vertical joints shall not exceed 2 inches in width.
i. CRM wall base shall be founded on firm undisturbed soil or structural fill compacted to a minimum 95% relative compaction. Remove soft and/or loose material at the bottom of the excavation and fill with granular fill compacted to a minimum 95% relative compaction. Alternately, the CRM wall base may be extended down to the firm undisturbed soil.



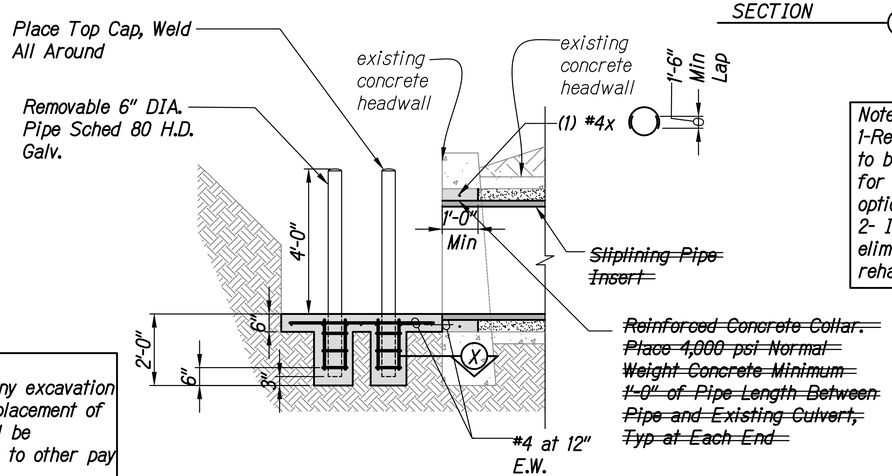

INLET PLAN

Note:
Cost to any excavation prior to placement of slab shall be incidental to other pay items.

## INLET DEBRIS CATCHER PLAN VIEW

3 S3.1 | S3.5

Scale: 1" = 2'-0"




Note:
1-Reinforced Concrete Collar to be replaced with sealant for CIPP rehabilitation option
2- Inlet Slab Overlay can be eliminated for CIPP rehabilitate option

## SECTION

4 S3.5 | S3.5

Scale: 1" = 2'-0"

LEGEND FOR AS-BUILT POSTINGS

| | |
|---|---|
| ~~wwww~~ | Squiggly line for as-built deletion |
| ~~100.00~~ | Double line for as-built deletion |
| Roadway | Text for as-built posting |

