SUPPLEMENTAL INFORMATION

ITEM NO.

5.b.	The Director of the Department of Transportation approves runoff from Vineyard Boulevard to discharge into the Highways Division drainage system. A copy of the project's NOI will be sent to the Oahu District, Highways Division. A MOU between the City and County of Honolulu Department of Environmental Services and The Department of Facility Maintenance and DOT Highways approves discharge connections to city drainage facilities without private drain connection licenses.)
5.b.	See Section 1.4 in the SSCBMP Plan for Discharge Point coordinates into the HDOT/C&C Honolulu MS4 system.
SSCBMP 1.8	Per letter of agreement with the City and County of Honolulu, this project falls under the typical project not requiring a grading permit (Road Rehabilitation/Landscape Improvement). A copy of the letter of agreement is included under Attachment A-8.

LIST OF SUPPORTING DOCUMENTS

NO.	TITLE OF DOCUMENT
Attachment A	
A-1	Location, Outfall, and BMP Maps
A-2	Table I - Discharge Point Information & Discharge Quantity w/ runoff calcs
A-3	Flow Chart
A-4	Non-structural Pollution Control Measures
A-5	Portions of Contract Plans
A-6	Specifications for Temporary Water Pollution, Dust and Erosion Control
A-7	Water Pollution and Erosion Control Notes Sheet
A-8	C&C County of Honolulu Grading Ordinance Letter of Agreement
A-9	HDOT Construction Best Management Practices and Supplemental Sheets
A-10	MS4 MOU Between HDOT and City and County of Honolulu.
Attachment B	Training Log
Attachment C	Construction Schedule
Attachment D	Sub-Contractor Certification
Attachment E	HDOT BMP Inspection and Maintenance Report Form
Attachment F	Contingency Plan
Attachment G	Amendment Log

Attachment A

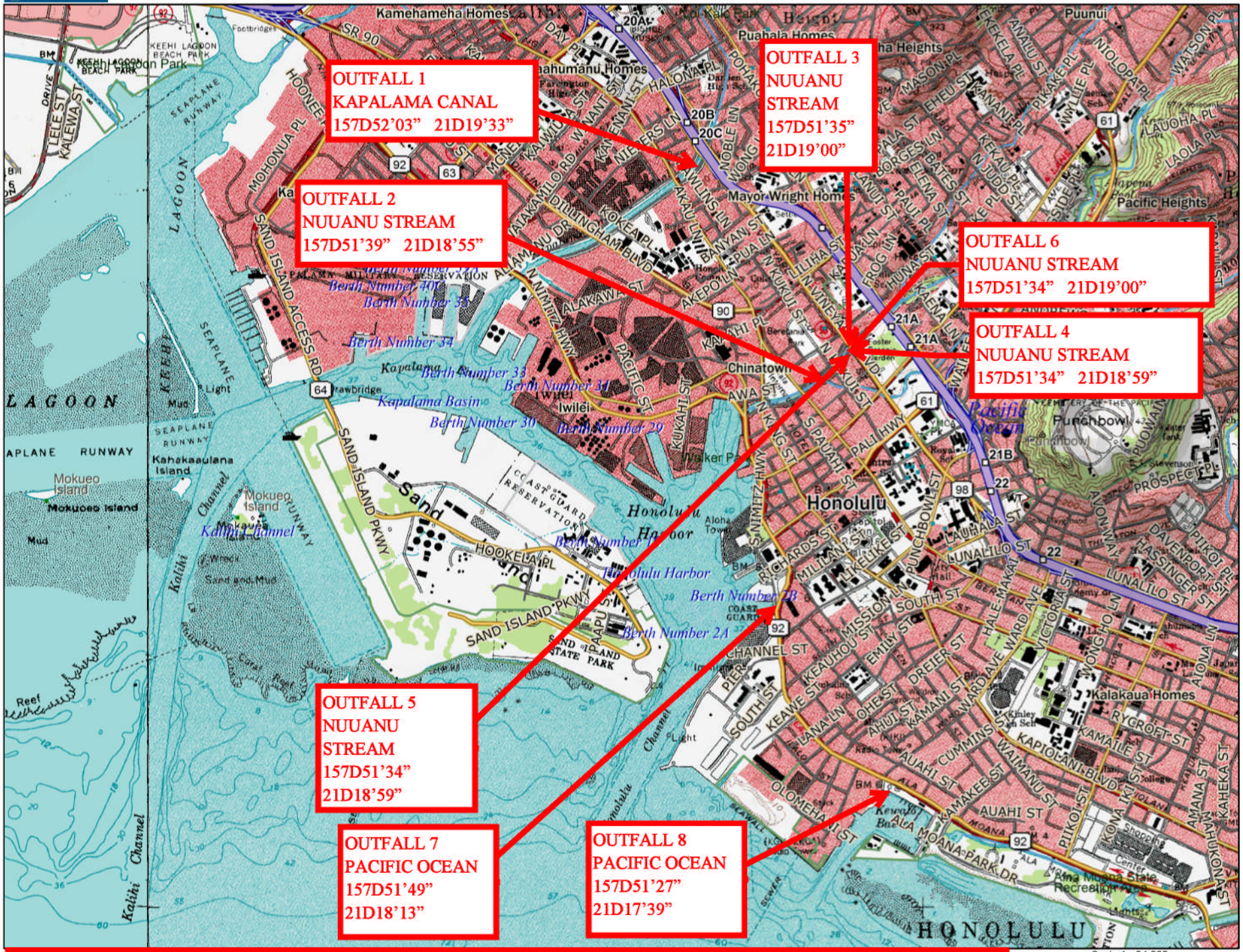
Attachment A-1
Location, Outfall, and BMP Maps

VICINITY MAP

Scale 1 : 500,000
1" = 7.89 mi

0 2 4 6 8 10 mi
0 4 8 12 16 20 km

TN
MN
10.1°E

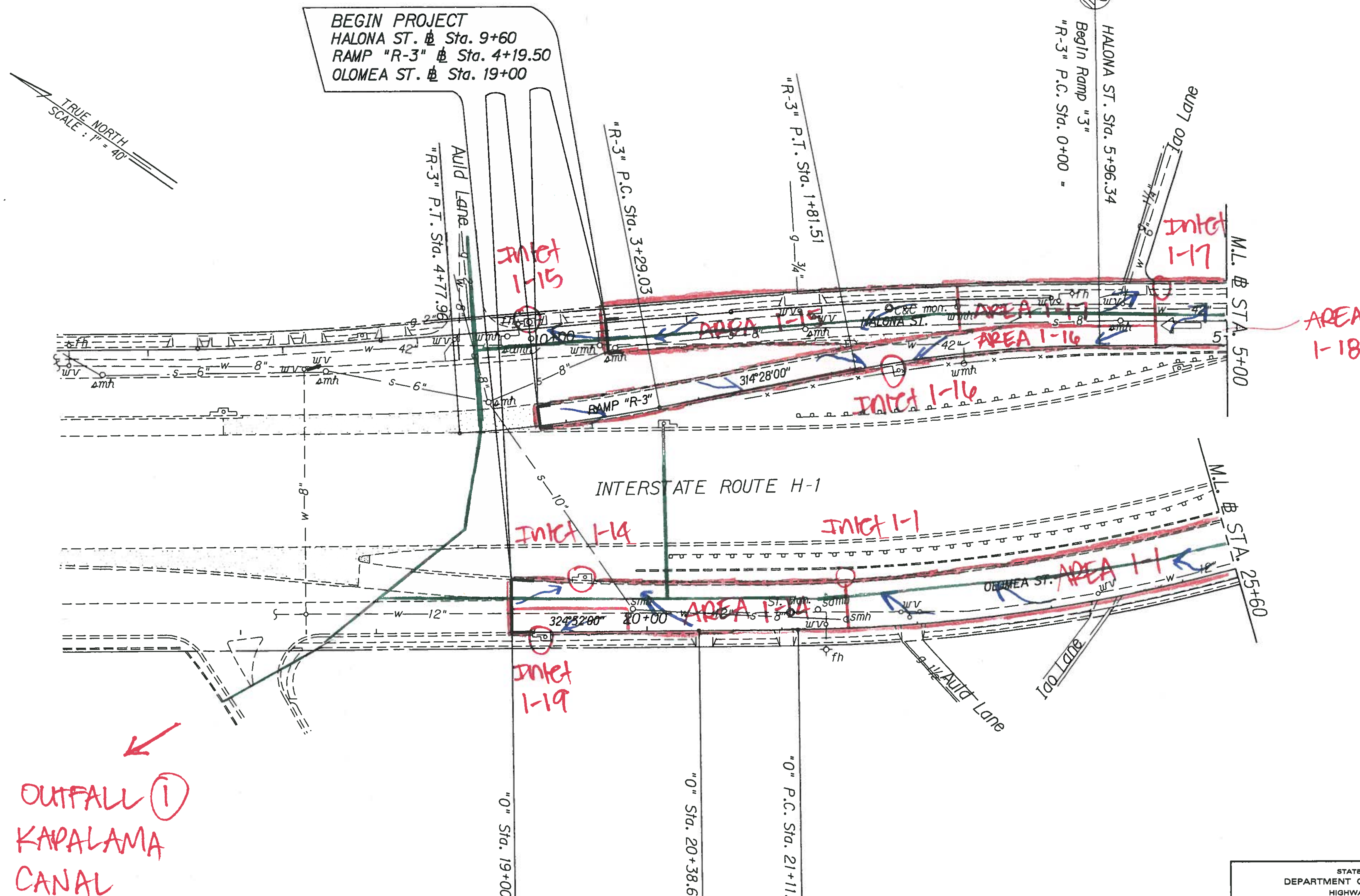


OUTFALL MAP

Scale 1 : 24,000

1" = 2,000.0 ft Data Zoom 12-5

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE x
NOTE BOOK	DRAWN BY x	
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	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 1 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x

VINEYARD BLVD. ℄ Sta. 86+49.98=
HALONA ST. ℄ Sta. -0+02.16=
PALAMA ST. Sta. ℄ 0+12.025

Limits of Resurfacing

VINEYARD BLVD. ℄ Sta. 86+47.80=
Beg. HALONA ST. ℄ Sta. 0+00=
PALAMA ST. ℄ Sta. 0+48.09

TRUE NORTH
SCALE : 1" = 40'

℄ Sta. -0+2.89 BK =
℄ Sta. 86+50.69 AHD

8 Rainbow Shower Tree

Inlet 1-18 | Inlet 1-3 | Inlet 1-4 | Inlet 1-5 | Inlet 1-7 | Inlet 1-8 | Inlet 1-10

Vineyard Pl.

PALAMA STREET

HALONA STREET

AREA 1-18 | AREA 1-3

M.L. ℄ STA. 5+00

M.L. ℄ STA. 93+00

1-1 | 1-2 | 1-3 | 1-4 | 1-5 | 1-5A | 1-6 | 1-6A | 1-7 | 1-7A | 1-8 | 1-8A | 1-9 | 1-9A

144°52'00" | 324°52'00" | 304°52'00" | 48°28'00" | 98+00

"0" P.C. Sta. 25+49.33"
"0" P.C. Sta. 26+63.93"
"0" P.T. Sta. 28+73.37"

Limits of Resurfacing

Inlet 1-2

PALAMA ST. ℄ Sta. -0+48.30=
VINEYARD BLVD. ℄ Sta. 86+56.07=
OLOMEA ST. Sta. 29+61.56

Inlet 1-6

Olomea St. ℄ Sta. 27+00± RT. to ℄ Sta. 27+70± RT.
Vineyard Blvd. ℄ Sta. 90+30± LT. to ℄ Sta. 91+00± LT.
Vineyard Blvd. ℄ Sta. 92+30± RT. to ℄ Sta. 93+00± RT.
Vineyard Blvd. ℄ Sta. 99+60± RT. to ℄ Sta. 100+30± RT.
Vineyard Blvd. ℄ Sta. 99+60± LT. to ℄ Sta. 100+30± LT.

Construct New P.C.C. Bus Pad with Modified Type 2DG Curb and Gutter. For details, see standard plan D-05, D-16 and D-17.

Limits of Resurfacing

LILIHA STREET

℄ P.C. Sta. 100+18.17

℄ P.T. Sta. 101+08.35

WAIPA LANE

Inlet 1-12 | Inlet 1-13 | Inlet 3-3 | Inlet 3-4 | Inlet 3-5 | Inlet 2-1

6 Rainbow Shower Tree

1-10 | 1-11 | 1-11A | 1-12 | 1-13 | 1-13A | 1-14 | 2-1 | 2-2 | 3-1 | 3-1A | 3-2 | 3-2A | 3-4 | 3-4A | 3-5 | 3-5A

95+00 | 100+00 | 105

PUA

Limits of Resurfacing

℄ Sta. 86+80± LT. to ℄ Sta. 89+90± LT.
℄ Sta. 92+10± LT. to ℄ Sta. 93+00± LT.
℄ Sta. 94+50± RT. to ℄ Sta. 101+80± RT.

Reconstruct Type 2DG Curb ⊄ Gutter. Demolition and disposal of existing curb ⊄ gutter shall be considered incidental to New Type 2DG Curb ⊄ Gutter.

TO OUTFALL (2)

Nuuanu Stream

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK dd/mm/yy	TRACED BY	
	DESIGNED BY X	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M
Scale: 1"=40' Date: Oct., 2011

SHEET No. 2 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	20xx	0	0

TRUE NORTH
SCALE : 1" = 40'

℄ P.C. Sta. 106+77.06
℄ P.T. Sta. 107+81.78
M.L. ℄ STA. 105+00
M.L. ℄ STA. 117+00
110+00
115+00
322°38'00"
323°01'00"
7 Rainbow Shower Tree
5 Rainbow Shower Tree
6 Rainbow Shower Tree
exist. retaining wall
abandoned
lt. std.
Limit of Resurfacing
Inlet 3-6
Inlet 3-7
Inlet 3-8
Inlet 3-9
Inlet 3-10
Inlet 3-11
℄ P.I. Sta. 115+00.00
AALA
COLLEGE WALK
NUUANU STREAM
st. mon.
OUTFALL ③ Nuuanu Stream

TRUE NORTH
SCALE : 1" = 40'

M.L. ℄ STA. 117+00
M.L. ℄ STA. 128+00
120+00
125+00
Inlet 4-1
Inlet 5-1
Inlet 5-3
Inlet 5-4
Inlet 5-5
Inlet 6-1
OUTFALL ④ Nuuanu Str.
OUTFALL ⑤ Nuuanu Stream
RIVER STREET
MAUNAKEA ST.
NUUANU AVENUE
sign post
Limit of Resurfacing

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BLVD. PAVEMENT PRESERVATION
Palama St. to Punchbowl St.
Project No. 98A-01-09M

Scale: 1"=40' Date: XX, 200X

SHEET No. 13 OF 16 SHEETS

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FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X

TRUE NORTH
SCALE : 1" = 40'

℄ STA. 128+00

M.L. ℄ STA. 139+00

Inlet 5-6

Inlet 5-8

Inlet 5-9

Limits of Resurfacing

8 Rainbow Shower Tree

Inlet 5-7

Oleander

℄ P.C. Sta. 132+71.00

Limits of Resurfacing

Inlet 5-10

℄ P.T. Sta. 135+26.99

℄ P.C. Sta. 139+45.72

Inlet 5-11

Limits of Resurfacing

Inlet 5-13

Inlet 5-14

Inlet 5-16

Limits of Resurfacing

Inlet 5-17

Inlet 5-18

M.L. ℄ STA. 139+00

M.L. ℄ STA. 149+00

Inlet 5-12

Inlet 5-15

9 Rainbow Shower Tree

Limits of Resurfacing

℄ P.T. Sta. 147+12.39

Inlet 7-1

Limits of Resurfacing

CB Punchbowl

Inlet 7-2

Inlet 7-3

CB Punchbowl

To Outfall Pacific Ocean

℄ Sta. 143+10± RT. to ℄ Sta. 144+40± RT.

Reconstruct Type 2DG Curb ⊄ Gutter.
Demolition and disposal of existing curb ⊄ gutter shall be considered incidental to New Type 2DG Curb ⊄ Gutter.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE X
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

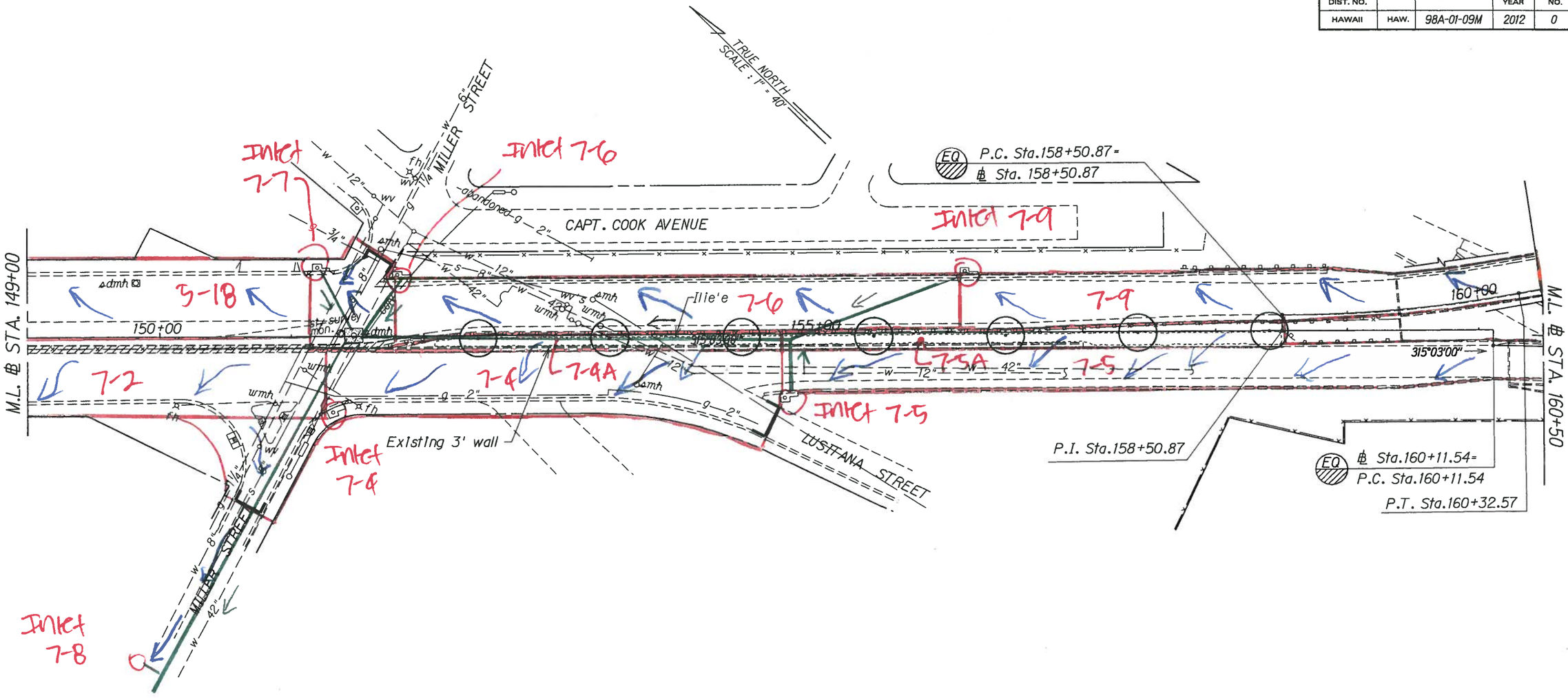
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 4 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



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DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

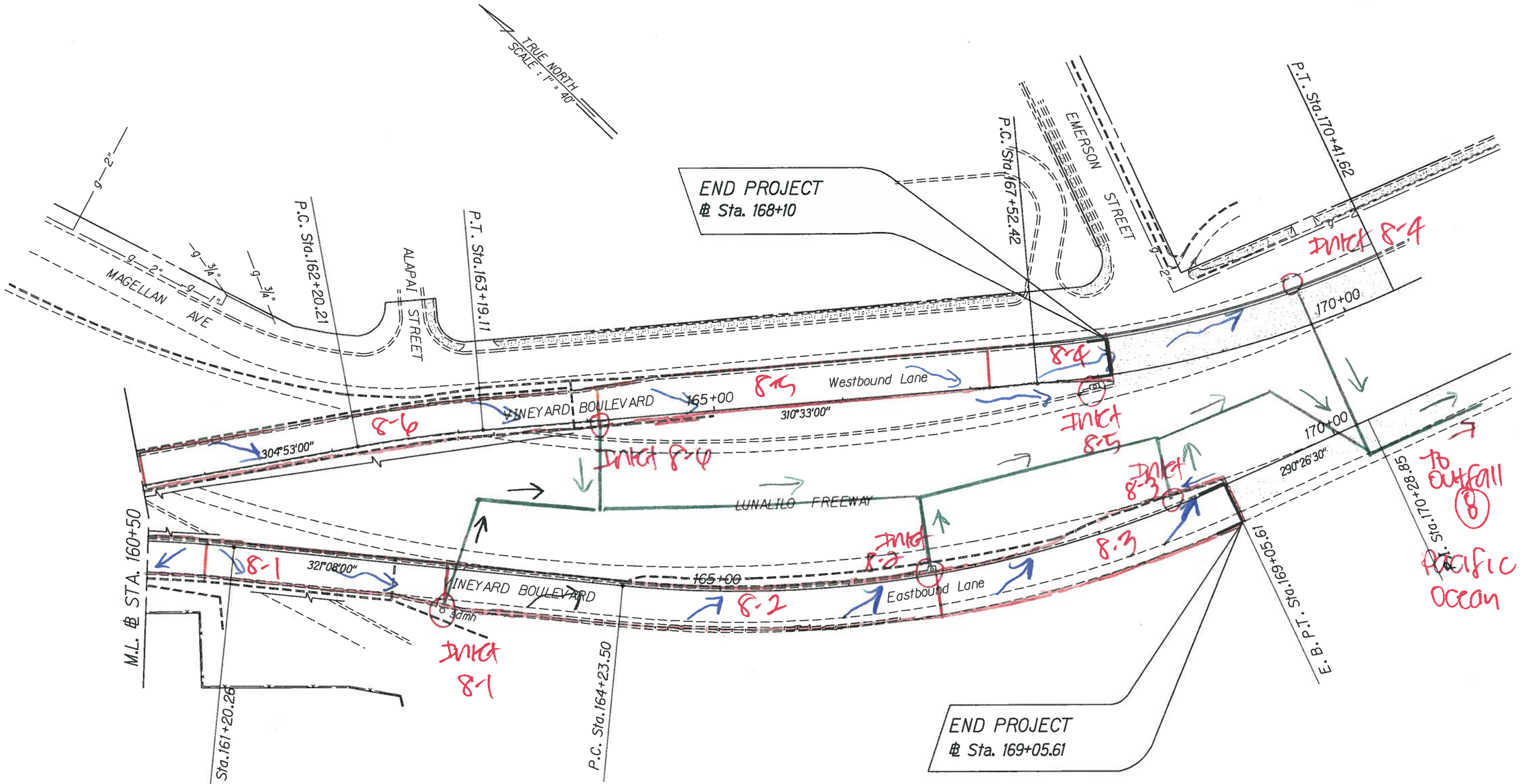
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 5 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



ORIGINAL PLAN
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DRAWN BY ____ .
TRACED BY ____ .
DESIGNED BY ____ .
QUANTITIES BY ____ .
CHECKED BY ____ .

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

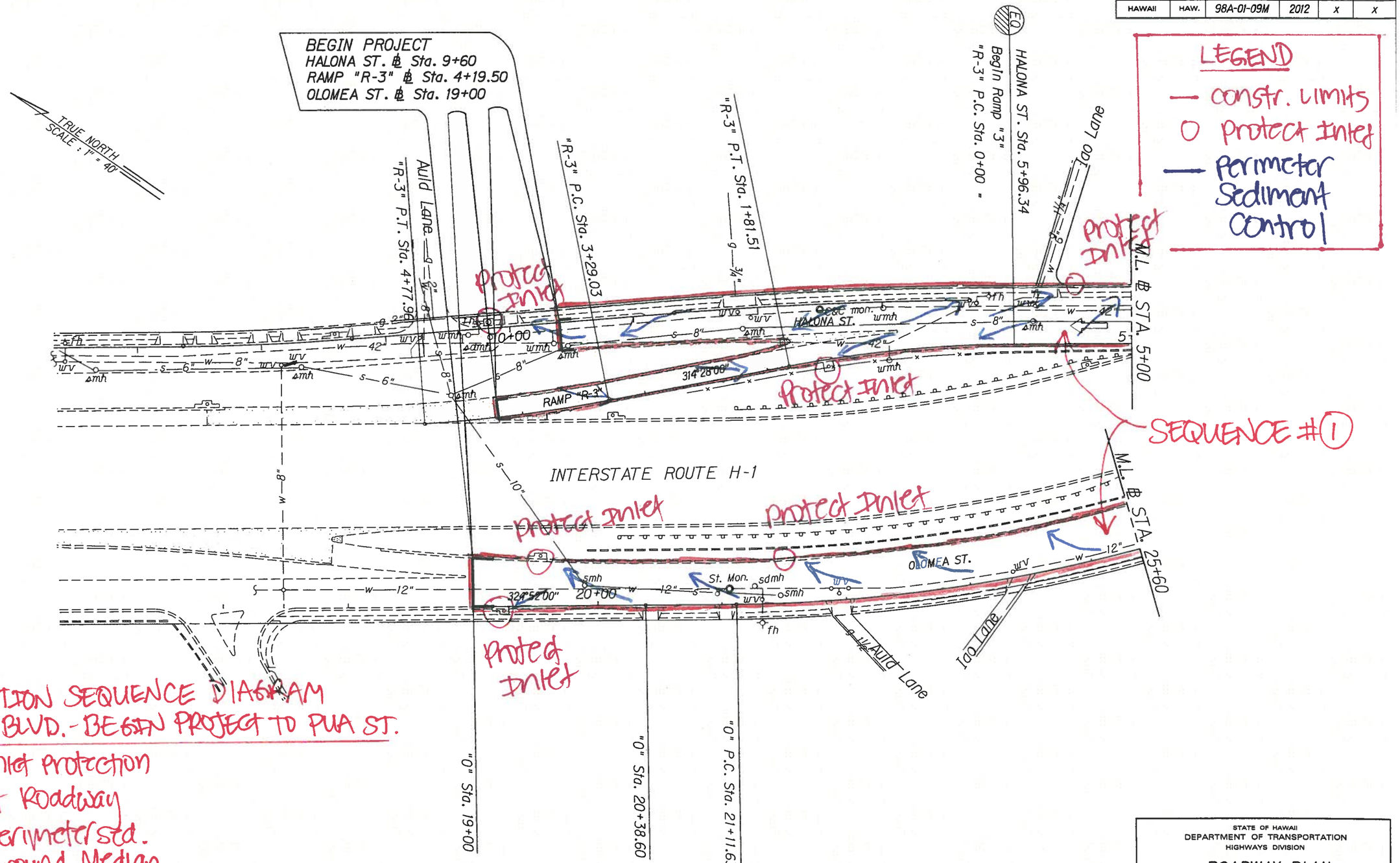
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 6 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X



(1) CONSTRUCTION SEQUENCE DIAGRAM
VINEYARD BLVD. - BEGIN PROJECT TO PUA ST.

(A) Install Inlet Protection
(B) Construct Roadway
(C) Install Perimeter Sed. Control Around Median
(D) Install Median Landscaping
(E) Remove ALL BMPs once plants are established except at Inlets I-11 + I-12

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY X	
NOTE BASE	TRACED BY X	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 1 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X

VINEYARD BLVD. ℄ Sta. 86+49.98=
HALONA ST. ℄ Sta. -0+02.16=
PALAMA ST. Sta. ℄ 0+12.025

Limits of Resurfacing

VINEYARD BLVD. ℄ Sta. 86+47.80=
Beg. HALONA ST. ℄ Sta. 0+00=
PALAMA ST. ℄ Sta. 0+48.09

℄ Sta. -0+2.89 BK =
℄ Sta. 86+50.69 AHD

6 Rainbow Shower Tree

TRUE NORTH
SCALE : 1" = 40'

Perimeter Sediment Control

Protect Inlet

Vineyard Pl.

HALONA STREET

PALAMA STREET

M.L. ℄ STA. 5+00

M.L. ℄ STA. 93+00

"0" P.C. Sta. 25+49.35

"0" P.C. Sta. 26+63.93

"0" P.T. Sta. 28+73.37

PALAMA ST. ℄ Sta. -0+48.30=
VINEYARD BLVD. ℄ Sta. 86+56.07=
OLOMEA ST. Sta. 29+61.56

SEQUENCE #(1)

Olomea St. ℄ Sta. 27+00± RT. to ℄ Sta. 27+70± RT.
Vineyard Blvd. ℄ Sta. 90+30± LT. to ℄ Sta. 91+00± LT.
Vineyard Blvd. ℄ Sta. 92+30± RT. to ℄ Sta. 93+00± RT.
Vineyard Blvd. ℄ Sta. 99+60± RT. to ℄ Sta. 100+30± RT.
Vineyard Blvd. ℄ Sta. 99+60± LT. to ℄ Sta. 100+30± LT.

Construct New P.C.C. Bus Pad with Modified Type 2DG Curb and Gutter. For details, see standard plan D-05, D-16 and D-17.

Limits of Resurfacing

Protect Inlet (Seq. #1 + #2)

Protect Inlet 1-12

Protect Inlet 1-11 (Seq. #1 + #2)

WAIPA LANE

LILIHA STREET

PUA STREET

M.L. ℄ STA. 93+00

M.L. ℄ STA. 105+00

SEQUENCE #(2)

Perimeter Sed. Control

Protect Inlets 1

℄ Sta. 86+80± LT. to ℄ Sta. 89+90± LT.
℄ Sta. 92+10± LT. to ℄ Sta. 93+00± LT.
℄ Sta. 94+50± RT. to ℄ Sta. 101+80± RT.

Reconstruct Type 2DG Curb & Gutter. Demolition and disposal of existing curb & gutter shall be considered incidental to New Type 2DG Curb & Gutter.

(2) CONSTRUCTION SEQUENCE DIAGRAM PROTECT INLET
VINEYARD BLVD. - PUA ST & AALA ST.

(A) Install Inlet Protection
(B) Construct Roadway
(C) Install Per. Scd. Contr. Around Median
(D) Install Median Landscaping
(E) Remove all BMPs once plants are established except at Inlets 3-1 and 6-1

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 2 OF 6 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY X	
	TRACED BY	
NOTE BOOK	DESIGNED BY X	
	QUANTITIES BY	
REVISED	CHECKED BY	

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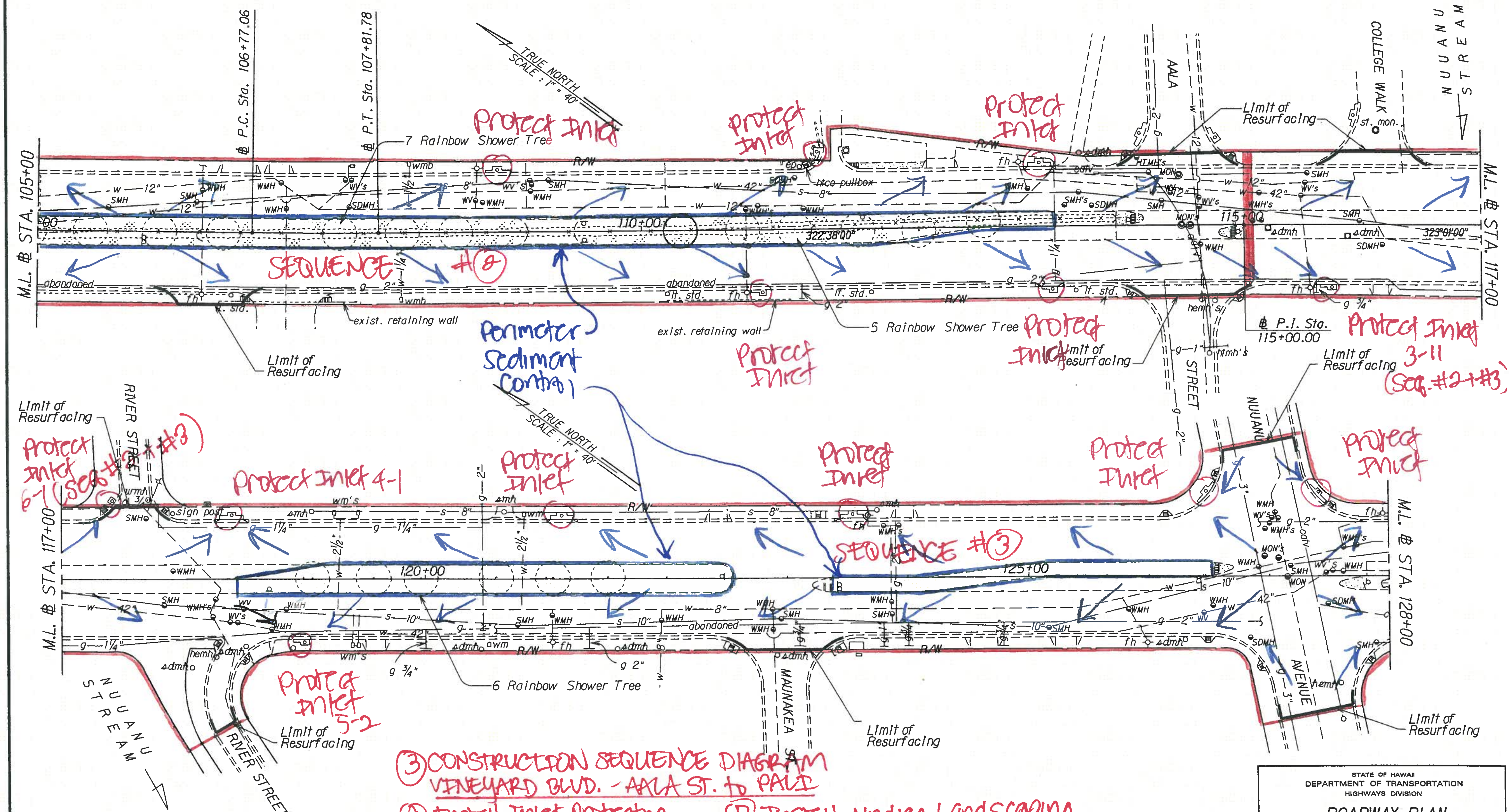
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x



TRUE NORTH
SCALE: 1" = 40'
M.L. ℄ STA. 105+00
M.L. ℄ STA. 117+00
M.L. ℄ STA. 128+00
℄ P.C. Sta. 106+77.06
℄ P.T. Sta. 107+81.78
7 Rainbow Shower Tree
5 Rainbow Shower Tree
6 Rainbow Shower Tree
℄ P.I. Sta. 115+00.00
Limit of Resurfacing
exist. retaining wall
AALA
COLLEGE WALK
NUUANU STREAM
STREET
RIVER STREET
NUUANU AVENUE
MAUNAKEA ST.
Protect Inlet
Protect Inlet 3-11 (Seq. #2+#3)
Protect Inlet 4-1
Protect Inlet 6-1 (Seq. #2+#3)
Protect Inlet 5-2
SEQUENCE #2
SEQUENCE #3
Perimeter Sediment Control

③ CONSTRUCTION SEQUENCE DIAGRAM
VINEYARD BLVD. - AALA ST. to PALI

Ⓐ Install Inlet Protection
Ⓑ construct Roadway
Ⓒ Install Perimeter Sed. control around median
Ⓓ Install Median Landscaping
Ⓔ Remove All BMPs once plants are established except at Inlets 5-9 and 5-10

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

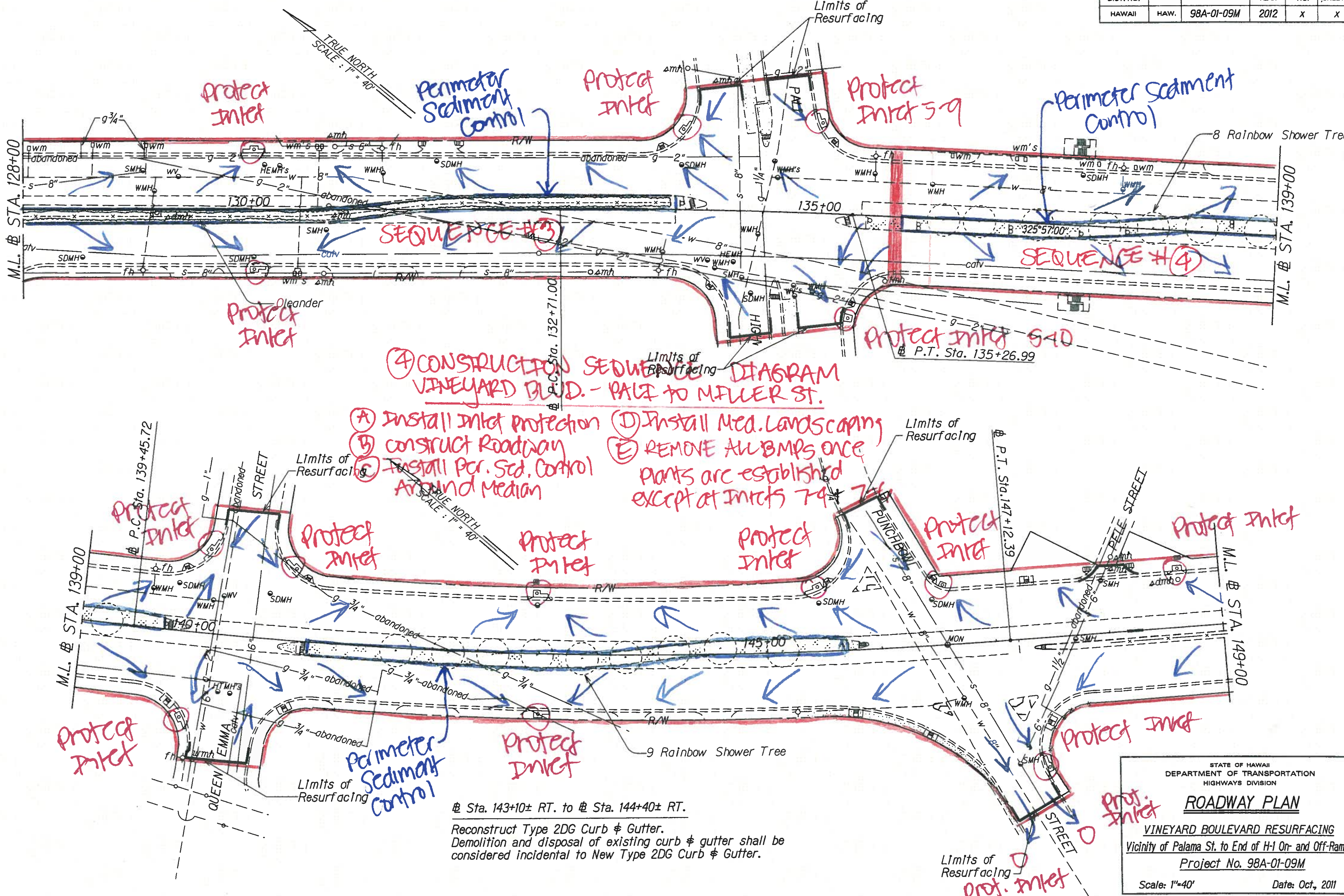
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40'   Date: Oct., 2011

SHEET No. 3 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

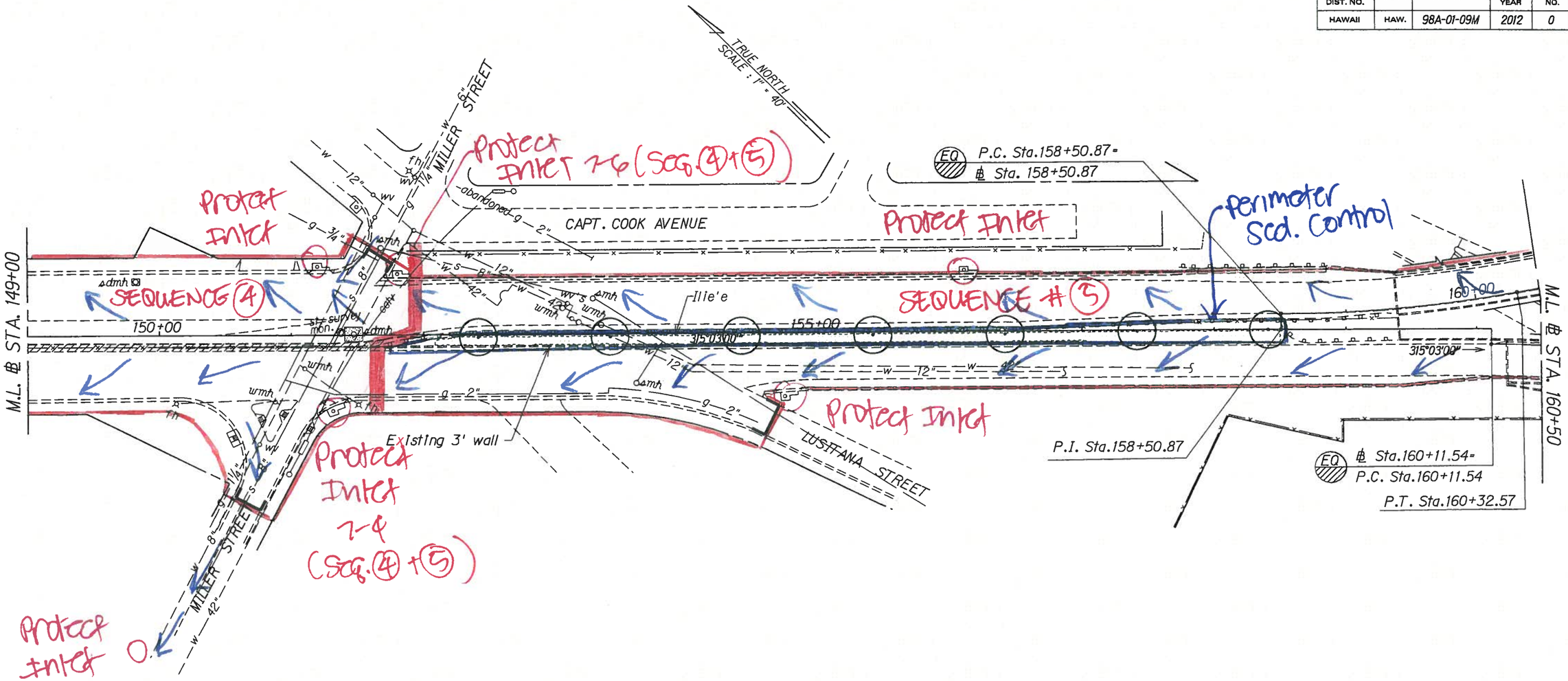
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 4 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



⑤ CONSTRUCTION SEQUENCE DIAGRAM
MILLER ST. TO END OF PROJECT

Ⓐ INSTALL INLET PROTECTION
Ⓑ CONSTRUCT ROADWAY
Ⓒ INSTALL PERIMETER SEDIMENT CONTROL AROUND MEDIAN
Ⓓ INSTALL MEDIAN LANDSCAPING
Ⓔ REMOVE ALL BMPS ONCE PLANTS ARE ESTABLISHED

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

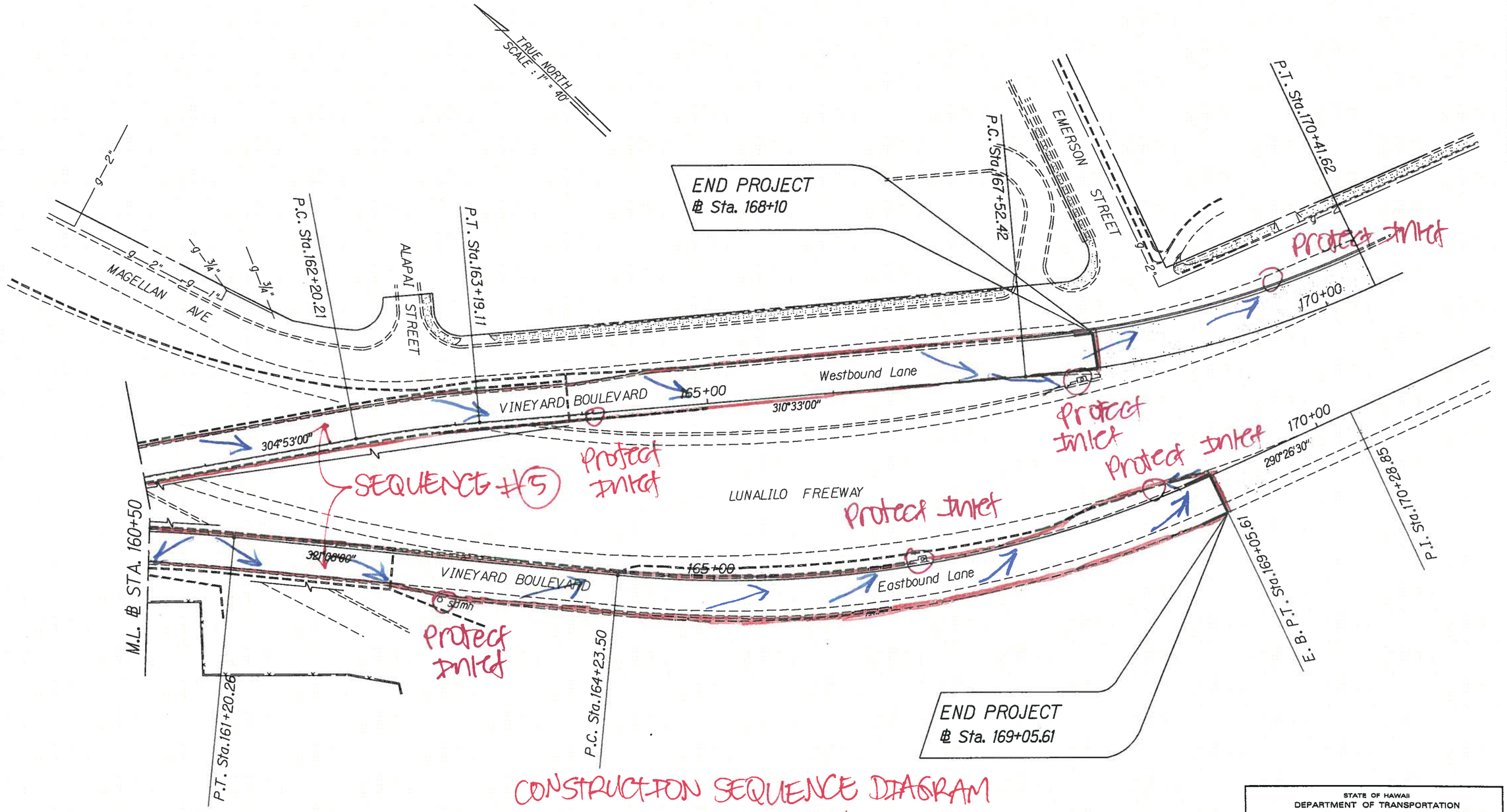
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 5 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



CONSTRUCTION SEQUENCE DIAGRAM
SEQUENCE #5 continued

ORIGINAL PLAN
NOTE BOOK
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SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

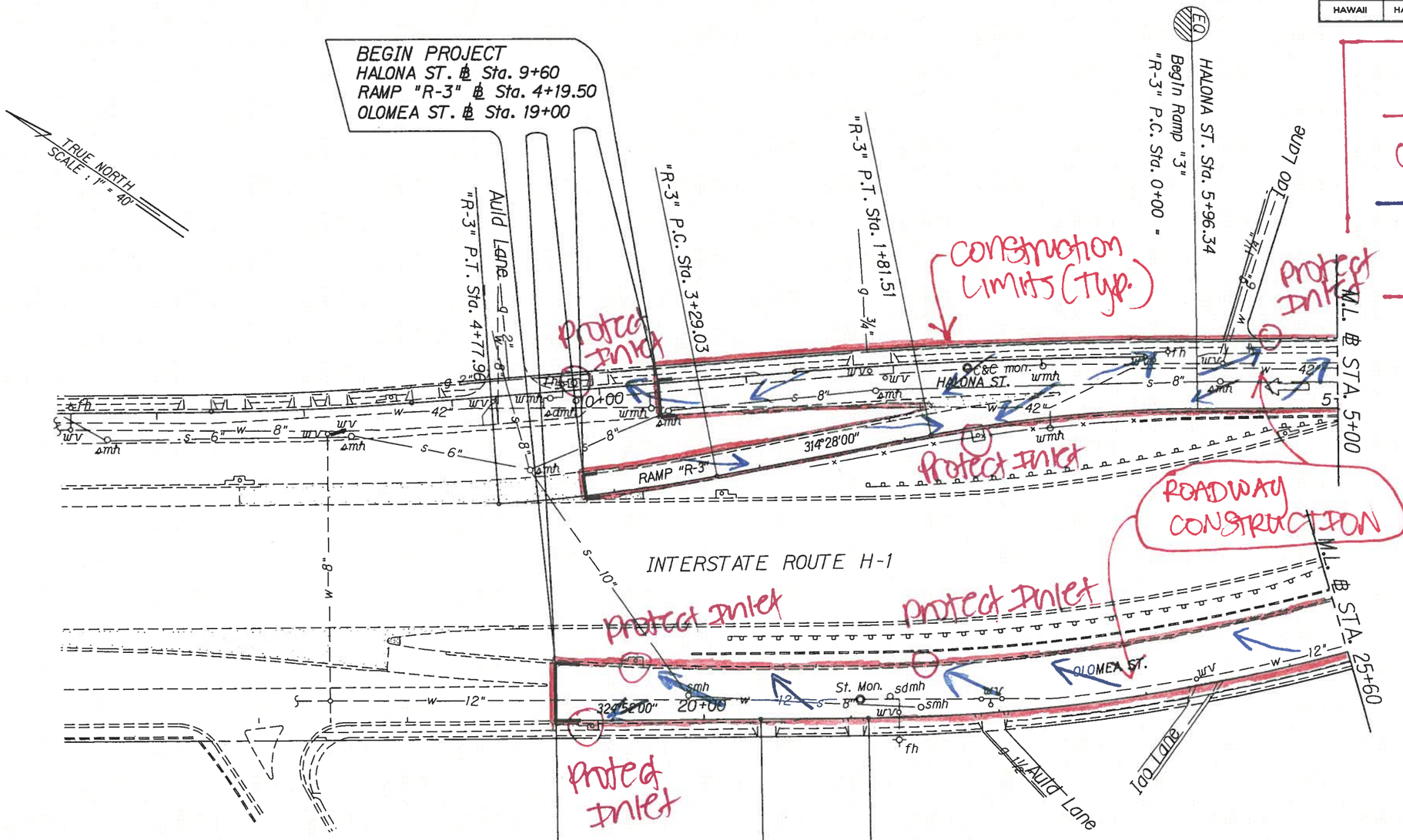
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 6 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X



LEGEND
- constr. limits
- O protect Inlet
- perimeter Sediment Control

BMP PLAN - ROAD CONSTRUCTION
(Roadway Reconstruction, Cold-planing A/C wearing surface, Resurfacing; Sidewalk Reconstruction, Gutter Repair/Installation)

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY X | TRACED BY | DESIGNED BY X | QUANTITIES BY | CHECKED BY | DATE X
NOTE BOOK dated

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 1 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X

VINEYARD BLVD. ℄ Sta. 86+49.98=
HALONA ST. ℄ Sta. -0+02.16=
PALAMA ST. Sta. ℄ 0+12.025

Limits of Resurfacing

VINEYARD BLVD. ℄ Sta. 86+47.80=
Beg. HALONA ST. ℄ Sta. 0+00=
PALAMA ST. ℄ Sta. 0+48.09

℄ Sta. -0+2.89 BK =
℄ Sta. 86+50.69 AHD

6 Rainbow Shower Tree

TRUE NORTH
SCALE : 1" = 40'

Protect Inlet

HALONA STREET

PALAMA STREET

Vineyard Pl.

M.L. ℄ STA. 5+00

M.L. ℄ STA. 93+00

PALAMA ST. ℄ Sta. -0+48.30=
VINEYARD BLVD. ℄ Sta. 86+56.07=
OLOMEA ST. Sta. 29+61.56

ROADWAY CONSTRUCTION

Olomea St. ℄ Sta. 27+00± RT. to ℄ Sta. 27+70± RT.
Vineyard Blvd. ℄ Sta. 90+30± LT. to ℄ Sta. 91+00± LT.
Vineyard Blvd. ℄ Sta. 92+30± RT. to ℄ Sta. 93+00± RT.
Vineyard Blvd. ℄ Sta. 99+60± RT. to ℄ Sta. 100+30± RT.
Vineyard Blvd. ℄ Sta. 99+60± LT. to ℄ Sta. 100+30± LT.

Construct New P.C.C. Bus Pad with Modified Type 2DG Curb and Gutter. For details, see standard plan D-05, D-16 and D-17.

"0" P.C. Sta. 25+49.33"

"0" P.C. Sta. 26+63.93"

"0" P.T. Sta. 28+73.37

℄ P.C. Sta. 100+18.17

℄ P.T. Sta. 101+08.35

LILIHA STREET

WAIPA LANE

Construction Limits (Typ.)

TRUE NORTH
SCALE : 1" = 40'

M.L. ℄ STA. 25+60

M.L. ℄ STA. 105+00

PUA

℄ Sta. 86+80± LT. to ℄ Sta. 89+90± LT.
℄ Sta. 92+10± LT. to ℄ Sta. 93+00± LT.
℄ Sta. 94+50± RT. to ℄ Sta. 101+80± RT.

Reconstruct Type 2DG Curb ⊕ Gutter. Demolition and disposal of existing curb ⊕ gutter shall be considered incidental to New Type 2DG Curb ⊕ Gutter.

BMP PLAN-ROAD CONSTRUCTION (Roadway Reconstruction, Cold-Planing AC wearing surface, Resurfacing, Sidewalk Recon., Gutter Repair/Installation)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 2 OF 6 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY X	
	TRACED BY	
NOTE BOOK dated	DESIGNED BY X	
	QUANTITIES BY	
	CHECKED BY	

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X

TRUE NORTH
SCALE : 1" = 40'

℄ P.C. Sta. 106+77.06

℄ P.T. Sta. 107+81.78

7 Rainbow Shower Tree

M.L. ℄ STA. 105+00

M.L. ℄ STA. 117+00

110+00

115+00

120+00

125+00

322°38'00"

323°01'00"

abandoned

exist. retaining wall

Limit of Resurfacing

5 Rainbow Shower Tree

6 Rainbow Shower Tree

AALA

COLLEGE WALK

NUUANU STREAM

℄ P.I. Sta. 115+00.00

RIVER STREET

MAUNAKEA ST

STREET

AVENUE

Protect Inlet

ROADWAY CONSTRUCTION

CONSTRUCTION Limits (Typ.)

BMP PLAN- ROAD CONSTRUCTION

(Roadway Reconstruction, cold-planing AC wearing surface, Resurfacing, Sidewalk Reconstruction, Gutter Repair/Installation)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

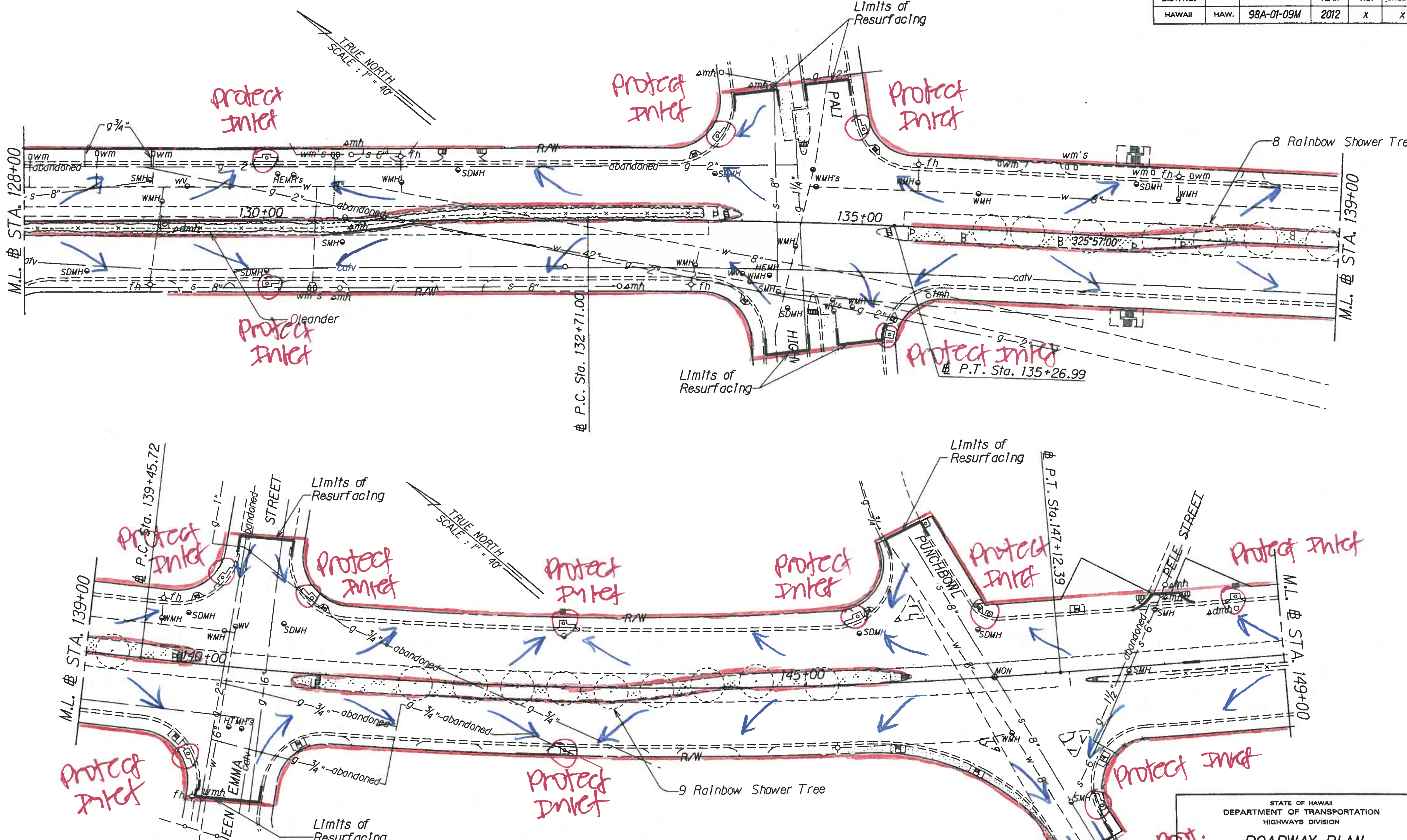
Scale: 1"=40' Date: Oct., 2011

SHEET No. 3 OF 6 SHEETS

XX

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK dated
No. Revisions

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x



℄ Sta. 143+10± RT. to ℄ Sta. 144+40± RT.

Reconstruct Type 2DG Curb & Gutter.
Demolition and disposal of existing curb & gutter shall be considered incidental to New Type 2DG Curb & Gutter.

BMP PLAN - ROAD CONSTRUCTION
(Roadway Recon., Cold-planing AC wearing surface, Resurfacing, Sidewalk Recon., Gutter Repair/Installation)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

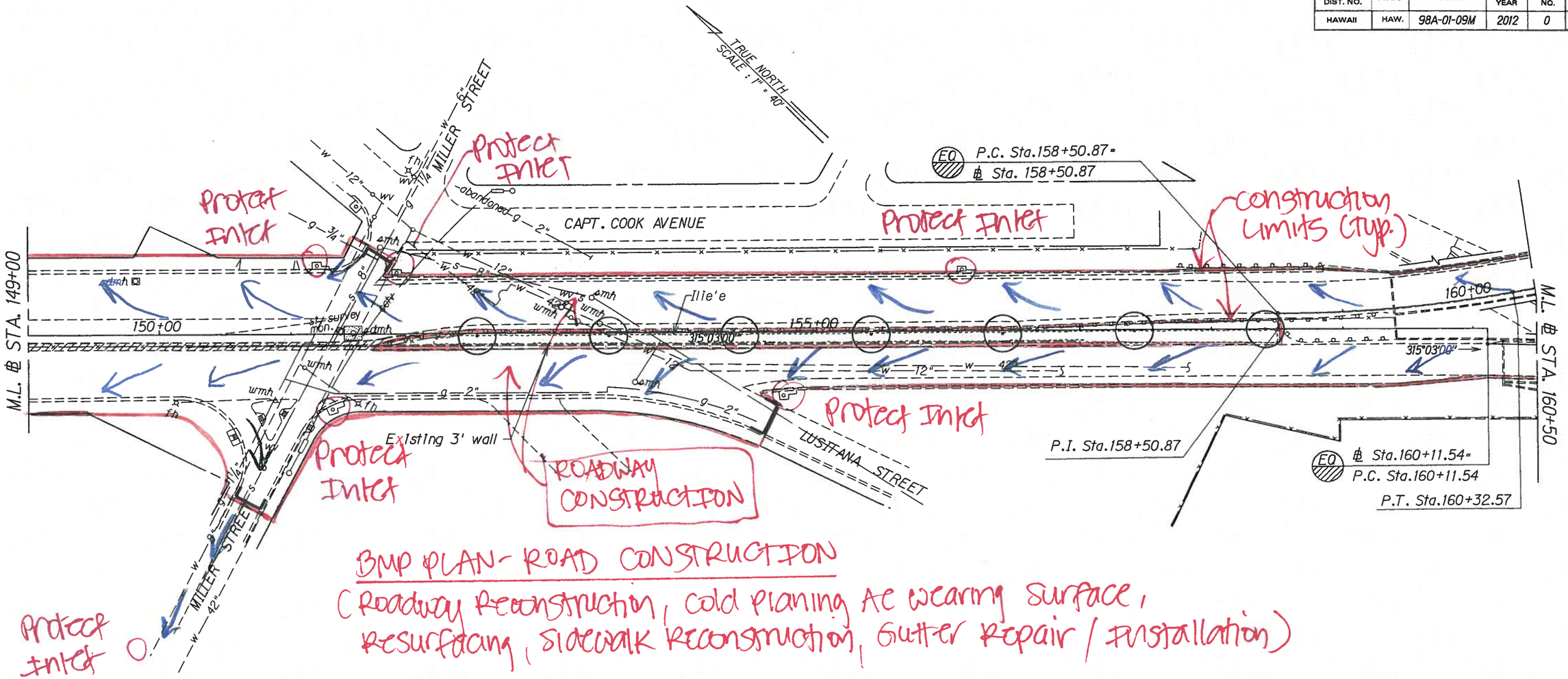
Scale: 1"=40' Date: Oct., 2011

SHEET No. 4 OF 6 SHEETS

XX

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY x | TRACED BY x | DESIGNED BY x | QUANTITIES BY | CHECKED BY | NOTE BOOK | DATE x

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
N.	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

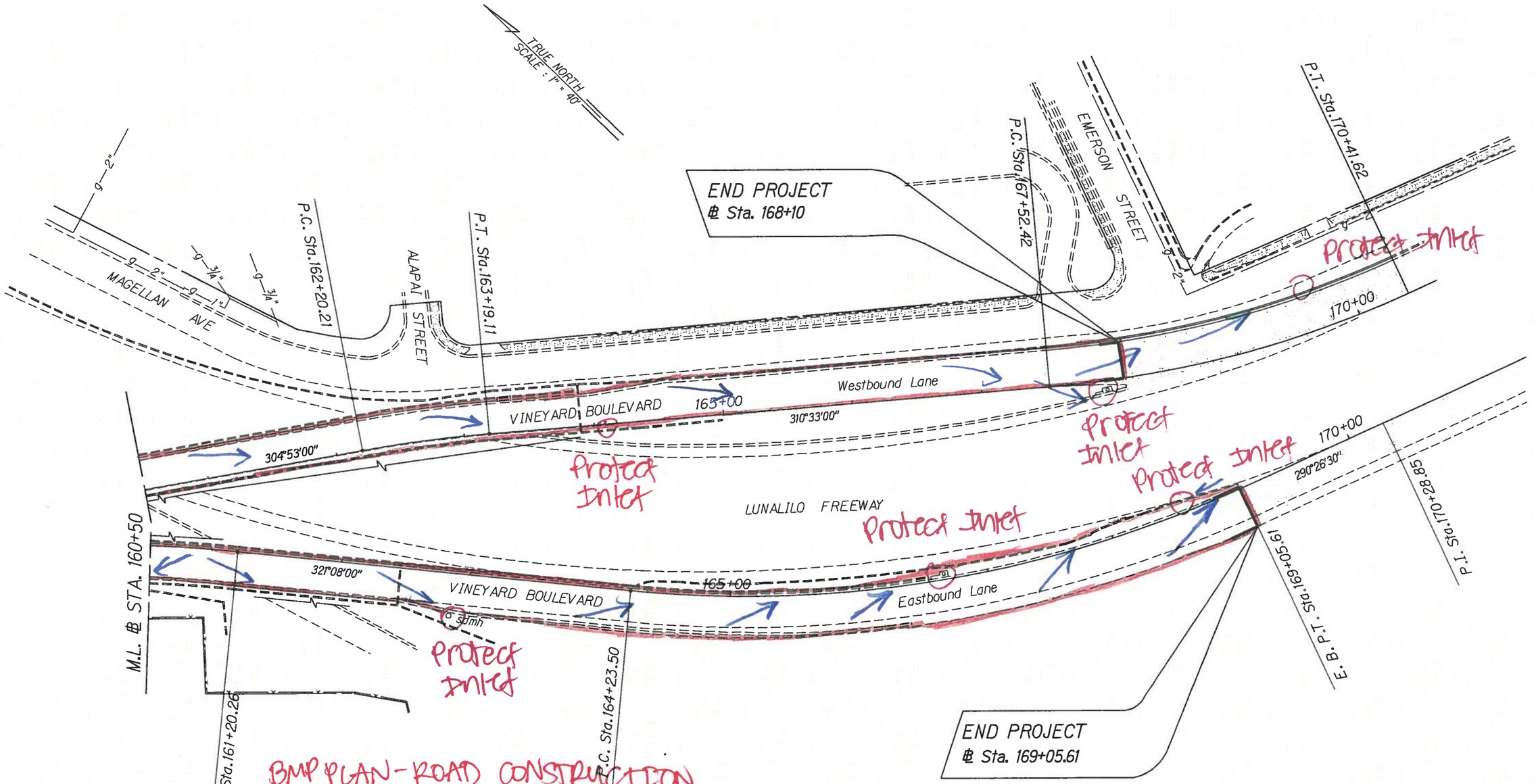
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 5 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



BMP PLAN - ROAD CONSTRUCTION

(Roadway Reconstruction, cold-planing AC wearing surface, Resurfacing, Sidewalk Reconstruction, Gutter Repair/Installation)

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

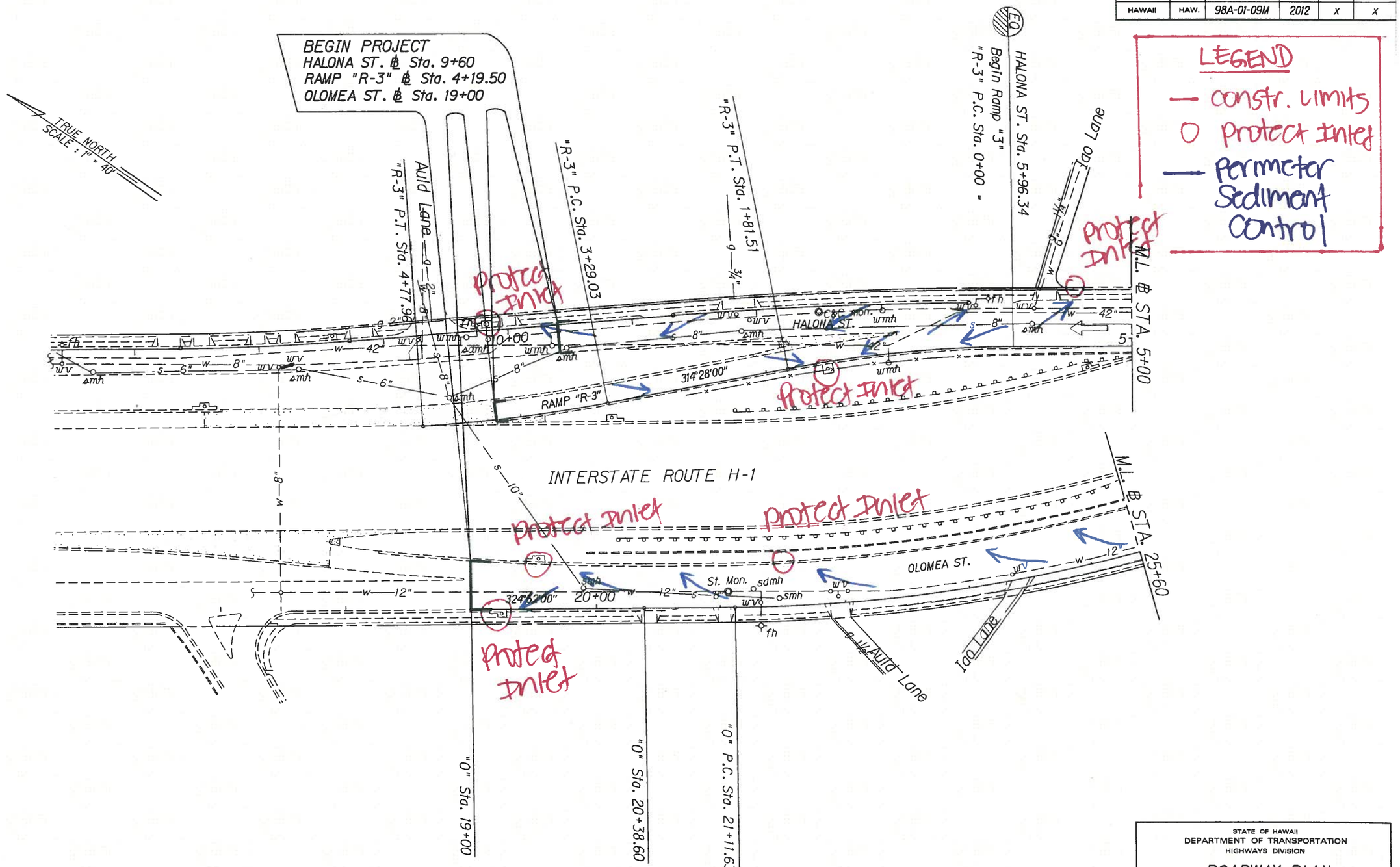
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 6 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X



ORIGINAL PLAN
SURVEY PLOTTED BY ____ DATE X
DRAWN BY X
TRACED BY X
DESIGNED BY X
QUANTITIES BY
CHECKED BY
NOTE BOOK dd/mm/yyyy

BMP PLAN- LANDSCAPING

(Note: Inlets on this sheet do not receive runoff from Landscape Areas)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

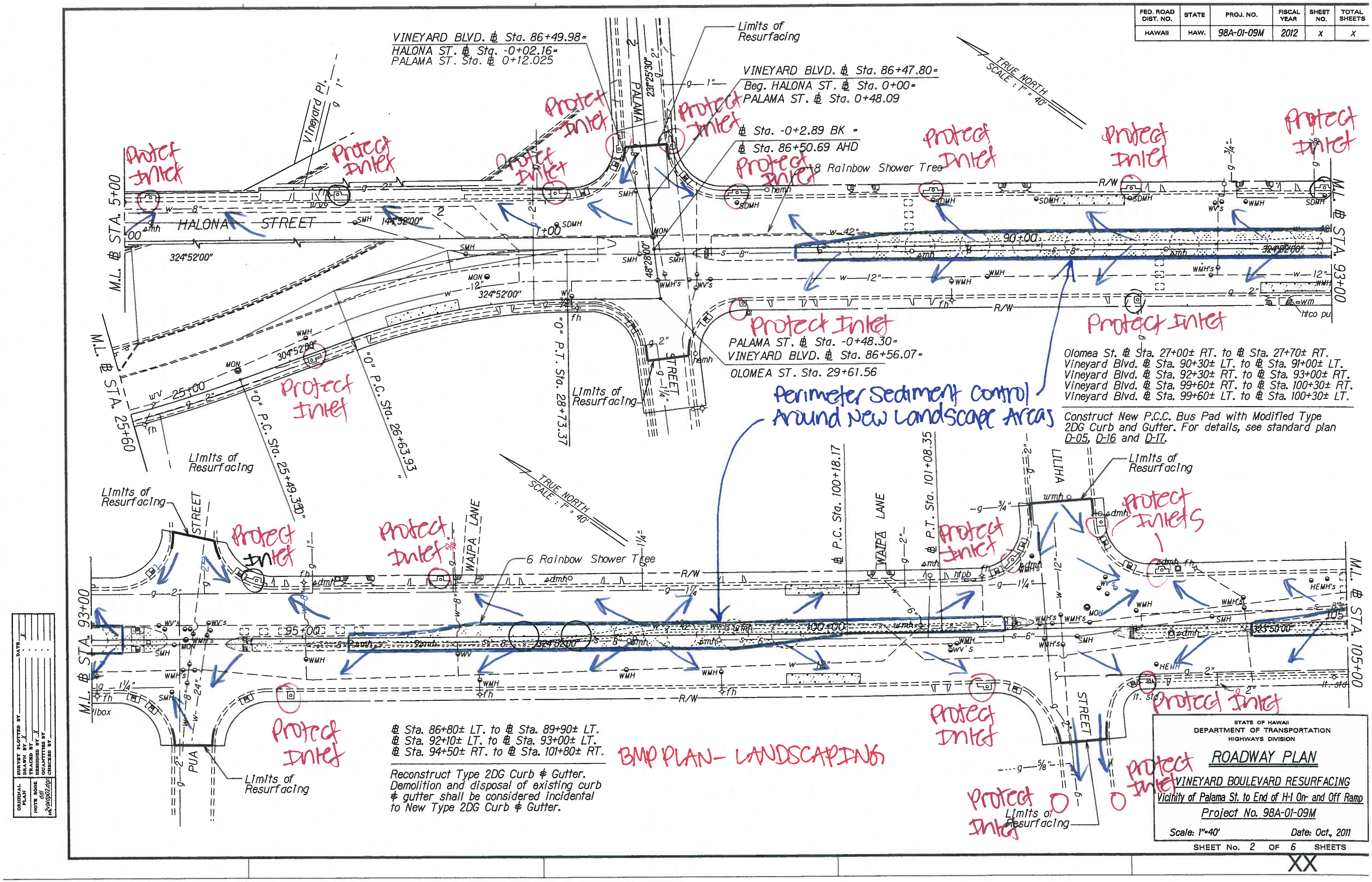
ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

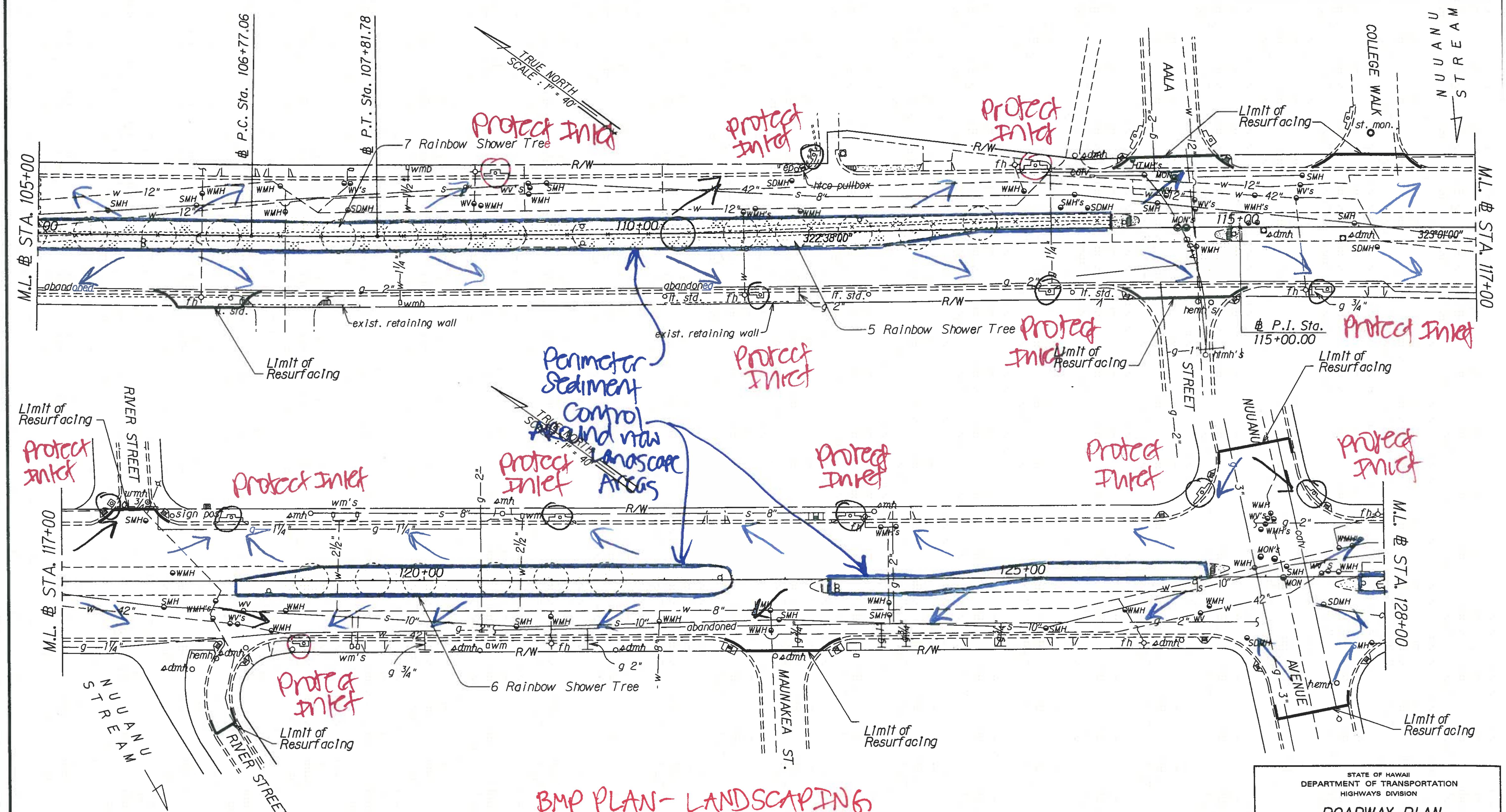
Scale: 1"=40' Date: Oct., 2011

SHEET No. 1 OF 6 SHEETS

XX


FED. ROAD DIST. NO. | STATE | PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS
HAWAII | HAW. | 98A-01-09M | 2012 | x | x
VINEYARD BLVD. ℄ Sta. 86+49.98=
HALONA ST. ℄ Sta. -0+02.16=
PALAMA ST. Sta. ℄ 0+12.025
Limits of Resurfacing
VINEYARD BLVD. ℄ Sta. 86+47.80=
Beg. HALONA ST. ℄ Sta. 0+00=
PALAMA ST. ℄ Sta. 0+48.09
℄ Sta. -0+2.89 BK =
℄ Sta. 86+50.69 AHD
8 Rainbow Shower Tree
TRUE NORTH SCALE : 1" = 40'
Vineyard Pl.
PALAMA
HALONA STREET
M.L. ℄ STA. 5+00
M.L. ℄ STA. 93+00
M.L. ℄ STA. 25+60
PALAMA ST. ℄ Sta. -0+48.30=
VINEYARD BLVD. ℄ Sta. 86+56.07=
OLOMEA ST. Sta. 29+61.56
"0" P.T. Sta. 28+73.37
"0" P.C. Sta. 26+63.93
"0" P.C. Sta. 25+49.30
Limits of Resurfacing
Olomea St. ℄ Sta. 27+00± RT. to ℄ Sta. 27+70± RT.
Vineyard Blvd. ℄ Sta. 90+30± LT. to ℄ Sta. 91+00± LT.
Vineyard Blvd. ℄ Sta. 92+30± RT. to ℄ Sta. 93+00± RT.
Vineyard Blvd. ℄ Sta. 99+60± RT. to ℄ Sta. 100+30± RT.
Vineyard Blvd. ℄ Sta. 99+60± LT. to ℄ Sta. 100+30± LT.
Construct New P.C.C. Bus Pad with Modified Type 2DG Curb and Gutter. For details, see standard plan D-05, D-16 and D-17.
Perimeter Sediment Control Around New Landscape Areas
Protect Inlet
Protect Inlets
LILIHA
WAIPA LANE
6 Rainbow Shower Tree
"0" P.C. Sta. 100+18.17
"0" P.T. Sta. 101+08.35
M.L. ℄ STA. 105+00
PUA
STREET
℄ Sta. 86+80± LT. to ℄ Sta. 89+90± LT.
℄ Sta. 92+10± LT. to ℄ Sta. 93+00± LT.
℄ Sta. 94+50± RT. to ℄ Sta. 101+80± RT.
Reconstruct Type 2DG Curb & Gutter. Demolition and disposal of existing curb & gutter shall be considered incidental to New Type 2DG Curb & Gutter.
BMP PLAN- LANDSCAPING
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
ROADWAY PLAN
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M
Scale: 1"=40'
Date: Oct., 2011
SHEET No. 2 OF 6 SHEETS
XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X



TRUE NORTH SCALE : 1" = 40'
P.C. Sta. 106+77.06
P.T. Sta. 107+81.78
7 Rainbow Shower Tree
5 Rainbow Shower Tree
6 Rainbow Shower Tree
Protect Inlet
Perimeter Sediment Control Around new Landscape Areas
exist. retaining wall
Limit of Resurfacing
M.L. STA. 105+00
M.L. STA. 117+00
M.L. STA. 128+00
110+00
115+00
120+00
125+00
P.I. Sta. 115+00.00
322°38'00"
323°01'00"
AALA STREET
COLLEGE WALK
NUUANU STREAM
NUUANU AVENUE
RIVER STREET
MAUNAKEA ST.
BMP PLAN- LANDSCAPING

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct, 2011

SHEET No. 3 OF 6 SHEETS

XX

ORIGINAL PLAN | NOTE BOOK dd1 | SURVEY PLOTTED BY | DRAWN BY X | TRACED BY | DESIGNED BY X | QUANTITIES BY | CHECKED BY | DATE X

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x

℄ Sta. 143+10± RT. to ℄ Sta. 144+40± RT.

Reconstruct Type 2DG Curb & Gutter.
Demolition and disposal of existing curb & gutter shall be considered incidental to New Type 2DG Curb & Gutter.

BMP PLAN- LANDSCAPING

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

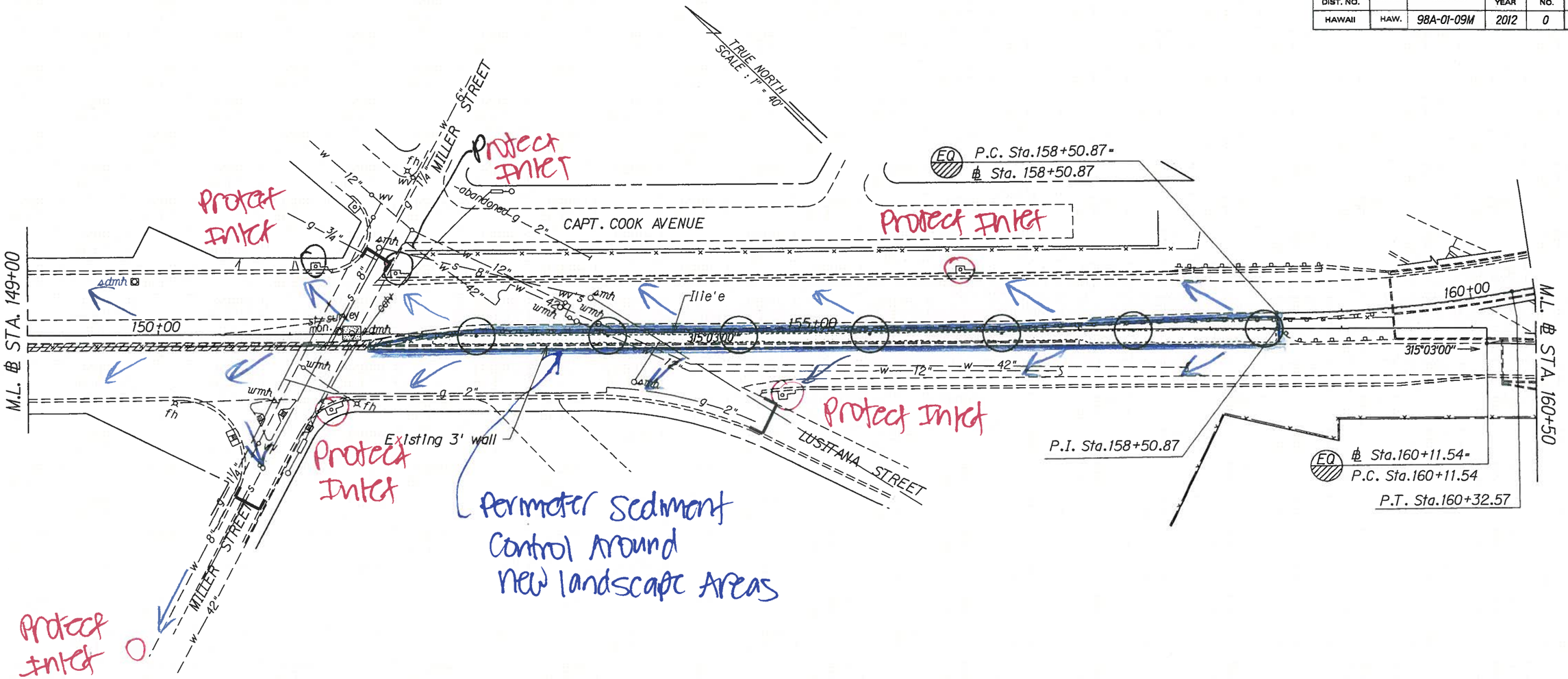
Scale: 1"=40'
Date: Oct., 2011

SHEET No. 4 OF 6 SHEETS

XX

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY X
TRACED BY X
DESIGNED BY X
QUANTITIES BY
CHECKED BY
NOTE BOOK
DATE X

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



BMP PLAN- LANDSCAPING

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

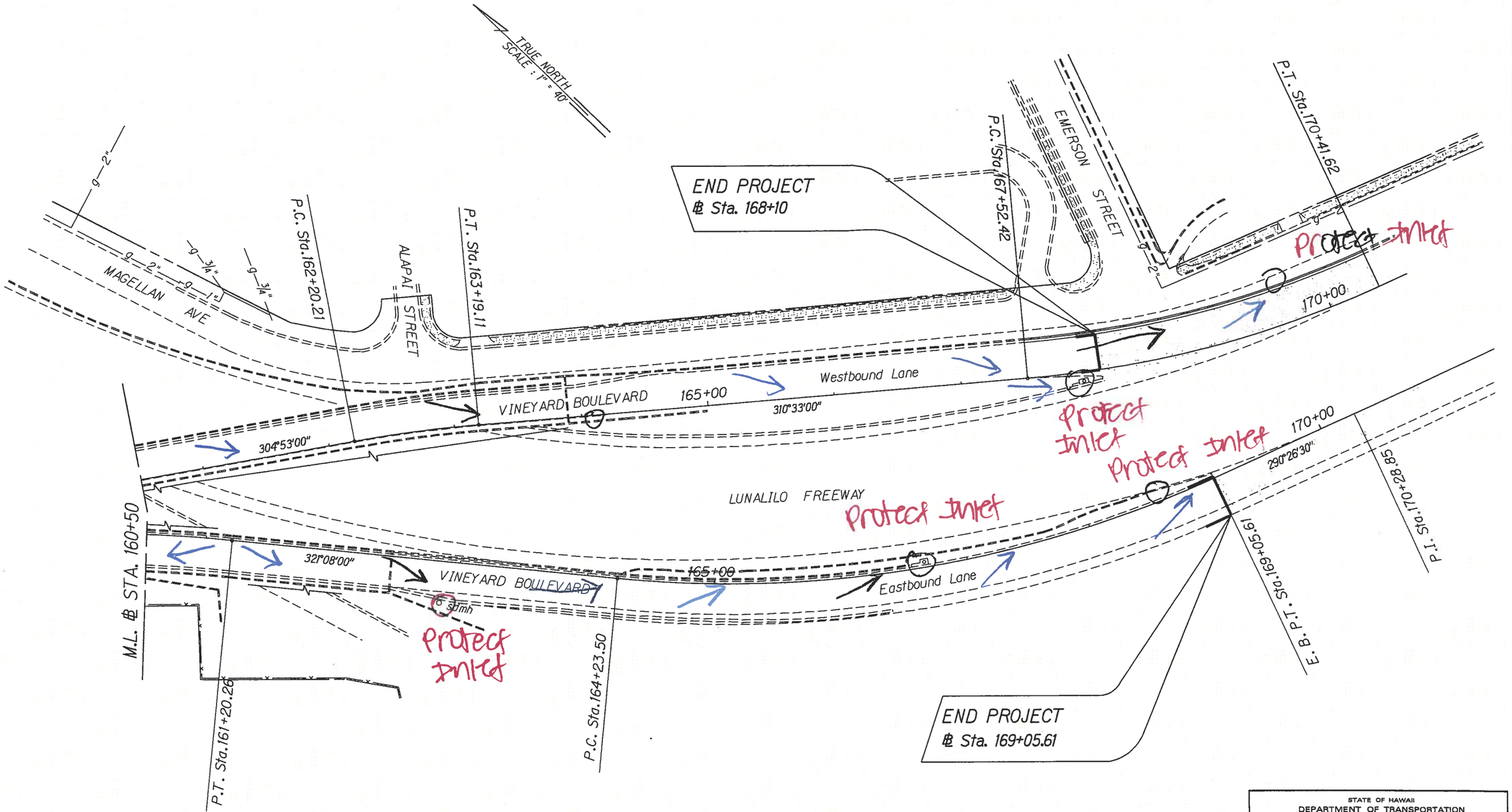
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 5 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



BMP PLAN- LANDSCAPING

(Note: Inlets on this sheet do not receive runoff from landscape areas)

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | NO.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 6 OF 6 SHEETS

XX

Attachment A-2
Tables and Calculations

TABLE I – DISCHARGE POINT INFORMATION & DISCHARGE QUANTITY

Discharge Point	LOCATION	Latitude	Longitude	Class	C (weighted)	I (in/hr)	A (Acres)	Q (cfs)
1	Kapalama Canal	21^19’33”	157^52’03”	2	0.90	3.375	5.38	16.57
2	Nuuanu Stream	21^18’55”	157^51’39”	2	0.95	3.375	0.15	0.47
3	Nuuanu Stream	21^19’00”	157^51’35”	2	0.89	3.375	4.72	14.11
4	Nuuanu Stream	21^18’59”	157^51’34”	2	0.86	3.375	0.39	1.12
5	Nuuanu Stream	21^18’59”	157^51’34”	2	0.90	3.375	8.50	25.93
6	Nuuanu Stream	21^19’00”	157^51’34”	2	0.95	3.375	0.56	1.79
7	Pacific Ocean	21^18’13”	157^51’49”	A	0.91	3.375	3.11	9.50
8	Pacific Ocean	21^18’13”	157^51’49”	A	0.95	3.375	1.19	3.81

RUNOFF CALCULATIONS

Given:

Area Disturbed 1-1 = 0.43 Acres
Area Disturbed 1-2 = 0.54 Acres
Area Disturbed 1-3 = 0.24 Acres
Area Disturbed 1-4 = 0.16 Acres
Area Disturbed 1-5 = 0.23 Acres
Area Disturbed 1-6 = 0.53 Acres
Area Disturbed 1-7 = 0.20 Acres
Area Disturbed 1-8 = 0.20 Acres
Area Disturbed 1-9 = 0.48 Acres
Area Disturbed 1-10 = 0.20 Acres
Area Disturbed 1-11 = 0.45 Acres
Area Disturbed 1-12 = 0.18 Acres
Area Disturbed 1-13 = 0.24 Acres
Area Disturbed 1-14 = 0.19 Acres
Area Disturbed 1-15 = 0.25 Acres
Area Disturbed 1-16 = 0.09 Acres
Area Disturbed 1-17 = 0.13 Acres
Area Disturbed 1-18 = 0.30 Acres
Area Disturbed 1-19 = 0.04 Acres
Area Disturbed 1-5A = 0.01 Acres
Area Disturbed 1-6A = 0.07 Acres
Area Disturbed 1-7A = 0.04 Acres

Area Disturbed 1-8A = 0.04 Acres
Area Disturbed 1-9A = 0.05 Acres
Area Disturbed 1-10A = 0.01 Acres
Area Disturbed 1-11A = 0.05 Acres
Area Disturbed 1-13A = 0.03 Acres

Area Disturbed 2-1 = 0.09 Acres
Area Disturbed 2-2 = 0.06 Acres

Area Disturbed 3-1 = 0.54 Acres
Area Disturbed 3-2 = 0.38 Acres
Area Disturbed 3-3 = 0.02 Acres
Area Disturbed 3-4 = 0.54 Acres
Area Disturbed 3-5 = 0.55 Acres
Area Disturbed 3-6 = 0.37 Acres
Area Disturbed 3-7 = 0.60 Acres
Area Disturbed 3-8 = 0.27 Acres
Area Disturbed 3-9 = 0.30 Acres
Area Disturbed 3-10 = 0.37 Acres
Area Disturbed 3-11 = 0.32 Acres
Area Disturbed 3-1A = 0.07 Acres
Area Disturbed 3-2A = 0.03 Acres
Area Disturbed 3-4A = 0.03 Acres
Area Disturbed 3-5A = 0.04 Acres
Area Disturbed 3-6A = 0.07 Acres
Area Disturbed 3-7A = 0.12 Acres
Area Disturbed 3-8A = 0.03 Acres
Area Disturbed 3-9A = 0.03 Acres
Area Disturbed 3-10A = 0.04 Acres

Area Disturbed 4-1 = 0.33 Acres
Area Disturbed 4-1A = 0.06 Acres

Area Disturbed 5-1 = 0.30 Acres
Area Disturbed 5-2 = 1.68 Acres
Area Disturbed 5-3 = 0.45 Acres
Area Disturbed 5-4 = 0.06 Acres
Area Disturbed 5-5 = 0.05 Acres
Area Disturbed 5-6 = 0.92 Acres
Area Disturbed 5-7 = 0.89 Acres
Area Disturbed 5-8 = 0.11 Acres
Area Disturbed 5-9 = 0.22 Acres
Area Disturbed 5-10 = 0.26 Acres
Area Disturbed 5-11 = 0.61 Acres
Area Disturbed 5-12 = 0.62 Acres
Area Disturbed 5-13 = 0.06 Acres

Area Disturbed 5-14 = 0.30 Acres
Area Disturbed 5-15 = 0.89 Acres
Area Disturbed 5-16 = 0.16 Acres
Area Disturbed 5-17 = 0.33 Acres
Area Disturbed 5-1A = 0.03 Acres
Area Disturbed 5-2A = 0.12 Acres
Area Disturbed 5-3A = 0.04 Acres
Area Disturbed 5-6A = 0.07 Acres
Area Disturbed 5-7A = 0.10 Acres
Area Disturbed 5-10A = 0.02 Acres
Area Disturbed 5-11A = 0.05 Acres
Area Disturbed 5-12A = 0.05 Acres
Area Disturbed 5-14A = 0.05 Acres
Area Disturbed 5-15A = 0.08 Acres

Area Disturbed 6-1 = 0.56 Acres

Area Disturbed 7-1 = 0.13 Acres
Area Disturbed 7-2 = 0.68 Acres
Area Disturbed 7-3 = 0.01 Acres
Area Disturbed 7-4 = 0.41 Acres
Area Disturbed 7-5 = 0.50 Acres
Area Disturbed 7-6 = 0.39 Acres
Area Disturbed 7-7 = 0.12 Acres
Area Disturbed 7-8 = 0.26 Acres
Area Disturbed 7-9 = 0.39 Acres
Area Disturbed 7-4A = 0.08 Acres
Area Disturbed 7-5A= 0.14 Acres

Area Disturbed 8-1 = 0.12 Acres
Area Disturbed 8-2 = 0.29 Acres
Area Disturbed 8-3 = 0.18 Acres
Area Disturbed 8-4 = 0.07 Acres
Area Disturbed 8-5 = 0.23 Acres
Area Disturbed 8-6 = 0.30 Acres

C = 0.95 (AC Pavement/Concrete Sidewalk/Concrete Driveways)
C = 0.30 (Unpaved Median)

i = (2-yr, 1-hr event) = 1.50 in./hr.