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 26 | 62 |

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HIGHWAYS DIVISION

# CULVERT M.P. 6.70 (PALI HWY) REPAIR DET AND SECTIONS

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1

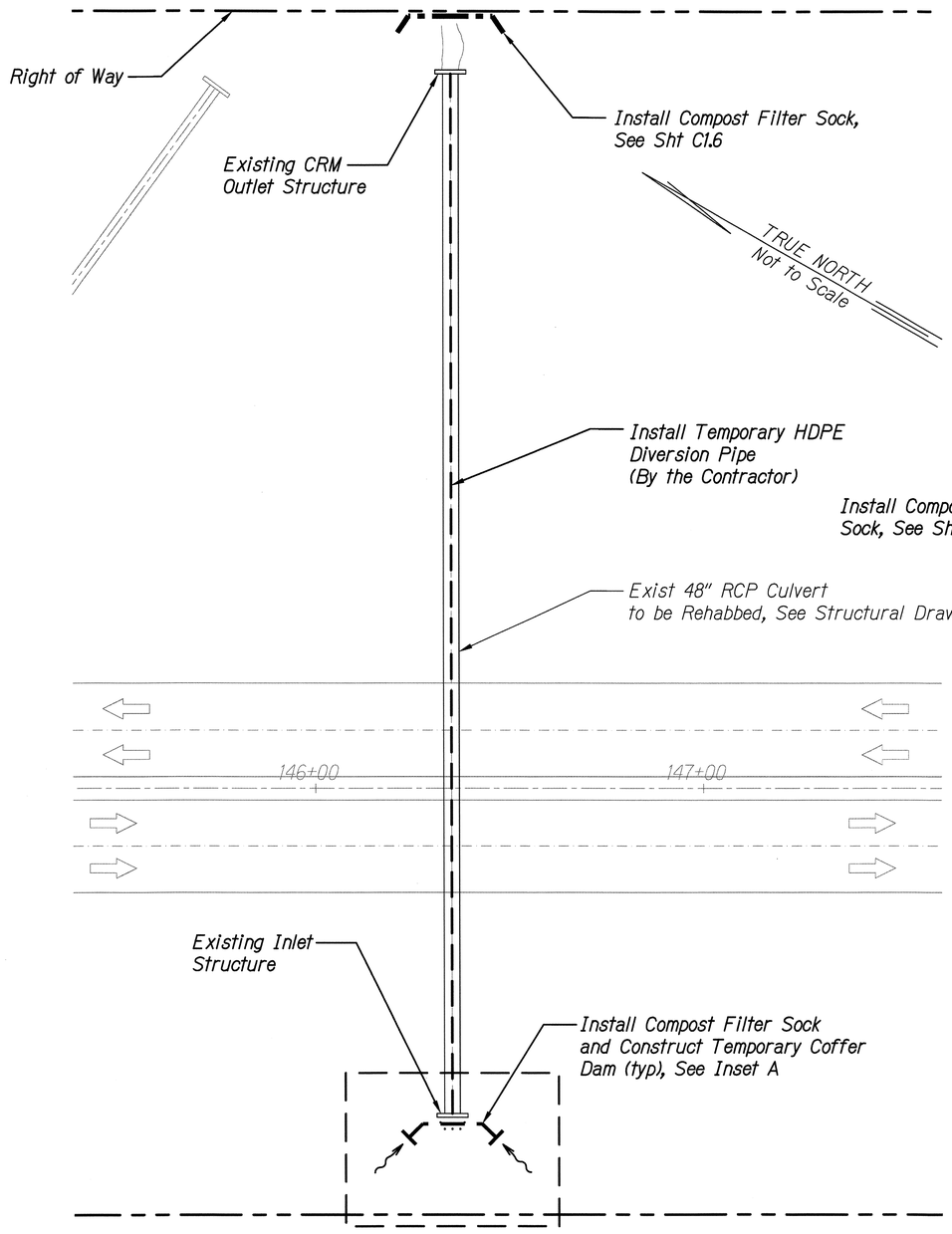
Project No. HWY-0-06-14

Scale: As Shown Date: March 2016

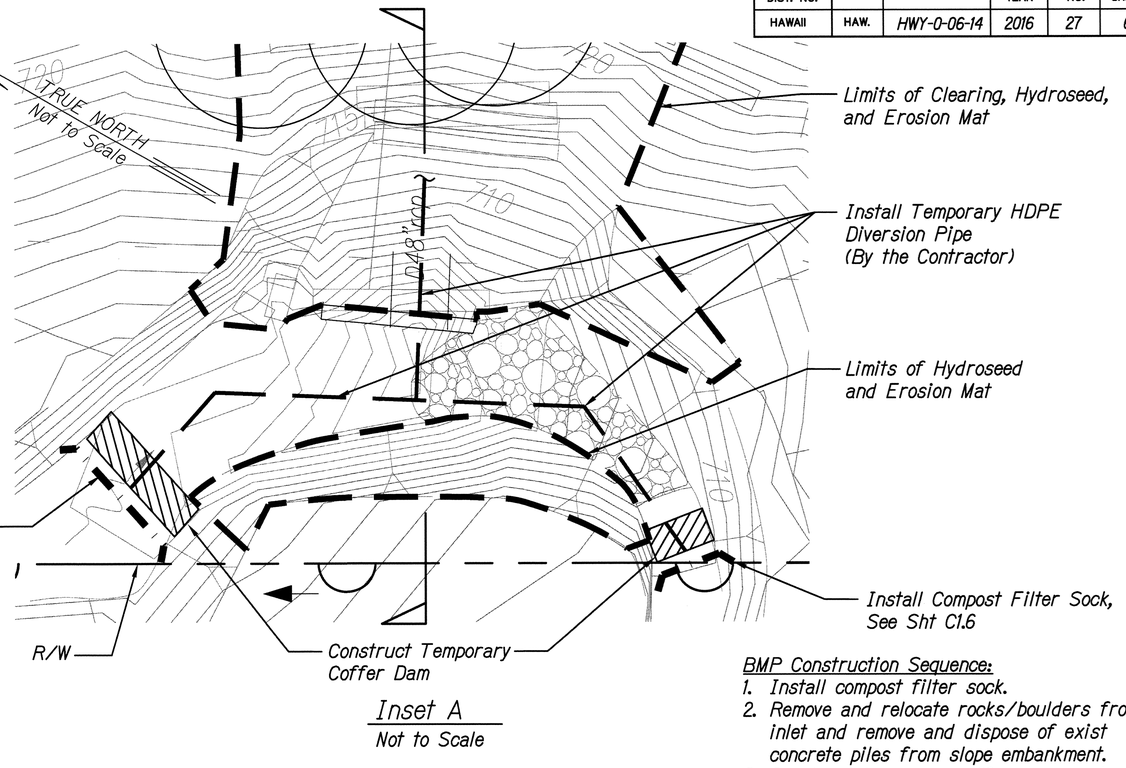
SHEET No. S3.5 OF 62 SHEETS

"AS-BUILT"