$tc_{(All\ Areas)}$ = 10 min. (minimum)

$Cf_{(All\ Areas)}$ = 2.25

I = i X Cf
I=1.50 in/hour x 2.25 = 3.375 in/hour

Since project area is less than 100 acres, the Rational Formula will be used to calculate potential runoff.

Find: Runoff for a 2-yr 1-hr rainfall event (Q).

Solution: Q = C x I x A

Q_{1-1} = (0.95) x (3.375 in/hr) x (0.11 Acs)
Q_{1-1} = 0.35 cfs

Q_{1-2} = (0.95) x (3.375 in/hr) x (0.54 Acs)
Q_{1-2} = 1.73 cfs

Q_{1-3} = (0.95) x (3.375 in/hr) x (0.24 Acs)
Q_{1-3} = 0.77 cfs

Q_{1-4} = (0.95) x (3.375 in/hr) x (0.16 Acs)
Q_{1-4} = 0.52 cfs

Q_{1-5} = (0.95) x (3.375 in/hr) x (0.23 Acs)
Q_{1-5} = 0.75 cfs

Q_{1-6} = (0.95) x (3.375 in/hr) x (0.53 Acs)
Q_{1-6} = 1.69 cfs

Q_{1-7} = (0.95) x (3.375 in/hr) x (0.20 Acs)
Q_{1-7} = 0.63 cfs

Q_{1-8} = (0.95) x (3.375 in/hr) x (0.20 Acs)
Q_{1-8} = 0.63 cfs

Q_{1-9} = (0.95) x (3.375 in/hr) x (0.48 Acs)
Q_{1-9} = 1.54 cfs

Q_{1-10} = (0.95) x (3.375 in/hr) x (0.20 Acs)
Q_{1-10} = 0.63 cfs

Q_{1-11} = (0.95) x (3.375 in/hr) x (0.45 Acs)
Q_{1-11} = 1.45 cfs

Q_{1-12} = (0.95) x (3.375 in/hr) x (0.18 Acs)
Q_{1-12} = 0.59 cfs

Q_{1-13} = (0.95) x (3.375 in/hr) x (0.24 Acs)

$Q_{1\text{-}13}$ = 0.76 cfs

$Q_{1\text{-}14}$ = (0.95) x (3.375 in/hr) x (0.19 Acs)
$Q_{1\text{-}14}$ = 0.60 cfs

$Q_{1\text{-}15}$ = (0.95) x (3.375 in/hr) x (0.25 Acs)
$Q_{1\text{-}15}$ = 0.79 cfs

$Q_{1\text{-}16}$ = (0.95) x (3.375 in/hr) x (0.09 Acs)
$Q_{1\text{-}16}$ = 0.28 cfs

$Q_{1\text{-}17}$ = (0.95) x (3.375 in/hr) x (0.13 Acs)
$Q_{1\text{-}17}$ = 0.43 cfs

$Q_{1\text{-}18}$ = (0.95) x (3.375 in/hr) x (0.30 Acs)
$Q_{1\text{-}18}$ = 0.96 cfs

$Q_{1\text{-}19}$ = (0.95) x (3.375 in/hr) x (0.04 Acs)
$Q_{1\text{-}19}$ = 0.13 cfs

$Q_{1\text{-}5A}$ = (0.30) x (3.375 in/hr) x (0.01 Acs)
$Q_{1\text{-}5A}$ = 0.01 cfs

$Q_{1\text{-}6A}$ = (0.30) x (3.375 in/hr) x (0.07 Acs)
$Q_{1\text{-}6A}$ = 0.07 cfs

$Q_{1\text{-}7A}$ = (0.30) x (3.375 in/hr) x (0.04 Acs)
$Q_{1\text{-}7A}$ = 0.04 cfs

$Q_{1\text{-}8A}$ = (0.30) x (3.375 in/hr) x (0.04 Acs)
$Q_{1\text{-}8A}$ = 0.04 cfs

$Q_{1\text{-}9A}$ = (0.30) x (3.375 in/hr) x (0.05 Acs)
$Q_{1\text{-}9A}$ = 0.05 cfs

$Q_{1\text{-}10A}$ = (0.30) x (3.375 in/hr) x (0.01 Acs)
$Q_{1\text{-}10A}$ = 0.01 cfs

$Q_{1\text{-}11A}$ = (0.30) x (3.375 in/hr) x (0.05 Acs)
$Q_{1\text{-}11A}$ = 0.05 cfs

$Q_{1\text{-}13A}$ = (0.30) x (3.375 in/hr) x (0.03 Acs)
$Q_{1\text{-}13A}$ = 0.03 cfs

$Q_{2\text{-}1}$ = (0.95) x (3.375 in/hr) x (0.09 Acs)
$Q_{2\text{-}1}$ = 0.29 cfs

$Q_{2\text{-}2}$ = (0.95) x (3.375 in/hr) x (0.06 Acs)
$Q_{2\text{-}2}$ = 0.18 cfs

$Q_{3\text{-}1}$ = (0.95) x (3.375 in/hr) x (0.54 Acs)
$Q_{3\text{-}1}$ = 1.72 cfs

$Q_{3\text{-}2}$ = (0.95) x (3.375 in/hr) x (0.38 Acs)
$Q_{3\text{-}2}$ = 1.23 cfs

$Q_{3\text{-}3}$ = (0.95) x (3.375 in/hr) x (0.02 Acs)
$Q_{3\text{-}3}$ = 0.07 cfs

$Q_{3\text{-}4}$ = (0.95) x (3.375 in/hr) x (0.54 Acs)
$Q_{3\text{-}4}$ = 1.72 cfs

$Q_{3\text{-}5}$ = (0.95) x (3.375 in/hr) x (0.55 Acs)
$Q_{3\text{-}5}$ = 1.76 cfs

$Q_{3\text{-}6}$ = (0.95) x (3.375 in/hr) x (0.37 Acs)
$Q_{3\text{-}6}$ = 1.18 cfs

$Q_{3\text{-}7}$ = (0.95) x (3.375 in/hr) x (0.60 Acs)
$Q_{3\text{-}7}$ = 1.91 cfs

$Q_{3\text{-}8}$ = (0.95) x (3.375 in/hr) x (0.27 Acs)
$Q_{3\text{-}8}$ = 0.86 cfs

$Q_{3\text{-}9}$ = (0.95) x (3.375 in/hr) x (0.30 Acs)
$Q_{3\text{-}9}$ = 0.98 cfs

$Q_{3\text{-}10}$ = (0.95) x (3.375 in/hr) x (0.37 Acs)
$Q_{3\text{-}10}$ = 1.19 cfs

$Q_{3\text{-}11}$ = (0.95) x (3.375 in/hr) x (0.32 Acs)
$Q_{3\text{-}11}$ = 1.02 cfs

$Q_{3\text{-}1A}$ = (0.30) x (3.375 in/hr) x (0.07 Acs)
$Q_{3\text{-}1A}$ = 0.07 cfs

$Q_{3\text{-}2A}$ = (0.30) x (3.375 in/hr) x (0.03 Acs)
$Q_{3\text{-}2A}$ = 0.03 cfs

$Q_{3\text{-}4A}$ = (0.30) x (3.375 in/hr) x (0.03 Acs)

$Q_{3\text{-}4A}$ = 0.03 cfs

$Q_{3\text{-}5A}$ = (0.30) x (3.375 in/hr) x (0.04 Acs)
$Q_{3\text{-}5A}$ = 0.04 cfs

$Q_{3\text{-}6A}$ = (0.30) x (3.375 in/hr) x (0.07 Acs)
$Q_{3\text{-}6A}$ = 0.07 cfs

$Q_{3\text{-}7A}$ = (0.30) x (3.375 in/hr) x (0.12 Acs)
$Q_{3\text{-}7A}$ = 0.12 cfs

$Q_{3\text{-}8A}$ = (0.30) x (3.375 in/hr) x (0.03 Acs)
$Q_{3\text{-}8A}$ = 0.03 cfs

$Q_{3\text{-}9A}$ = (0.30) x (3.375 in/hr) x (0.03 Acs)
$Q_{3\text{-}9A}$ = 0.03 cfs

$Q_{3\text{-}10A}$ = (0.30) x (3.375 in/hr) x (0.04 Acs)
$Q_{3\text{-}10A}$ = 0.04 cfs

$Q_{4\text{-}1}$ = (0.95) x (3.375 in/hr) x (0.33 Acs)
$Q_{4\text{-}1}$ = 1.06 cfs

$Q_{4\text{-}1A}$ = (0.30) x (3.375 in/hr) x (0.06 Acs)
$Q_{4\text{-}1A}$ = 0.06 cfs

$Q_{5\text{-}1}$ = (0.95) x (3.375 in/hr) x (0.30 Acs)
$Q_{5\text{-}1}$ = 0.96 cfs

$Q_{5\text{-}2}$ = (0.95) x (3.375 in/hr) x (1.68 Acs)
$Q_{5\text{-}2}$ = 5.37 cfs

$Q_{5\text{-}3}$ = (0.95) x (3.375 in/hr) x (0.45 Acs)
$Q_{5\text{-}3}$ = 1.45 cfs

$Q_{5\text{-}4}$ = (0.95) x (3.375 in/hr) x (0.06 Acs)
$Q_{5\text{-}4}$ = 0.18 cfs

$Q_{5\text{-}5}$ = (0.95) x (3.375 in/hr) x (0.05 Acs)
$Q_{5\text{-}5}$ = 0.15 cfs

$Q_{5\text{-}6}$ = (0.95) x (3.375 in/hr) x (0.92 Acs)
$Q_{5\text{-}6}$ = 2.96 cfs

$Q_{5\text{-}7}$ = (0.95) x (3.375 in/hr) x (0.89 Acs)
$Q_{5\text{-}7}$ = 2.84 cfs

$Q_{5\text{-}8}$ = (0.95) x (3.375 in/hr) x (0.11 Acs)
$Q_{5\text{-}8}$ = 0.35 cfs

$Q_{5\text{-}9}$ = (0.95) x (3.375 in/hr) x (0.22 Acs)
$Q_{5\text{-}9}$ = 0.71 cfs

$Q_{5\text{-}10}$ = (0.95) x (3.375 in/hr) x (0.26 Acs)
$Q_{5\text{-}10}$ = 0.82 cfs

$Q_{5\text{-}11}$ = (0.95) x (3.375 in/hr) x (0.61 Acs)
$Q_{5\text{-}11}$ = 1.95 cfs

$Q_{5\text{-}12}$ = (0.95) x (3.375 in/hr) x (0.62 Acs)
$Q_{5\text{-}12}$ = 1.99 cfs

$Q_{5\text{-}13}$ = (0.95) x (3.375 in/hr) x (0.06 Acs)
$Q_{5\text{-}13}$ = 0.19 cfs

$Q_{5\text{-}14}$ = (0.95) x (3.375 in/hr) x (0.30 Acs)
$Q_{5\text{-}14}$ = 0.98 cfs

$Q_{5\text{-}15}$ = (0.95) x (3.375 in/hr) x (0.89 Acs)
$Q_{5\text{-}15}$ = 2.84 cfs

$Q_{5\text{-}1A}$ = (0.30) x (3.375 in/hr) x (0.03 Acs)
$Q_{5\text{-}1A}$ = 0.03 cfs

$Q_{5\text{-}2A}$ = (0.30) x (3.375 in/hr) x (0.12 Acs)
$Q_{5\text{-}2A}$ = 0.12 cfs

$Q_{5\text{-}3A}$ = (0.30) x (3.375 in/hr) x (0.04 Acs)
$Q_{5\text{-}3A}$ = 0.04 cfs

$Q_{5\text{-}6A}$ = (0.30) x (3.375 in/hr) x (0.07 Acs)
$Q_{5\text{-}6A}$ = 0.07 cfs

$Q_{5\text{-}7A}$ = (0.30) x (3.375 in/hr) x (0.10 Acs)
$Q_{5\text{-}7A}$ = 0.10 cfs

$Q_{5\text{-}10A}$ = (0.30) x (3.375 in/hr) x (0.02 Acs)
$Q_{5\text{-}10A}$ = 0.02 cfs

$Q_{5\text{-}11A}$ = (0.30) x (3.375 in/hr) x (0.05 Acs)

$Q_{5\text{-}11A}$ = 0.05 cfs

$Q_{5\text{-}12A}$ = (0.30) x (3.375 in/hr) x (0.05 Acs)
$Q_{5\text{-}12A}$ = 0.05 cfs

$Q_{5\text{-}14A}$ = (0.30) x (3.375 in/hr) x (0.05 Acs)
$Q_{5\text{-}14A}$ = 0.05 cfs

$Q_{5\text{-}15A}$ = (0.30) x (3.375 in/hr) x (0.08 Acs)
$Q_{5\text{-}15A}$ = 0.08 cfs

$Q_{6\text{-}1}$ = (0.95) x (3.375 in/hr) x (0.56 Acs)
$Q_{6\text{-}1}$ = 1.79 cfs

$Q_{7\text{-}1}$= (0.95) x (3.375 in/hr) x (0.13 Acs)
$Q_{7\text{-}1}$= 0.40 cfs

$Q_{7\text{-}2}$= (0.95) x (3.375 in/hr) x (0.68 Acs)
$Q_{7\text{-}2}$ = 2.19 cfs

$Q_{7\text{-}3}$ = (0.95) x (3.375 in/hr) x (0.01 Acs)
$Q_{7\text{-}3}$ = 0.04 cfs

$Q_{7\text{-}4}$ = (0.95) x (3.375 in/hr) x (0.41 Acs)
$Q_{7\text{-}4}$ = 1.31 cfs

$Q_{7\text{-}5}$ = (0.95) x (3.375 in/hr) x (0.50 Acs)
$Q_{7\text{-}5}$ = 1.60 cfs

$Q_{7\text{-}6}$ = (0.95) x (3.375 in/hr) x (0.39 Acs)
$Q_{7\text{-}6}$ = 1.27 cfs

$Q_{7\text{-}7}$ = (0.95) x (3.375 in/hr) x (0.12 Acs)
$Q_{7\text{-}7}$ = 0.39 cfs

$Q_{7\text{-}8}$ = (0.95) x (3.375 in/hr) x (0.26 Acs)
$Q_{7\text{-}8}$ = 0.84 cfs

$Q_{7\text{-}9}$ = (0.95) x (3.375 in/hr) x (0.39 Acs)
$Q_{7\text{-}9}$ = 1.24 cfs

$Q_{7\text{-}4A}$ = (0.30) x (3.375 in/hr) x (0.08 Acs)
$Q_{7\text{-}4A}$= 0.08 cfs

$Q_{7\text{-}5A}$ = (0.30) x (3.375 in/hr) x (0.14 Acs)

$Q_{7\text{-}5A}$ = 0.14 cfs

$Q_{8\text{-}1}$= (0.95) x (3.375 in/hr) x (0.12 Acs)
$Q_{8\text{-}1}$= 0.39 cfs

$Q_{8\text{-}2}$= (0.95) x (3.375 in/hr) x (0.29 Acs)
$Q_{8\text{-}2}$ = 0.92 cfs

$Q_{8\text{-}3}$ = (0.95) x (3.375 in/hr) x (0.18 Acs)
$Q_{8\text{-}3}$ = 0.57 cfs

$Q_{8\text{-}4}$ = (0.95) x (3.375 in/hr) x (0.07 Acs)
$Q_{8\text{-}4}$ = 0.21 cfs

$Q_{8\text{-}5}$ = (0.95) x (3.375 in/hr) x (0.23 Acs)
$Q_{8\text{-}5}$ = 0.75 cfs

$Q_{8\text{-}6}$ = (0.95) x (3.375 in/hr) x (0.30 Acs)
$Q_{8\text{-}6}$ = 0.98 cfs

TABLE II – MS4 DISCHARGE POINT COORDINATES

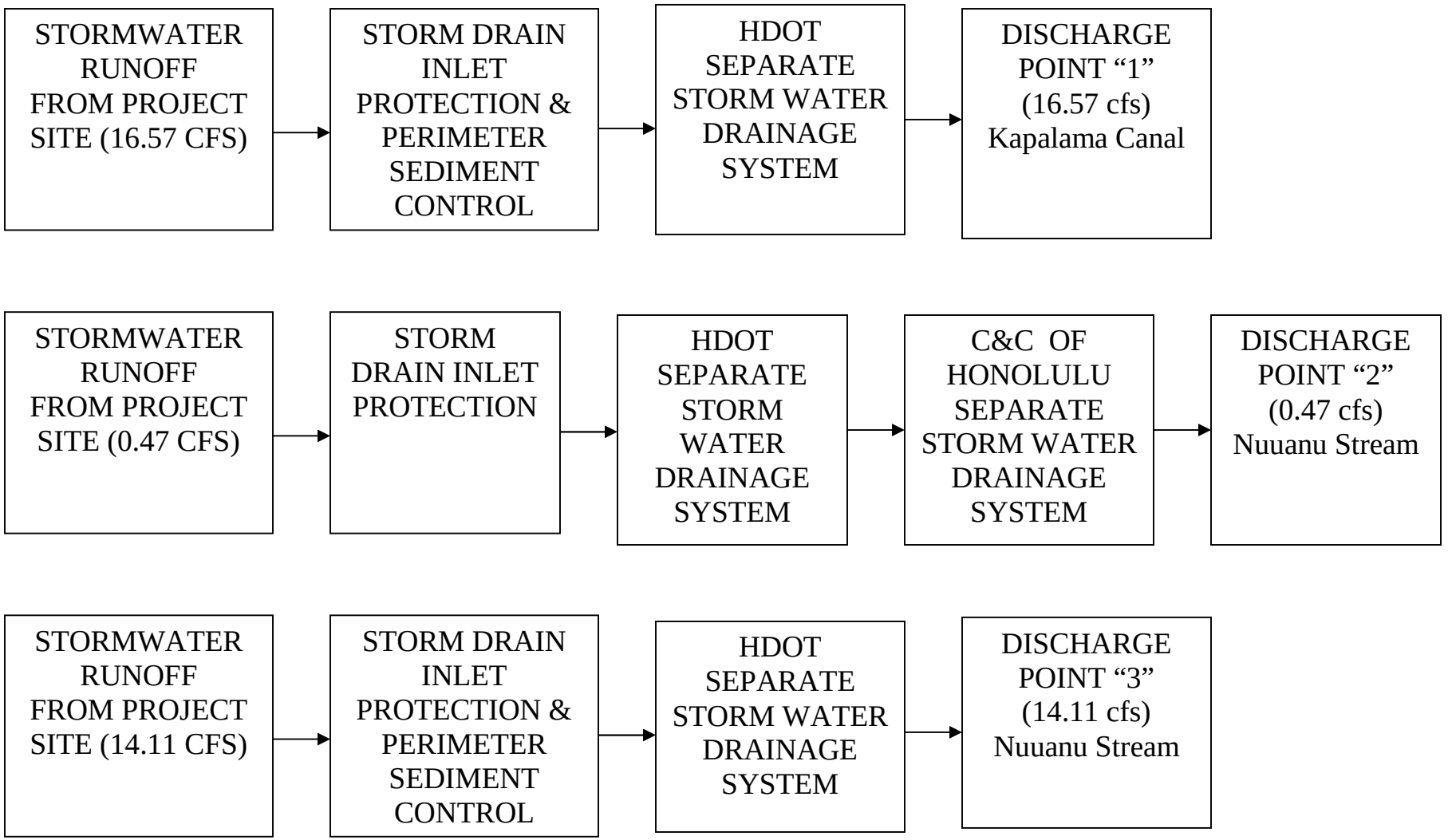
INLET	LAT	LONG
1-1	21D 19' 32"	157D 52' 01"
1-2	21D 19' 26"	157D 51' 55"
1-3	21D 19' 29"	157D 51' 56"
1-4	21D 19' 25"	157D 51' 53"
1-5	21D 19' 24"	157D 51' 52"
1-6	21D 19' 24"	157D 51' 53"
1-7	21D 19' 23"	157D 51' 51"
1-8	21D 19' 21"	157D 51' 50"
1-9	21D 19' 20"	157D 51' 51"
1-10	21D 19' 19"	157D 51' 48"
1-11	21D 19' 18"	157D 51' 49"
1-12	21D 19' 18"	157D 51' 48"
1-13	21D 19' 18"	157D 51' 48"
1-14	21D 19' 32"	157D 52' 01"
1-15	21D 19' 33"	157D 52' 00"
1-16	21D 19' 30"	157D 51' 58"
1-17	21D 19' 29"	157D 51' 56"
1-18	21D 19' 29"	157D 51' 56"
1-19	21D 19' 32"	157D 52' 02"
2-1	21D 19' 11"	157D 51' 45"
2-2	21D 19' 11"	157D 51' 44"

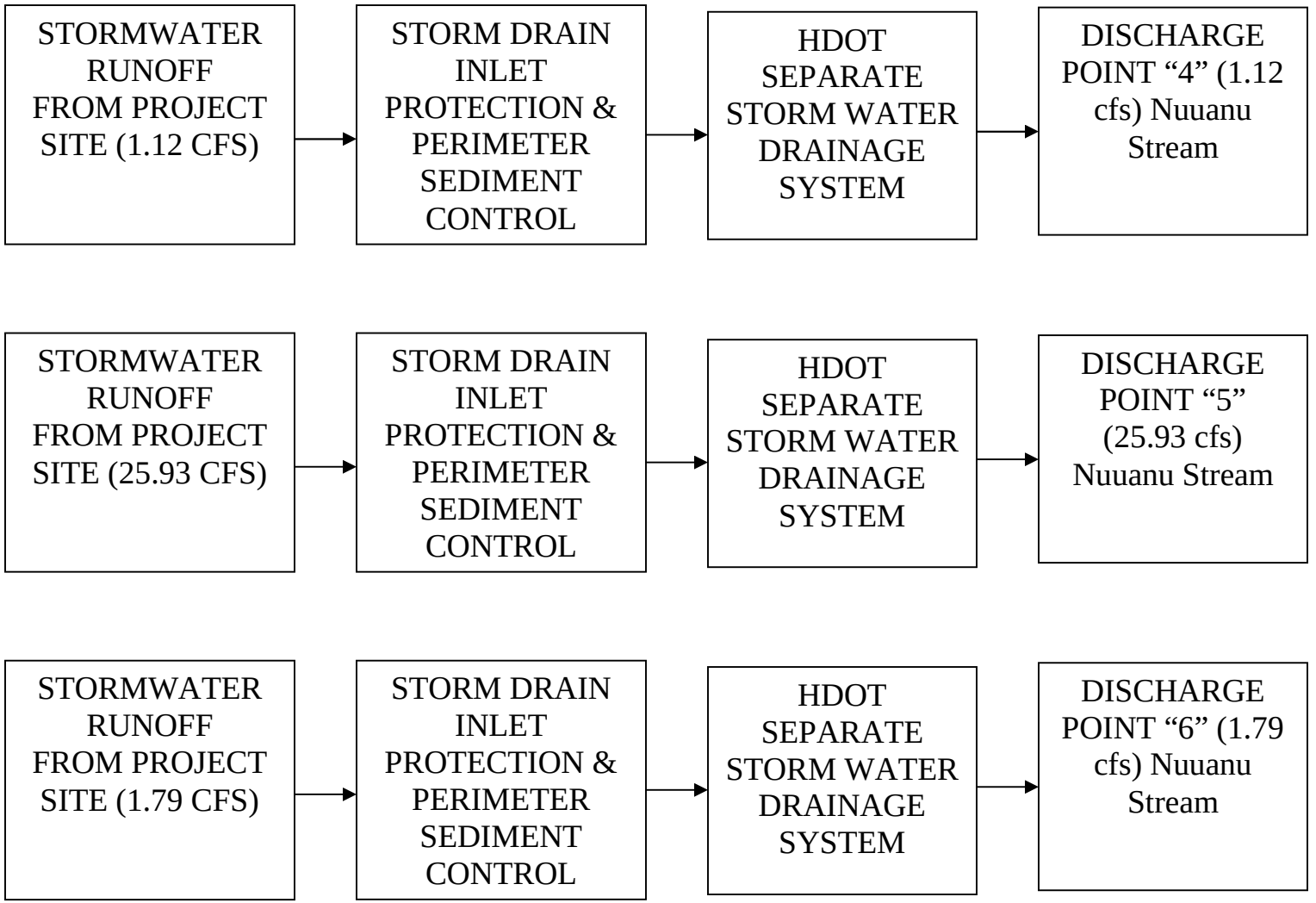
3-1	21D 19' 12"	157D 51' 43"
3-2	21D 19' 12"	157D 51' 44"
3-3	21D 19' 12"	157D 51' 43"
3-4	21D 19' 12"	157D 51' 43"
3-5	21D 19' 11"	157D 51' 43"
3-6	21D 19' 07"	157D 51' 39"
3-7	21D 19' 04"	157D 51' 38"
3-8	21D 19' 05"	157D 51' 38"
3-9	21D 19' 01"	157D 51' 35"
3-10	21D 19' 01"	157D 51' 35"
3-11	21D 19' 00"	157D 51' 35"
4-1	21D 18' 59"	157D 51' 33"
5-1	21D 18' 58"	157D 51' 32"
5-2	21D 18' 58"	157D 51' 34"
5-3	21D 18' 55"	157D 51' 30"
5-4	21D 18' 52"	157D 51' 28"
5-5	21D 18' 52"	157D 51' 27"
5-6	21D 18' 50"	157D 51' 26"
5-7	21D 18' 40"	157D 51' 26"
5-8	21D 18' 47"	157D 51' 23"
5-9	21D 18' 46"	157D 51' 23"
5-10	21D 18' 45"	157D 51' 24"
5-11	21D 18' 42"	157D 51' 20"
5-12	21D 18' 41"	157D 51' 20"
5-13	21D 18' 41"	157D 51' 19"
5-14	21D 18' 39"	157D 51' 18"
5-15	21D 18' 39"	157D 51' 18"
5-16	21D 18' 37"	157D 51' 16"
5-17	21D 18' 37"	157D 51' 15"
6-1	21D 19' 00"	157D 51' 34"
7-1	21D 18' 33"	157D 51' 17"
7-2	21D 18' 35"	157D 51' 16"
7-3	21D 18' 32"	157D 51' 17"
7-4	21D 18' 33"	157D 51' 12"
7-5	21D 18' 31"	157D 51' 10"
7-6	21D 18' 33"	157D 51' 12"
7-7	21D 18' 34"	157D 51' 12"
7-8	21D 18' 29"	157D 51' 23"
7-9	21D 18' 31"	157D 51' 09"
8-1	21D 18' 24"	157D 51' 04"
8-2	21D 18' 22"	157D 52' 00"
8-3	21D 18' 21"	157D 50' 58"
8-4	21D 18' 22"	157D 50' 57"

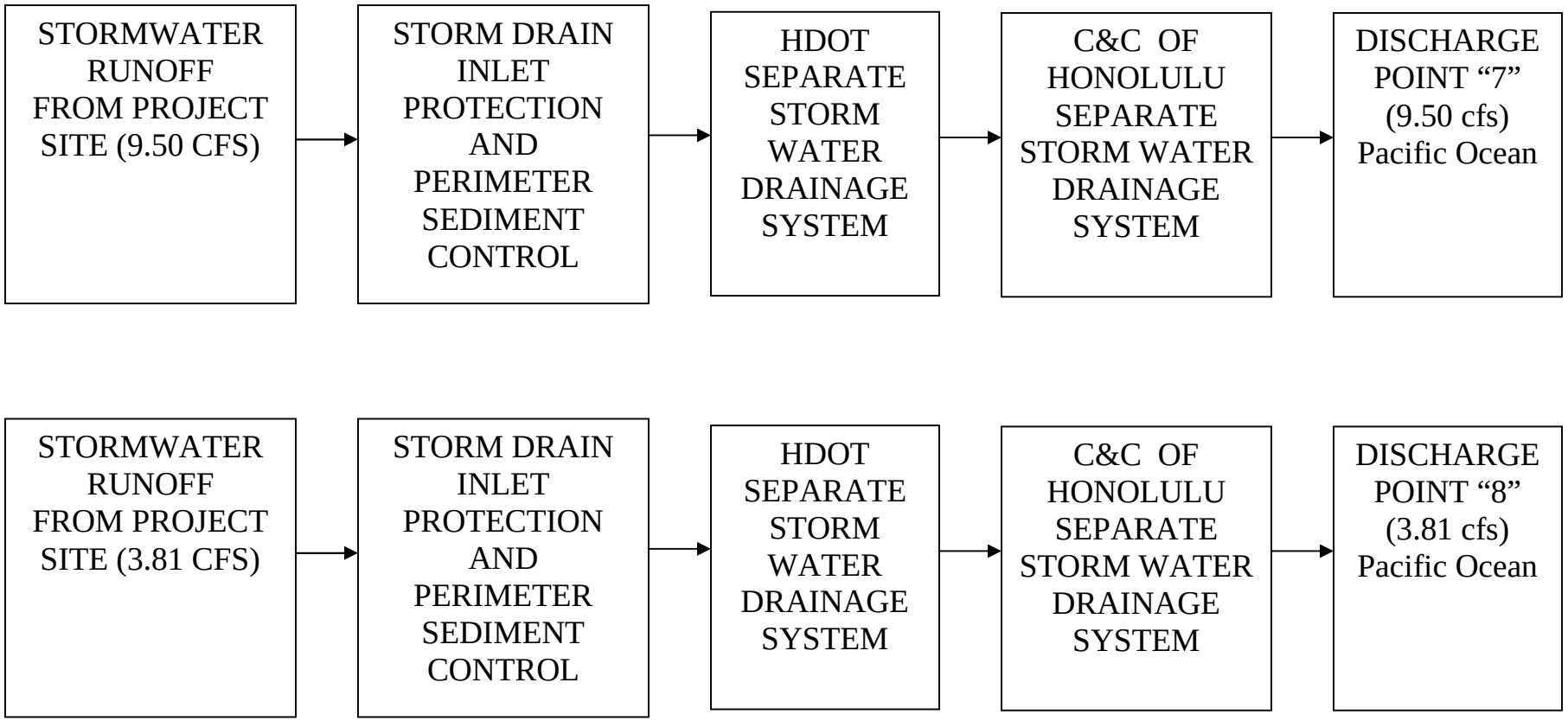
8-5	21D 18' 22"	157D 50' 58"
8-6	21D 18' 25"	157D 51' 02"

Attachment A-3
Flow Chart

FLOW CHART FOR VINEYARD BOULEVARD RESURFACING, VICINITY OF PALAMA STREET TO END OF H-1 ON AND OFF RAMP
Project No.: 98A-01-09M




STORMWATER RUNOFF FROM PROJECT SITE (1.12 CFS)
STORM DRAIN INLET PROTECTION & PERIMETER SEDIMENT CONTROL
HDOT SEPARATE STORM WATER DRAINAGE SYSTEM
DISCHARGE POINT “4” (1.12 cfs) Nuuanu Stream
STORMWATER RUNOFF FROM PROJECT SITE (25.93 CFS)
STORM DRAIN INLET PROTECTION & PERIMETER SEDIMENT CONTROL
HDOT SEPARATE STORM WATER DRAINAGE SYSTEM
DISCHARGE POINT “5” (25.93 cfs) Nuuanu Stream
STORMWATER RUNOFF FROM PROJECT SITE (1.79 CFS)
STORM DRAIN INLET PROTECTION & PERIMETER SEDIMENT CONTROL
HDOT SEPARATE STORM WATER DRAINAGE SYSTEM
DISCHARGE POINT “6” (1.79 cfs) Nuuanu Stream


STORMWATER RUNOFF FROM PROJECT SITE (9.50 CFS)
STORM DRAIN INLET PROTECTION AND PERIMETER SEDIMENT CONTROL
HDOT SEPARATE STORM WATER DRAINAGE SYSTEM
C&C OF HONOLULU SEPARATE STORM WATER DRAINAGE SYSTEM
DISCHARGE POINT "7" (9.50 cfs) Pacific Ocean
STORMWATER RUNOFF FROM PROJECT SITE (3.81 CFS)
STORM DRAIN INLET PROTECTION AND PERIMETER SEDIMENT CONTROL
HDOT SEPARATE STORM WATER DRAINAGE SYSTEM
C&C OF HONOLULU SEPARATE STORM WATER DRAINAGE SYSTEM
DISCHARGE POINT "8" (3.81 cfs) Pacific Ocean

Attachment A-4
Non-Structural Pollution Control Measures

NON-STRUCTURAL POLLUTION CONTROL MEASURES

A. Waste Disposal:

1. Waste Materials

All waste materials will be collected and stored in a securely lidded metal dumpster. The dumpster will meet all City and State solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied a minimum of twice per week or as often deemed necessary. No construction waste materials will be buried onsite. Operator's supervisory personnel will be instructed regarding the correct procedure for waste disposal. Notices stating these practices will be posted in the office trailer and the Operator will be responsible for seeing that these procedures are followed.

2. Hazardous Waste

All hazardous waste materials will be disposed of in the manner specified by local or State regulation or by the manufacturer. Operator's site personnel will be instructed in these practices and will be responsible for seeing that these practices are followed.

3. Sanitary Waste

All sanitary waste will be collected from the portable units a minimum of once per week, or as required.

B. Offsite Vehicle Tracking:

A stabilized construction entrance will be provided to reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be cleaned daily or as required to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

C. Erosion and Sediment Control Inspection and Maintenance Practices

These are the inspection and maintenance practices that will be used to maintain erosion and sediment controls.

- All control measures will be inspected at least once each week and within 24 hours of any rainfall event of 0.5 inches or greater in a 24 hour period.

- All measures will be maintained in good working order. If a repair is necessary, it will be initiated within 24 hours after the inspection.

- Built-up sediment will be removed from silt fence when it has reached one-third the height of the fence.

- Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.

- The sediment basin will be inspected for depth of sediment, and built-up sediment will be removed when it reaches 10 percent of the design capacity and at the end of the job.

- Diversion dike will be inspected and any breaches promptly repaired.

- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.

- A maintenance inspection report will be made promptly after each inspection by the Operator.

- The Operator will submit the name of a specific individual designated responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance report.

- Personnel selected for the inspection and maintenance responsibilities will receive training from the Operator. They will be trained in all the inspection and practices necessary for keeping the erosion and sediment controls used onsite in good working order.

D. Inventory For Pollution Prevention Plan

Applicable materials or substances listed below are expected to be present onsite during construction. Other materials and substances not listed below will be added to the inventory

- Concrete
- Fertilizers
- Detergents
- Petroleum Based Products
- Paints (Enamel/Latex)
- Cleaning Solvents
- Metal Studs
- Wood
- Tar
- Masonry Block

E. Spill Prevention

1. Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff.

a. Good Housekeeping:

The following good housekeeping practices will be followed onsite during the construction project

- An effort will be made to store only enough product required to do the job.

- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.

- Products will be kept in their original containers with the original manufacturer's label.

- Substances will not be mixed with one another unless recommended by the manufacturer.

- Whenever possible, all of a product will be used up before disposing of the container.

- Manufacturers' recommendations for proper use and disposal will be followed.

- The Operator will conduct a daily inspection to ensure proper use and disposal of materials onsite.

b. Hazardous Products:

These practices are used to reduce the risks associated with hazardous materials.

- Products will be kept in original containers unless they are not resealable.

- Original labels and materials safety data will be retained; they contain important product information.

- If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal will be followed.

2. Product Specific Practices

The following product specific practices will be followed onsite:

a. Petroleum Products:

All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

b. Fertilizers:

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

c. Paints:

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the highway drainage system but will be properly disposed of according to manufacturers' instructions or State and local regulations. Avoid cleaning or rinsing water-based paint brushes in soil, streets, gutters, storm drains, or streams. Rinse from water-based paints shall be discharged into the sanitary sewer system. Filter and re-use solvents and thinners. Dispose of oil-based paints and residue as hazardous waste.

d. Concrete Trucks:

Concrete trucks will be allowed to wash out or drum wash water only at designated site. Water will not be discharged in the highway drainage system or waters of the United States. Locate on-site wash area a minimum of 50 feet away from storm drain inlets, open drainage facilities, or water bodies. Runoff from the on-site concrete wash area shall be contained in a temporary pit or level bermed area where the concrete can set. Temporary pit shall be lined with plastic to prevent seepage of the wash water into the ground. Allow wash water to evaporate or collect wash water and all concrete debris in a concrete washout system bin.

3. Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite.

- All spills will be cleaned up immediately after discovery.

- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.

- The spill prevention plan will be adjusted to include measures to prevent this type of spill from recurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

- The Operator will be the spill prevention and cleanup coordinator. He will designate at least three site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.