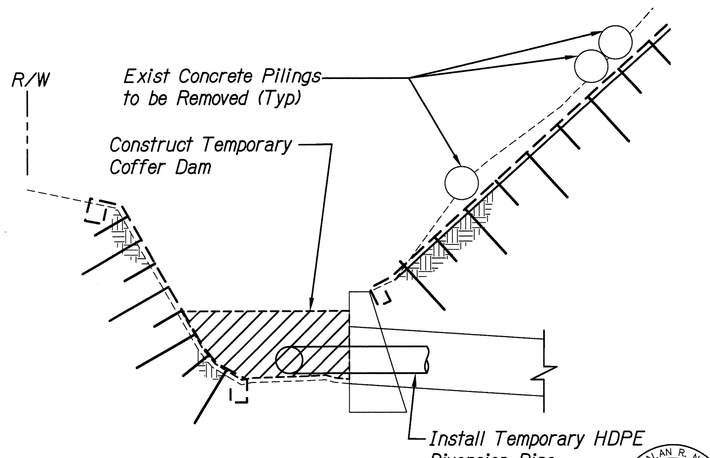
| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 27 | 62 |




Plan
Not to Scale




Inset A
Not to Scale




Section
Not to Scale

*BMP Construction Sequence:*

1. Install compost filter sock.
2. Remove and relocate rocks/boulders from inlet and remove and dispose of exist concrete piles from slope embankment.
3. Construct temporary coffer dams and install stream diversion pipe.
4. Remove debris from within invert cavity and backfill.
5. Repair the pipe, see structural drawings.
6. Repair damaged CRM outlet.
7. Construct new inlet debris catchment.
8. Grade slope at inlet. Hydro-seed and install erosion mat.
9. Remove BMPs.

*Note:*

Proposed BMP plan is provided to show general intent. Contractor shall submit BMP plan for review and approval by the Engineer prior to performing the work.

MILEPOST 6.70 (PALI HIGHWAY), SITE SPECIFIC BMP

Scale: As Noted

1
C3.1 | C3.1

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HIGHWAYS DIVISION

M.P. 6.70 (PALI HIGHWAY)
SITE SPECIFIC BMP
CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14

Scale: As Shown Date: March 2016

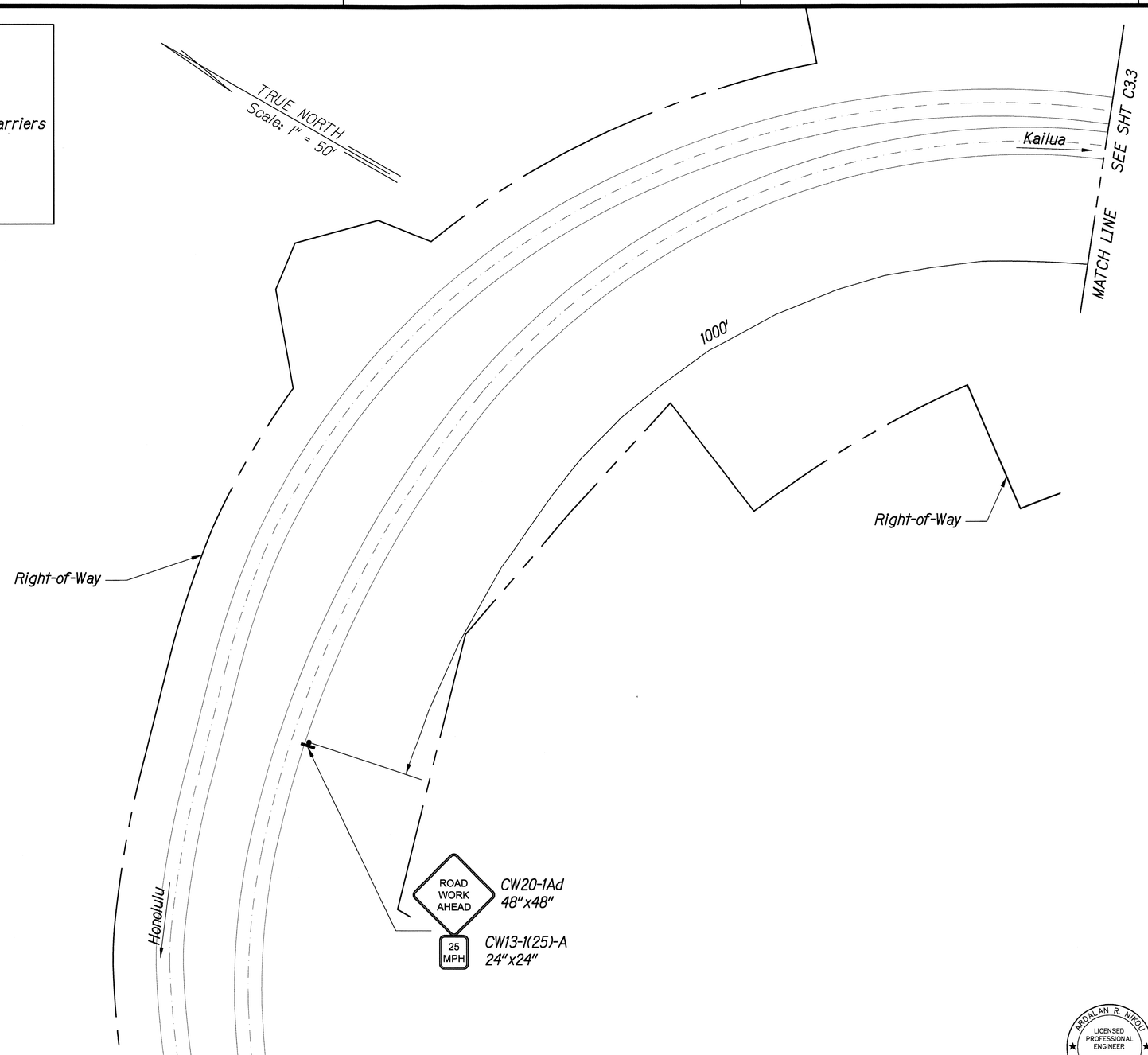
SHEET No. C3.1 OF 62 SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 28 | 62 |