Attachment A-5
Portions of Contract Plans

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	1	X

INDEX TO DRAWINGS	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	STANDARD PLANS SUMMARY
3-4	GENERAL NOTES AND LEGEND
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X
X	X

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

HONOLULU, HAWAII

PLANS FOR

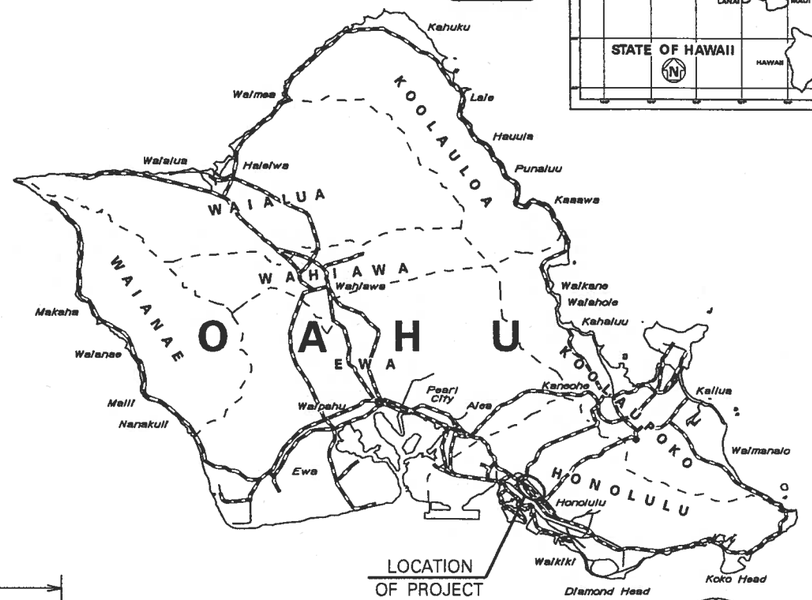
VINEYARD BOULEVARD RESURFACING

VICINITY OF PALAMA STREET TO END OF H-1 ON-AND-OFF RAMP

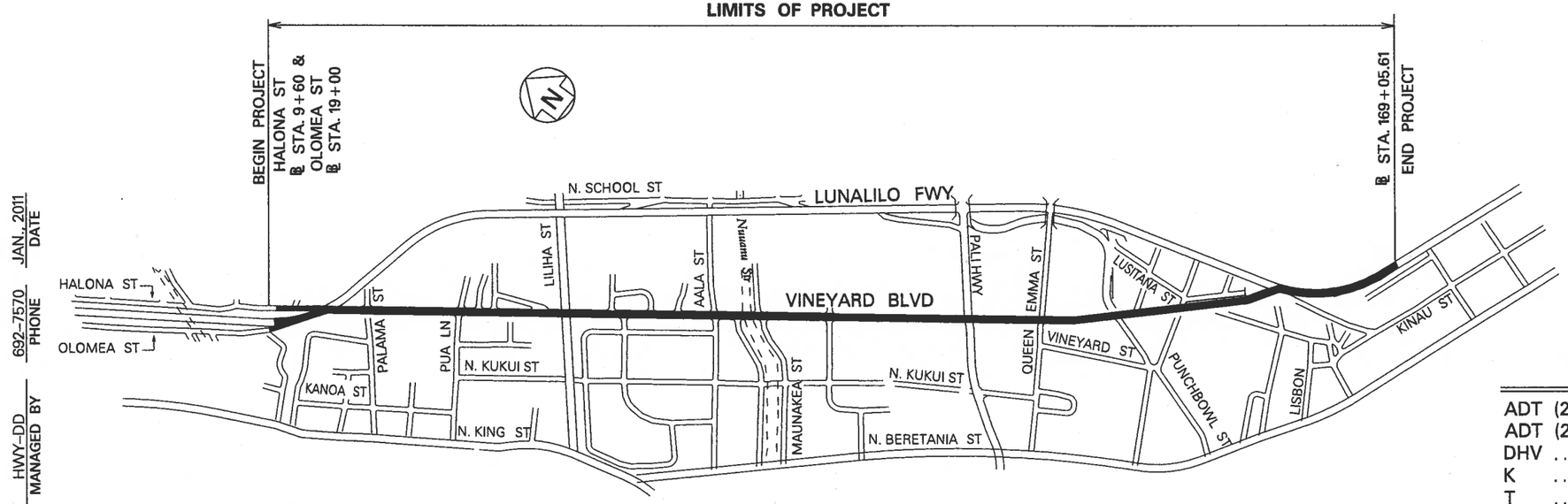
PROJECT NO. 98A-01-09M

DISTRICT OF HONOLULU

ISLAND OF OAHU



LIMITS OF PROJECT



LAYOUT PLAN

GROSS LENGTH OF PROJECT.....1.76 MILES
NET LENGTH OF PROJECT.....1.76 MILES

5 0 5 10 15

SCALE IN HUNDRED FEET

FEDERAL AID PROJECTS PREVIOUSLY CONSTRUCTED OR UNDER CONSTRUCTION

HALONA ST. & OLOMEA ST. M.P. 0.00 TO M.P. 0.20

ROUTE 98 VINEYARD BLVD. M.P 0.20 TO M.P. 1.76

	PALAMA ST TO LILIHA ST	LILIHA ST TO NUUANU AVE	NUUANU AVE TO PUNCHBOWL ST
ADT (2010)	46,300	23,300	35,800
ADT (2020)	51,200	24,700	37,800
DHV	3,900	2,000	3,100
K	7.5	8.0	8.0
T	5.0 %	4.5 %	4.0 %
T24	5.5 %	4.5 %	5.0 %

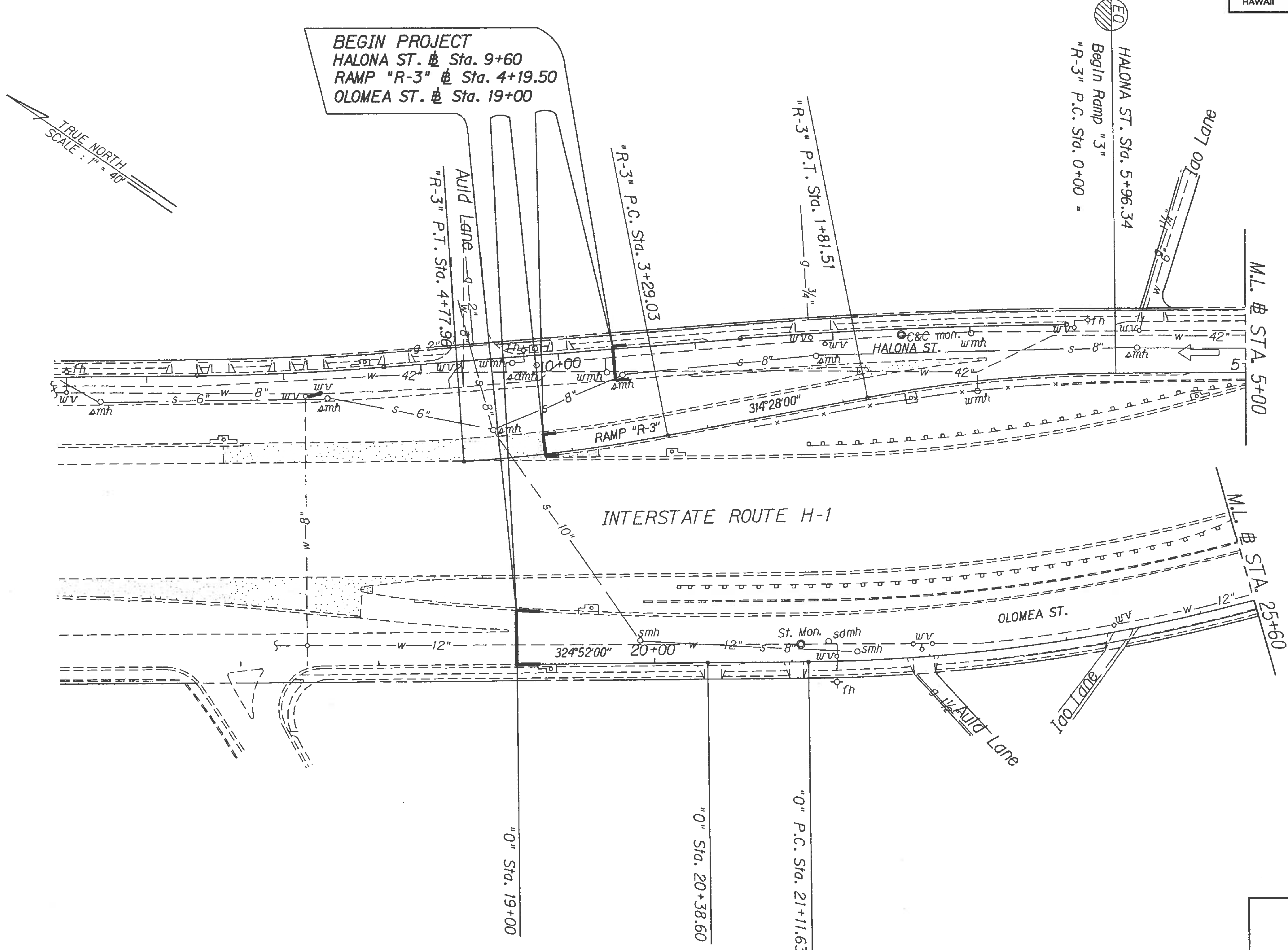
HWY-DD	DESIGNED BY
HWY-DD	MANAGED BY
692-7570	PHONE
JAN., 2011	DATE

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

APPROVED:

DIR. OF TRANSPORTATION — DATE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x



ORIGINAL PLAN
NOTE BOOK ddl
N:\vblpd01.dgn

SURVEY PLOTTED BY
DRAWN BY x
TRACED BY
DESIGNED BY x
QUANTITIES BY
CHECKED BY
DATE x

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

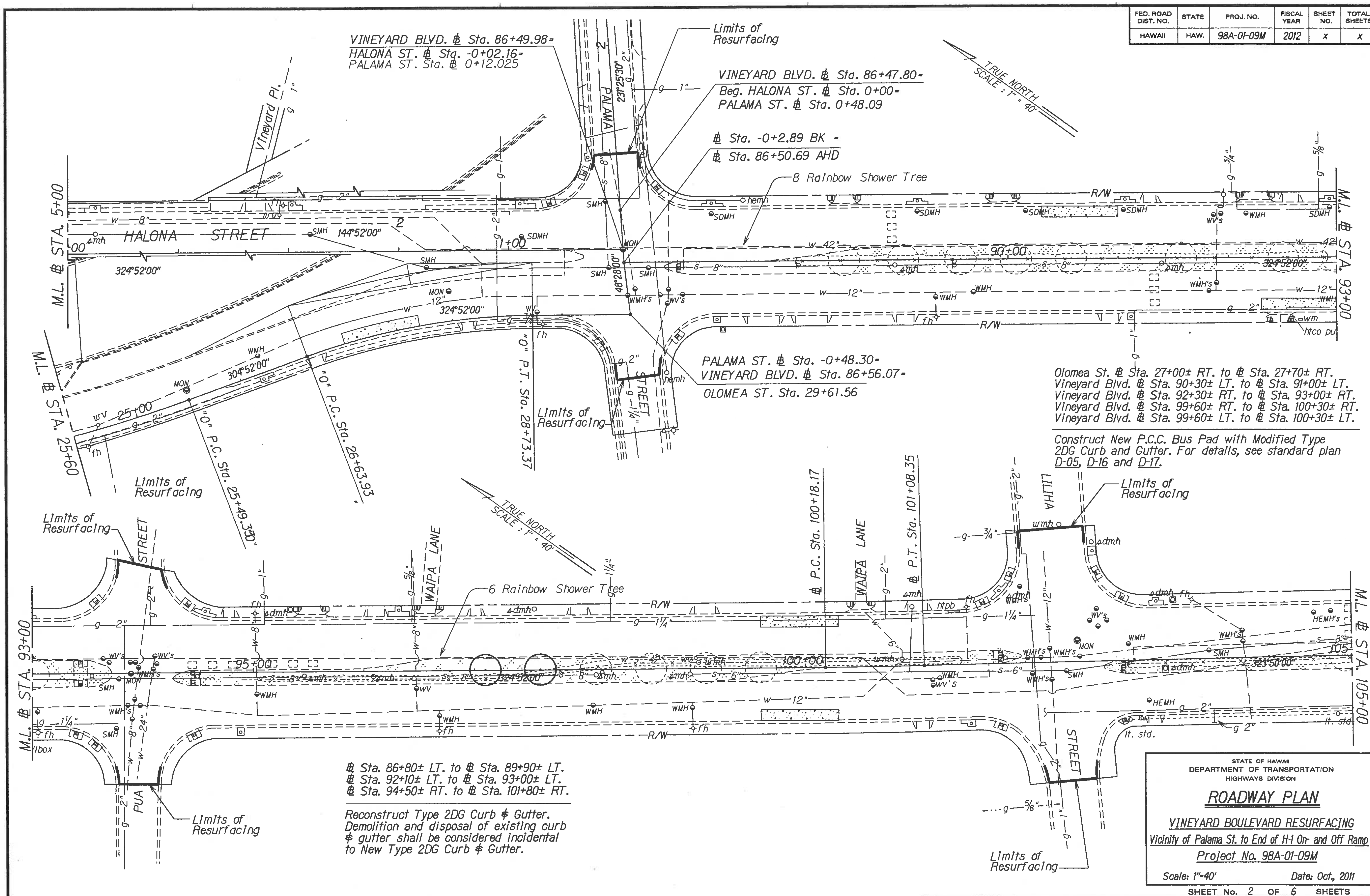
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 1 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	x	x



VINEYARD BLVD. ℄ Sta. 86+49.98=
HALONA ST. ℄ Sta. -0+02.16=
PALAMA ST. Sta. ℄ 0+12.025
Limits of Resurfacing
VINEYARD BLVD. ℄ Sta. 86+47.80=
Beg. HALONA ST. ℄ Sta. 0+00=
PALAMA ST. ℄ Sta. 0+48.09
℄ Sta. -0+2.89 BK =
℄ Sta. 86+50.69 AHD
8 Rainbow Shower Tree
TRUE NORTH
SCALE : 1" = 40'
Vineyard Pl.
PALAMA
HALONA STREET
M.L. ℄ STA. 5+00
M.L. ℄ STA. 93+00
M.L. ℄ STA. 25+60
PALAMA ST. ℄ Sta. -0+48.30=
VINEYARD BLVD. ℄ Sta. 86+56.07=
OLOMEA ST. Sta. 29+61.56
"0" P.T. Sta. 28+73.37
"0" P.C. Sta. 26+63.93
"0" P.C. Sta. 25+49.330
Limits of Resurfacing
Olomea St. ℄ Sta. 27+00± RT. to ℄ Sta. 27+70± RT.
Vineyard Blvd. ℄ Sta. 90+30± LT. to ℄ Sta. 91+00± LT.
Vineyard Blvd. ℄ Sta. 92+30± RT. to ℄ Sta. 93+00± RT.
Vineyard Blvd. ℄ Sta. 99+60± RT. to ℄ Sta. 100+30± RT.
Vineyard Blvd. ℄ Sta. 99+60± LT. to ℄ Sta. 100+30± LT.
Construct New P.C.C. Bus Pad with Modified Type 2DG Curb and Gutter. For details, see standard plan D-05, D-16 and D-17.
6 Rainbow Shower Tree
WAIPA LANE
LILIHA STREET
PUA STREET
℄ P.C. Sta. 100+18.17
℄ P.T. Sta. 101+08.35
M.L. ℄ STA. 105+00
℄ Sta. 86+80± LT. to ℄ Sta. 89+90± LT.
℄ Sta. 92+10± LT. to ℄ Sta. 93+00± LT.
℄ Sta. 94+50± RT. to ℄ Sta. 101+80± RT.
Reconstruct Type 2DG Curb & Gutter. Demolition and disposal of existing curb & gutter shall be considered incidental to New Type 2DG Curb & Gutter.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING

Vicinity of Palama St. to End of H-1 On- and Off Ramp

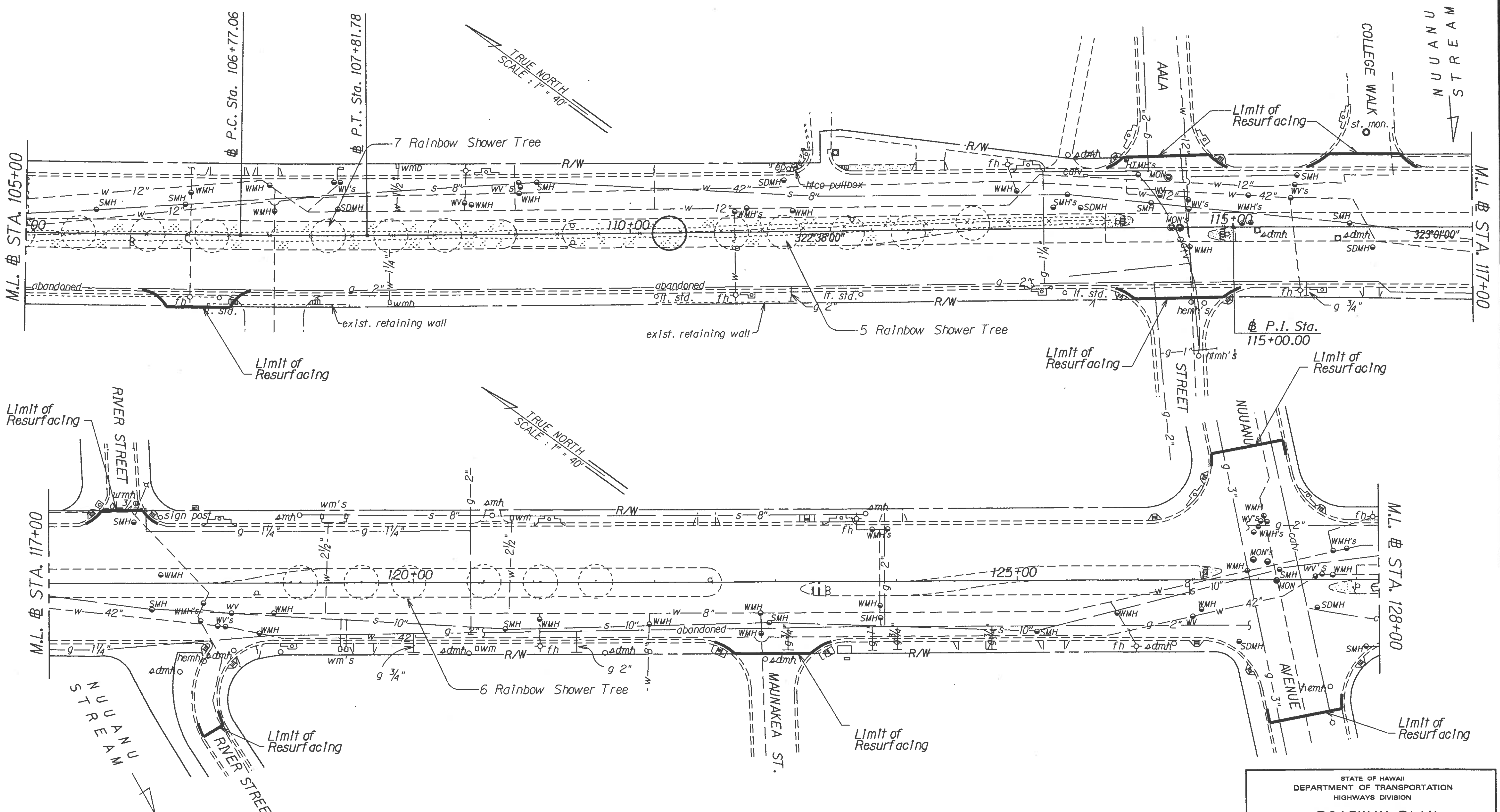
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 2 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING

Vicinity of Palama St. to End of H-1 On- and Off-Ramp

Project No. 98A-01-09M

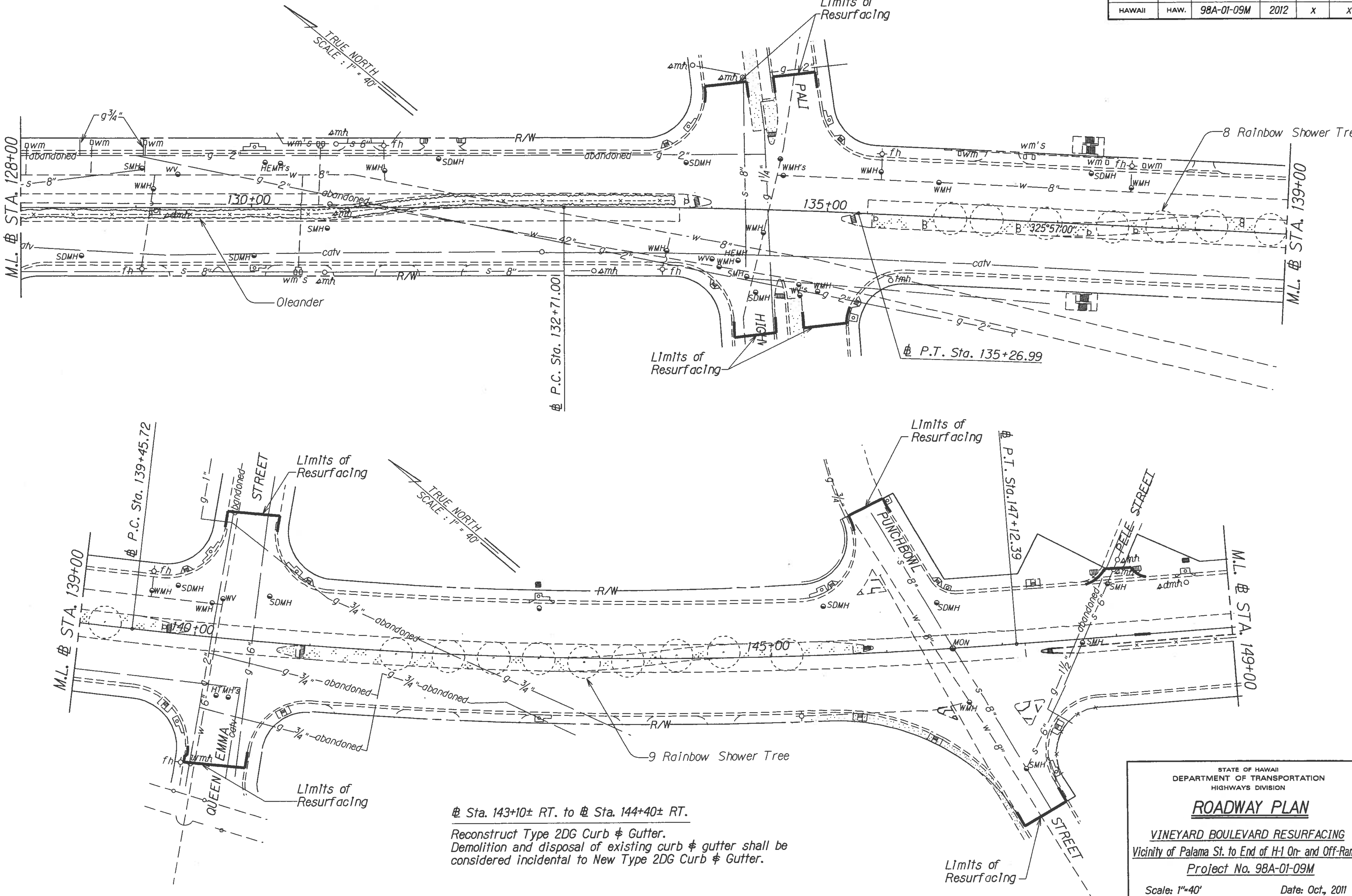
Scale: 1"=40' Date: Oct., 2011

SHEET No. 3 OF 6 SHEETS

XX

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE X
	DRAWN BY X	
NOTE BOOK ddl	TRACED BY	
	DESIGNED BY X	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	X	X



℄ Sta. 143+10± RT. to ℄ Sta. 144+40± RT.

Reconstruct Type 2DG Curb & Gutter.
Demolition and disposal of existing curb & gutter shall be considered incidental to New Type 2DG Curb & Gutter.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

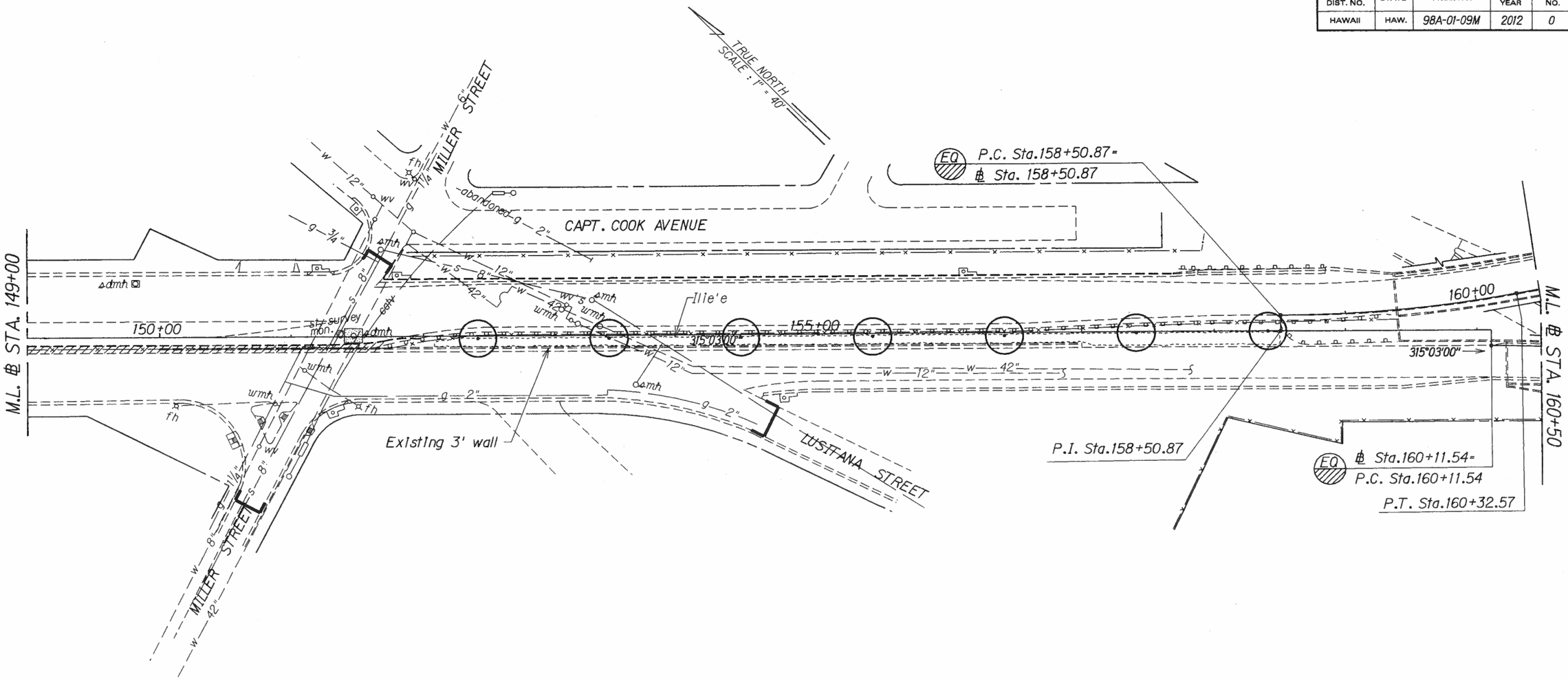
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 4 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
N.	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

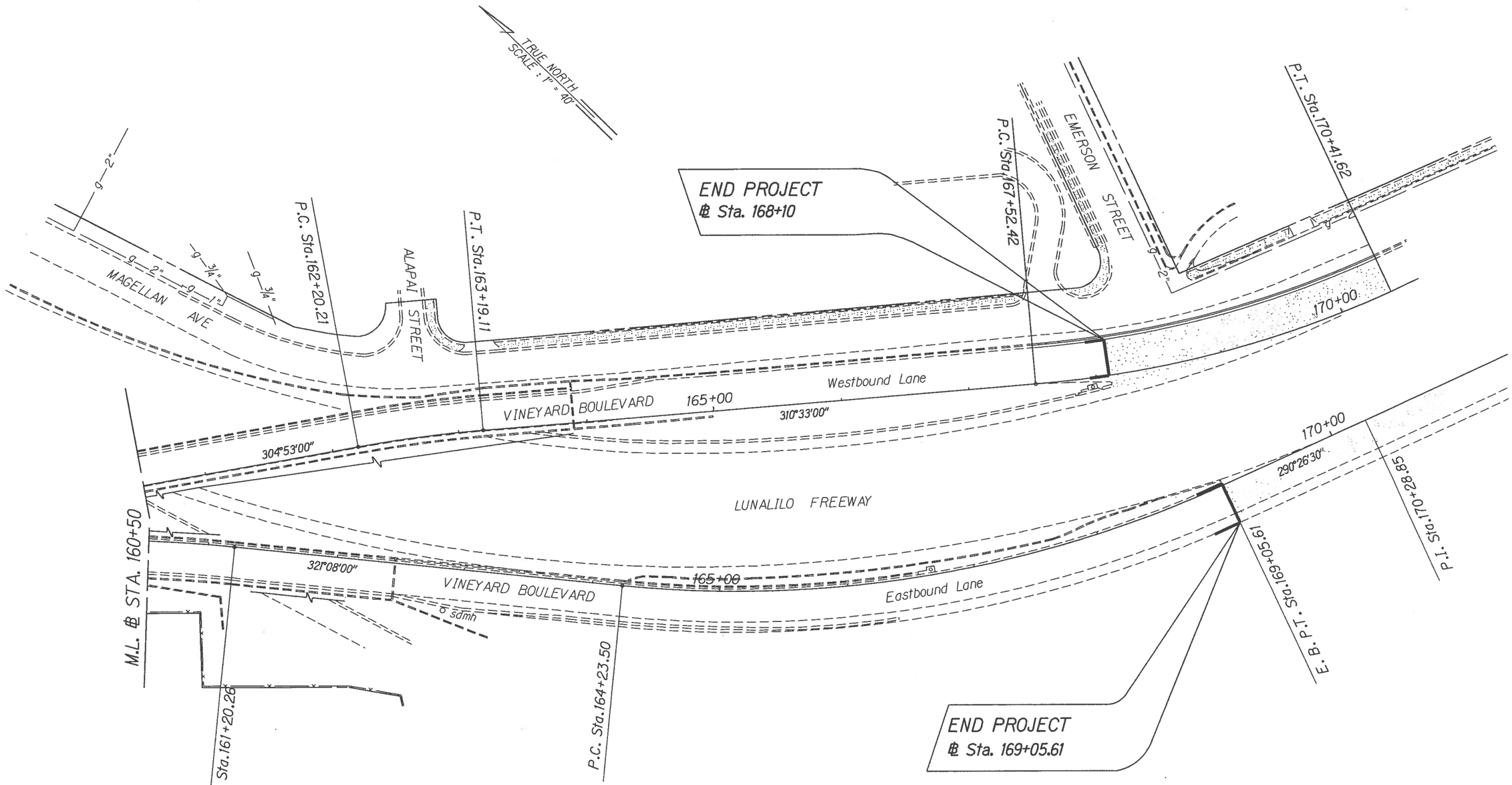
VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 5 OF 6 SHEETS

XX

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	98A-01-09M	2012	0	0



ORIGINAL PLAN
NOTE BOOK N.
SURVEY PLOTTED BY ____ DATE
DRAWN BY : :
TRACED BY : :
DESIGNED BY :
QUANTITIES BY :
CHECKED BY :

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ROADWAY PLAN

VINEYARD BOULEVARD RESURFACING
Vicinity of Palama St. to End of H-1 On- and Off-Ramp
Project No. 98A-01-09M

Scale: 1"=40' Date: Oct., 2011

SHEET No. 6 OF 6 SHEETS

XX

Attachment A-6
Specifications for Temporary Water Pollution, Dust, and Erosion Control

SECTION 209 - TEMPORARY WATER POLLUTION, DUST, AND EROSION CONTROL

209.01 Description. This section describes the following:

(A) Including detailed plans, diagrams, and written site-specific best management practices (BMP); constructing, maintaining, and repairing temporary water pollution, dust, and erosion control measures at the project site, including local material sources, work areas and haul roads; removing and disposing hazardous wastes; control of fugitive dust (defined as uncontrolled emission of solid airborne particulate matter from any source other than combustion); and complying with applicable State and Federal permit conditions.

(B) Work associated with dewatering activities and complying with conditions of the National Pollutant Discharge Elimination System (NPDES) general permit coverage authorizing discharges associated with construction activity dewatering.

Requirements of this section also apply to borrow pit operations, haul roads and Contractor's storage sites located outside State Right-of-Way.

209.02 Materials. Materials shall conform to the following:

(A) Slope Drains. Slope drains may be constructed of pipe, fiber, mats, erosion control fabric, geotextiles, rubble, portland cement concrete, bituminous concrete, plastic sheets, or other materials acceptable to Engineer.

(B) Mulches. Mulches shall be recycled materials include bagasse, hay, straw, wood cellulose, bark, wood chips, or other materials acceptable to Engineer. Mulches shall be clean and free of noxious weeds and deleterious materials.

(C) Grass. Grass shall be a quick growing species such as rye grass, Italian rye grass, or cereal grasses. Grass shall be suitable to the area and provide a temporary cover that will not compete later with permanent cover. Alternative grasses are allowable if acceptable to Engineer.

(D) Fertilizer and Soil Conditioners. Fertilizer and soil conditioners shall be a standard commercial grade acceptable to the Engineer. Fertilizer shall conform to Subsection 619.02(H)(1) - Commercial Fertilizer.

(E) Hydro-mulching. Hydro-mulching used as a BMP shall consist of materials in Subsections 209.02(B) - Mulches, 209.02(C) - Grass, and 209.02(D) –Fertilizer and Soil conditioners, with potable water meeting the

requirements of Subsection 712.01 - Water. Installation and other requirements shall in accordance with portions of Section 641- Hydro-Mulch Seeding.

(F) Silt Fences. Silt fences shall be synthetic filter fabric mounted on posts and embedded in compacted ground in accordance with contract documents, and shall be in compliance with ASTM D6462, Standard Practice for Silt Fence Installation.

(G) Berms. Berms shall be gravel or sand wrapped with geotextile material. Alternate materials are allowable if acceptable to Engineer.

Alternative materials or methods to control, prevent, remove and dispose pollution are allowable if acceptable to Engineer.

209.03 Construction.

(A) Preconstruction Requirements.

(1) Water Pollution, Dust, and Erosion Control Meeting. Submit site specific BMP to Engineer. Schedule a water pollution, dust, and erosion control meeting with Engineer after site specific BMP is accepted in writing by Engineer. Meeting shall be scheduled 14 days before start of construction work. Discuss sequence of work, plans and proposals for water pollution, dust, and erosion control.

(2) Water Pollution, Dust, and Erosion Control Submittals. Submit the following:

(a) Written site-specific BMP describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems. BMP shall include the following:

1. An identification of potential pollutants and their sources.

2. A list of all materials and heavy equipment to be used during construction.

3. Descriptions of the methods and devices used to minimize the discharge of pollutants into State waters, drainage or sewer systems.

4. Details of the procedures used for the maintenance and subsequent removal of any erosion or siltation control devices.

5. Methods of removing and disposing hazardous wastes encountered or generated during construction.

6. Methods of removing and disposing concrete and asphalt pavement cutting slurry, concrete curing water, and hydrodemolition water.

7. Spill control.

8. Fugitive dust control, including dust from grinding, sweeping, or brooming off operations or combination thereof.

9. Methods of storing and handling of oils, paints and other products used for the project.

10. Material storage and handling areas, and other staging areas.

11. Concrete truck washouts.

12. Concrete waste control.

13. Fueling and maintenance of vehicles and other equipment.

14. Tracking of sediment offsite from project entries and exits.

15. Litter management.

16. Toilet facilities.

17. Other factors that may cause water pollution, dust and erosion control.

(b) Provide plans indicating location of water pollution, dust and erosion control devices; provide plans and details of BMPs to be installed or utilized; show areas of soil disturbance in cut and fill, indicate areas used for storage of aggregate (indicate type of aggregate), asphalt cold mix, soil or waste, and show areas where vegetative practices are to be implemented. Indicate intended drainage pattern on plans. Include separate drawing for each phase of construction that alters drainage patterns. Indicate approximate date when device will be installed and removed.

(c) Construction schedule.

(d) Name(s) of specific individual(s) designated responsible for water pollution, dust, and erosion controls on the project site. Include home and business telephone numbers, fax numbers, and e-mail addresses.

(e) Description of fill material to be used.

Date and sign BMP. Keep accepted copy on site throughout duration of the project. Revisions to the BMP shall be included with original BMP. Modify contract documents to conform to revisions. Include actual date of installation and removal of BMP. Obtain written acceptance by Engineer before revising BMP.

Effective October 1, 2008, follow guidelines in the "Construction Best Management Practices Field Manual" dated January 2008, in developing, installing, and maintaining BMPs for all projects. Follow Honolulu's City and County "Rules for Soil Erosion Standards and Guidelines" for all projects on Oahu. Use respective Soil Erosion Guidelines for Maui, Kauai and Hawaii projects.

(B) Construction Requirements. Do not begin work until submittals detailed in Subsection 209.03(A)(2) - Water Pollution, Dust, and Erosion Control Submittals are completed and accepted in writing by Engineer.

Install, maintain, monitor, repair and replace site-specific BMP measures, such as for water pollution, dust and erosion control; installation, monitoring, and operation of hydrotesting activities; removal and disposal of hazardous waste indicated on plans, concrete cutting slurry, concrete curing water; or hydrodemolition water.

Furnish, install rain gage in a secure location for projects that require NPDES permit from the Department of Health prior to field work including installation of site-specific BMP. Provide rain gage with a tolerance of at least 0.05 inches of rainfall, and an opening of at least 1-inch diameter. Install rain gage on project site in an area that will not deter rainfall from entering the gate opening. Maintain rain gage and replace rain gage that is stolen, does not function properly or accurately, is worn out, or needs to be relocated. Do not begin field work until rain gauge is installed and site specific BMPs are in place. Do not begin field work until rain gauge is installed and site specific BMPs are in place.

Address all comments received from Engineer.

Modify and resubmit plans and construction schedules to correct conditions that develop during construction which were unforeseen during the design and pre-construction stages.

Coordinate temporary control provisions with permanent control features throughout the construction and post-construction period.

Limit maximum surface area of earth material exposed at any time to 300,000 square feet. Do not expose or disturb surface area of earth material (including clearing and grubbing) until BMP measures are installed and accepted in writing by Engineer. Protect temporarily or permanently disturbed soil surface from rainfall impact, runoff and wind before end of workday.

Protect exposed or disturbed surface area with mulches, grass seeds or hydromulch. Spray mulches at a rate of 2,000 pounds per acre. Add tackifier to mix at a rate of 85 pounds per acre. Apply grass seeds at a rate of 125 pounds per acre. For hydromulch use the ingredients and rates required for mulches and grass seeds.

Apply fertilizer to mulches, grass seed or hydromulch at a rate of 450 pounds per acre. Apply an additional 250 pounds per acre every 90 calendar days.

Install velocity dissipation measures when exposing erodible surfaces greater than 15 feet in height.

BMP measures shall be in place and operational (such as shaping the earthwork to control and directing the runoff) at the end of workday. Shaping earthwork may include constructing earth berms along the top edges of embankments if acceptable to Engineer.

Install and maintain either or both stabilized construction entrances and wheel washes to minimize tracking of dirt and mud onto roadways. Restrict traffic to stabilized construction areas only. Clean dirt, mud, or other material tracked onto the road immediately. Modify stabilized construction entrances to prevent mud from being tracked onto road. Stabilize entire access roads if necessary.

Chemicals may be used as soil stabilizers for either or both erosion and dust control if acceptable to Engineer.

Provide temporary slope drains of rigid or flexible conduits to carry runoff from cuts and embankments. Provide portable flume at the entrance. Shorten or extend temporary slope drains to ensure proper function.

Protect ditches, channels, and other drainageways leading away from cuts and fills at all times by either:

(1) Hydro-mulching the lower region of embankments in the immediate area.

(2) Placing an 8- to 15-inch layer of excavated rock, if available on-site, without reducing the cross section of the drainageway. Rocks shall be less than four inches in diameter.

(3) Installing check dams and siltation control devices.

(4) Other methods acceptable to Engineer.

Provide for controlled discharge of waters impounded, directed, or controlled by project activities or erosion control measures.

Cover exposed surface of materials completely with tarpaulin or similar device when transporting aggregate, soil, excavated material or material that may be source of fugitive dust.

Cleanup and remove any pollutant that can be attributed to Contractor.

Install or modify BMP measures due to change in Contractor's means and methods, or for omitted condition that should have been allowed for in the accepted site specific BMP or a BMP that replaces an accepted site specific BMP that is not satisfactorily performing.

Properly maintain all BMP features. Inspect, prepare a written report, and make repairs to BMP measures at following intervals:

(1) Weekly during dry periods.

(2) Within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period.

(3) Daily during periods of prolonged rainfall.

(4) When existing erosion control measures are damaged or not operating properly as required by site specific BMP.

Remove, destroy, replace or relocate any BMP that must be removed, destroyed, replaced or relocated due to potential or actual flooding, or potential danger or damage to project or public.

Maintain records of inspections of BMP work. Keep continuous records for duration of the project. Submit weekly copy of records to Engineer.

In addition to weekly reports, submit to Engineer all amounts spent initializing and maintaining BMP during previous week. Amount spent includes, but is not limited to: purchases of erosion control material, construction of storage areas, and installation of water pollution, erosion and dust control measures. Submit report weekly along with site inspection report.

Protect finished and previously seeded areas from damage and from spillover materials placed in upper lifts of embankment.

The Contractor's designated representative specified in Subsection 209.03(A)(2)(d) shall address any BMP concerns brought up by Engineer within 24 hours of notification, including weekends and holidays. Failure to satisfactorily address these concerns, Engineer reserves the right to employ outside assistance or use Engineer's own labor forces to provide necessary corrective measures. Engineer will charge Contractor such incurred costs plus any associated project engineering costs. Engineer will make appropriate deductions from Contractor's monthly progress estimate. Failure to apply BMP measures shall result in either or both the establishment and increase in the amount of retainage due to unsatisfactory progress or withholding of monthly progress payment. Continued failure to apply BMP measures may result in one or more of the following: assessment of liquidated damages, suspension, or cancellation of Contract with Contractor being fully responsible for all additional costs incurred by State.

(C) Hydrotesting Activities. If work includes removing, relocation or installing waterlines, and Contractor elects to flush waterline or discharge hydrotesting effluent into State waters or drainage systems, obtain an NPDES Hydrotesting Waters Permit from Department of Health, Clean Water Branch (DOH-CWB).

Do not begin hydrotesting activities until the DOH-CWB has issued a Notice of General Permit Coverage (NGPC). Hydrotesting operations shall be in accordance with conditions in NGPC. Submit a copy of the NPDES Hydrotesting Waters Application and Permit to Engineer.

(D) Dewatering Activities. If excavation of backfilling operations require dewatering, and Contractor elects to discharge dewatering effluent into State waters or existing drainage systems, obtain NPDES General Permit Coverage authorizing discharges associated with construction activity

dewatering from Department of Health, Clean Water Branch (DOH-CWB). If permit is required, prepare and submit permit application (CWB-NOI Form G) to DOH-CWB.

Do not begin dewatering activities until DOH-CWB has issued Notice of General Permit Coverage (NGPC). Conduct dewatering operations in accordance with conditions in NGPC. Submit copy of NPDES Hydrotesting Waters Application and Permit to Engineer.

209.04 Measurement.

(A) Installation, maintenance, monitoring, and removal of BMP will be paid on a lump sum basis. Measurement for payment will not apply.

(B) Engineer will only measure additional water pollution, dust and erosion control required and requested by Engineer on a force account basis in accordance with Subsection 109.06 – Force Account Provisions and Compensation.

209.05 Payment. Engineer will pay for accepted pay items listed below at contract price per pay unit, as shown in the proposal schedule. Payment will be full compensation for work prescribed in this section and contract documents.

Engineer will pay for each of the following pay items when included in proposal schedule:

Pay Item	**Pay Unit**
Installation, Maintenance, Monitoring, and Removal of BMP	Lump Sum
Additional Water Pollution, Dust, and Erosion Control	Force Account

An estimated amount for force account is allocated in proposal schedule under ‘Additional Water Pollution, Dust, and Erosion Control’, but actual amount to be paid will be the sum shown on accepted force account records, whether this sum be more or less than estimated amount allocated in proposal schedule. Engineer will pay for BMP measures requested by Engineer that are beyond scope of accepted site specific BMP and for litter management due to rubbish created by the public on a force account basis.

No progress payment will be authorized until Engineer accepts in writing site-specific BMP or when Contractor fails to maintain project site in accordance with accepted BMP.

For all citations or fines received by the Department for non-compliance with Notice of General Permit Coverage (NGPC), the Contractor shall reimburse State

within 30 days for full amount of outstanding cost State has incurred, or Engineer will deduct cost from progress payment.

Engineer will assess liquidated damages up to $27,500 per day for non-compliance of each BMP requirement and all other requirements in this section.

END OF SECTION 209

Attachment A-7
Water Pollution and Erosion Control Notes Sheet

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	X	200X	0	0

WATER POLLUTION AND EROSION CONTROL NOTES:

A. GENERAL:

1. See Section 209 - Temporary Water Pollution, Dust, and Erosion Control. Section 209 describes but is not limited to: submittal requirements; scheduling of a water pollution and erosion control conference with the Engineer; construction requirements; method of measurement; and basis of payment.

2. Effective October 1, 2008, follow the guidelines in the "Construction Best Management Practices Field Manual", dated January 2008 in developing, installing and maintaining the Best Management Practices (BMP) for the project.

3. Follow the guidelines in the Honolulu's City & County "Rules Relating to Soil Erosion Standards and Guidelines" along with applicable Soil Erosion Guidelines for projects on Maui, Molokai, Kauai, and Hawaii.

4. The Engineer may assess liquidated damages of up to $27,500 for non-compliance of each BMP requirement and each requirement stated in Section 209, for every day of non-compliance. There is no maximum limit on the amount assessed per day.

5. The Engineer will deduct the cost from the progress payment for all citations received by the Department for non-compliance, or the Contractor shall reimburse the State for the full amount of the outstanding cost incurred by the State.

6. For projects that require an NPDES Permit from the Department of Health, install a rain gage prior to any field work including the installation of any site-specific best management practices. The rain gage shall have a tolerance of at least 0.05 inches of rainfall, and have an opening of at least one-inch in diameter. Install the rain gage on the project site in an area that will not deter rainfall from entering the gage opening. The rain gage installation shall be stable and plumbed. Do not begin field work until the rain gage is installed and site-specific best management practices are in-place.

B. WASTE DISPOSAL:

1. Waste Materials
Collect and store all waste materials in a securely lidded metal dumpster. The dumpster shall meet all local and State solid waste management regulations. Deposit all trash and construction debris from the site in the dumpster. Empty the dumpster a minimum of twice per week or as often as is deemed necessary. Do not bury construction waste materials onsite. The Contractor's supervisory personnel shall be instructed regarding the correct procedure for waste disposal. Post notices stating these practices in the office trailer and the Contractor shall be responsible for seeing that these procedures are followed.

2. Hazardous Waste
Dispose all hazardous waste materials in the manner specified by local or State regulations and by the manufacturer. The Contractor's site personnel shall be instructed in these practices and shall be responsible for seeing that these practices are followed.

3. Sanitary Waste
Collect all sanitary waste from the portable units a minimum of once per week, or as required.

C. EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES:

1. Inspect all control measures at least once each week and within 24 hours of any rainfall event of 0.5 inches or greater within a 24 hour period.
2. Maintain all measures in good working order. If repair is necessary, it shall be initiated within 24 hours after the inspection.
3. Remove built-up sediment from silt fence when it has reached one-third the height of the fence.
4. Inspect silt screen or fence for depth of sediment, tears, to verify that the fabric is securely attached to the fence posts or concrete slab, and to verify that the fence posts are firmly in the ground. Inspect and verify the bottom of the silt screen is buried a minimum of 6 inches below the existing ground.
5. Inspect temporary and permanent seeding and planting for bare spots, washouts, and healthy growth.
6. Make a maintenance inspection report promptly after each inspection. Submit a copy to the Engineer no later than one week from the date of the inspection.
7. Provide a stabilized construction entrance to reduce vehicle tracking of sediments. Include stabilized construction entrance in the Water Pollution, Dust, and Erosion Control submittals. Minimum length should be 50 feet. Minimum width should be 30 feet. Minimum depth should be 12 inches or as recommended by the soils engineer and underlain with geo-textile fabric. Clean the paved street adjacent to the site entrance daily or as required to remove any excess mud, cold planed materials, dirt, or rock tracked from the site. Cover dump trucks hauling material from the construction site with a tarpaulin.
8. Include designated Concrete Washout Area(s) in the Water Pollution, Dust, and Erosion Control submittals.
9. Submit the name of a specific individual designated responsible for inspections, maintenance and repair activities and filling out the inspection and maintenance report.
10. Personnel selected for the inspection and maintenance responsibilities shall receive training from the Contractor. They shall be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.
11. Contain, remove, and dispose slurry generated from saw cutting of pavement in accordance with approved BMP practices. Payment for confinement, removal, and disposal of slurry shall be considered incidental to the various contract items.

D. GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES:

1. Materials Pollution Prevention Plan

a. Applicable materials or substances listed below are expected to be present onsite during construction. Other materials and substances not listed below shall be added to the inventory.

Concrete	Fertilizers
Detergents	Petroleum Based Products
Paints (enamel and latex)	Cleaning Solvents
Metal Studs	Wood
Tar	Masonry Block

b. Use Material Management Practices to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. Make an effort to store only enough product as is required to do the job.

c. Store all materials stored onsite in a neat, orderly manner in their appropriate containers and if possible under a roof or other enclosure.

d. Keep products in their original containers with the original manufacturer's label.

e. Do not mix substances with one another unless recommended by the manufacturer.

f. Whenever possible, use a product up completely before disposing of the container.

g. Follow manufacturer's recommendations for proper use and disposal.

h. Conduct a daily inspection to ensure proper use and disposal of materials onsite.

2. Hazardous Material Pollution Prevention Plan
a. Keep products in original containers unless they are not resealable.
b. Retain original labels and material safety data sheets (MSDS).
c. Dispose of surplus products according to manufacturer's instructions and local and State regulations.

REDUCED PLAN
(HALF SIZE)
0 1 2 3
3 INCHES OF ORIGINAL PLAN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION & EROSION CONTROL NOTES

XX
XX
Project No.: X

Date: XX, 200X

SHEET No. 1 OF 2 SHEETS

00

ORIGINAL PLAN | NOTE BOOK dd.x.x | No. X.dgn
SURVEY PLOTTED BY | DRAWN BY X | TRACED BY | DESIGNED BY X | QUANTITIES BY | CHECKED BY | DATE 10/27/11

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	X	200X	0	0

WATER POLLUTION AND EROSION CONTROL NOTES: -Cont.

D. GOOD HOUSEKEEPING BEST MANAGEMENT PRACTICES: -Cont.

3. Onsite and Offsite Product Specific Plan

The following product specific practices shall be followed onsite:

a. Petroleum Based Products:
Monitor all onsite vehicles for leaks and perform regular preventive maintenance to reduce the chance of leakage. Store petroleum products in tightly sealed containers which are clearly labeled. Apply asphalt substances used onsite according to the manufacturer's recommendation.

b. Fertilizers:
Apply fertilizers used only in the minimum amounts recommended by the manufacturer. Once applied, work fertilizer into the soil to limit exposure to storm water. Storage shall be in a covered shed. Transfer the contents of any partially used bags of fertilizer to a sealable plastic bin to avoid spills.

c. Paints:
Seal and store all containers when not required for use. Do not discharge excess paint to the highway drainage system. Dispose properly according to manufacturer's instructions or State and local regulations.

d. Concrete Trucks:
Wash out or discharge concrete truck drum wash water only at a designated site. Do not discharge water in the highway drainage system or waters of the United States. Contact Drinking Water Branch, Department of Health at 586-4258 to receive permission to designate a disposal site. Clean disposal site as required or as requested by the Owner's representative.

4. Spill Control Plan

a. Post a spill prevention plan to include measures to prevent and clean up each spill.

b. The Contractor shall be the spill prevention and cleanup coordinator. Designate at least three site personnel who shall receive spill prevention and cleanup training. These individuals shall each become responsible for a particular phase of prevention and cleanup. Post the names of responsible spill personnel in the material storage area and in the office trailer onsite.

c. Clearly post manufacturers' recommended methods for spill cleanup. Make site personnel aware of the procedures and the location of the information and cleanup supplies.

d. Keep materials and equipment necessary for spill cleanup in the material storage area onsite.

e. Clean up all spills immediately after discovery.

f. Keep the spill area well ventilated. Personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

g. Report spills of toxic hazardous material to the appropriate State or local government agency, regardless of the size.

E. PERMIT REQUIREMENTS:

1. If a National Pollutant Discharge Elimination System (NPDES) Permit is required for Construction Activities of one acre or more, submit to the Engineer six sets of the Water Pollution and Erosion Control Submittals as detailed in Subsection 209.03 of the specifications. The Contractor's attention is directed to the applicable NPDES Permit documents on the bid package compact disc.

2. If an NPDES Permit for Construction Dewatering is required, the Contractor shall be responsible to obtain the Permit from the Department of Health, Clean Water Branch.

3. Comply with all applicable State and Federal Permit conditions. Permits may include but are not limited to the following:

a. NPDES Permit for Construction Activities
b. NPDES Permit for Construction Dewatering
c. NPDES Permit for Hydrotesting Waters
d. Water Quality Certification
e. Stream Channel Alteration Permit
f. Section 404 Army Corps of Engineer Permit

REDUCED PLAN
(HALF SIZE)
0 1 2 3
3 INCHES OF ORIGINAL PLAN

ORIGINAL PLAN
SURVEY PLOTTED BY _____ DATE 10/22/11
DRAWN BY X
TRACED BY _____
DESIGNED BY X
QUANTITIES BY _____
CHECKED BY _____
NOTE BOOK dated X
No. X,dgn

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER POLLUTION & EROSION CONTROL NOTES

XX
XX
Project No. X
Date: XX, 200X

SHEET No. 2 OF 2 SHEETS

Attachment A-8
C&C County of Honolulu Grading Ordinance Letter of Agreement

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DESIGN BRANCH
M E M O R A N D U M

HWY-DH 2.3846
DATE: November 13, 2009

TO: HWY- C, O, -T, -L, -DS, -DD, -DH, -DB, -DL

FROM: HWY-D Scot D. Urada

SUBJECT: CITY AND COUNTY OF HONOLULU, DEPARTMENT OF PLANNING AND PERMITTING (DPP) - GRADING PERMIT SUBMITTAL REQUIREMENTS

This is a follow up to a HWY Memo dated September 8, 2008 (Attachment 2). The original self-certification form has been revised to include a paragraph stating that the Department of Transportation has reviewed the City and County of Honolulu Rules Relating to Soil Erosion Standards and Guidelines and has submitted the required documents to DPP. (See revised self-certification form in Attachment 1)

Documents required for submittal to DPP include the revised self certification form, Universal Soil Loss calculations, and Erosion Control Plans. The Design Engineer shall be responsible to complete the self certification form and prepare the soil loss calculations. The Oahu District office shall be responsible to ensure that these documents along with the Erosion Control Plans are submitted to DPP prior to the start of construction.

Again as a reminder, these submittals are only applicable to construction projects on Oahu that require a Grading Permit from DPP. In general, projects such as: pavement preservation, resurfacing, reconstruction, and rehabilitation; roadway, traffic, and drainage safety improvements; landscaping; utility work; rockfall; retaining and sound walls will not apply. The Table in Attachment 2 provides a detailed description of projects that do not require a Grading Permit.

Should you have any questions, please contact Scot Urada, Design Branch Head at 692-7559, or Curtis Matsuda at 692-7561 of our Hydraulic Design Section.

Attachments

CM: mjkn

c: HWY

ATTACHMENT 1

To: Department of Planning and Permitting
City & County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Attention: Permitting & Inspection Section

From: State of Hawaii
Department of Transportation
Highways Division
601 Kamokila Boulevard, Room 688A
Kapolei, Hawaii 96707

Subject: Non applicability for Detailed Plan review for projects requiring Grading Permits:

Project No: _____

Project Title:_____

_____

TMK No(s): _____

Detailed plan review and approval for the above project by the City & County of Honolulu is not applicable for the reasons stated in the HWY-D letter no. 2.8186 dated June 25, 2008 and as agreed with in DPP Letter 2008/ELOG-1912 dated August 12, 2008.

We certify that the work has been reviewed and is found to be in compliance with Chapter 14, Articles 13, 14 & 15 as amended, Revised Ordinances of Honolulu.

The Department of Transportation and/or its consultant have reviewed the City & County of Honolulu Rules Relating to Soil Erosion Standards and Guidelines (Guidelines) and the attached Erosion Control Plan and related documents have been prepared in accordance with the referenced Guidelines.

For questions regarding this matter, please contact Scot Urada at 692-7559, Engineering Program Manager, Design Branch, Highways Division.

Project Manager: _____ Date: _____
Print name

Section Head: _____ Date: _____
signature

Branch Head: _____ Date: _____
signature

Original: HWY-OC
cc: Project File

ATTACHMENT 2

Mailed out
SEP 19 2008

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DESIGN BRANCH
MEMORANDUM

HWY-D 2.9279
DATE: September 15, 2008

TO: HWY-C, -D, -L, -T, -O

FROM: HWY

SUBJECT: WAIVER OF DETAILED PLAN REVIEW - LETTER OF AGREEMENT (LOA) BETWEEN HAWAII STATE DEPARTMENT OF TRANSPORTATION AND CITY & COUNTY OF HONOLULU (C&C) DATED AUGUST 12, 2008

By letter of agreement (Attachment A), the C&C has agreed not to conduct a detailed plan review for DOT-Highways projects requiring grading permits provided that DOT submits a self certification form (page 2 of Attachment B) along with any required grading permit applications. This applies only to projects on Oahu that require grading permits.

Upon completion of design, the design Project Manager shall use Attachment C, Typical Projects not Requiring Grading Permits dated 8-20-08 and Attachment D, Revised Ordinances of Honolulu to determine whether if the project requires a grading permit or not.

If the project does not require a grading permit, no grading plan review by C&C is needed. The Project Manager checks the applicable block and signs on page 1 of Attachment B. The original is furnished to HWY-OC, and a copy is placed in the project file.

However if a project requires a grading permit, the following shall be done:

1. The Project Manager shall complete check the applicable block and sign page 1 of Attachment B, and complete page 2 of this form. The signatures of Section Head and Branch Head will be that of the office managing the PS&E.

2. The signed originals will be provided to HWY-OC prior to the preconstruction conference. A copy of this form will be kept in the design project file.

3. At the preconstruction meeting, page 2 of the original, signed form will be provided to the construction contractor, who in turn, will provide this to the C&C when a grading permit is processed.

It should be noted that this specifically pertains to grading plan review for projects on Oahu. The possibility exists that a project may affect other C&C facilities such as sewer lines, waterlines, traffic signals, sidewalks, etc. While such work may not require a grading permit, these plans will still require review and approval by C&C.

If you have any questions regarding this matter, please contact Scot Urada, Design Branch Head at 692-7559.

Attachment

SU:su

SELF- CERTIFICATION FORM

To: Department of Planning and Permitting
City & County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Attention: Permitting & Inspection Section

From: State of Hawaii
Department of Transportation
Highways Division
601 Kamokila Boulevard, Room 688A
Kapolei, Hawaii 96707

Subject: Non applicability for Detailed Plan review for projects requiring Grading Permits:

Project No: _____

Project Title:_____

_____

TMK No(s): _____

Detailed plan review and approval for the above project by the City & County of Honolulu is not applicable for the reasons stated in the HWY-D letter no. 2.8186 dated June 25, 2008 and as agreed with in DPP Letter 2008/ELOG-1912 dated August 12, 2008.

We certify that the work has been reviewed and is found to be in compliance with Chapter 14, Articles 13, 14 & 15 as amended, Revised Ordinances of Honolulu.

For questions regarding this matter, please contact Scot Urada at 692-7559, Engineering Program Manager, Design Branch, Highways Division.

Section Head: _____ Date: _____

Branch Head: _____ Date: _____

ATTACHMENT B

SUPERSEDED

Typical projects not requiring Grading Permits 8-20-08

(for DOT's use only to determine non-applicability)

	Project Type	Typical Scope of Work
1	Pavement Preservation and Maintenance (PPM)	Application of chip seal, slurry seal, cold plane and replace up to 1-1/2 inches of asphalt.
2	Road Resurfacing	Cut and replace asphalt, place more than 1-1/2 inches of asphalt, ultra thin white topping
3	Road Rehabilitation	Demolition and replacement of PCC, removal and repair and replacement of entire pavement section including PCC or AC and underlying pavement structure materials.
4	Electrical, water, sewer, drainage, communication or other utility installation or relocations	Trenching, removal and/or installation of conduits or pipes, trench backfill, and patching.
5	Traffic Signal Modernization and/or Installation	Trenching, installation of electrical and communication conduits, backfill, patching, replacement of traffic signal hardware, installation of poles & mast arms, augering and placement of concrete foundations, placement of small concrete pads for electrical equipment.
6	Lighting Improvements	Trenching, installation of electrical conduits, backfill, patching, augering and placement of concrete light foundations, placement of small concrete pads for electrical transformers and equipment.
7	Guardrail and Shoulder Improvements	Excavation for shoulder pavement section, install concrete sidewalks and wheel chair ramps, guardrails and end treatments, relocating street lights, grading to "shape" shoulder areas.
8	Intersection Improvements	Installation of pavement structures & sidewalks; minor grading and/or shaping; sometimes installation of traffic signal facilities and installation of electrical and communication conduits.
9	Landscape Improvements	Installation of trees, shrubs, irrigation facilities and other architectural features.
10	Retaining Walls or Sound Walls	Excavation and backfill for footings and walls.
11	Rockfall Protection	Installation of anchors, restraining or containment mesh, restraining or energy absorbing fencing. Slope scaling and removal of boulders.
12	Drainage Improvements	Trenching and replacement of drainage pipes, installation of catchment, inlet or outlet structures, installation of AC or concrete berms or curbs, installation of concrete gutters. Earth or lined ditches and/or swales.

Exclusions (Section 14, Article 13.5, ROH)

1. *Excavation* which does not alter the general drainage pattern with respect to abutting properties, which does not exceed 50 cubic yards of materials on any one site, and does not exceed three feet in vertical height at its deepest point; **provided that the cut meets the cut slopes and distance from property lines requirement in Section 14-15.1, ROH (attachment D).**
2. *Fill* which does not alter the general drainage pattern with respect to abutting properties, which does not exceed 50 cubic yards of materials on any one site, and does not exceed three feet in vertical height at its deepest point; **provided that the cut meets the cut slopes and distance from property lines requirement in Section 14-15.1, ROH.**
3. Grubbing that does not alter the general drainage pattern with respect to abutting properties and does not exceed a total of 15,000 square feet.

ATTACHMENT C

the corrective measures to be taken. Grading operations shall cease until corrective measures satisfactory to the chief engineer have been taken. In addition, whenever the work is not being done in conformance with a NPDES permit, the state department of health will be notified.
(Sec. 23-2.9, R.O. 1978 (1983 Ed.); Am. Ord. 92-122)

Article 15. Grading, Grubbing and Stockpiling

Sections:

14-15.1 Conditions of permit.
14-15.2 Special requirements.

Sec. 14-15.1 Conditions of permit.

The requirements of subsections (a), (b) and (c) may be modified by the director of planning and permitting based on the engineer's soils report and engineering slope hazard report.
(a) Height. Where a cut or fill is greater than 15 feet in height, terraces or benches shall be constructed at vertical intervals of 15 feet except that where only one bench is required, it shall be at the midpoint. The minimum width of such terraces or benches shall be at least eight feet and provided with drainage provisions to control erosion on the slope face and bench surface.
(b) Cut Slopes. Under the following soil conditions, no cut may be steeper in slope than the ratio of its horizontal to its vertical distance as shown below:
(1) One-half horizontal to one vertical in unweathered rock or mudrock;
(2) One horizontal to one vertical in decomposed rock;
(3) One and one-half horizontal to one vertical in soils of low plasticity, cuts of any height in highly plastic soils shall be as recommended in the applicable report.
(c) Fill Slopes. Fills shall not be steeper than a ratio of two horizontal to one vertical except that fill using highly plastic clays shall have slopes as recommended in the applicable report.
(d) Distance from property line. The horizontal distance from the top of a cut slope or the bottom of a fill slope to the adjoining property line shall not be less than as follows:

Height of Cut or Fill	Distance from Property Line (in feet)
Zero feet to 4 feet	2
More than 4 feet to 8 feet	4
More than 8 feet to 15 feet	6
More than 15 feet	8

These requirements may be modified by the director of planning and permitting when cuts or fills are supported by retaining walls or when the permittee submits an engineer's soils report or engineering slope hazard report stating that the soil conditions will permit a lesser horizontal distance without causing damage or danger to the adjoining property.
(e) Area Opened. The maximum-sized parcel of land that may be opened for grading or grubbing is 15 acres. Noncontiguous increments may be worked concurrently provided no single parcel exceeds 15 acres, provided the work is in conformance with the NPDES permit. The area of land that may be opened may be reduced by the director of planning and

Attachment P

permitting to control pollution and minimize storm damage. However, if soils, hydrologic, climatic and construction conditions warrant, and adequate erosion prevention measures have been taken, the director of planning and permitting may authorize additional area to be opened. Additional area may not be opened for grading or grubbing until measures to prevent dust or erosion problems in the area already graded or grubbed have been undertaken to the satisfaction of the director.

(f) Fills. The requirements of subdivisions (1), (2) and (3) may be modified by the director of planning and permitting if the permittee submits an engineer's soils report recommending criteria for the proposed fill for its intended use.

(1) Fill material shall be selected to meet the requirements and conditions of the particular fill for which it is to be used. The fill material shall not contain vegetation or organic matter. Where rocks, concrete, or similar materials of greater than eight inches in diameter are incorporated into the fill, they shall be placed in accordance with the recommendation of a soils engineer.

(2) Preparation of Ground Surface. Before placing or stockpiling, the natural ground surface shall be prepared by removing the vegetation and, if required by the director of planning and permitting, shall be notched by a series of benches and/or subsurface drains installed. No fill shall be placed over any water spring, marsh, refuse dump, nor upon a soft, soggy or springy foundation; provided, that this requirement may be waived by the director of planning and permitting if the permittee submits an engineer's soils report recommending criteria for the fill.

(3) Placement and Compaction. Fill materials shall be spread and compacted in a series of eight-inch to 10-inch layers when compacted, unless otherwise recommended by the soils engineer. Except for slopes, the fill shall be compacted to 90 percent of maximum density as determined by the most recent ASTM soil compaction test D1557 unless the engineer's soils report justifies a lesser degree of compaction, or unless otherwise recommended by the soils engineer.

(g) Vegetation. Whenever feasible, natural vegetation should be retained by becoming part of the erosion control plan during construction or part of the permanent landscaping plan if applicable. If it is necessary that vegetation be removed, trees, timber, plants, shrubbery and other woody vegetation, after being uprooted, displaced or dislodged from the ground by excavation, clearing or grubbing, shall not be stored or deposited along the banks of any stream, river or natural watercourse. After being uprooted, displaced or dislodged, such vegetation shall be disposed of by means approved in writing by the director of planning and permitting or removed from the site within a reasonable time, but not to exceed three months.

(h) Drainage Provisions. Adequate provisions shall be made to prevent surface waters from damaging the cut face of an excavation or the sloped surfaces of a fill. Positive drainage shall be provided to prevent the accumulation or retention of surface water in pits, gullies, holes or similar depressions. All drainage facilities shall be designed to carry surface waters to a street, storm drain inlet or natural watercourse and shall include an erosion and sedimentation control plan to prevent sediment-laden runoff from leaving the site, either during or following construction. The director of planning and permitting may require such detention or retention drainage structures and pipes to be constructed or installed, which in the director's opinion, are necessary to prevent erosion damage, prevent sediment-laden runoff from leaving the site, and to satisfactorily carry off surface waters. The flow of any existing and known natural underground drainage shall not be impeded or changed so as to cause damage to adjoining property.

(i) Debris Prohibited. No person shall perform any grading operation so as to cause falling rocks, soil or debris in any form to fall, slide or flow onto adjoining properties, streets or natural watercourses.

(j) Work Days. No grading work shall be done on Saturdays, Sundays and holidays at any time without prior notice to the director of planning and permitting, provided such grading work is also in conformance with Hawaii Administrative Rules, Chapter 11-43, "Community Noise Control for Oahu."

(k) Dust Control. All work areas within and without the actual grading area shall be maintained free from dust which will cause a nuisance or hazard to others and in conformance with the air pollution control standards contained in Hawaii Administrative Rules, Chapter 11-60, "Air Pollution Control."

(l) Water Quality Standards. All grading operations authorized under Articles 13 through 16 of this chapter shall be performed in conformance with the applicable provisions of the water pollution control and water quality standards contained in Hawaii Administrative Rules, Chapter 11-55, "Water Pollution Control" and Chapter 11-54, "Water Quality Standards" and if applicable, the NPDES permit for the project. Any dewatering discharge into state waters will require an NPDES permit from the department of health under Chapter 11-55, "Water Pollution Control." Any dewatering discharge into the city-owned storm sewer system will require a construction dewatering permit from the director of planning and permitting and an NPDES permit for the discharge of any pollutant into state waters through the city-owned storm sewer system from the department of health, State of Hawaii.

(m) Notification of Completion. The permittee or the permittee's agent shall notify the director of planning and permitting or the director's representative when the grading operation is ready for final inspection. Final approval shall not be given until completion of all work including installation of all drainage structures and their protective devices, completion of all planting showing a healthy growth in conformance with the approved plans and specifications, and the required reports have been submitted.

(n) Report After Grading.

(1) When grading involves cuts or fills for which an engineer's soils report was required, the permittee shall submit a final report, prepared by an engineer, upon the completion of such work. This report shall contain:

(A) A description of materials used in the fill and its moisture content at the time of compaction, the procedure used in depositing and compacting the fill, the preparation of original ground surface before making the fill, but not limited to benching and subsurface drainage, and a plan or tabulation showing the general location and elevation of compaction tests made in the fill together with a tabulation of relative compaction densities obtained at each location, the location of subdrains and other pertinent features of the fill necessary for its stability.

(B) A certification that the work was done in conformity to this chapter, the approved plans and specifications and the engineer's soils report.

(2) Where a slope hazard evaluation and mitigation plan was required to be submitted with a grading permit application, the permittee shall submit a final assessment report, prepared by an engineer, upon the completion of site work, prior to building construction. The assessment report shall contain a verification that the prevention measures and any stabilization measures called for in the engineering slope hazard report or construction plans

were done in conformity with this chapter, and the approved plans and specifications.
(o) As-Graded Plan. Upon completion of grading areas over one acre or areas graded under subdivision rules, an as-graded plan prepared by an engineer or land surveyor shall be submitted if required by the director of planning and permitting.
(Sec. 23-3.1, R.O. 1978 (1983 Ed.); Am. Ord 92-122, 04-27)

Sec. 14-15.2 Special requirements.
(a) Any person performing or causing to be performed any excavation or fill shall, at such person's own expense, provide the necessary means to prevent the movement of earth of the adjoining properties, to protect the improvements thereon, and to maintain the existing natural grade of adjoining properties.
(b) Any person performing or causing to be performed, any excavation or fill shall be responsible for the maintenance or restoration of street pavements, sidewalks and curbs, and improvements of public utilities which may be affected. The maintenance or restoration of street pavements, sidewalks and curbs shall be performed in accordance with the requirements of the City and County of Honolulu and the maintenance and restoration of improvements of public utilities shall be in conformity with the standards of the public utility companies affected. At cuts fronting any street, a suitable and adequate barrier shall be installed to provide protection to the public.
(c) Any person depositing or causing to be deposited, any silt or other debris in ditches, watercourses, drainage facilities and public roadways, shall remove such silt or other debris. In case such person shall fail, neglect or refuse to comply with the provisions of this section within 48 hours after written notice, served upon such person, either by mail or by personal service, the chief engineer may proceed to remove the silt and other debris or to take any other action the chief engineer deems appropriate. The costs incurred for any action taken by the chief engineer shall be payable by such person.
(d) At any stage of the grading, grubbing or stockpiling work, if the chief engineer finds that further work as authorized by an existing permit is likely to create soil erosion problems or to endanger any life, limb or property, the chief engineer may require safety precautions, which may include but shall not be limited to the construction of flatter exposed slopes, the construction of additional silting or sediment basins, drainage facilities or benches; the removal of rocks, boulders, debris and other dangerous objects which, if dislodged, are likely to cause injury or damage; the construction of fences or other suitable protective barriers; or may refer to the local soil and water conservation district for advice from the soil conservation service or other appropriate agencies on the planting or sodding of slopes and bare areas. All planted or sodded areas shall be maintained. An irrigation system or watering facilities may be required by the chief engineer.
(e) At any stage of the grading, grubbing or stockpiling operations, if the chief engineer finds that further work as authorized by an existing permit is likely to create dust problems which may jeopardize health, property or the public welfare, the chief engineer may require additional dust control precautions and, if these additional precautions are not effective in controlling dust, may stop all operations. These additional dust control measures may include such items as sprinkling water, applying mulch treated with bituminous material, or applying hydro mulch.
(f) Hillside lots shall be graded in such a manner that any parcels which may be created therefrom, including all separate building sites which may be contained within said parcels, can be satisfactorily graded and developed as individual building sites.
(Sec. 23-3.2, R.O. 1978 (1983 Ed.))

Article 16. Violations, Penalties and Liabilities for Grading, Grubbing and

Stockpiling

Sections:

14-16.1 General.
14-16.2 Notice of violation--Stop work.
14-16.3 Criminal prosecution.
14-16.4 Administrative enforcement.
14-16.5 Liability.
14-16.6 Rule-making powers.
14-16.7 Decisions of the chief engineer.

Sec. 14-16.1 General.

It is unlawful for any person to do any act forbidden, or to fail to perform any act required, by the provisions of Articles 13 through 16 of this chapter. Whenever a corporation violates any of the provisions of Articles 13 through 16 of this chapter, the violation shall be deemed to be also that of the individual directors, officers or agents of the corporation who in their capacity as directors, officers or agents of such corporation have authorized, ordered or done any of the acts constituting in whole or in part such violation. (Sec. 23-4.1, R.O. 1978 (1983 Ed.); Am. Ord. 90-71)

Sec. 14-16.2 Notice of violation--Stop work.

(a) Whenever any person, firm or corporation violates any provision of Articles 13 throught 16 of this chapter, the chief engineer shall serve the person, firm or corporation with a notice of violation which shall require the person, firm or corporation responsible to correct the violation.

(b) The notice of violation shall include but not be limited to the following information:

(1) The date of issuance of the notice;

(2) The name and address of the person or entity notified and the location of the violation;

(3) The section number of the ordinance, code or rule which has been violated;

(4) The nature of the violation; and

(5) An order to stop work if deemed necessary by the chief engineer; and

(6) The deadline for correction of the violation.

(c) If the chief engineer deems it necessary for work to stop, the work shall cease upon receipt of the notice and shall not resume until corrective measures satisfactory to the chief engineer have been taken. If the notice includes a stop work order, the chief engineer shall notify and transmit a copy to the chief of police concurrently with the issuance of the notice. The chief of police shall have the power to enforce the stop work order pursuant to Section 6-1604, Revised Charter of Honolulu, 1973, as amended.

(Added by Ord. 90-71; Am. Ord. 91-07)

Sec. 14-16.3 Criminal prosecution.

Any person, firm or corporation violating any of the provisions of Articles 13 through 16 of this chapter shall be deemed guilty of a misdemeanor for each and every day or portion thereof during which any violation of any provisions of this chapter is committed and, upon conviction of any such violation, such person shall be punishable by a fine of not more than $1,000.00 or by imprisonment for not more than one year, or by both fine and imprisonment. (Added by Ord. 90-71)

Sec. 14-16.4 Administrative enforcement.

(a) In lieu of or in addition to enforcement pursuant to Section 14-16.3, if the chief engineer determines that any person, firm or corporation is not complying with a notice of violation, the chief engineer may issue an order to the person or entity responsible for the violation, pursuant to this section.

(b) Contents of Order.

(1) The order may require the party responsible for the violation to do any or all of the following:

(A) Correct the violation within the time specified in the order;

(B) Upon compliance with the provisions of HRS Chapter 91, pay a civil fine not to exceed $1,000.00 in the manner, at the place and time specified in the order; and

(C) Upon compliance with the provisions of HRS Chapter 91, pay a civil fine not to exceed $1,000.00 per day for each day in which the violation occurs, in the manner and at the time and place specified in the order.

(2) The order shall advise the party responsible for the violation that the order shall become final 30 calendar days after the date of its delivery.

(c) Judicial Enforcement of Order. The chief engineer may institute a civil action in any court of competent jurisdiction for the enforcement of any order issued pursuant to this section. Where the civil action has been instituted to enforce the civil fine imposed by said order, the chief engineer need only show that the notice of violation and order were served, that a civil fine was imposed, the amount of the civil fine imposed and that the fine imposed has not been paid.

(Added by Ord. 90-71)

Sec. 14-16.5 Liability.

The provisions of Articles 13 through 16 of this chapter shall not be construed to relieve or alleviate the liability of any person for damages resulting from performing, or causing to be performed, any grading, grubbing or stockpiling operation. The city, its officers and employees shall be free from any liability, cost or damage which may accrue from any grading, grubbing or stockpiling or any work connected therewith, authorized by Articles 13 through 16 of this chapter. (Sec. 23-4.2, R.O. 1978 (1983 Ed.); Am. Ord. 90-71)

Sec. 14-16.6 Rule-making powers.

The chief engineer shall be empowered to promulgate rules and regulations pursuant to HRS Chapter 91, for the implementation of the provisions of Articles 13 through 16 of this chapter. (Sec. 23-4.3, R.O. 1978 (1983 Ed.); Am. Ord. 90-71)

Sec. 14-16.7 Decisions of the chief engineer.

Decisions of the chief engineer made in accordance with the provisions of Articles 13 through 16 of this chapter, and/or decisions involving variations from the standards referred to herein shall be made a matter of record in the permit file. (Sec. 23-4.4, R.O. 1978 (1983 Ed.); Am. Ord. 90-71)

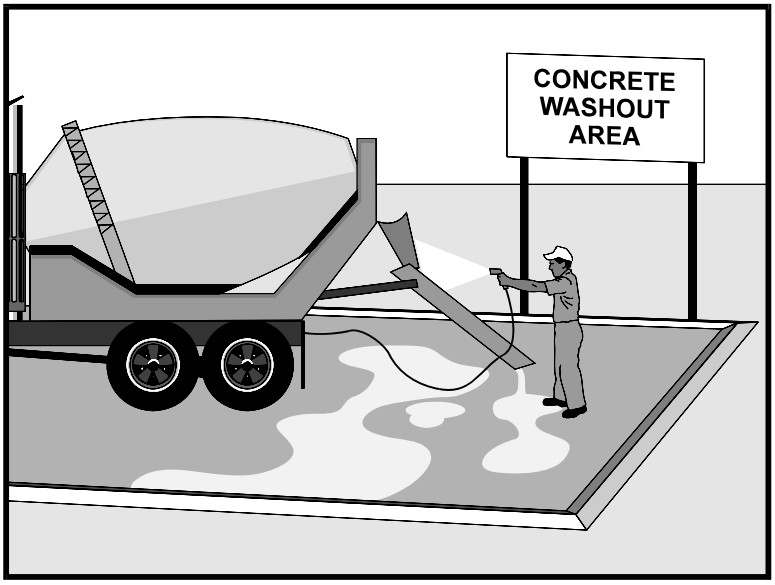
Article 17. Excavation and Repairs of Streets and Sidewalks

Sections:

14-17.1 Permit required--Application--Insurance--Bond--Permit fee.
14-17.2 Notice of commencement, prosecution of work and inspection.
14-17.3 Trench excavation, backfill and pavement restoration.
14-17.4 Repairs by city.

Attachment A-9
HDOT Construction Best Management Practices And Supplemental Sheets

Concrete Waste Management SM-5



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to prevent or reduce the discharge of concrete waste to the drainage system or adjacent water bodies.

Applications

- Projects involving use of concrete as a construction material or demolition activities generating concrete dust and debris.
- On-site wash areas used for concrete-coated vehicles or equipment.
- Activities such as sawcutting and grinding which result in the formation of slurries containing portland cement concrete or asphalt concrete.

Installation and Implementation Requirements

- Properly store concrete materials away from runoff and under cover.
- Avoid mixing excess concrete, if possible. Discard excess concrete in the designated area.
- Wash concrete-coated vehicles or equipment off-site or in the designated wash area. Locate on-site concrete wash area a minimum of 50 feet away from storm drain inlets, open drainage facilities, or water bodies. Runoff from the on-site concrete wash area shall be contained in a temporary pit or level bermed area where the concrete can set.
- Temporary pit shall be lined with plastic to prevent seepage of the wash water into the ground. Allow wash water to evaporate or collect wash water and all concrete debris in a concrete washout system bin.

Installation and Implementation Requirements (Continued)

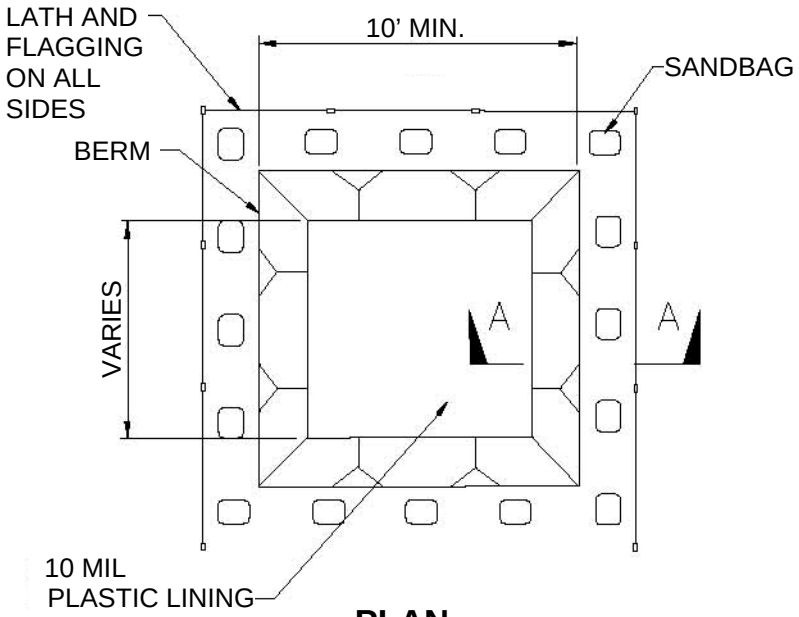
- Break up and properly dispose of hardened concrete from wash area.
- Collect and properly dispose of aggregate concrete sweepings.
- Provide concrete waste management training for employees and contractors.

Limitations

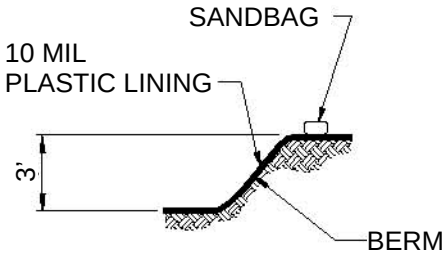
Off-site concrete wash areas may be impracticable.

Inspections and Maintenance

- Inspect concrete wash areas for damage and repair as necessary.
- Regularly remove and dispose hardened concrete.
- Monitor contractors to ensure proper concrete waste management measures are implemented.



PLAN
NTS



SECTION A-A
NTS

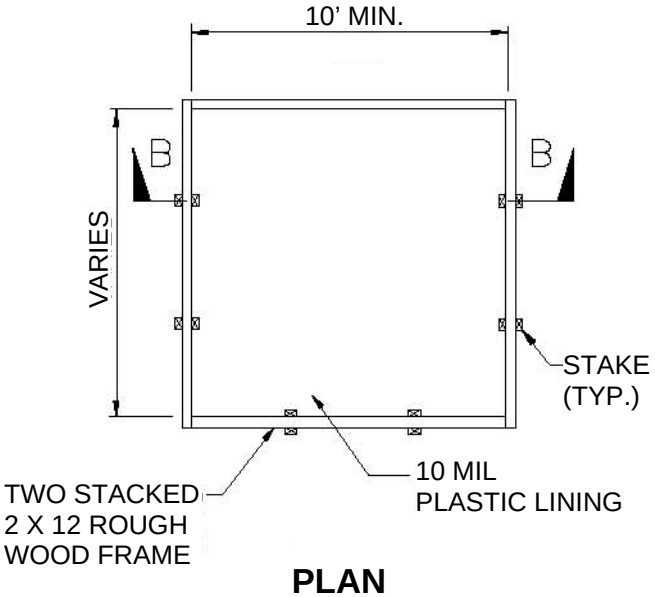
NOTES:

1. ACTUAL LAYOUT DETERMINED IN FIELD.

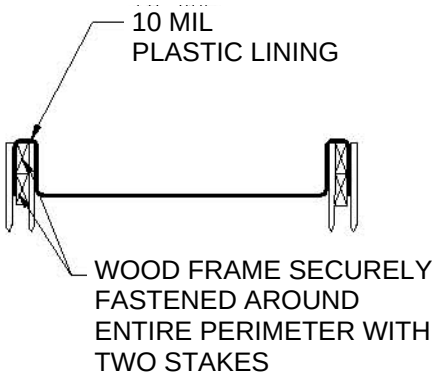
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FEET OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

WASH AREA (BELOW GRADE)

Source: Caltrans Construction Site Best Management Practices Manual, 2003.



PLAN
NTS



SECTION A-A
NTS

NOTES:

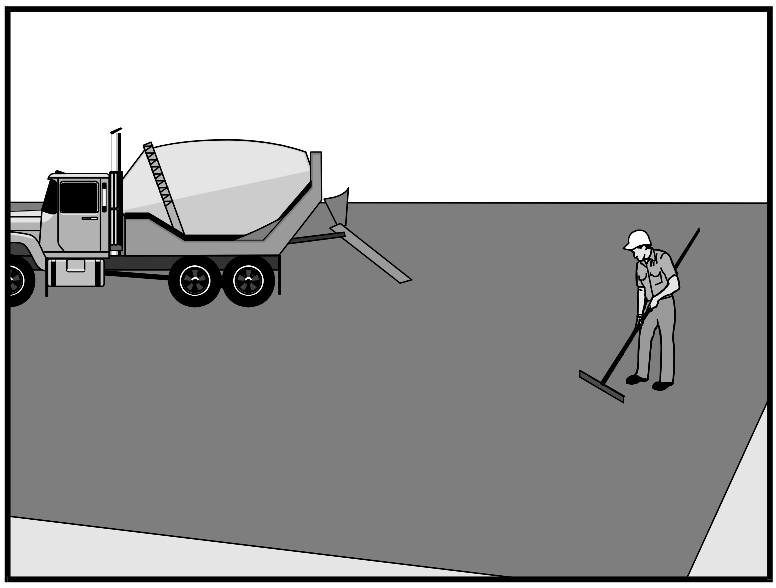
1. ACTUAL LAYOUT DETERMINED IN FIELD.

2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FEET OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

WASH AREA (ABOVE GRADE)

Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Paving Operations SM-19



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to prevent or reduce the discharge of pollutants into the storm drain system or adjacent water body from paving, saw cutting, or grinding activities.

Applications

- Paving equipment storage.
- Asphalt cleaning.
- Removal of existing asphalt or concrete.
- Concrete, asphalt, seal coat, tack coat, or slurry applications.
- Recycling of pavement.

Installation and Implementation Requirements

- Limit paving operations during wet weather when possible.
- Store materials for paving activities away from concentrated runoff.
- Use asphalt emulsions as prime coat when possible.
- Place drip pans under paving equipment to contain leaks and spills. Clean up spills with absorbent materials.
- Place geotextile filter fabric over drain inlet structures and manholes during application of tack coat, seal coat, slurry seal, and fog seal.
- Saw cut slurry shall be removed from site by vacuuming. Provide storm drain protection during saw cutting.
- Refer to SM-5 (Concrete Waste Management) in this manual for activities involving Portland cement concrete.
- Adhere to the following when paving involves asphaltic concrete (AC):
  - Properly dispose of old or spilled asphalt. Collect and remove broken asphalt. Recycle asphalt when possible;
  - Excess sand and gravel shall be swept to prevent discharge into

Installation and Implementation Requirements (Continued)

the storm drainage system or adjacent water body; and

o Comply with storm water permitting requirements for industrial activities if paving requires an on-site mixing plant.

Limitations

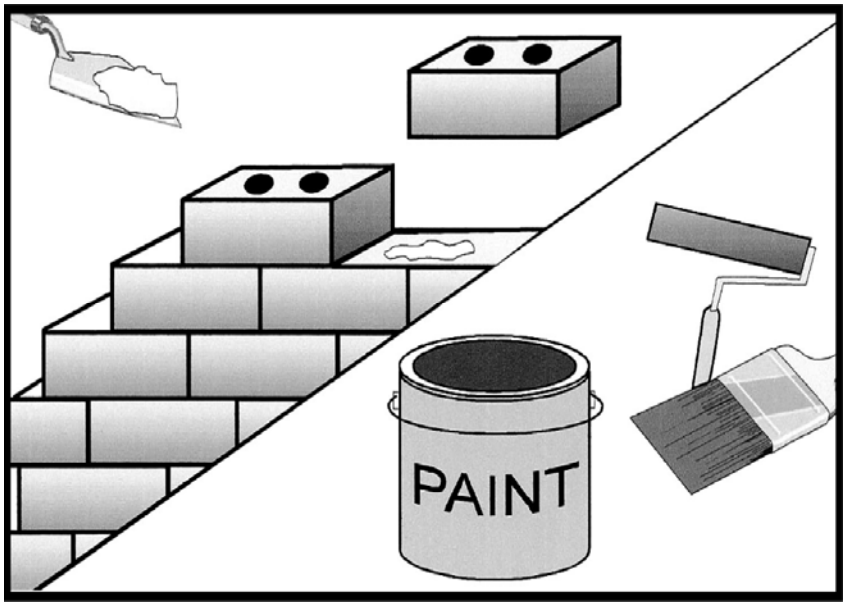
Restrict paving operations during wet weather to prevent contact between storm water and paving materials.

Inspections and Maintenance

- Ample supplies of drip pans and absorbent materials shall be kept on-site.
- Inspect inlet protection equipment.
- Monitor employees to ensure appropriate paving practices and procedures are being implemented.

Structure Construction and Painting

SM-20



Source: Knoxville BMP Manual, 2003.

Description

Practices and procedures to reduce or prevent the discharge of pollutants from structure construction and painting activities into the storm drain system or adjacent water bodies. Pollutants include solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, epoxy compounds, adhesive residues, and old asbestos insulation. Refer to SM-6 (Solid Waste Management), SM-9 (Hazardous Waste Management), and SM-5 (Concrete Waste Management) in this manual for additional information.

Applications

Construction or maintenance activities involving painting or structure repair and construction.

Installation and Implementation Requirements

- Maintain a clean and orderly work site.
- Use recycled or less hazardous products if practical.
- Comply with local air quality and OSHA regulations during painting activities.
- Properly store paints, solvents, and epoxy compounds.
- Properly store and dispose waste materials generated from painting and structure repair and construction activities.
- Avoid drift by enclosing or covering painting operations.
- Use appropriate application equipment to minimize overspray.
- Immediately clean up spills.
- Collect residue from sand blasting or scraping operations on a drop cloth. Dispose of this residue properly.

Installation and Implementation Requirements (Continued)

- Paint chips containing lead or tributyl tin shall be treated as hazardous waste. Refer to the SM-9 (Hazardous Waste Management) in this manual for more information.
- Clean painting equipment in a sink connected to the sanitary sewer system.
- Mix paints in a covered and contained area when possible to minimize adverse impacts from spills.
- Comply with applicable laws and regulations for recycle/disposal of residual paints, solvents, lumber, and other materials.
- Minimize inadvertent disposal of residual paints and other liquids by ensuring nearby storm drains are clearly marked.
- Upon completion of the activity, inspect the storm drain system in the immediate work area and remove dirt or debris.
- Provide employee training.
- Properly dispose of material from sand blasting activities. Chips and dust from marine paints or paints containing lead shall be considered hazardous waste. Paint chips and dust from non-hazardous dry stripping and sand blasting shall be swept and disposed of as trash.

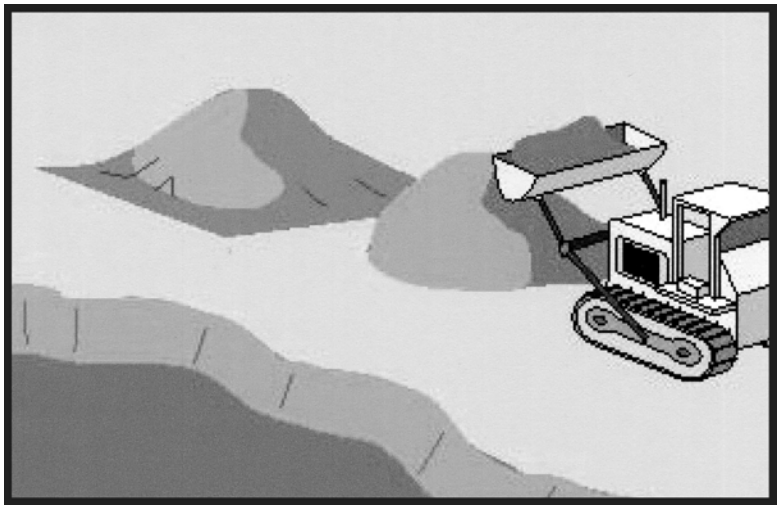
Limitations

- Availability of recycled or less hazardous products may be limited.
- Hazardous waste which may not be recycled or reused shall be disposed of by a licensed hazardous waste transporter.
- Storm water quality protection measures shall comply with State and Federal safety (OSHA) and air quality regulations.

Inspections and Maintenance

Materials and equipment for proper housekeeping and disposal practices shall be readily available.

Topsoil Management SM-21



Source: Truckee Meadows Construction Best Management Practices Handbook, 2003.