Legend:

- Designates Work Area
- Traffic Rated Portable Barriers
- Direction of Traffic
- Sign (Shown Facing Left)

Note:
See Traffic Control Notes and Table on Sheet C1.7




MILEPOST 6.70 (PALI HIGHWAY), TRAFFIC CONTROL PLAN
Scale: 1" = 50'

1
C3.2 | C3.2

0 50 100 150
Scale: 1" = 50' Feet

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M.P. 6.70 (PALI HIGHWAY)
TRAFFIC CONTROL PLAN-01

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14
Scale: As Shown Date: March 2016

SHEET No. C3.2 OF 62 SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 29 | 62 |

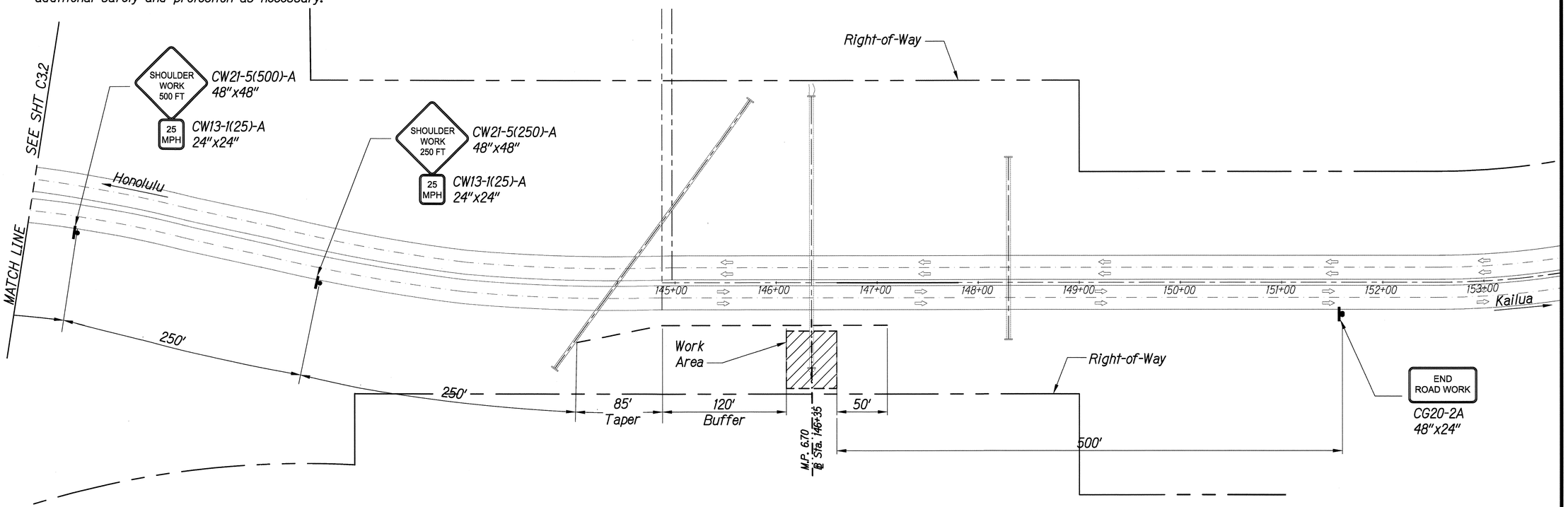
Legend:

- Designates Work Area
- Traffic Rated Portable Barriers
- Direction of Traffic
- Sign (Shown Facing Left)

TRUE NORTH
Scale: 1" = 50'

Notes:

1. See Traffic Control Notes and Table on Sheet C1.7
2. Contractor shall maintain access for Runaway Truck Ramp at all times and provide for additional safety and protection as necessary.




MILEPOST 6.70 (PALI HIGHWAY), TRAFFIC CONTROL PLAN
Scale: 1" = 50'

1
C3.3 | C3.3

0 50 100 150
Scale: 1" = 50' Feet

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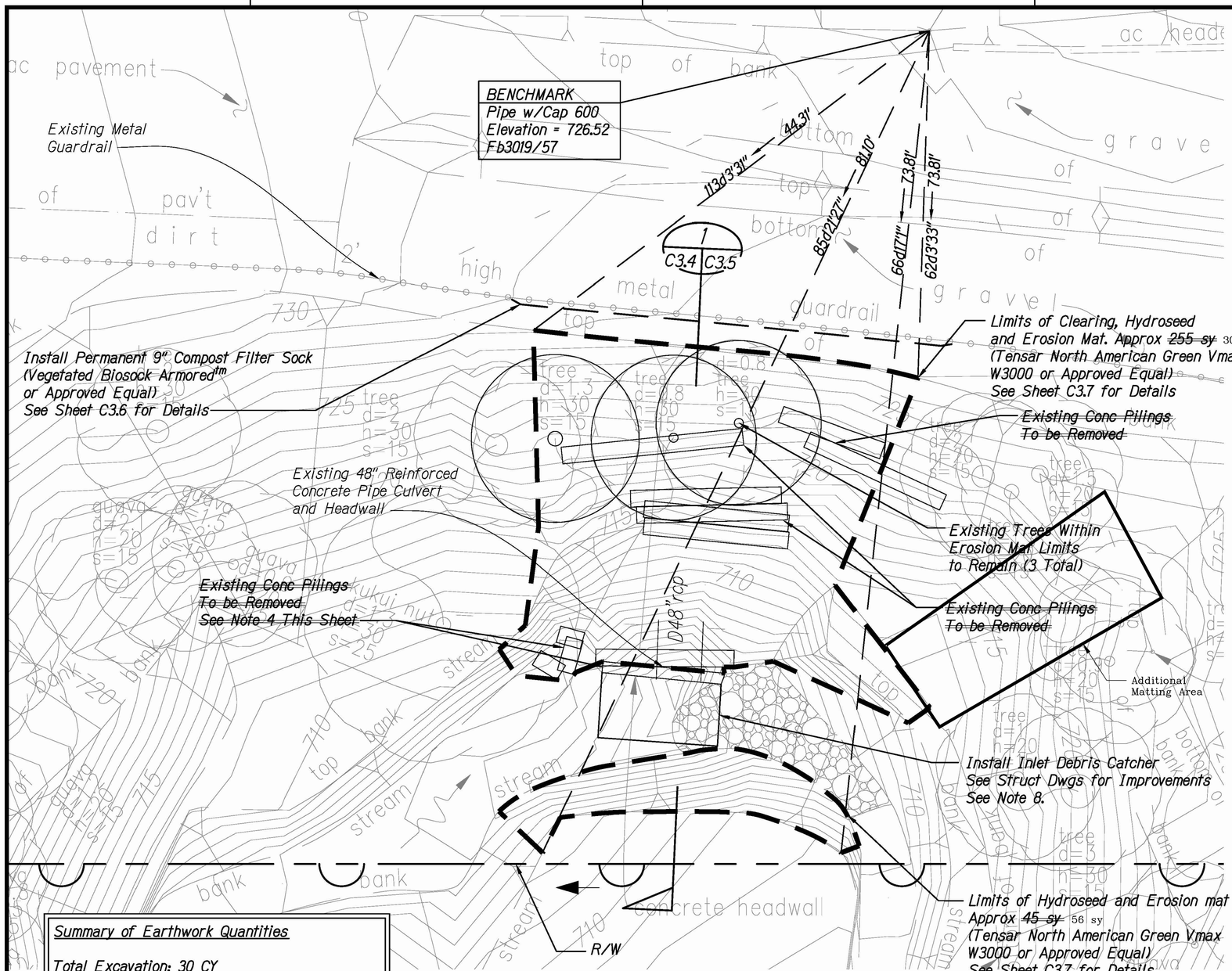
M.P. 6.70 (PALI HIGHWAY)
TRAFFIC CONTROL PLAN-02
CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14
Scale: As Shown Date: March 2016

SHEET No. C3.3 OF 62 SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 30 | 62 |




TRUE NORTH
Scale: 1" = 5'

Notes:

1. BMP's shall be in place and functional prior to the start of construction work and in accordance with sheet C1.6 and manufacturer's recommendations, whichever is more stringent.
2. Erosion Mat limits are shown in plan view. Contractor shall account for all slope irregularities when performing work and installing construction materials.
3. Unless otherwise noted on the plans, remove existing trees (12" in diameter or smaller) and vegetation within erosion mat limits, remove existing concrete pilings, grade back any vertical and/or overhanging soil areas, provide a smooth slope surface, and hydroseed prior to erosion mat installation.
4. Removal and disposal of cut trees, vegetation, and concrete pilings at an approved location shall be done at no additional cost to the State.
5. Contractor shall provide a detail for installation of erosion mat around protected trees identified on the plan per manufacturer recommendations for review by the Engineer.
6. Contractor shall stake-out the proposed erosion mat areas in the field for review and approval by the Engineer prior to erosion mat installation.
7. Contractor shall maintain access and clearance to existing Runaway Truck Ramp at all times during construction.
8. Contractor shall exercise caution when removing the existing rock buildup for the inlet debris catcher installation (see structural drawings for details). Any rock removal by the Contractor that exposes bare soil or creates an unstable situation shall be immediately brought to the attention of the Engineer for corrective action.