Description

Reuse of native topsoil and other selected materials during revegetation activities. Salvaging, stockpiling, and reapplication of native topsoil are integral to successful revegetation efforts, especially for the reestablishment of native vegetation.

Applications

- Reestablishment of areas where vegetation with native plant species is desirable.
- Appropriate for sensitive habitat areas, floodplains, wetlands, and stream banks.

Installation and Implementation Requirements

- Conduct a site-specific soil survey of the area prior to soil disturbing activities to assess the location, depth, and amount of soils suitable for salvaging.
- Salvage and stockpile all suitable topsoil and other material for future use during revegetation of the area. Stockpile material in an area free of contamination from demolition or construction activities.
- Refer to SM-4 (Protection of Stockpiles) in this manual when stockpiling salvaged topsoil.
- Carefully remove shrubs suitable for revegetation and store with the roots covered with mulch or loose soil.
- Cover or stabilize soil stockpiles with temporary measures such as mulch or temporary vegetation.
- Apply topsoil or growth medium directly to disturbed areas when practicable.
- Soil replacement depths are determined by factors such as soil depth prior to disturbance, type of vegetation, and physical and/or chemical properties of the material to be covered. A deeper soil layer is required for soils with poor physical and chemical

Installation and Implementation Requirements (Continued)

properties. Testing (nutrients, pH, and toxicity factors) of replacement soils and material to be covered shall be completed prior to reapplication.

- Consideration of the following items is necessary when developing a topsoil management plan:
  - Quality and amount of native topsoil or growth medium;
  - Area of surface disturbance to which topsoil or growth medium will be applied and the required depth of application;
  - Methodology for salvaging topsoil or growth medium;
  - Stockpile location, duration of storage, and required erosion control measures to protect stockpile;
  - Feasibility of direct application of salvaged soils; and
  - Availability of other growth media to supplement topsoil reclamation.

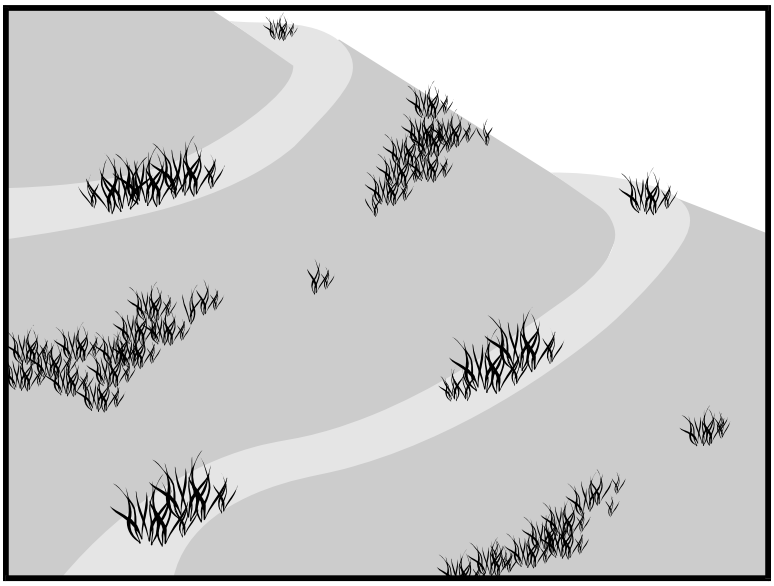
Limitations

- Stockpiles may limit the area available for construction activity.
- Runoff from stockpiles may adversely impact water quality.

Inspections and Maintenance

- Regularly inspect stockpiles for erosion and stabilize as necessary.
- Inspect stockpile covers to ensure adequate protection from wind and rain.
- Adequately water plantings until they are established.

Seeding and Planting EC-5



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Seeding and planting of trees, vines, shrubs, and ground cover for temporary or permanent stabilization of soil.

Applications

Soil stabilization during or after the construction phase applies to the following site conditions:

- Graded/cleared areas without on-going construction activity;
- Open space and fill areas;
- Steep slopes;
- Spoil piles or temporary stockpile of fill material;
- Vegetated swales;
- Landscape corridors; and
- Stream banks.

Installation and Implementation Requirements

Requirements for each seeding/planting application shall be considered and include:

- Type of vegetation;
- Site and seedbed preparation;
- Seasonal planting times;
- Fertilization; and
- Water.

Grasses

- Ground preparation requires fertilization and mechanical stabilization of the soil.
- Short-term temperature extremes and waterlogged soil conditions tolerable.

Installation and Implementation Requirements (Continued)

- Appropriate soil conditions include a shallow soil base, good drainage, and 2:1 or flatter slope.
- Quickly develops from seeds.
- Vigorous grass growth dependent on mowing, irrigating, and fertilizing.

Trees and Shrubs

- Selection dependent on vigor, species, size, shape, and potential wildlife food source.
- Consider wind/exposure and irrigation requirements.
- Use indigenous species where possible.

Vines and Ground Cover

- Lime and fertilizer required for ground preparation.
- Use appropriate seeding rates.
- Consider requirements for drainage, acidity, and ground slope.
- Use indigenous species where possible.
- Avoid species which require irrigation.

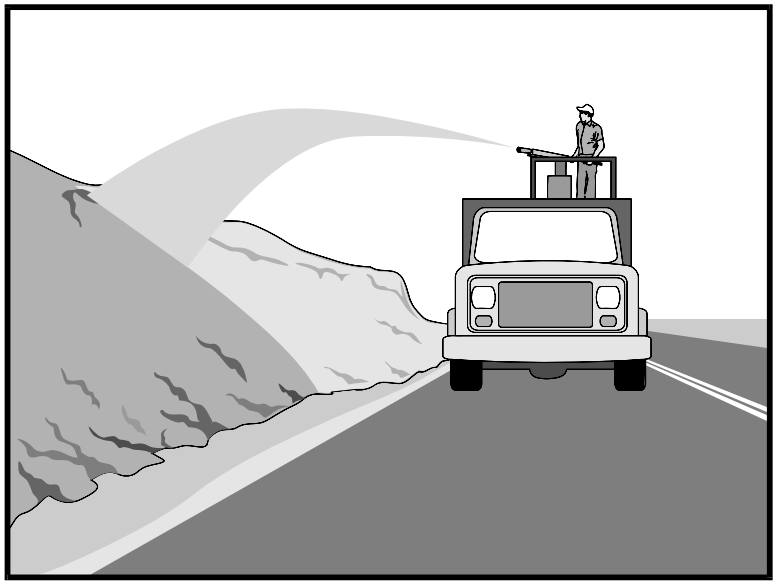
Limitations

- During dry periods without irrigation, permanent and temporary vegetation may not be appropriate.
- Improper application of fertilizer may contribute to storm water pollution.

Inspections and Maintenance

Monitor vegetation growth and water, fertilize, mow, and/or prune the grasses/plants as needed.

Mulching EC-6



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Application of loose bulk material to stabilize disturbed soil by protecting bare soil, increasing infiltration, and reducing runoff. Materials used for mulching include green material, hydraulic matrices, hydraulic mulches of recycled paper or wood fiber, stone and aggregate, vegetable fibers (hay or straw), and wood/bark chips.

Applications

- Temporary ground cover until permanent vegetation has been established.
- Method used in combination with temporary or permanent seeding to enhance plant growth.
- Areas requiring soil moisture retention to prevent cracking of the soil.
- Ground cover for exposed soil between trees or shrubs.

Installation and Implementation Requirements

VEGETABLE FIBERS (HAY OR STRAW)

- Loose hay or straw which may be used in combination with seeding. Mulching usually follows seeding and the process is described in the following:
  - Apply seed and fertilizer to bare soil;
  - Apply loose hay or straw over top of seed and fertilizer prior to seed germination. Apply at a rate of 2,000 pounds per acre by machine or hand distribution;
  - Evenly distribute mulch on the soil surface to cover 80% to 90% of the ground;
  - Maintain maximum fiber length. Average fiber length shall be greater than 6 inches;

Installation and Implementation Requirements (Continued)

- o Use a tackifier, netting, or mechanical "punching" method to anchor mulch. Method depends on slope steepness, accessibility, soil conditions, and longevity; and
- o "Punching" straw or hay into soil is the preferred method of anchoring mulch for the following conditions:
  - Use a spade or shovel on small areas,
  - Use a knife-blade roller or straight bladed coulter ("crimper") on slopes with soil, which can support construction equipment without undesirable compaction or instability,
  - Use plastic netting or jute on small areas and/or steep slopes. Geotextile pins, wooden stakes, or 11 gauge wire staples shall secure netting in place. This condition warrants consideration of the use of matting rather than mulch, and
  - Use tackifiers on steep slopes unable to support construction equipment or large application areas where use of nettings, straw, or hay is not cost-effective. Tackifiers glue vegetable fibers together and to the soil surface until the establishment of permanent vegetation.

GREEN MATERIAL

- Consists of recycled vegetation trimmings such as grass and shredded shrubs and trees.
- Generally applied by hand.
- Temporary ground cover with or without seeding.
- Evenly distribute green material on soil surface. Depth shall not exceed 4 inches.
- Anchor with a tackifier or netting on steep slopes or for areas with anticipated overland sheet flow. This condition warrants consideration of the use of matting rather than mulch.

WOOD/BARK CHIPS

- Suitable for areas which will not be mowed such as around trees, shrubs, and landscape plantings.
- Test soils prior to application. Add a minimum of 12 pounds of nitrogen per ton of mulch to counteract the effect of decomposing wood-based materials, which extract nitrogen from soil. Use a balanced, slow-release fertilizer or an organic source such as compost.
- Apply mulch by hand.
- Evenly distribute wood/bark chips on soil surface and maintain a mulch depth of 2-inch to tree basins and 4-inch to shrub beds.

HYDRAULIC MULCHES OF RECYCLED PAPER

- Consists of recycled newsprint, magazines, and other waste paper sources.
- May be applied with or without tackifiers.

Installation and Implementation Requirements (Continued)

- Hydraulic mulch materials shall conform to *2005 Hawaii Standard Specifications for Road and Bridge Construction.*
- Mix mulch in a hydraulic application machine (hydroseeder) and apply as a liquid slurry.
- May be sprayed from a cannon up to 200 feet or from a hose up to 1,500 feet away from the application area.
- Mix mulch with seed and fertilizer as specified by the manufacturer. Apply mulch at the manufacturer's recommended rate to ensure uniform, effective coverage.

HYDRAULIC MULCHES OF WOOD FIBER

- Consists of wood waste from lumber mills or urban sources.
- May be manufactured with or without a tackifier.
- Hydraulic mulch shall conform to *2005 Hawaii Standard Specifications for Road and Bridge Construction* or comply with the following requirements:
  - 100% wood fiber;
  - Maximum moisture content (total weight basis) shall not exceed 12% ±3%;
  - Minimum organic matter content (oven dry weight basis) of 99.3%;
  - Maximum inorganic matter (ash) content (oven dried basis) of 0.7%;
  - pH of 4.9±10% for a 3% water slurry; and
  - Minimum water holding capacity (oven dried basis) of 1.2 gallons per pound of fiber.
- Mix mulch in a hydraulic application machine (hydroseeder) and apply as a liquid slurry.
- Mix mulch with seed and fertilizer as specified by the manufacturer. Apply mulch at the manufacturer's recommended rate to ensure uniform, effective coverage.

HYDRAULIC MATRICES

- Hydraulic slurries consisting of wood fiber, paper fiber, or a combination of wood and paper fiber mixed with a binder system.
- Exceeds erosion control performance of blankets due to close contact with soil.
- Apply as an aqueous slurry (with seed) using standard hydroseeding equipment.
- Applications rates vary for different combinations of conditions and products.
- A typical mixture based on one acre of treated area includes the following:
  - 500 pounds wood fiber mulch;
  - 1,000 pounds recycled paper mulch; and

Installation and Implementation Requirements (Continued)

- 55 gallons acrylic copolymer with a minimum solids content of 55%.

- Bonded Fiber Matrix (BFM) consists of premixed fiber and binders.
  - After application and upon drying, BFM shall adhere to soil and form a 100% cover. The cover shall be biodegradable, promote vegetation, and prevent soil erosion.
  - Composed of long strand, thermally produced wood fibers (>88% of total volume by weight), held together by organic tackifiers (10%) and mineral bonding agents (<2%), which become insoluble and non-dispersible upon drying. Composition of BFM varies based on supplier.
  - Perform a free liquid quality control test on the liquid slurry.
  - Binder shall not dissolve or disperse upon watering.
  - Upon application to the soil, holes in the matrix shall not exceed 0.04 inches in size.
  - There shall not be any gaps between the matrix and the soil.
  - Minimum water holding capacity of the matrix shall be 1.2 gallons per pound matrix.
  - The matrix shall be free of germination or growth inhibiting factors and shall not form a water resistant crust.
  - Materials used for the matrix shall be 100% biodegradable and 100% beneficial to plant growth.
  - Testing and evaluation of the matrix by an independent research laboratory shall have been conducted to verify reported erosion control performance.
  - A trained and manufacturer certified applicator with knowledge of proper mixing and product application shall install the BFM.
  - Typical BFM application rates range from 3,000 to 8,000 pounds per acre per recommendations from various manufacturers.
  - BFM shall not be applied immediately before, during, or after a rainfall event to ensure a drying time of 24 hours after installation.

- Mulch used as temporary ground cover shall be reapplied to bare areas until permanent vegetation has been established.
- Avoid spraying mulch onto sidewalk, lined drainage channels, travelway, and existing vegetation.

Limitations

VEGETABLE FIBERS (HAY OR STRAW)

- Require three-step machinery.
- Labor intensive installation.
- Weed seeds and undesirable plant material may be introduced to sensitive areas.

Limitations (Continued)

- For applications using straw blowers, the applicable area must be located within 150 feet of a road or surface capable of supporting loads from large vehicles. If both hay and straw are available, it is preferable to use straw.

GREEN MATERIAL

- Limited commercial availability.
- Variable quality.
- Weeds or undesirable plant material may be introduced to the mulched area.
- Application primarily uses manual labor.
- Unpredictable effectiveness as an erosion control measure. Requires overspray with a tackifying agent to increase effectiveness.
- Application of fertilizer may be required.
- Limit use to non-critical steep slopes and areas where alternative erosion control measures may be readily applied.

WOOD/BARK CHIPS

- Poor erosion control effectiveness.
- Anchoring of chips onto steep slopes is difficult due to potential movement from high winds.
- Subject to displacement from concentrated flows.
- Use of a fertilizer with high nitrogen content is required to prevent nutrient deficiency in plants due to decomposing wood-based materials, which extract nitrogen from soil. Improper fertilizer use may contribute to water quality pollution.
- Limit use to non-critical steep slopes and areas where alternative erosion control measures may be readily applied.

HYDRAULIC MULCHES OF RECYCLED PAPER

- Limited erosion control effectiveness due to short fiber length and absence of a tackifier.
- Limited moisture and soil temperature moderation.
- Residual inks within mulches may be undesirable in environmentally sensitive areas.
- Significant decrease in longevity compared with wood fiber mulch.
- Difficulty budgeting for this product due to volatile prices for recycled paper products.

HYDRAULIC MULCHES OF WOOD FIBER

- Limited erosion control effectiveness.
- Short-term use of one growing season.

Limitations (Continued)

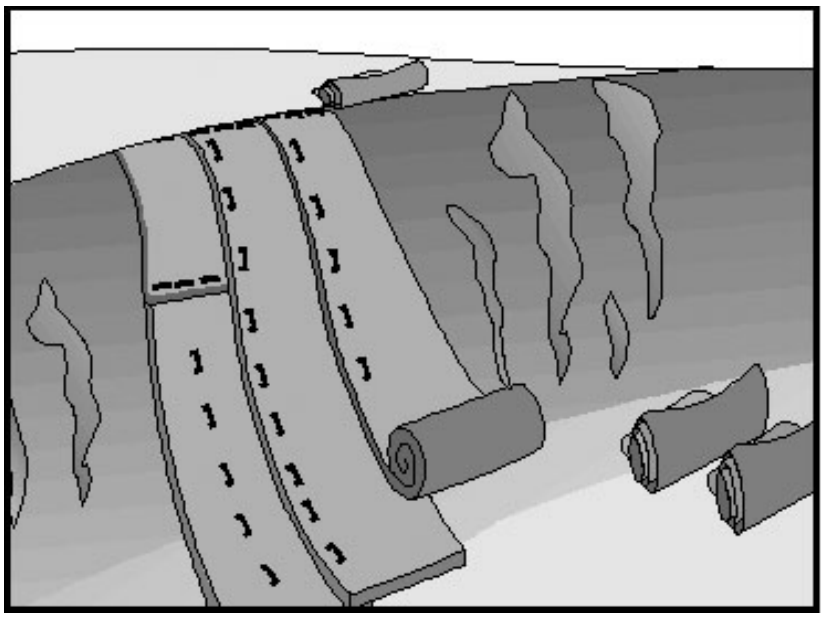
HYDRAULIC MATRICES

- Avoid application of mulch immediately before, during, or after a rainfall event.
- Requires drying time of 24 hours.

Inspections and Maintenance

- Mulches applied to seeded areas may be disturbed due to wind or runoff. Recover exposed areas until permanent vegetation has been established.
- Mulches applied to areas, which will be regraded and revegetated, shall be inspected weekly.
- Replace ornamental and landscape mulches of bark or wood chips if soil is visible in more than 75% of the designated area.

Geotextiles and Mats EC-7



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Natural or synthetic mats to be used for temporary or permanent soil stabilization.

Applications

- Drainage ditches, channels, and stream banks.
- Steep slopes.

Installation and Implementation Requirements

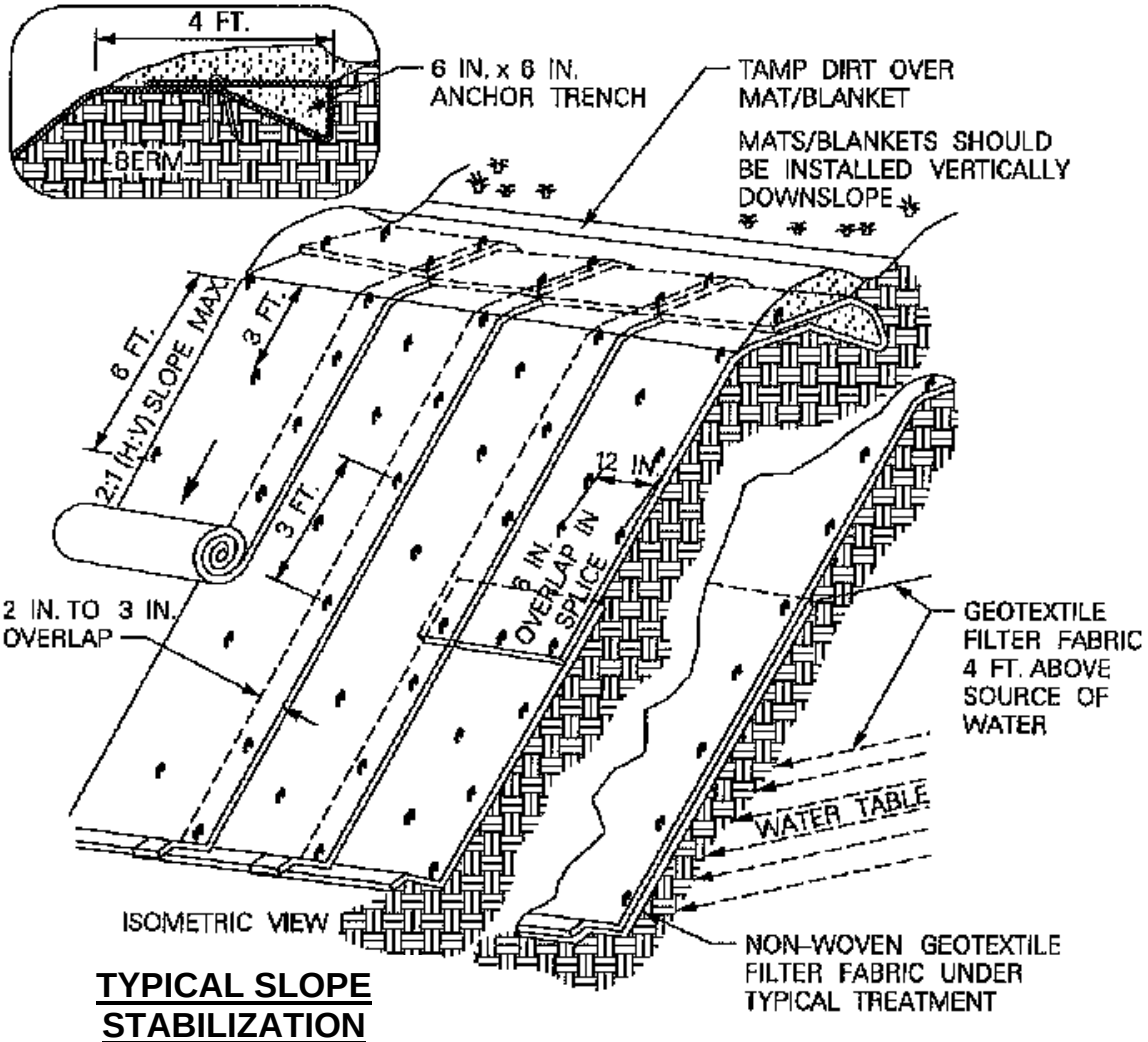
- Apply matting to disturbed soils and areas where vegetation has been removed.
- Organic matting provides temporary protection until permanent vegetation has been established, optimal weather conditions occur, or construction delays are resolved. Organic matting materials include the following:
  - o Jute matting; and
  - o Straw matting.
- Synthetic matting provides temporary or post-construction soil stabilization in both vegetated and non-vegetated areas. Synthetic matting materials include the following:
  - o Excelsior™ matting;
  - o Glass fiber matting;
  - o Staples; and
  - o Mulch netting.
- Other proprietary devices may be used and shall be installed per manufacturer's recommendations.

Limitations

- Minimize use of matting to areas where other erosion control measures are not applicable such as channels or steep slopes since matting is more costly compared to other erosion control measures.
- Seed germination may be delayed due to decreased soil temperature.
- An experienced maintenance engineer is required during installation.

Inspections and Maintenance

Periodically inspect matting after installation.



TYPICAL SLOPE STABILIZATION
NTS

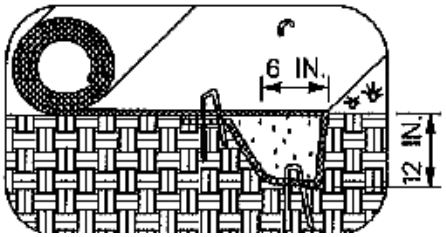
WET SLOPE LINING
NTS

NOTES:

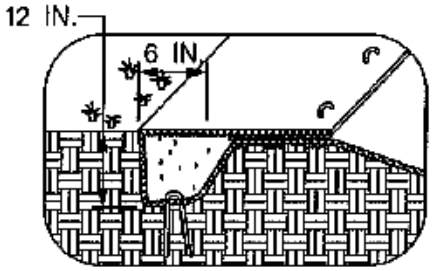
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS. SOIL CONTACT SHALL BE MAXIMIZED.
2. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
3. INSTALLATION MAY VARY ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

GEOTEXTILES AND MATS INSTALLATION DETAIL

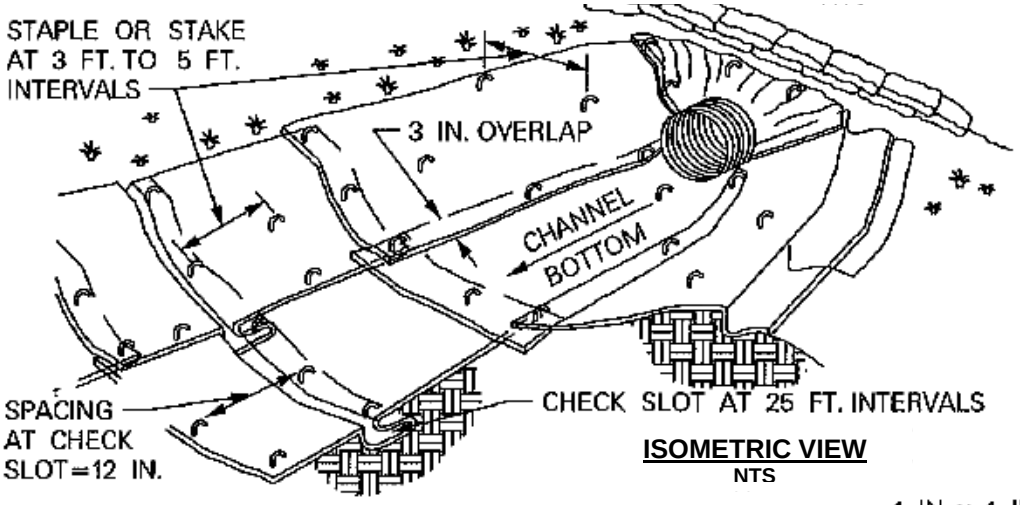
Source: HDOT Storm Water Management Plan, Oahu District, 2003.



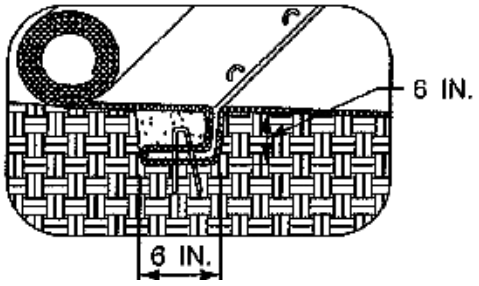
INITIAL CHANNEL ANCHOR TRENCH
NTS



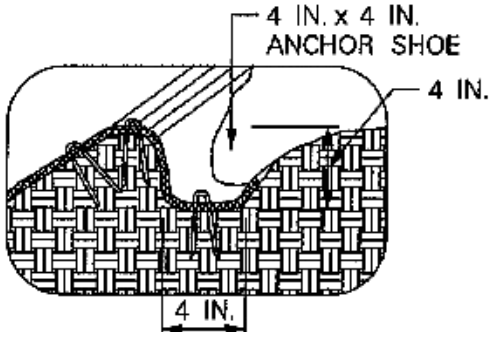
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

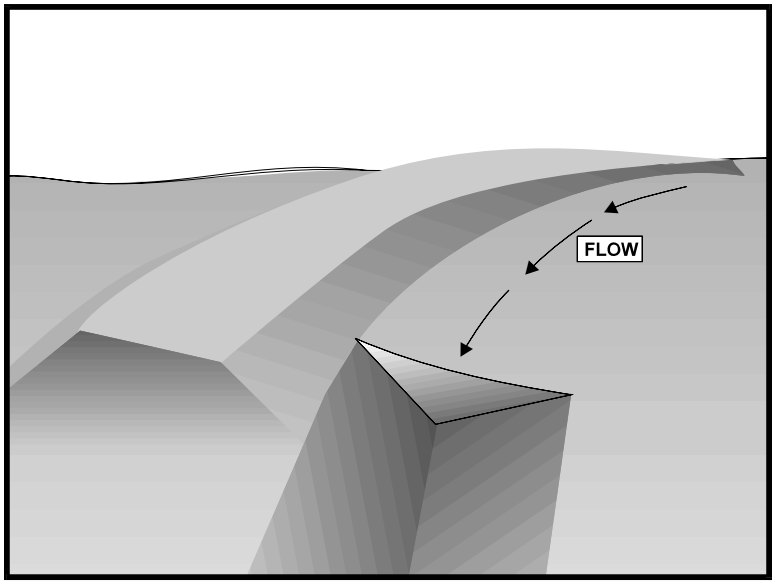
NOTES:

1. CHECK SLOTS TO BE CONSTRUCTED PER MANUFACTURER'S SPECIFICATIONS.
2. STAKING OR STAPLING LAYOUT PER MANUFACTURER'S SPECIFICATIONS.

GEOTEXTILES AND MATS DETAIL

Source: HDOT Storm Water Management Plan, Oahu District, 2003.

Earth Dike SC-6



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Structure that prevents erosion by intercepting, diverting, and conveying surface run-on (storm water entering the site) to a stabilized area or other sediment trapping device.

Applications

- Drainage areas smaller than 10 acres.
- Direct runoff around unstable or disturbed areas to a stabilized water course, drainage pipe, or channel.
- Divert runoff to sediment basins or sediment traps.
- Intercept runoff at the point of concentration.
- Supplement other sediment control measures.
- Intercept and divert runoff to prevent sheet flow over sloped surfaces.
- Convey surface runoff down sloping land.

Installation and Implementation Requirements

- Firmly compact to minimize erosion and prevent unequal settling.
- Drain to a stabilized outlet.
- Drain sediment laden runoff to a sediment trapping device.
- Ensure continuous, positive grade along dike to prevent ponding of runoff.
- Stabilize earth dikes with vegetation, chemicals, or other physical devices.
- Conform to predevelopment drainage patterns and capacities.
- The design of dikes shall be submitted to the HWY-OM Engineer or Hydraulic Section staff for review. The review will evaluate structural stability and drainage capacity.
- Design flow and safety factor shall be determined by an evaluation

Installation and Implementation Requirements (Continued)

of risks associated with overtopping, flow backups, or washout of structures.

- Evaluate potential run-on from off-site properties.
- Flow velocity limit shall be determined by on-site soil type and drainage flow patterns.
- Establish minimum flow velocity requiring lining (rip-rap, geotextile filter fabric, vegetation, concrete) for earthen diversion devices. Refer to Highways Division's *Hawaii Statewide Uniform Design Manual for Streets and Highways*.
- Incorporate an emergency overflow section or bypass area into the design for storms exceeding the design storm.

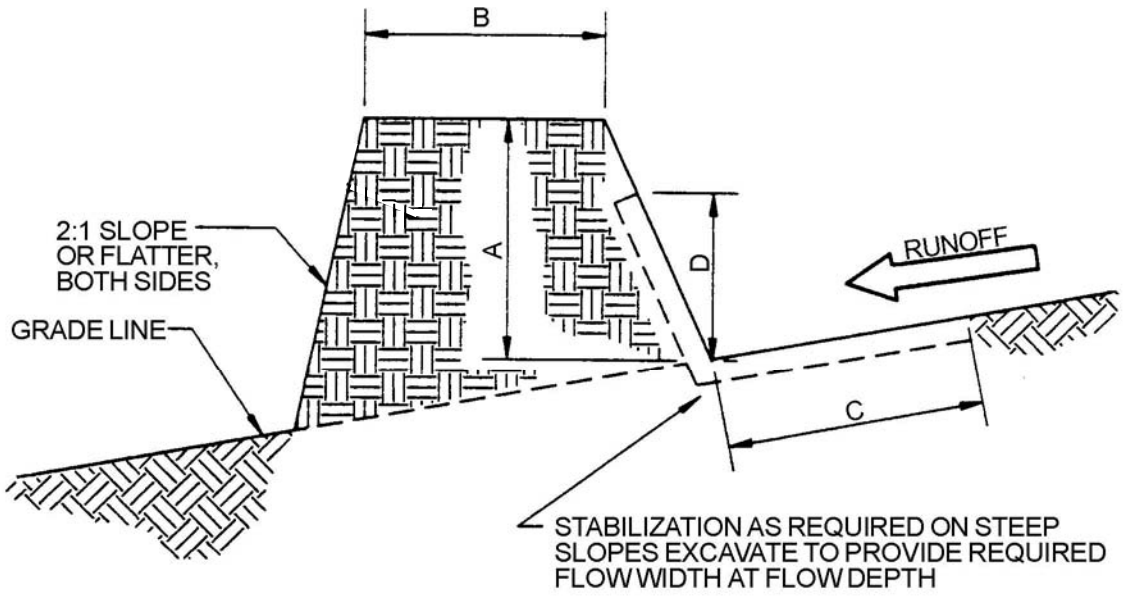
Limitations

- Unsuitable for use as a sediment trapping device.
- Use of additional sediment and erosion control devices may be required to prevent scour and erosion in recently graded dikes.
- Select size and location to prevent unintended consequences such as erosion along steep and unlined ditches and ponding within the travelway or material storage areas. Alteration of existing waterways and clearing of existing vegetation are subject to permit requirements of the U.S. Army Corps of Engineers and state or local agencies.

Inspections and Maintenance

- Remove dikes after stabilization of the surrounding drainage area or completion of construction.
- Inspect dikes weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall. Inspections shall include the following:
  - Check for erosion along berms. Restore all bare areas with the appropriate lining material;
  - Remove accumulated sediment and debris; and
  - Inspect dike walls for cracks, washouts, animal habitation, exposed materials, and other signs of potential failure. Restore areas with the appropriate materials. Coordinate restoration with the HWY-OM Engineer or Material Testing and Research Section as necessary. The Hydraulic Section shall also be consulted for problems associated with structural design or runoff flow patterns.

Earth Dike SC-6



REQUIREMENTS BASED ON UPSTREAM DRAINAGE AREA

	DIKE 1 (5 ACRES OR LESS)	DIKE 1 (5-10 ACRES)
A-DIKE HEIGHT	18"	36"
B-DIKE WIDTH	24"	36"
C-FLOW WIDTH	4'	6'
D-FLOW DEPTH	8"	15"

EARTH DIKE
NTS

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

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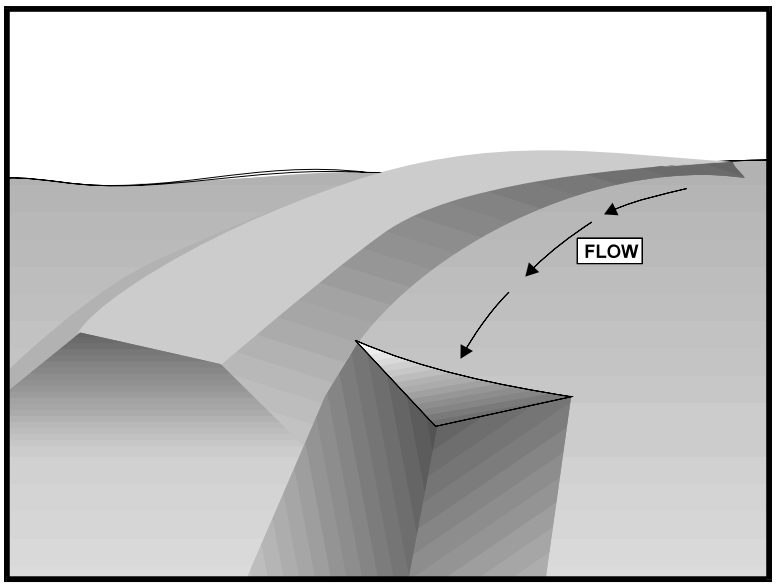
Temporary Drains and Swales SC-7



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Structures that prevent erosion by intercepting, diverting, and conveying surface run-on (storm water entering the site) to a stabilized area or other sediment trapping device.

Applications

- Drainage areas smaller than 5 acres.
- Direct runoff around unstable or disturbed areas to a stabilized water course, drainage pipe, or channel.
- Divert runoff to sediment basins or sediment traps.
- Intercept runoff at point of concentration.
- Supplement other sediment control measures.
- Intercept and divert runoff to prevent sheet flow over sloped surfaces.
- Convey surface runoff down sloping land.

Installation and Implementation Requirements

- Firmly compact to minimize erosion and prevent unequal settling.
- Drain to a stabilized outlet.
- Drain sediment laden runoff to a sediment trapping device.
- Ensure continuous, positive grade along swale or ditch to prevent ponding of runoff.
- Stabilize earth drains or swales with vegetation, chemicals, or other physical devices.
- Conform to predevelopment drainage patterns and capacities.
- The design of swales or ditches shall be submitted to the HWY-OM Engineer or Hydraulic Section staff for review. The review will evaluate structural stability and drainage capacity.

Installation and Implementation Requirements (Continued)

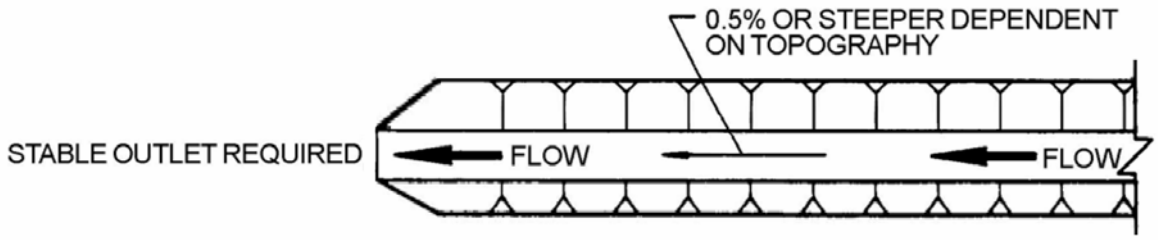
- Design flow and safety factor shall be determined by an evaluation of risks associated with overtopping, flow backups, or washout of structures.
- Evaluate potential run-on from off-site properties.
- Flow velocity limit shall be determined by on-site soil type and drainage flow patterns.
- Establish minimum flow velocity requiring lining (rip-rap, geotextile filter fabric, vegetation, concrete) for earthen diversion devices. Refer to Highways Division's *Hawaii Statewide Uniform Design Manual for Streets and Highways*.
- Incorporate an emergency overflow section or bypass area into the design for storms exceeding the design storm.

Limitations

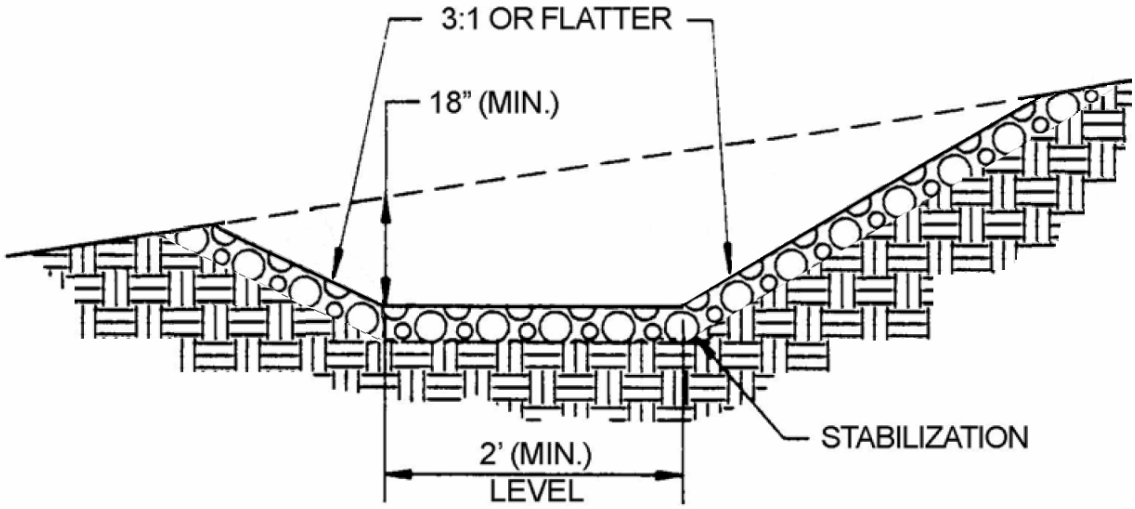
- Unsuitable for use as a sediment trapping device.
- Use of additional sediment and erosion control devices may be required to prevent scour and erosion in recently graded swales and ditches.
- Select size and location to prevent unintended consequences such as erosion along steep and unlined ditches and ponding within the travelway or material storage areas. Alteration of existing waterways and clearing of existing vegetation are subject to permit requirements of the U.S. Army Corps of Engineers and state or local agencies.
- Ditches and swales may require check dams or lining to prevent erosion.

Inspections and Maintenance

- Remove temporary swales and ditches after stabilization of the surrounding drainage area or completion of construction.
- Inspect swales and ditches weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall. Inspections shall include the following:
  - Check for erosion along channel linings, embankments, or beds of ditches. Restore all bare areas with the appropriate lining material;
  - Remove accumulated sediment and debris; and
  - Inspect embankments, compacted fills, and earthen channel sidewalls for cracks, washouts, animal habitation, exposed materials and other signs of potential failure. Restore areas with the appropriate materials. Coordinate restoration with the HWY-OM Engineer or Material Testing and Research Section as necessary. The Hydraulic Section shall also be consulted for problems associated with structural design or runoff flow patterns.



PLAN
NTS



SECTION
NTS

TEMPORARY DRAINAGE SWALE

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

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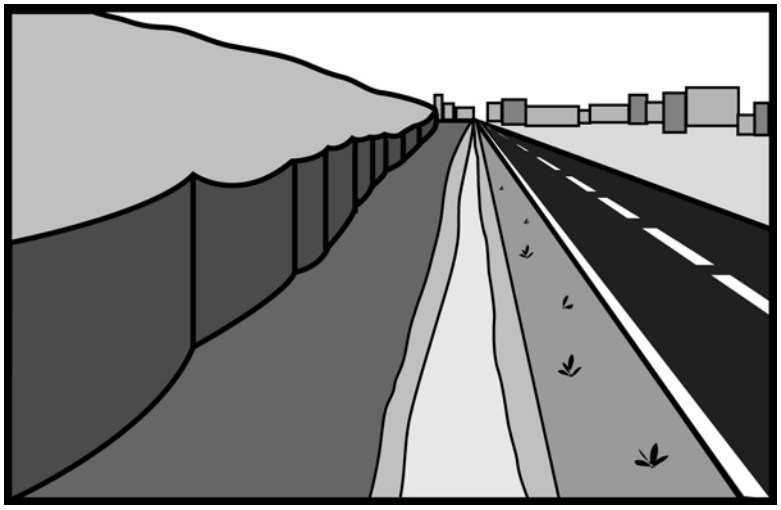
Run-on Diversion EC-8



Description

Devices to intercept, divert, and convey off-site surface runoff around or away from the project site to prevent site erosion. Run-on (storm water entering the site) diversion devices include dikes, swales, and slope drains.

Applications

- Along paved surfaces to intercept runoff.
- Upslope from project site to prevent erosion of disturbed areas located on-site.
- Downslope of project site to convey runoff to a sediment control device such as a sediment trap or sediment basin.
- Around material storage areas, maintenance and fueling areas, or areas with runoff containing contaminants or pollutants.
- Below steep grades to intercept concentrated runoff.
- Located around adjacent property and buildings, diversion devices can provide protection from stormwater runoff.

Installation and Implementation Requirements

- Size diversion devices appropriately.
- Immediately stabilize earth dikes and swales. Refer to SC-6 (Earth Dike) and SC-7 (Temporary Drains and Swales) in this manual for more information.
- Refer to SC-11 (Slope Drains and Subsurface Drains) in this manual for more information.

Limitations

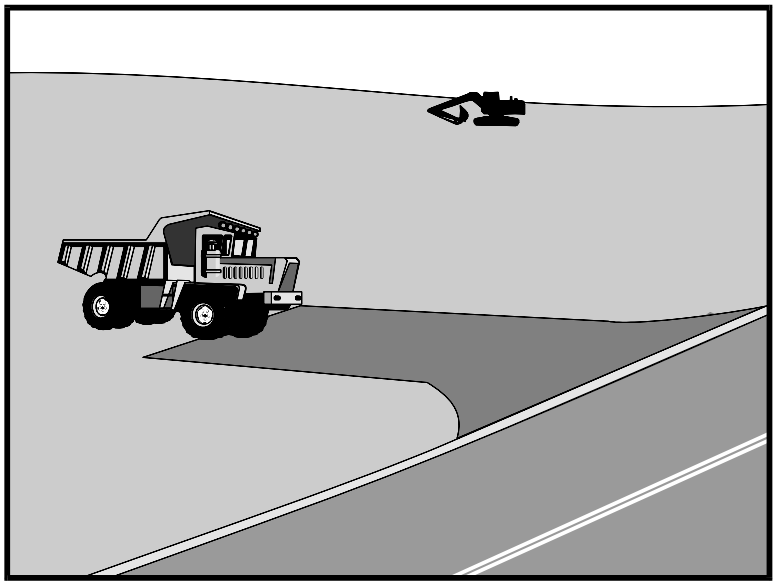
- Run-on diversion devices do not remove sediment from runoff.
- Ditches and swales may require check dams or lining to prevent erosion.

Inspections and Maintenance

- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall.
- Inspect channels embankments, and ditch beds for erosion, washout, and accumulated sediment and debris.
- Remove accumulated sediment and debris and repair damages as necessary.

Stabilized Construction Entrance/Exit

EC-2



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Stabilized construction entrances/exits are designated areas for entry to or exit from a construction site. Stabilization of the construction entrances/exits reduces the amount of sediment tracked off-site by construction vehicles.

Applications

Stabilized construction entrances/exits shall be used where access to a construction site from paved roads is required.

Installation and Implementation Requirements

- Grade the stabilized entrance/exit to prevent runoff from discharging off-site.
- Direct runoff to a sediment trap or basin prior to discharge.
- Construct stabilized entrance/exit on level ground where possible.
- Provide ample turning radii.
- Crushed aggregate free of fine material shall be 3 to 6 inches in size. The use of crushed asphalt concrete (AC) is not allowed.
- Depth of aggregate shall be 12 inches thick or as recommended by the soils engineer. Contractor is responsible to design stabilized construction entrances/exit to support heaviest vehicles and equipment that will use it.
- Place geotextile filter fabric beneath the aggregate.
- Dimensions shall be a minimum of 50 feet in length and 30 feet in width. If project site layout will not accommodate minimum dimensions identify additional BMPs to minimize tire tracking.

Limitations

- Surface aggregate shall be periodically replenished.
- A sediment trapping device is required if a wash rack is used in

Limitations (Continued)

conjunction with the stabilized construction entrance/exit.