Summary of Earthwork Quantities

Total Excavation: 30 CY
Total Graded Area (Plan): 0.02 AC
Total Disturbed Area (Plan): 0.02 AC

1. Earthwork quantities are taken from exist ground to finish grade
2. Quantities are for permit purposes only

LEGEND FOR AS-BUILT POSTINGS

| | |
|---|---|
| ~~^^^^^^^~~ | Squiggly line for as-built deletion |
| ~~100.00~~ | Double line for as-built deletion |
| Roadway | Text for as-built posting |

MILEPOST 6.70 (PALI HIGHWAY) SITE PLAN
Scale: 1" = 5'

1
C3.4 C3.4

0 5 10 15
Scale: 1" = 5' Feet

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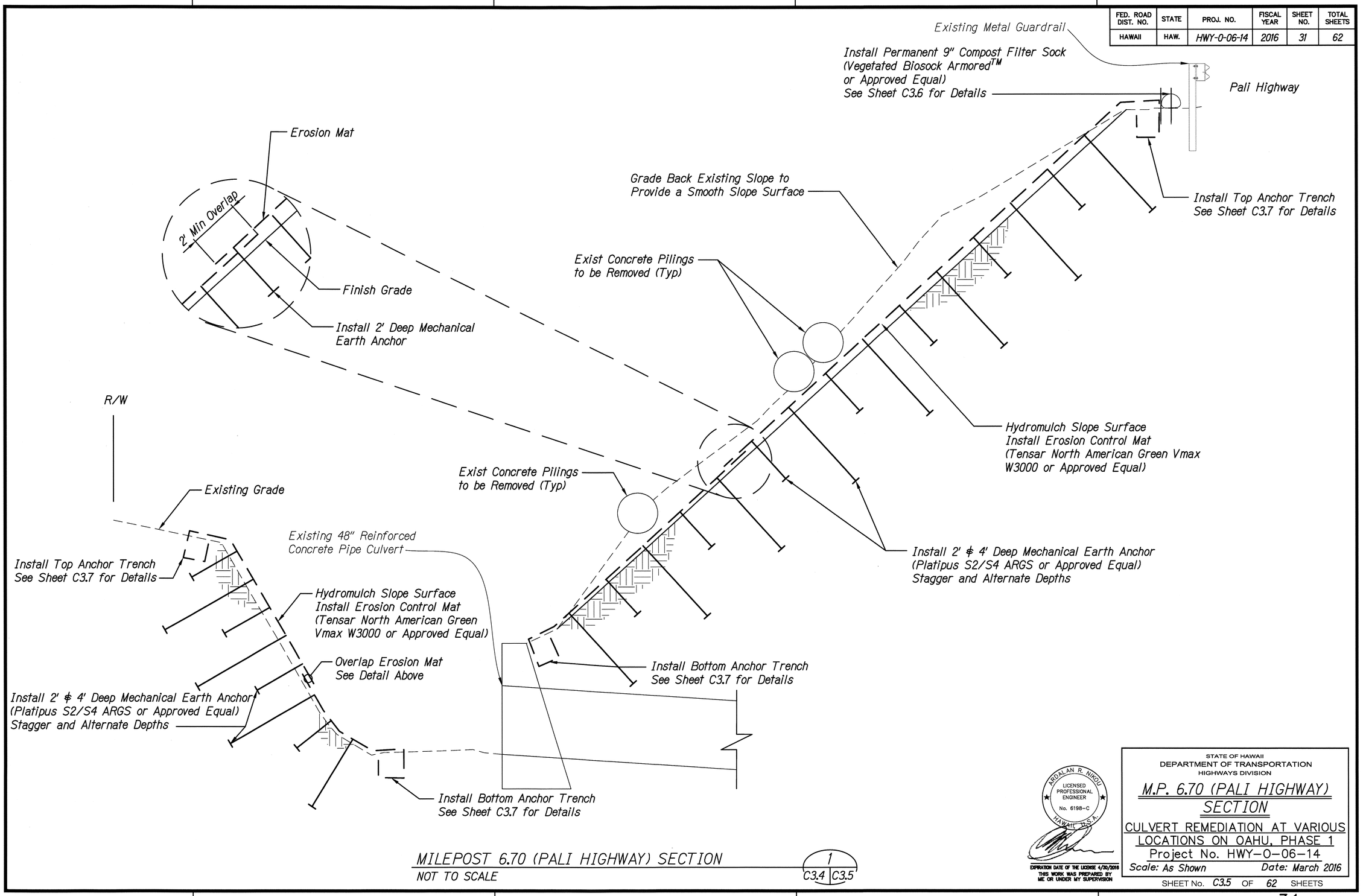
HIGHWAYS DIVISION

M.P. 6.70 (PALI HIGHWAY)
SITE PLAN

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14
Scale: As Shown Date: March 2016

SHEET No. C3.4 OF 62 SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 31 | 62 |




MILEPOST 6.70 (PALI HIGHWAY) SECTION
NOT TO SCALE

1
C3.4 | C3.5

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

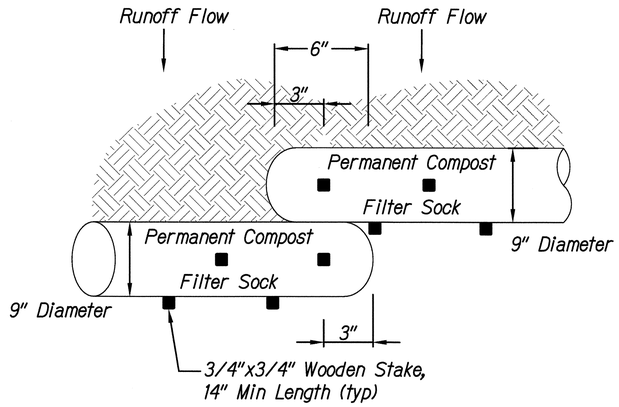
M.P. 6.70 (PALI HIGHWAY)
SECTION

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14

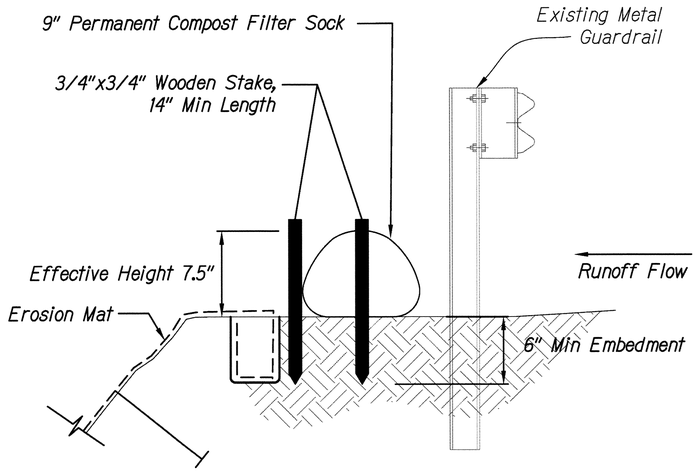
Scale: As Shown Date: March 2016

SHEET No. C3.5 OF 62 SHEETS

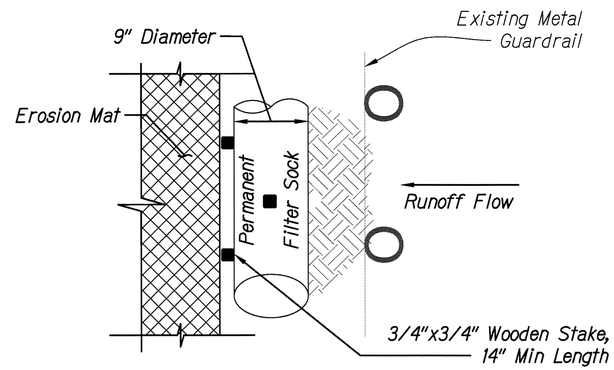
| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 32 | 62 |




OVERLAPPING (ANCHORING)




SECTION (ANCHORING)




PLAN (ANCHORING)

## Compost Filter Sock Notes:

1. Permanent compost filter sock adjacent to guardrail at top of slope shall be vegetated with seed and wrapped with a bi-axial geogrid (Vegetated Biosock Armored$^{TM}$ or approved equal).
2. Details provided as a minimum requirement. Contractor also to adhere to manufacturer's installation instructions.
3. Compost shall not contain biosolids and should be consistent with EPA guidelines.

COMPOST FILTER SOCK DETAILS — 1 / C3.6 | C3.6

Not to Scale

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LICENSED PROFESSIONAL ENGINEER
No. 6198-C
HAWAII, U.S.A.

EXPIRATION DATE OF THE LICENSE 4/30/2016
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