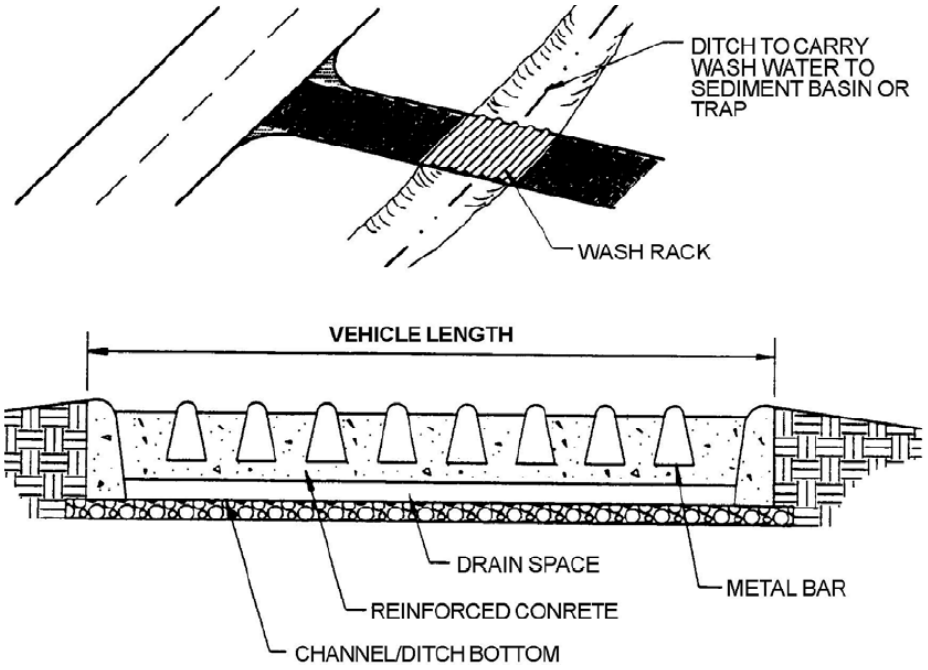
- If the construction entrance is not preventing sediment from being tracked onto the pavement, then alternative measures to keep the streets free of sediment shall be used. This may include street sweeping, and increasing the dimensions of the entrance, or the installation of a wheel wash. Any sediment that is tracked onto the pavement shall be removed by shoveling or street sweeping. The sediment collected by sweeping shall be removed or stabilized on site. The pavement shall not be cleaned by washing down the street, except when sweeping is ineffective and there is a threat to public safety. If it is necessary to wash the streets, the construction of a small sump shall be considered. The sediment would then be washed into the sump where it can be controlled. Use BMPs for adjacent drainage structures.

Inspections and Maintenance

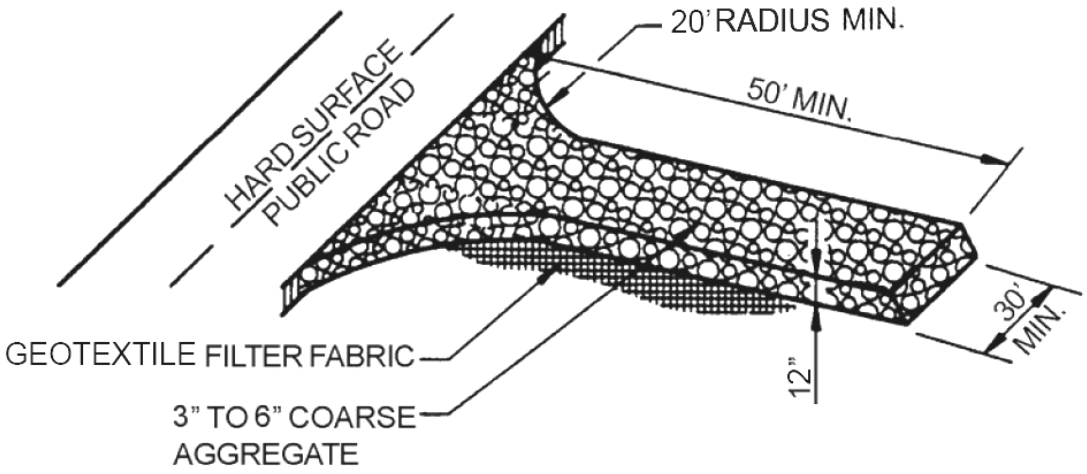
- Inspect construction entrance/exit weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall for damage.
- Remove deposited sediment from adjacent roadways or paved areas within 24 hours.
- Replenish surface aggregate periodically.
- Upon project completion, all construction entrances/exits shall be removed by the contractor and restore the area to the condition approved by the Engineer.

Stabilized Construction Entrance/Exit

EC-2



WASH RACK (SCHEMATIC)
NTS



STABILIZED CONSTRUCTION ENTRANCE
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Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

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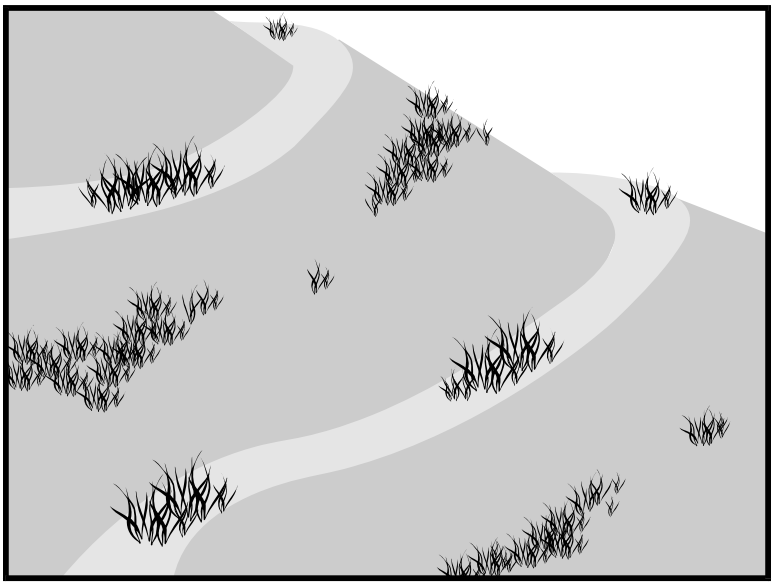
Seeding and Planting EC-5



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Seeding and planting of trees, vines, shrubs, and ground cover for temporary or permanent stabilization of soil.

Applications

Soil stabilization during or after the construction phase applies to the following site conditions:

- Graded/cleared areas without on-going construction activity;
- Open space and fill areas;
- Steep slopes;
- Spoil piles or temporary stockpile of fill material;
- Vegetated swales;
- Landscape corridors; and
- Stream banks.

Installation and Implementation Requirements

Requirements for each seeding/planting application shall be considered and include:

- Type of vegetation;
- Site and seedbed preparation;
- Seasonal planting times;
- Fertilization; and
- Water.

Grasses

- Ground preparation requires fertilization and mechanical stabilization of the soil.
- Short-term temperature extremes and waterlogged soil conditions tolerable.

Installation and Implementation Requirements (Continued)

- Appropriate soil conditions include a shallow soil base, good drainage, and 2:1 or flatter slope.
- Quickly develops from seeds.
- Vigorous grass growth dependent on mowing, irrigating, and fertilizing.

Trees and Shrubs

- Selection dependent on vigor, species, size, shape, and potential wildlife food source.
- Consider wind/exposure and irrigation requirements.
- Use indigenous species where possible.

Vines and Ground Cover

- Lime and fertilizer required for ground preparation.
- Use appropriate seeding rates.
- Consider requirements for drainage, acidity, and ground slope.
- Use indigenous species where possible.
- Avoid species which require irrigation.

Limitations

- During dry periods without irrigation, permanent and temporary vegetation may not be appropriate.
- Improper application of fertilizer may contribute to storm water pollution.

Inspections and Maintenance

Monitor vegetation growth and water, fertilize, mow, and/or prune the grasses/plants as needed.

Efficient Irrigation SD-12

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to eliminate the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

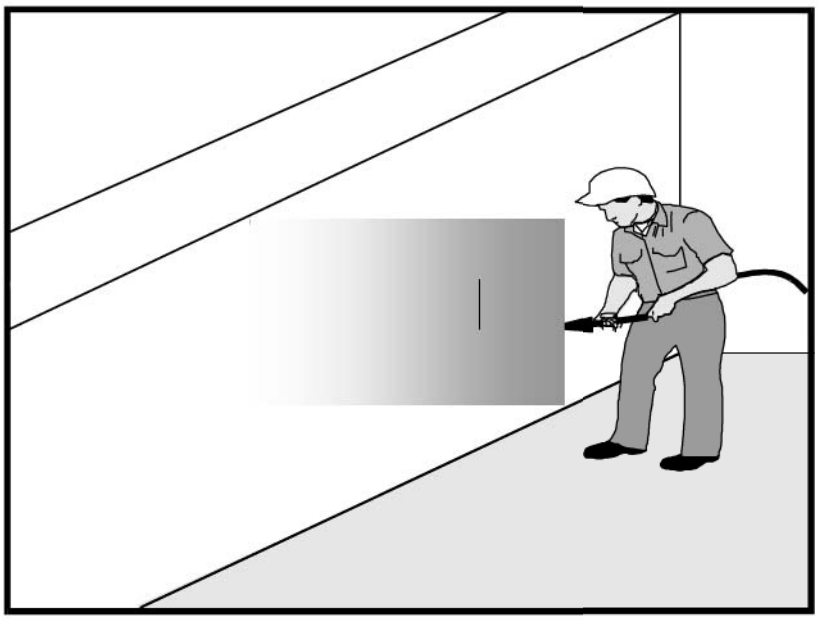
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Concrete Curing NS-12



Objectives

EC	Erosion Control	
SE	Sediment Control	
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. Proper procedures reduce or eliminate the contamination of stormwater runoff during concrete curing.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

None identified.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift of chemical cure as much as possible by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.

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- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for infiltration or other means of removal in accordance with all applicable permits.
- Collect cure water at the top of slopes and transport or dispose of water in a non-erodible manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

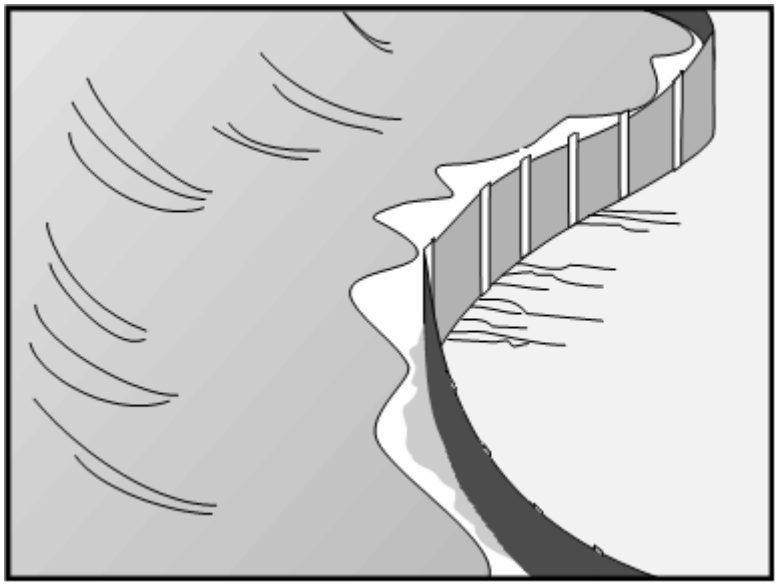
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Silt Fence or Filter Fabric Fence

SC-1



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

A sediment barrier composed of permeable geotextile filter fabric attached to supporting posts. Wire fencing may provide additional support. The silt fence intercepts the flow of sediment laden runoff, which filters the water and traps the sediment.

Applications

- Along the site perimeter.
- Around temporary stockpiles.
- Along streams and channels.
- Below the toe of cleared or erodible slopes.
- Downslope of exposed soil areas.

Installation and Implementation Requirements

- Primarily use where sheet flow occurs.
- Install silt fence along or parallel to contours.
- Ends of silt fence shall be turned uphill and the geotextiles should be overlapped.
- Silt fence posts shall be driven 14 inches minimum into the trench (see silt fence detail) and the geotextile filter fabric shall be embedded a minimum of 6 inches vertically into the ground or install according to manufacturer's recommendation.

Limitations

- Avoid installing silt fence on slope. However if silt fence is placed on slope, fence posts may need additional embedment.
- Do not install in streams, channels, or areas of concentrated flow.
- Do not use to divert flow.

Silt Fence or Filter Fabric Fence

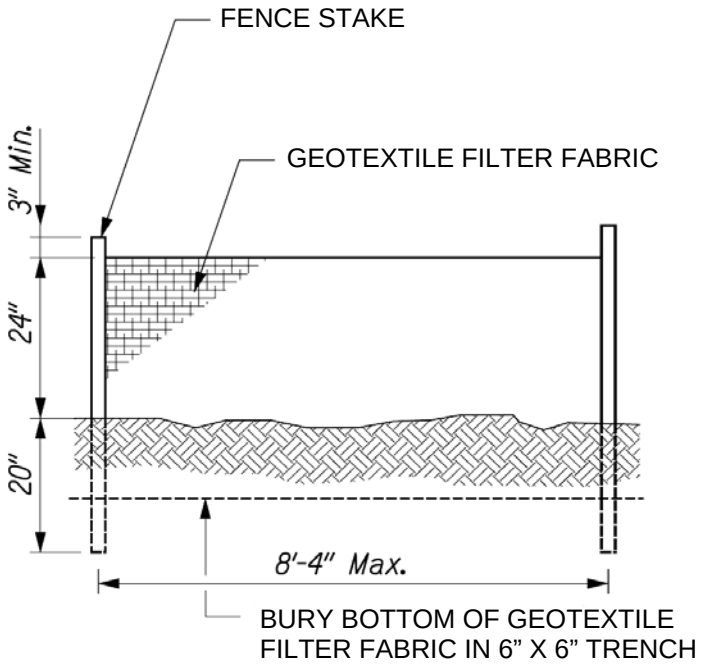
SC-1

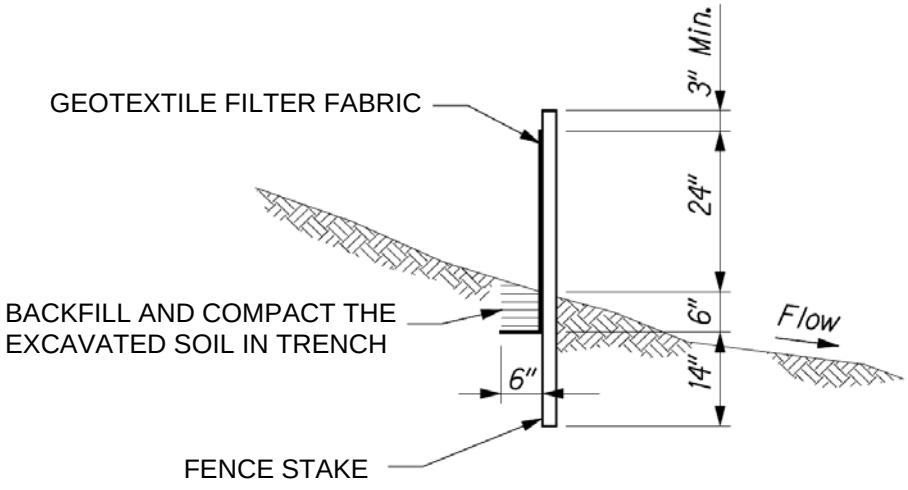
Inspections and Maintenance

- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall.
- Repair or replace damaged fence or posts.
- Remove accumulated sediment when depth reaches 1/3 the barrier height.

Silt Fence or Filter Fabric Fence

SC-1





NOTES:

1. THE FILTER FABRIC SHALL BE A MINIMUM OF 36 INCHES WIDE.
2. IF SILT FENCE IS OBTAINED FROM MANUFACTURER AS A PACKAGE (I.E. FABRIC ATTACHED TO POST) THE MANUFACTURER'S INSTALLATION INSTRUCTION SHALL BE ADHERED TO.
3. FENCE STAKES MAY BE WOOD OR METAL, MUST BE CAPABLE OF SUPPORTING ANTICIPATED LOADS.

SILT FENCE
NTS

Source: Water Pollution and Erosion Control Details, Fort Weaver Road Widening Vicinity of Aawa Drive to Geiger Road, Depart of Transportation Highways Division, 2007.

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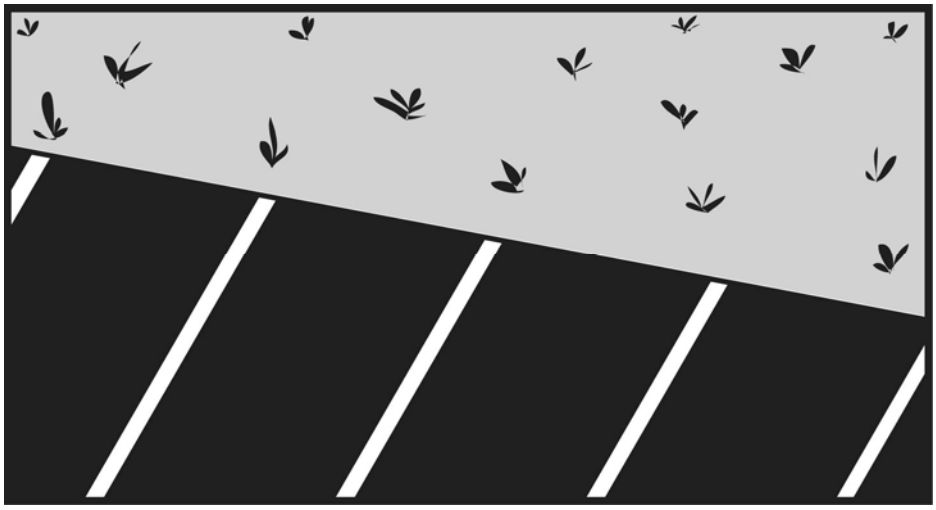
Vegetated Buffer Strips and Channels

SC-5



Source: Modified from Knoxville BMP Manual, 2003.

Description

Vegetative buffer strips and channels protect soil from erosion, increase infiltration, and remove sediment from surface runoff. Located adjacent to pollutant sources such as construction sites, vegetated buffer strips also provide protection to downstream receiving inlets or water bodies.

Applications

- Any site which is suitable for establishment of vegetation.
- Vegetated buffer strips are appropriate for uncurbed, paved areas; steep and potentially unstable slopes; and areas adjacent to sensitive water bodies.
- Vegetated channels are appropriate for surface runoff conveyed by channels to downstream inlets or receiving waters.

Installation and Implementation Requirements

- Refer to SM-16 (Preservation of Existing Vegetation) in this manual if existing vegetation will be used as a buffer strip.
- Installation of a buffer strip with new vegetation shall comply with the following:
  - Prior to cultivation of the designated buffer strip area, remove and dispose of all weeds and debris in accordance with *2005 Standard Specifications for Road and Bridge Construction;*
  - During construction, strip and stockpile good topsoil for surface preparation purposes prior to planting activities;
  - Plant the area upon completion of grading in the area;
  - Fine grade and roll areas to be planted after cultivating soil and, if applicable, installing the irrigation system;
  - Provide additional watering or irrigation of vegetation to supplement rainfall until vegetation has been established;
  - Fertilize vegetation in accordance with manufacturers' instructions and grass/soil requirements determined by testing of the soil;

Installation and Implementation Requirements (Continued)

- o Vehicular traffic passing through vegetated buffer strips or channels shall be avoided to protect vegetation from damage and maximize its effectiveness;
- o Comply with applicable regulations and manufacturers' instructions when applying fertilizers, pesticides, soil amendments, or chemicals;
- o Comply with the following during seeding activities:
  - Add soil amendments such as fertilizer when preparing seedbed. Apply mulch after seeding to protect vegetation during establishment. Select an appropriate seed mixture based on site conditions. Dense grasses are more effective in reducing flow velocities and removing sediment. Thick root structures are necessary for erosion control,
  - Use proper equipment and methods to ensure uniform distribution and appropriate seed placement, and
  - Overseed, repair bare spots, and apply additional mulch as necessary; and
- o Comply with the following during sodding activities:
  - Protect sod with tarps or other types of protective covering during delivery and do not allow sow to dry between harvesting and placement,
  - Any irregular or uneven areas observed prior to or during the plant establishment period shall be restored to a smooth and even appearance,
  - Prior to placing sod, ground surface shall be smooth and uniform,
  - Areas, which will be planted with sod and are adjacent to paved surfaces such as sidewalks and concrete headers, shall be 1.5±0.25 inches below the top grade of the paved surface after fine grading, rolling, and settlement of the soil.
  - Ends of adjacent strips of sod shall be staggered a minimum of 24 inches,
  - Edges and ends of sod shall be placed firmly against paved borders,
  - After placement of the sod, lightly roll sodded area to eliminate air pockets and ensure close contact with the soil,
  - After rolling, water the sodded area to moisten the soil to a depth of 4 inches,
  - Do not allow sod to dry,
  - Avoid planting sod during extremely hot or wet weather, and
  - Sod shall not be placed on slopes steeper than 3:1 (H:V) if the area will be mowed.

Limitations

- Site conditions such as availability of land.
- Flow depth and vegetative condition determine BMP effectiveness.
- May require irrigation to maintain vegetation.

Limitations (Continued)

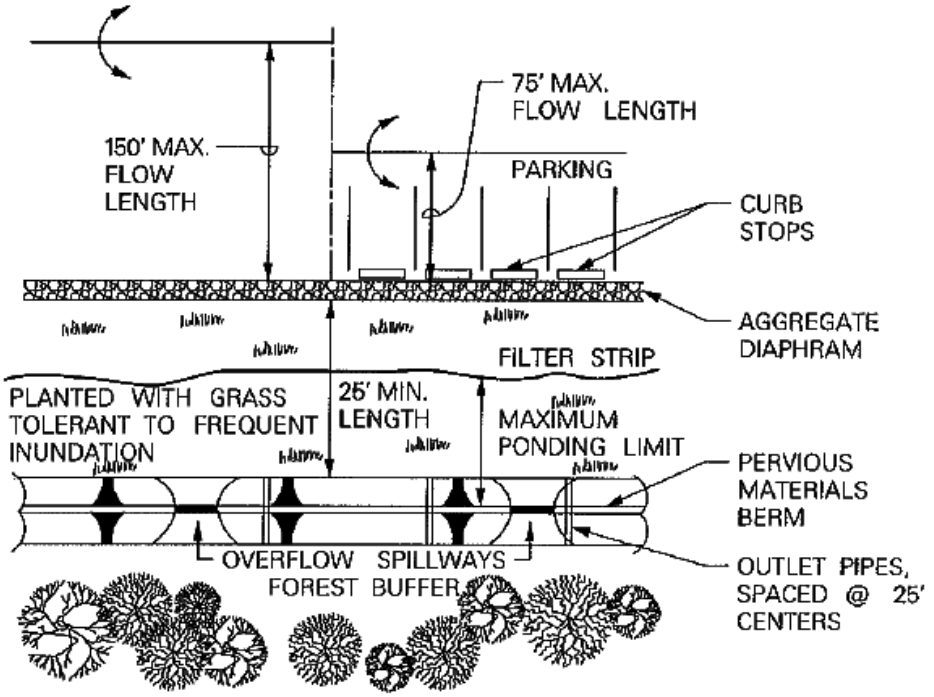
- High maintenance requirements may exist depending on the design condition of the vegetation.
- Unless existing vegetation is used as a buffer strip, an area will need to be provided specifically for a buffer strip and vegetation will need to be established.
- Maintaining sheet flow in buffer strips may be difficult.
- Vegetated channels require a larger area than lined channels.
- Vegetated channels require gradual slopes since runoff with high flow velocity may flow over grass rather than through it.

Inspections and Maintenance

- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall until vegetation is established. Repair eroded or damaged areas as necessary.
- Maintenance activities include mowing, weeding, and verification of a properly operating irrigation system, if applicable.
- Properly remove and dispose of clippings from mowing and trimming in accordance with *2005 Standard Specifications for Road and Bridge Construction.*

Vegetated Buffer Strips And Channels

SC-5



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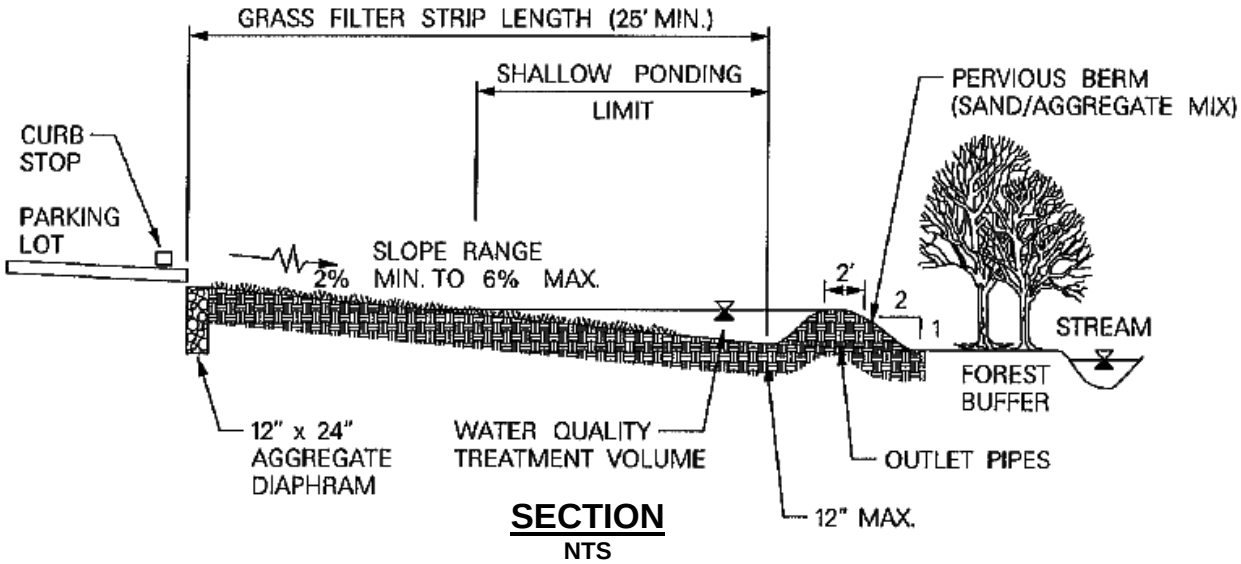

SECTION
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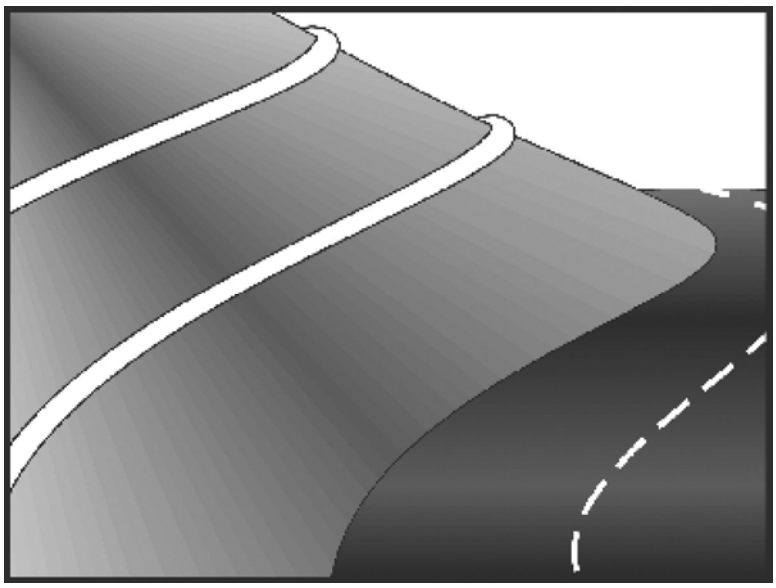
TYPICAL VEGETATED BUFFER STRIP

Source: Prince George's County, Low-Impact Development Design Strategies:
An Integrated Environmental Design Approach, 1999.

Compost Filter Berm SC-8



Source: Truckee Meadows Construction Site Best Management Practices Handbook, 2003.

Description

A dike consisting of composted material and placed perpendicular to runoff to reduce flow velocity and retain sediment and other pollutants.

Applications

- Along the site perimeter.
- Along the slope face.
- Check dam in small drainage ditches.
- Inlet protection for storm drains.
- Appropriate for small drainage areas and low surface velocity flows (less than 1 cfs).
- May be used in combination with other BMPs such as a compost blanket or silt fence for high rainfall areas and steeper or longer slopes.

Installation and Implementation Requirements

- Usually located at the base of slopes, however, additional berms may be used for increased erosion protection.
- Berm size is determined by factors including slope length and grade, soil characteristics, climate, and presence of existing vegetation.
- Berms may be vegetated or unvegetated.
- Compost quality shall comply with all local, state, and Federal requirements.

Compost Filter Berm SC-8

Installation and Implementation Requirements (Continued)

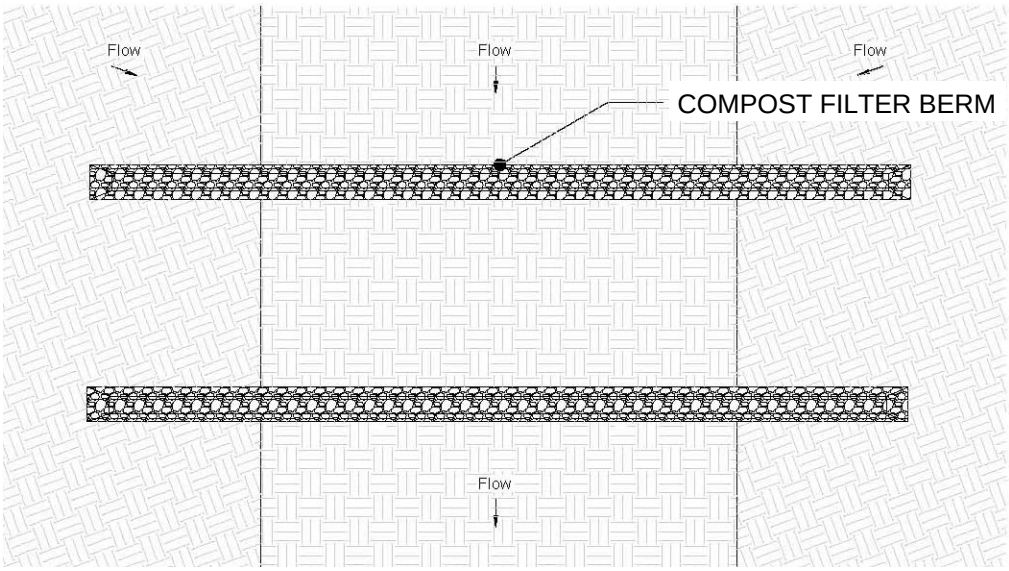
- Installation of a compost filter sock, which consists of a mesh tube filled with composted material, as a type of compost filter berm shall comply with the following:
  - Assemble by tying a knot at one end of the mesh sock, filling the sock with compost, and knotting the other end of the sock. A pneumatic blower may be used to fill the sock with compost;
  - Use a filter sock equivalent to the length of the slope where practicable;
  - When use of multiple socks is required, place socks end-to-end and interlock the ends;
  - Anchor filter socks to ground; and
  - Turn ends of filter sock up slope to prevent flow around ends.
- Material for compost berm may be left at the site and used as a soil amendment.
- Mesh socks filled with compost may also be used for areas of concentrated flow such as near streams or shorelines.

Limitations

- Unsuitable for areas with concentrated runoff unless a low flow rate and small drainage area warrants use of a filter berm.
- Heavy vegetation must be removed to ensure close contact of compost with the ground surface.

Inspections and Maintenance

- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall.
- Remove sediment which has accumulated to within 1/3 of the berm height.
- Replace disturbed or damaged areas of the berm.
- Significant washout may indicate a larger berm or additional BMPs such as a compost blanket or silt fence are required.



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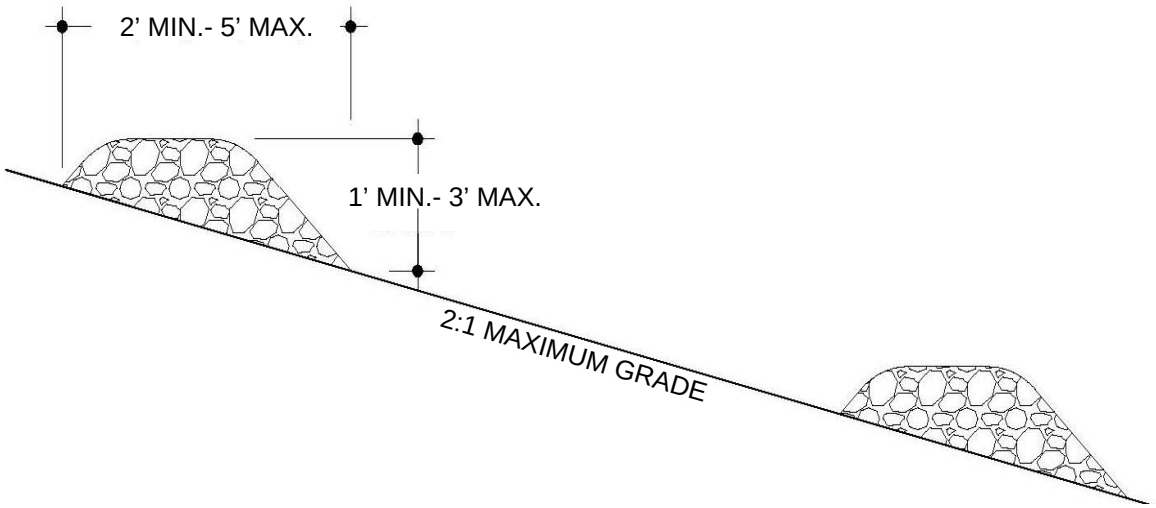

SECTION
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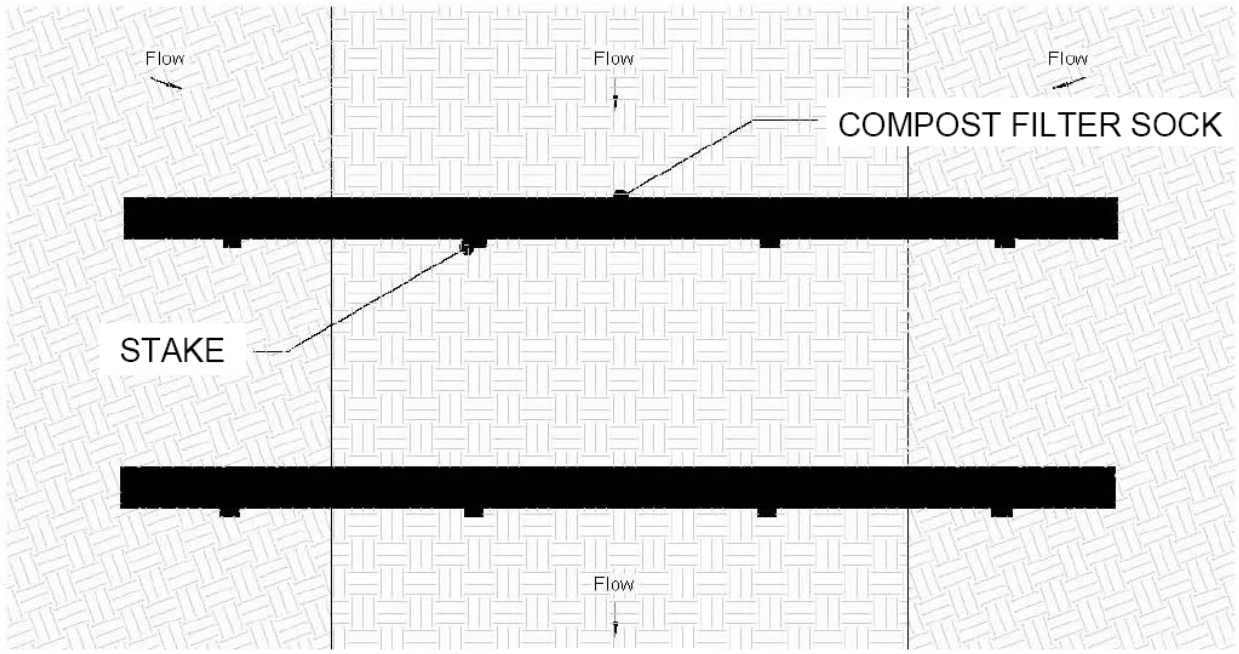
COMPOST FILTER BERM

Source: Texas Commission on Environmental Quality, www.tceq.state.tx.us/assets/public/assistance/compost/erosioncontroldrawings.pdf accessed September 2006.



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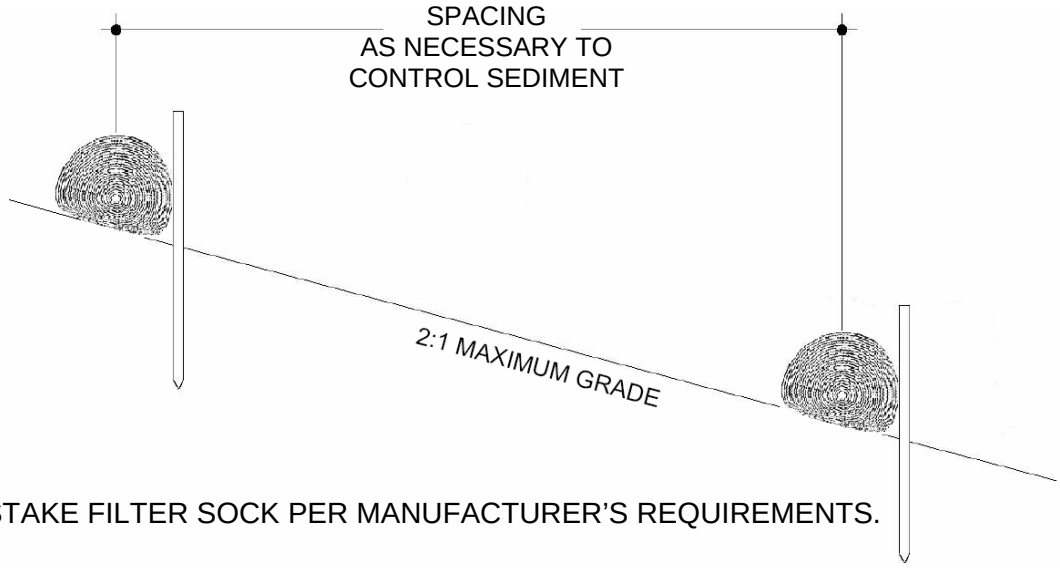

NOTE: STAKE FILTER SOCK PER MANUFACTURER'S REQUIREMENTS.

SECTION
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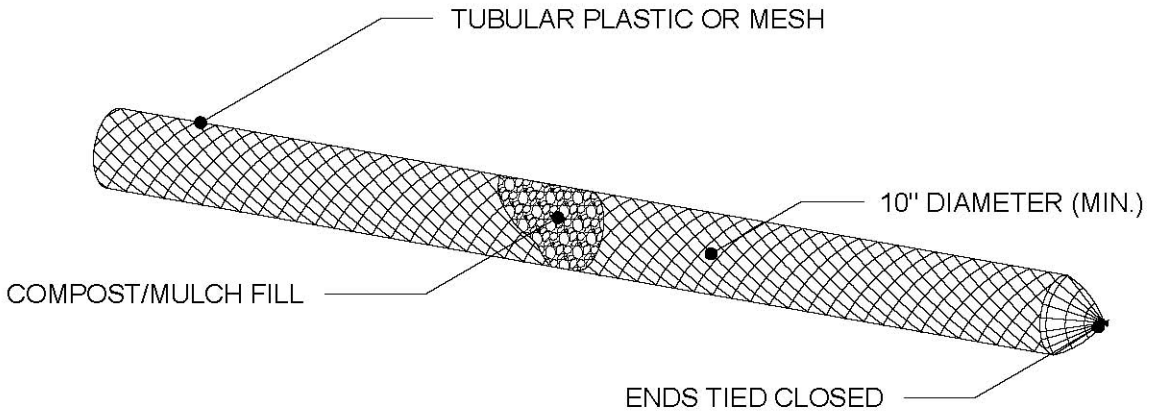
COMPOST FILTER BERM (FILTER SOCK)

Source: Adapted from Texas Commission on environmental Quality, www.tceq.state.tx.us/assets/public/assistance/compost/erosioncontroldrawings.pdf accessed September 2006

Compost Filter Berm SC-8



COMPOST FILTER BERM (FILTER SOCK)

NTS

Source: Texas Commission on Environmental Quality, www.tceq.state.tx.us/assets/public/assistance/compost/erosioncontroldrawings.pdf accessed September 2006.

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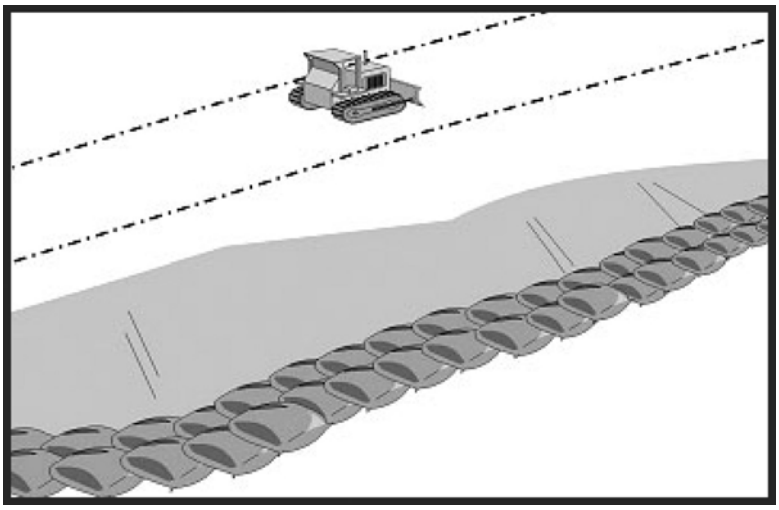
Sandbag Barrier SC-13



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Stacked sandbags, which intercept sediment-laden sheetflow runoff to allow sediment to settle prior to discharge off-site.

Applications

- Along the site perimeter.
- Along streams and channels.
- Utility trench barriers in channels.
- Across swales with small catchments.
- Diversion dike or berm.
- Below toe of exposed slopes.
- Temporary sediment trap.
- Around stockpiles.

Installation and Implementation Requirements

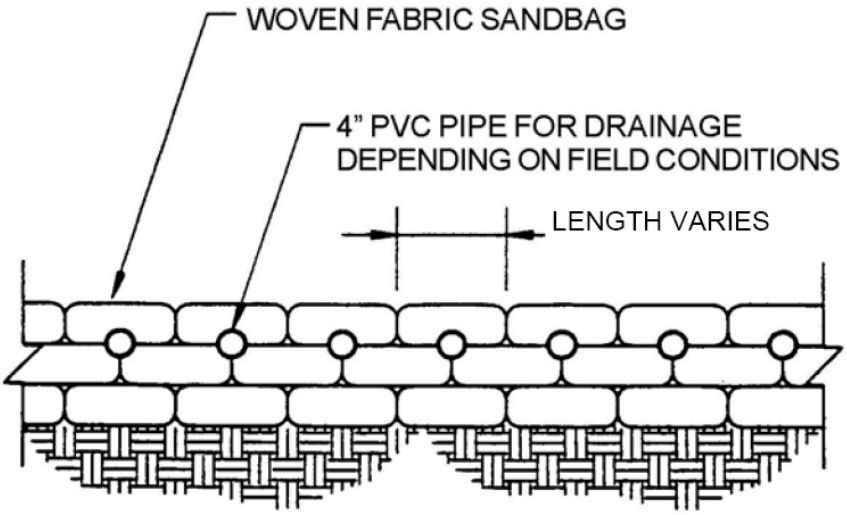
- Install bags end-to-end along a level contour.
- Turn ends of sandbag barrier up slope to prevent flow around ends.
- May be used in combination with soil stabilization controls up slope.
- Materials for sandbag barrier shall comply with the following:
  - Sandbag shall be woven polypropylene or polyamide fabric with ultraviolet protection to avoid rapid deterioration of fabric.
  - Bag dimensions can vary but must be able to withstand anticipated flows.
  - Fill material shall consist of non-cohesive, permeable material free from clay and deleterious material.

Limitations

- Drainage area shall not exceed 5 acres.
- Avoid installing at locations which may compromise traffic safety.
- Burlap material shall not be used for sandbags.

Inspections and Maintenance

- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall.
- Reshape or replace sandbags as necessary.
- Remove and properly dispose of sediment, which has accumulated to a depth of 6 inches.