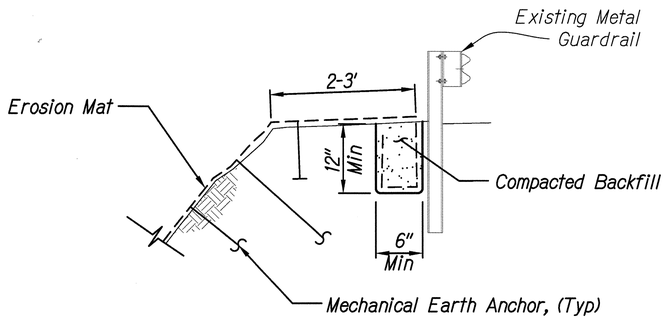
# COMPOST FILTER SOCK DETAILS

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
Project No. HWY-0-06-14

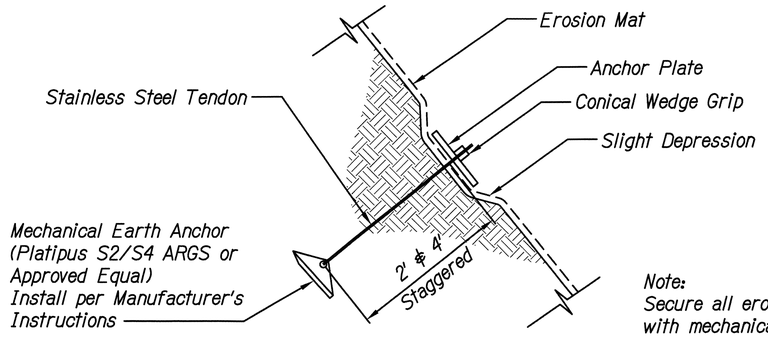
Scale: As Shown Date: March 2016

SHEET No. C3.6 OF 62 SHEETS

| FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|---|
| HAWAII | HAW. | HWY-0-06-14 | 2016 | 33 | 62 |

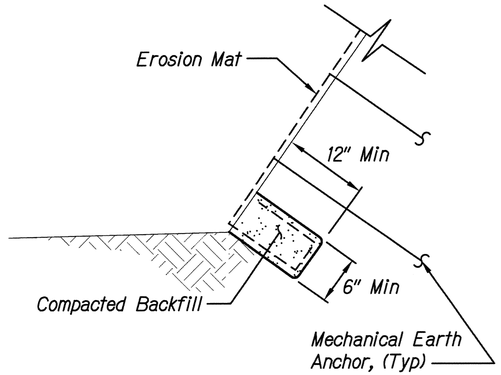



TOP ANCHOR TRENCH DETAIL
Not to Scale

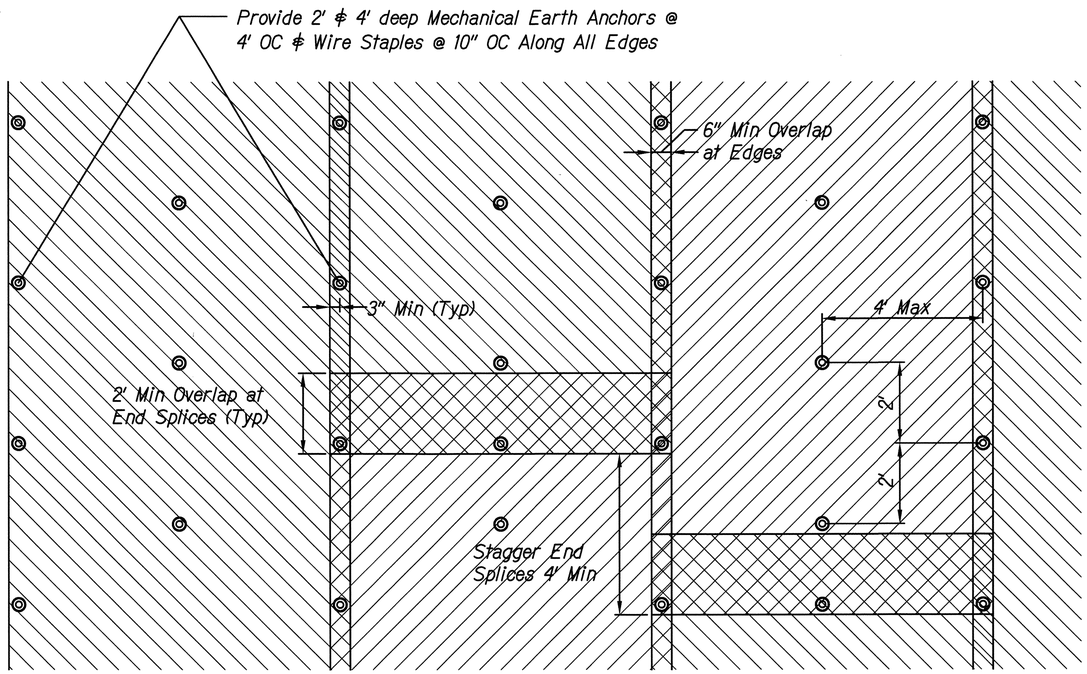



Note:
Secure all erosion mat edges with mechanical earth anchors at 4' on center

MECHANICAL EARTH ANCHOR DETAIL
Not to Scale




BOTTOM ANCHOR TRENCH DETAIL
Not to Scale




EROSION MAT/ANCHOR LAYOUT
Not to Scale

EROSION MAT DETAILS
Not to Scale

1
C3.7 | C3.7

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EROSION MAT DETAILS

CULVERT REMEDIATION AT VARIOUS LOCATIONS ON OAHU, PHASE 1
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SHEET No. C3.7 OF 62 SHEETS