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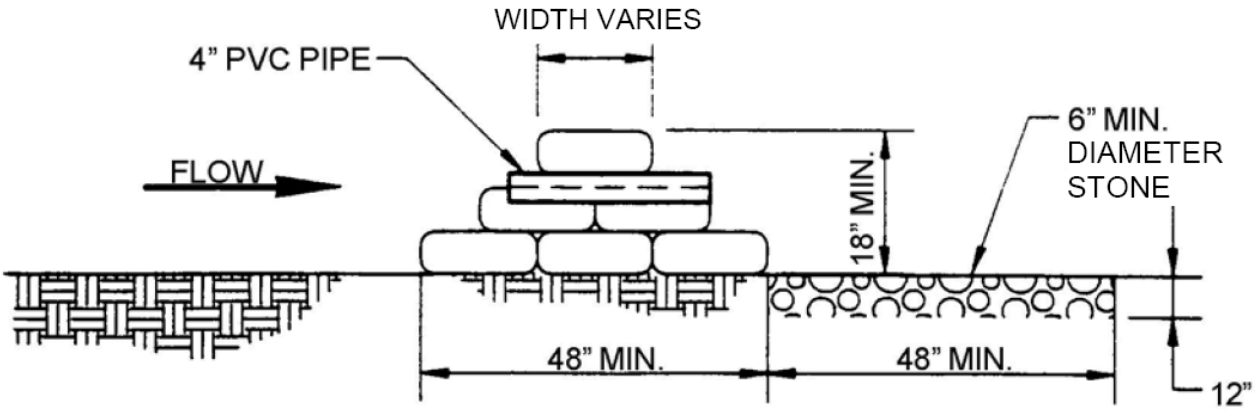

SECTION
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SANDBAG BARRIER

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

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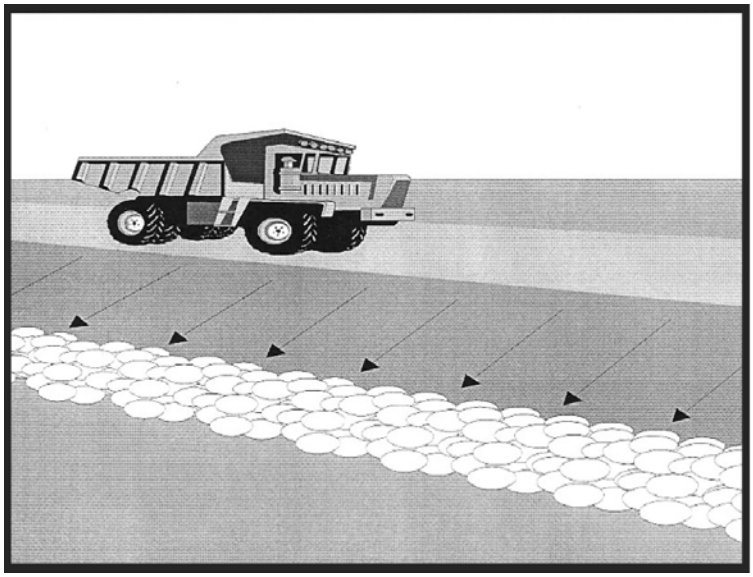
Brush or Rock Filter SC-14



Source: Knoxville BMP Manual, 2003.

Description

A berm composed of rock or brush placed across an area where sheet flow may occur. Sedimentation will occur as runoff intercepted by the berm is detained.

Applications

- Check dams across construction roads with mild slopes.
- Below the toe of slopes.
- Along the site perimeter, streams, or channels.
- Around temporary spoil areas.
- Downstream of small cleared areas.
- Sediment traps at culvert or pipe outlets.

Installation and Implementation Requirements

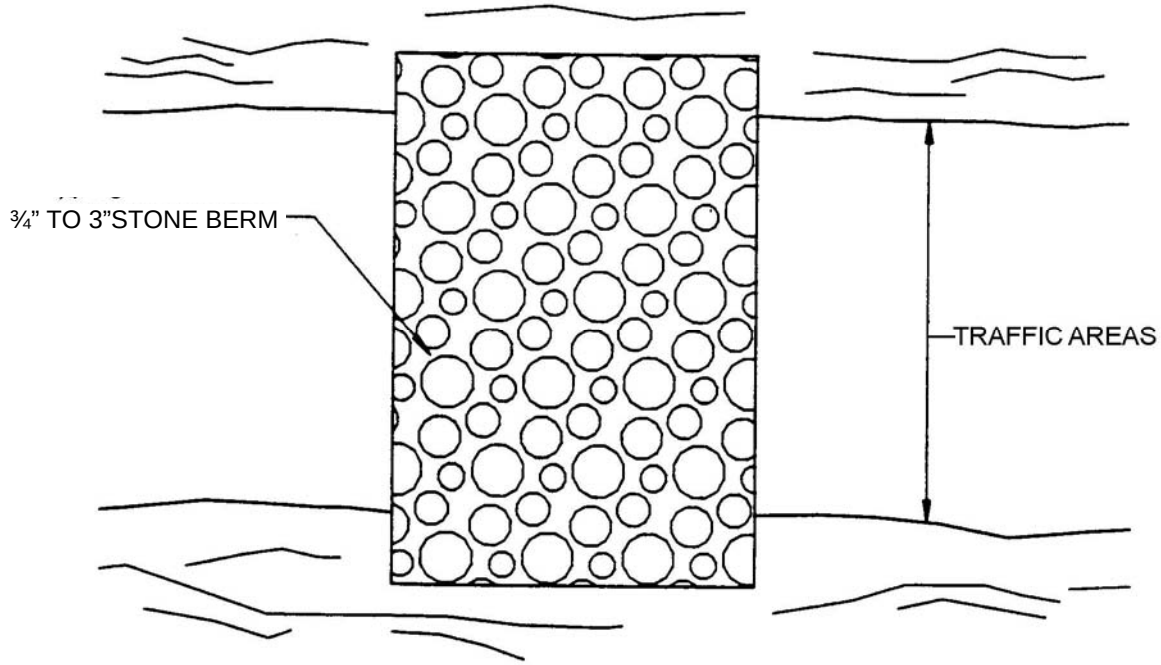
- Use stones between ¾ to 3 inches in diameter or brush wrapped in geotextile filter fabric. Brush from site clearing may be used.
- Place across areas of sheet flow.
- If stones are used across an area of concentrated flow, use larger stones placed in staked and woven wire sheathing.
- Construct along a level contour.
- Provide an area behind berm for detention and sedimentation.

Limitations

- Adequate detention area behind berm is necessary to prevent flooding upstream.
- Drainage area shall not exceed 5 acres.
- Removal of stone berms may be difficult resulting in limited usefulness in landscaped areas.

Inspections and Maintenance

- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall.
- Reshape berm and replace any missing or dislodged stone or brush.
- Remove and dispose of sediment on upstream side of filter upon reaching a depth of six inches.



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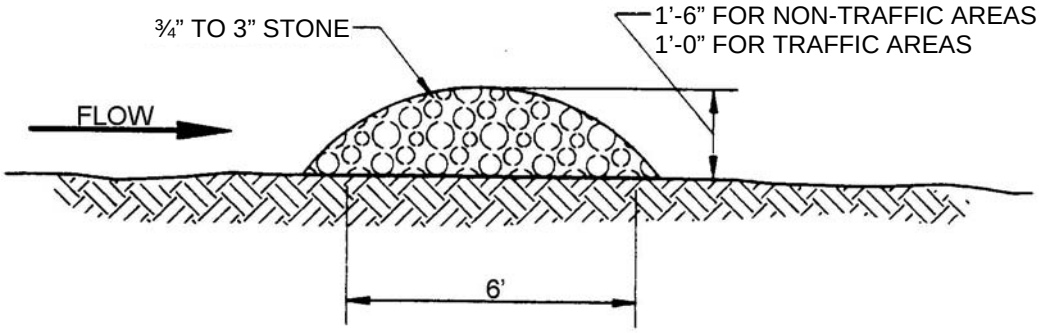

SECTION
NTS

BRUSH OR ROCK FILTER

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

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Employee Training SM-1

Source: Knoxville BMP Manual, 2003.

Description

Training programs ensure that all employees understand the requirements of the Storm Water Management Program Plan as applicable to their responsibilities. Training topics include but are not limited to storm water management, potential contamination sources, and BMPs.

Applications

Employees involved in the planning, design, or construction phase of construction, repair, or maintenance activities within the HDOT Highways rights-of-way.

Implementation Requirements

- Provide storm water management training through courses, seminars, workshops, product demonstrations, employee meetings, posters, and bulletin boards.
- Provide field training programs conducted by trained personnel.
- Maintain commitment and request input from senior DOT and Highways Division management.
- Promote open communication between employees involved in various stages of the projects.
- Improve storm water quality management based on past experience involving water quality problems at construction sites. Implement revised practices and procedures in training.
- Increase employee awareness of requirements and procedures for BMP monitoring and reporting.
- Develop standard operating procedures for storm water quality management.
- Conduct spill drills.

Employee Training SM-1

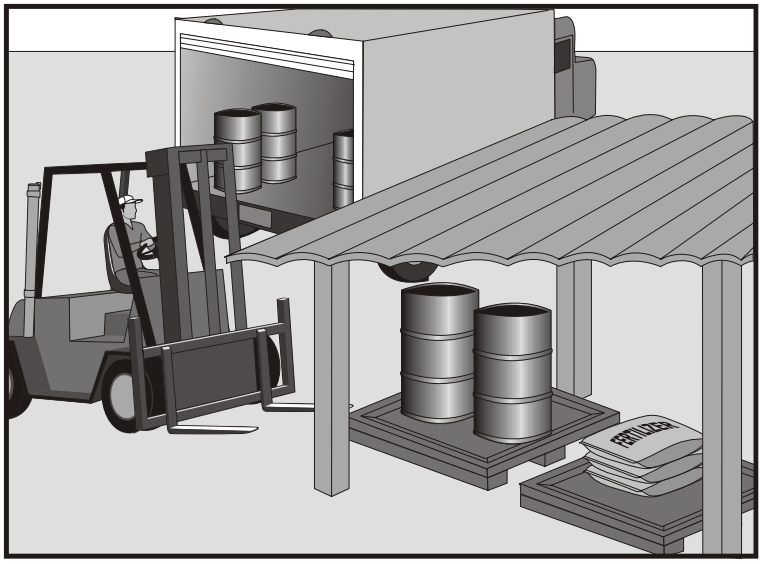
Limitations

- Training performance depends on the degree of employee motivation and incentive to learn about BMP implementation; and
- The availability of staff time to coordinate and conduct training.

Inspections and Maintenance

Provide annual training on construction BMP implementation for all employees involved with construction activities.

Material Delivery and Storage SM-2



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures that promote proper handling and storage of construction materials to prevent or reduce storm water pollution, injury to workers or visitors, groundwater pollution, and soil contamination.

Applications

Storage and handling activities on construction sites involving one of the following:

- Soil;
- Soil stabilizers and binders;
- Fertilizers;
- Pesticides and herbicides;
- Detergents;
- Plaster;
- Hazardous chemicals such as acids, lime, glues, paints, solvents, and curing compounds;
- Petroleum products such as fuel, oil, and grease; and
- Asphalt and concrete products.

Installation and Implementation Requirements

- Provide training for employees and contractors on proper material delivery and storage practices and procedures.
- Designate on-site material delivery and storage areas. Areas shall be located near construction entrances and away from watercourses. Earth berms or other containment measures shall surround storage areas.

Installation and Implementation Requirements (Continued)

- Flammable materials shall comply with the fire codes of Honolulu. Contact the local Fire Marshal for site specific requirements. Refer to the Flammable and Combustible Liquid Code, NFPA30 for more information.
- Maintain accurate and up to date records of material delivered and stored on-site.
- Minimize on-site inventory.
- Retain a complete set of material safety data sheets on-site.
- Minimize handling of hazardous materials.
- Store materials under cover during the rainy season.
- Store chemicals, drum, and bagged materials on a pallet and when possible, under cover in secondary containment.
- If drums must be stored in an uncovered area, place them at a slight angle to minimize ponding of rainwater on the lids to minimize corrosion.
- Hazardous chemicals shall be well-labeled and stored in the original containers.
- Employees with emergency spill cleanup training shall be present during unloading of dangerous materials or liquid chemicals.
- Any significant residual materials remaining on the ground after the completion of construction shall be removed and properly disposed. If the residual materials contaminate the soil, then the contaminated soil shall also be removed and properly disposed.

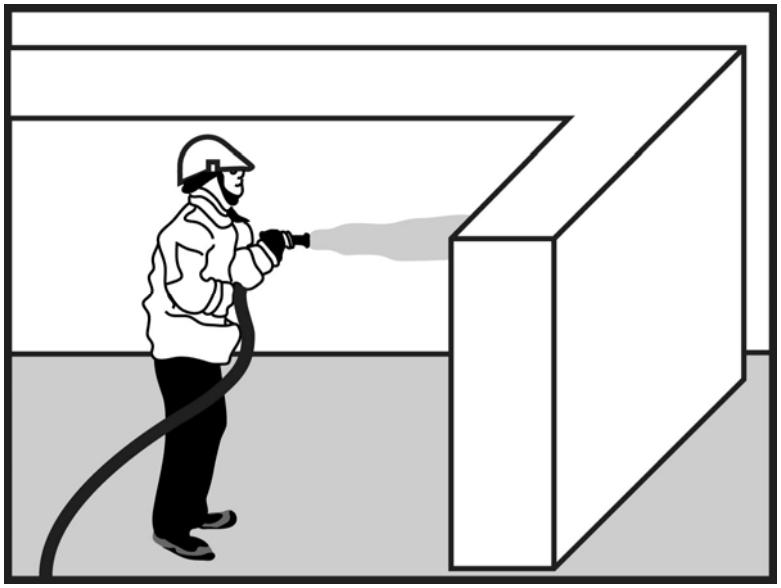
Limitations

Storage sheds shall comply with building and fire code requirements.

Inspections and Maintenance

- Storage areas shall be clean and well organized.
- An ample supply of spill cleanup materials shall be kept with work crew supplies.
- Conduct weekly inspections of material containers for corrosion.
- Conduct weekly inspections of storage areas which may require repair or replacement.

Material Use SM-3



Source: Modified from Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Minimizing or eliminating the discharge of pollutants to the storm drain system or adjacent water bodies by reducing hazardous material use on-site, using alternative products, and training employees in proper handling and use of construction materials.

Applications

Activities involving use of one of the following materials:

- Fertilizers;
- Detergents;
- Herbicides;
- Plaster;
- Petroleum products such as oil, fuel, and grease;
- Soil stabilizers and binders;
- Asphalt and concrete components; and
- Other hazardous materials such as acids, lime, glues, adhesives, paints, solvents, and curing compounds.

Installation and Implementation Requirements

- Restrict use of materials to only when and where necessary to complete the construction activity.
- Reduce or eliminate on-site use of hazardous materials. Refer to SM-9 (Hazardous Waste Management) in this manual for more information regarding use of hazardous materials.
- Carefully select appropriate material needed for the task.
- Do not remove the original label. Comply with manufacturer's labels, which include product information regarding uses, protective equipment, flammability, ventilation, and mixing of chemicals.

Installation and Implementation Requirements (Continued)

- Dispose container only after all of the product has been used.
- Restrict amount of herbicide prepared to quantity necessary for the current application. Comply with the recommended usage instructions. Do not apply fertilizers or herbicides during or just before a rain event.
- An ample supply of cleanup materials for spills shall be readily accessible.
- Provide employee training on proper material use.

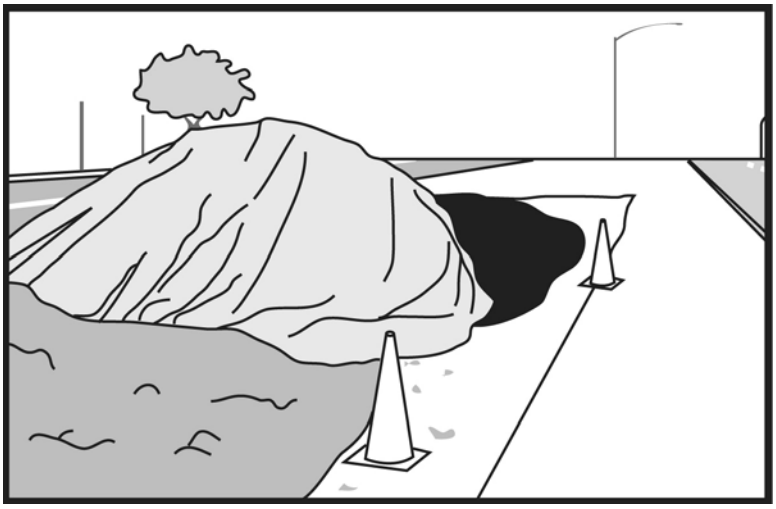
Limitations

Alternative materials may not be available or appropriate for certain construction activities.

Inspections and Maintenance

- Provide training to all new employees at the beginning of their employment.
- Provide periodic training to all employees involved in handling construction materials.

Protection of Stockpiles SM-4



Description

Stockpile protection measures reduce the potential for air and storm water pollution originating from stockpiles of construction materials, including soil and paving materials.

Applications

Projects requiring stockpiles of construction materials.

Installation and Implementation Requirements

- Stockpiles shall be located a minimum of 50 feet away from concentrated runoff.
- Place bagged materials on pallets and under cover.
- Provide physical diversion to protect stockpiles from concentrated runoff.
- Cover stockpiles with plastic or comparable material prior to a rain event and during the rainy season.
- Place silt fence, fiber filtration tubes, or straw wattles around stockpiles.

Limitations

Stockpiles are only applicable for temporary storage of material.

Inspections and Maintenance

Periodic replacement and repair of materials used for stockpile protection.

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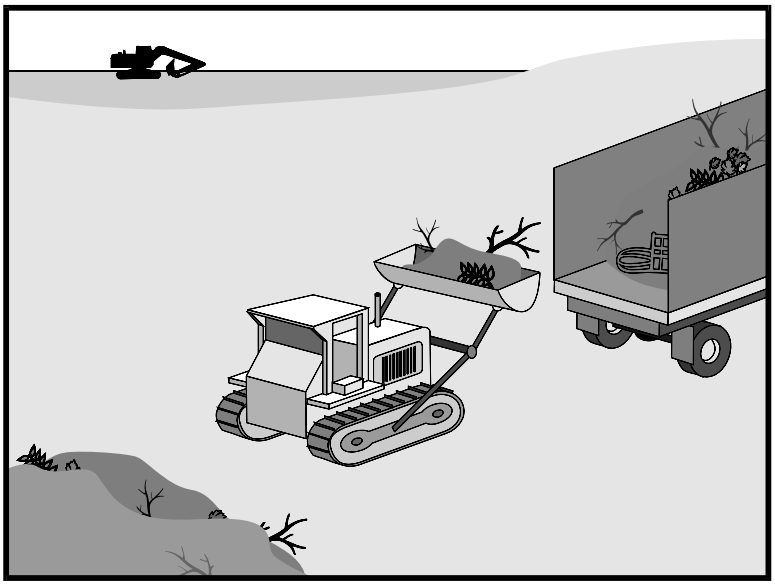
Solid Waste Management SM-6



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to prevent or reduce the discharge of pollutants from construction site wastes to the drainage system or adjacent water bodies.

Applications

Construction projects generating non-hazardous solid wastes from construction and demolition (C&D) activities. These wastes include C&D wastes, inert fill material, and recycle/reuse material.

C&D wastes include materials originating from the demolition of roads, buildings, or other structures. Materials generated from these activities include concrete, brick, bituminous concrete, wood, masonry, composition roofing, roofing paper, steel, plaster, and minor amounts of metals.

Inert fill materials are wastes that are not contaminated with hazardous materials such as asbestos or lead-based paint. Inert fill materials do not decompose or produce leachate or other products harmful to the environment. Inert fill materials include earth, soil, rock, cured asphalt, brick, and clean concrete (no exposed steel-reinforcing rod) with no dimension greater than eight inches.

Recycle/reuse materials include but are not limited to: asphalt pavement, cardboard, concrete aggregate (no LBP, asbestos-free), electronic equipment, excavated rock, soil (uncontaminated), Freon from appliances, glass, green waste, metals, ferrous/non-ferrous, used tires, wood and lumbers, furniture, etc.

Installation and Implementation Requirements

- Separate contaminated clean up materials from C&D wastes. Contamination may be from hazardous substances, friable asbestos, waste paint, solvents, sealers, or adhesives.
- Inert fill material shall not contain vegetation, organic material, or other solid waste.
- Inert fill materials shall not be mixed with other C&D waste.

Limitations

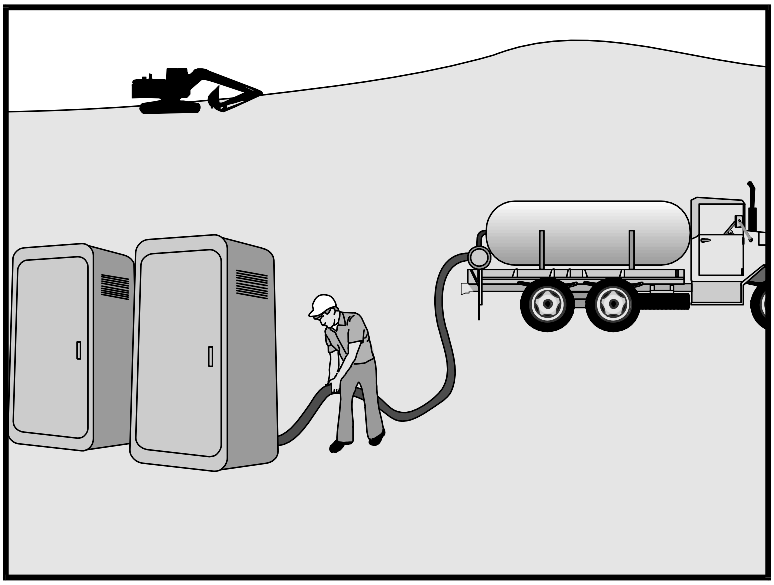
None

Inspections and Maintenance

- Inspect construction waste and recycling areas regularly.
- Schedule solid waste collection regularly.
- Schedule recycling activities based on construction/demolition phases.

Sanitary/Septic Waste Management

SM-7



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to reduce or prevent the discharge of sanitary wastes from construction sites into the storm drain system or adjacent water bodies.

Applications

Construction sites containing temporary or portable sanitary/septic waste systems.

Installation and Implementation Requirements

- Locate sanitary facilities in a convenient place away from drainage facilities.
- Untreated wastewater shall not be discharged to the ground or buried.
- Comply with the State of Hawaii, Department of Health requirements when using an on-site disposal system such as a septic system.
- Avoid illicit discharges by properly connecting temporary sanitary facilities to the sanitary sewer system.
- Sanitary/septic systems discharging to the sanitary sewer shall comply with the local wastewater treatment plant requirements.
- A licensed service provider shall maintain sanitary/septic facilities in good working order.
- Schedule regular waste collection by a licensed transporter.

Limitations

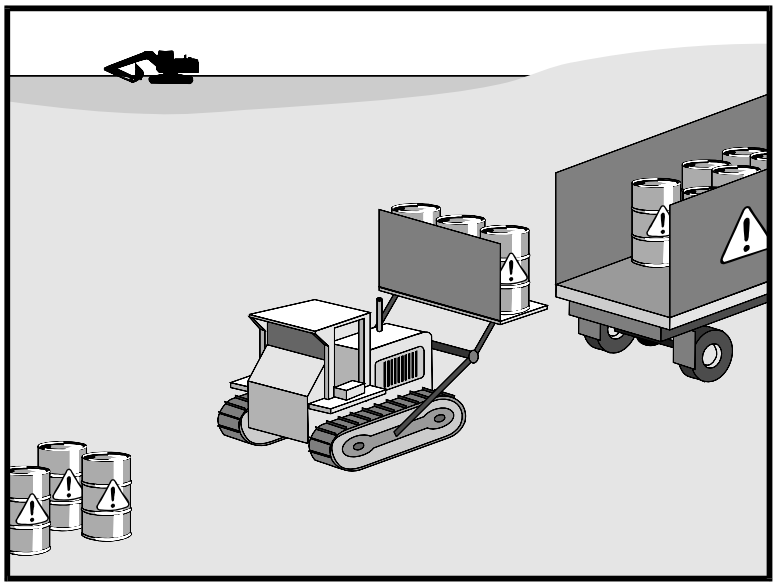
None

Inspections and Maintenance

- Inspect and maintain facilities regularly.
- Schedule regular waste collection.
- Prevent illicit discharges.

Hazardous Waste Management

SM-9



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to prevent or reduce the discharge of hazardous waste to the land, storm drain system, or adjacent water bodies.

Applications

Handling procedures on construction sites involving one of the following hazardous wastes:

- Paints and solvents;
- Petroleum products such as oils, fuels, and grease;
- Herbicides;
- Acids for cleaning masonry;
- Concrete curing and repair compounds; and
- Contaminated waste material.

Hazardous waste management shall also be implemented for wastes from existing structures including:

- Sandblasted material such as grit or chips containing lead, cadmium, or chromium-based paints;
- Asbestos; and
- Polychlorinated Biphenyls (PCBs). Older transformers are a common source of PCBs.

Hazardous Waste Management

SM-9

Installation and Implementation Requirements

Recognize potentially hazardous waste by implementing the following:

- Review product label and shipping papers;
- Identify key words such as flammable or ignitable (able to catch fire); carcinogenic (causes cancer); toxic or poisonous (injures or harms people or animals); and hazardous, danger, caustic or corrosive (burns through chemical action). Hawaii Administrative Rules (HAR) Title 11, Chapter 261 includes a list of hazardous waste and criteria;
- Review material safety data sheets (MSDS) from the manufacturer and supplier of the product; and
- Contact DOH, Hazardous Waste Program Office at 586-4226 for additional questions and information.

Material use practices and procedures for hazardous waste management include the following:

- Dispose container only after all of the product has been used;
- Keep the original product label on the container since it includes important safety and disposal information;
- Restrict amount of herbicide prepared to quantity necessary for the current application. Comply with the recommended usage instructions. Do not apply herbicides during or just before a rain event; and
- Remove as much paint from brushes on painted surface. Avoid cleaning or rinsing water-based paint brushes in soil, streets, gutters, storm drains, or streams. Rinse from water-based paints shall be discharged into the sanitary sewer system. Filter and re-use solvents and thinners. Dispose of oil-based paints and residue as a hazardous waste.

Waste recycling and disposal practices and procedures for hazardous waste management include the following:

- Designate areas for collection of hazardous wastes;
- Store hazardous materials and wastes in covered containers;
- Provide secondary containment for hazardous waste containers;
- Keep wastes separate to prevent chemical reactions which make recycling and disposal difficult;
- Recycle useful materials such as oil or water-based paint;
- Avoid disposal of toxic liquid wastes (solvents, used oils, and paints) or chemicals (additives, acids, and curing compounds) in dumpsters allocated for construction debris;
- Schedule periodic waste collection to prevent overflow of containers; and
- Ensure collection, removal, and disposal of hazardous waste complies with regulations.

Installation and Implementation Requirements (Continued)

Hazardous waste management training shall include the following:

- Awareness of potential dangers from hazardous wastes;
- Identifying hazardous wastes;
- Proper hazardous waste storage and disposal procedures;
- Safety procedures for hazardous wastes;
- Placement of warning signs in areas recently treated with chemicals;
- Use of cleanup materials for spills;

Limitations

Hazardous waste that cannot be reused or recycled shall be disposed of by a licensed hazardous waste hauler.

Inspections and Maintenance

- Regularly inspect hazardous waste collection and storage areas and containers.
- Schedule hazardous waste collection regularly.

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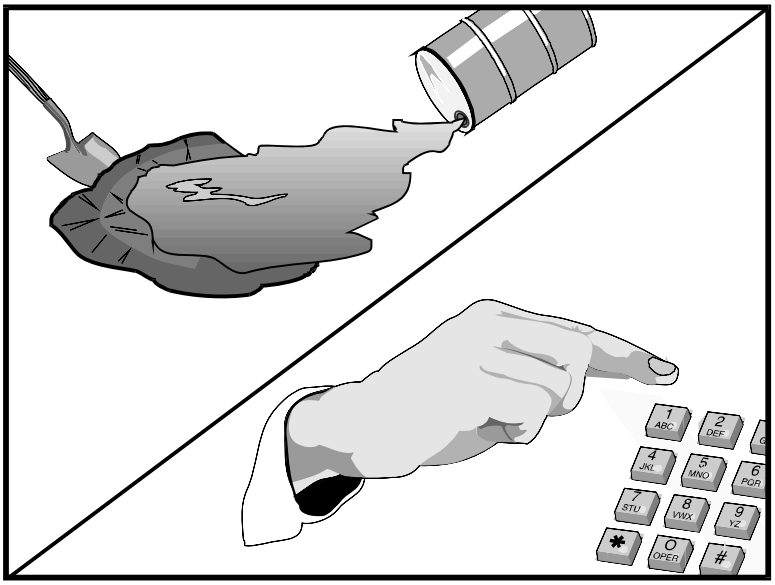
Spill Prevention and Control SM-10



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to reduce or prevent leaks or spills which may be discharged into the storm drain system or adjacent water bodies.

Applications

Construction projects involving the storage of chemicals or hazardous substances.

Installation and Implementation Requirements

General Requirements include the following:

- Store hazardous materials and wastes in covered containers and protect containers from vandalism;
- Maintain an ample supply of cleanup materials for spills shall be readily accessible;
- Train employees on proper spill prevention and cleanup; and
- Review spill response requirements at all applicable work sites.

Cleanup Requirements include the following:

- Immediately clean up leaks and spills;
- Use minimal water to clean up spills on paved surfaces. For small spills, use a rag. For general cleanup, use a damp mop. For larger spills, use absorbent materials. Properly dispose of materials used to clean up hazardous materials; and
- Avoid hosing down or burying dry material spills.

Reporting includes the following:

- Report significant spills to the U.S. coast Guard, Hawaii State Office of Hazard Evaluation and Emergency Response, and City and

Installation and Implementation Requirements (Continued)

County of Honolulu agencies, such as the Fire Department and

- Per federal regulations, report significant spills of oil onto an adjoining shoreline or into a water body to the National Response Center at 800-424-8802 (24 hour).

Vehicle and equipment maintenance activities requirements include the following:

- Use a designated area and/or secondary containment for on-site repair or maintenance activities. These areas shall be located away from drainage courses;
- Complete regular inspections of on-site vehicles and equipment, including delivery trucks and employees' vehicles, for leaks. Do not allow vehicles or equipment with leaks on-site;
- Secondary containment devices such as drop cloths and drain pans shall be used to catch leaks or spills while removing or changing fluids from vehicles or equipment;
- Place drip pans or absorbent materials under paving equipment not in use;
- Use absorbent materials on small spills. Avoid hosing down or burying spills. Remove and properly dispose of cleanup materials;
- Immediately transfer used fluids to the appropriate waste or recycling containers. Avoid leaving full drip pans and open containers on-site;
- Drain excess oil from oil filters prior to disposal by placing filter in a funnel over a waste oil recycling drum. Recycle oil filters if this service is available; and
- Store all cracked batteries in a non-leaking secondary container even if the acid appears to have drained out. Handle dropped batteries as cracked batteries until assured it is not leaking.

Vehicle and equipment fueling activities requirements include the following:

- Use designated areas for required on-site fueling. Fueling areas shall be located away from drainage courses;
- Avoid "topping off" of fuel tanks; and
- Use secondary containment devices such as drain pans to catch spills or leaks while fueling.

Limitations

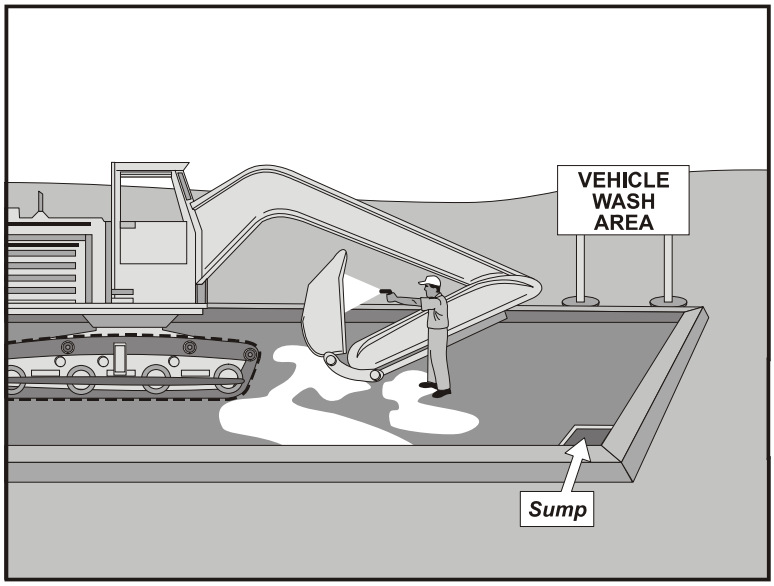
Use of a private spill cleanup company may be necessary.

Inspections and Maintenance

- Update spill prevention and control plans and stock necessary cleanup materials as the chemicals used or stored on-site change.
- Ample supplies of materials for spill control and cleanup shall be located on-site near maintenance and material storage or unloading areas.

Vehicle and Equipment Cleaning

SM-11



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to reduce or prevent the discharge of pollutants from vehicle and equipment cleaning activities to storm drain.

Applications

Construction or maintenance activities involving cleaning of vehicles and equipment.

Installation and Implementation Requirements

- Use off-site vehicle wash racks or commercial washing facilities when practical. Off-site cleaning facilities may be better equipped to properly handle and dispose of wash waters.
- If on-site cleaning is necessary, designate bermed wash areas for cleaning activities. The wash area may be sloped to facilitate collection of wash water and evaporative drying.
- Minimize water use to avoid the need for erosion and sediment controls for the wash area.
- Use phosphate-free, biodegradable soaps.
- Train employees on pollution prevention measures.
- Steam cleaning shall not occur in uncontained areas. Significant pollutant concentrations may be generated from steam cleaning.

Limitations

Some soaps labeled phosphate-free and/or biodegradable have been shown to be toxic to fish before the soap degrades. Do not discharge wash water directly into streams.

Inspections and Maintenance

- Train employees on implementation of revised procedures.
- Inspect and maintain structural controls.

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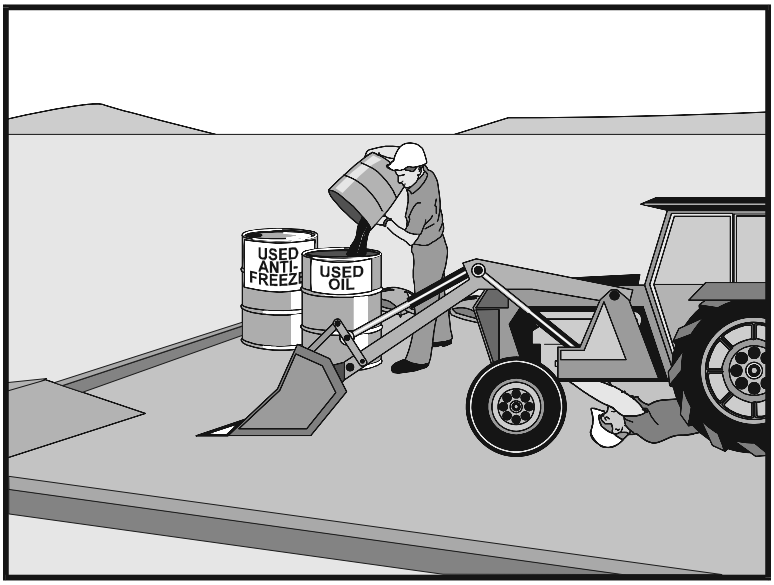
Vehicle and Equipment Maintenance

SM-12



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to prevent or reduce the discharge of pollutants from vehicular and equipment maintenance procedures into the storm drain system or adjacent water bodies.

Applications

Construction sites with on-site areas for storage and maintenance of vehicles and equipment.

Installation and Implementation Requirements

- Prevent excessive accumulation of oil and grease by keeping vehicles and equipment clean.
- Use off-site repair and maintenance facilities where practical.
- Designate a maintenance area away from drainage courses to prevent pollutants from entering the drainage system.
- Place drip pans or drop cloths under vehicles and equipment to absorb spills or leaks.
- Provide an ample supply of readily accessible spill cleanup materials.
- Use absorbent materials on small spills. Promptly remove and properly dispose of absorbent materials. Do not hose down or bury small spills.
- On-site vehicles and equipment shall be inspected regularly for leaks and all leaks shall be immediately repaired.
- Incoming vehicles and equipment shall be checked for leaks. Leaking vehicles and equipment shall not be allowed on-site.

Installation and Implementation Requirements (Continued)

- Segregate and recycle wastes from vehicle/equipment maintenance activities such as used oil or oil filters, greases, cleaning solutions, antifreeze, automotive batteries, and hydraulic and transmission fluids.
- Properly dispose of wastes generated by vehicle/equipment maintenance activities.
- Provide employee training on proper maintenance and spill cleanup practices and procedures.

Limitations

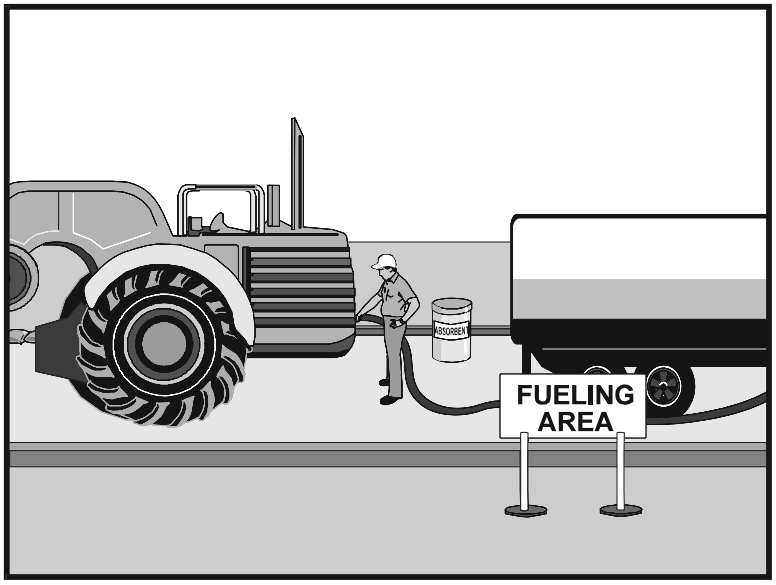
Off-site maintenance facility may not be easily accessible.

Inspections and Maintenance

- Regularly inspect vehicle and maintenance areas.
- Ample supplies of spill cleanup materials shall be kept on-site.

Vehicle and Equipment Refueling

SM-13



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Practices and procedures to prevent or reduce the discharge of pollutants to storm water from vehicle and equipment fuel leaks or spills.

Applications

Construction or maintenance activities involving fueling of vehicles or equipment.

Installation and Implementation Requirements

- Comply with Federal and State requirements regarding stationary, above ground storage tanks.
- Use off-site fueling sites when practical. Off-site fueling sites may be better equipped to service and handle spills due to multiple vehicles or pieces of equipment.
- If on-site fueling is necessary, locate designated fuel areas away from drainage courses to prevent contamination of storm water.
- Avoid “topping-off” of fuel tanks.
- Drip pans or drop cloths shall be used to absorb leaks or spills during fueling.
- Absorbent spill cleanup materials shall be available and located in fueling areas.
- Use absorbent materials on small spills instead of hosing down or burying the spill. Promptly remove and properly dispose the absorbent materials.
- Minimize mobile fueling of construction equipment by transporting equipment to designated areas for fueling.
- Train employees on proper fueling and cleanup procedures.

Vehicle and Equipment Refueling

SM-13

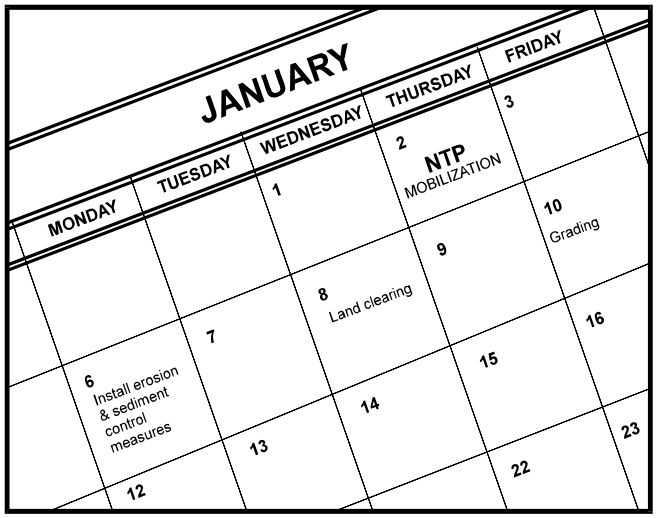
Limitations

Off-site fueling of vehicles and equipment may not be practical.

Inspections and Maintenance

- Ample supplies of materials for fuel spill control and cleanup shall be located on-site near fueling areas.
- Regularly inspect fueling areas and storage tanks.

Scheduling SM-14



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Development of a plan that addresses the sequence of construction activities as it relates to the local climate. Scheduling considerations may minimize soil erosion resulting from exposure to wind, rain, runoff, and vehicle tracking.

Applications

Proper scheduling shall be used on all projects.

Installation and Implementation Requirements

- Minimize the area of active construction. Limit is 300,000 square feet.
- Minimize work involving soil disturbing activities during the rainy season.
- Schedule disturbed areas to be stabilized prior to additional grading of other areas.
- Minimize duration of time trenches remain open. Schedule trenching activities to ensure trenches are closed prior to excavating new trenches.
- Implement erosion and sediment control year round.

Limitations

None

Inspections and Maintenance

- Monitor progress of construction activities relative to construction schedule. Implement remedial measures if progress deviates from schedule.
- Revise the schedule as necessary.

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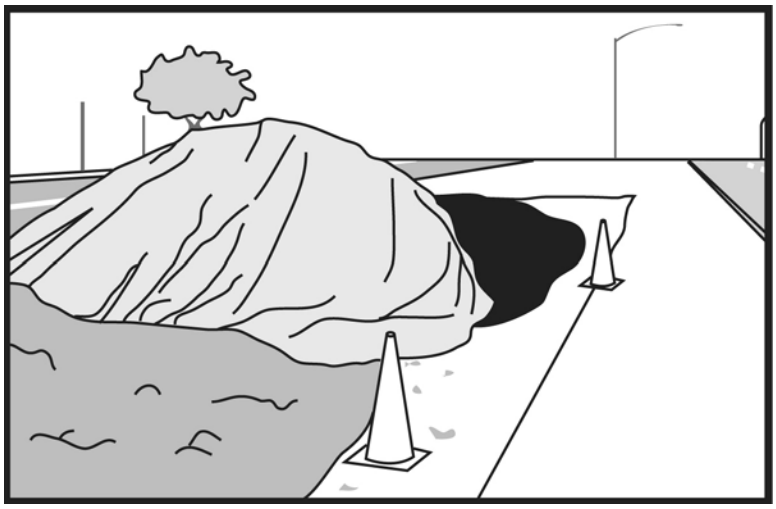
Location of Potential Sources of Sediment

SM-15



Description

Identify potential sources of sediment to reduce erosion and sediment discharge from construction sites.

Applications

Any potential source of sediment on all projects.

Installation and Implementation Requirements

- Configure construction site to ensure vegetated areas buffer haul roads and stockpiles. Vegetation provides an effective means of reducing sediment and pollutants discharged off-site.
- Place stockpiles away from waterways or low spots.
- Direct off-site runoff away from bare ground.
- Maintain vegetation in swales and natural drainage ways.
- Designate naturally level areas for parking and equipment staging during construction.

Limitations

Additional BMPs such as mulching, planting, and structural controls, including berms, silt fences, and silt basins, shall also be implemented.

Inspections and Maintenance

Inspect construction site periodically and after rain to identify areas requiring installation, repair, or replacement of additional BMPs to cover exposed areas or redirect off-site runoff.

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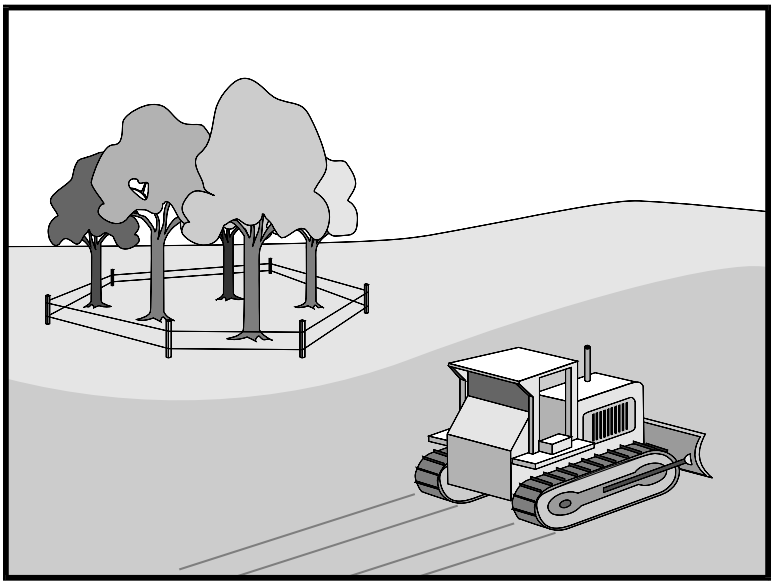
Preservation of Existing Vegetation

SM-16



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Identification of existing vegetation to remain provides erosion and sediment control on a site with future land disturbing activities.

Applications

Preservation of existing vegetation practices apply to the following:

- Areas on-site where no construction activity occurs or will occur at a later date.
- Areas where the existing vegetation should be preserved such as steep slopes, watercourses, and building sites in wooded areas.
- Natural resources or environmental protection areas requiring preservation by local, state, and federal governments such as wetlands and marshes.

Installation and Implementation Requirements

- Incorporate existing vegetation into landscaping plans when possible. Proper care of this vegetation before and after construction is required.
- Consider aesthetic and environmental values, tree/plant health, life span, sun exposure limitations, and space requirements when determining which vegetation to preserve.
- When preparing the landscaping plans, avoid using vegetation which competes with the existing vegetation.
- Establish setback distances defined by devices such as berms, fencing, or signs. Setback distances are based on vegetation species, location, size, and age. The type of construction activity in the vicinity of the vegetation shall also be considered. Construction activities are not permitted within the setback.

Preservation of Existing Vegetation

SM-16

Installation and Implementation Requirements (Continued)

- Protect existing vegetation using one of the following methods:
  - o Mark, flag, or fence areas of vegetation to be preserved;
  - o Designate limits of root system (tree drip line);
  - o Tree wells and retaining walls which are large enough to protect the root system;
  - o Limit grading to within one foot of the tree drip lines, if grading under the tree is necessary; and
  - o Locate construction traffic routes, spoil piles, etc. away from existing vegetation.

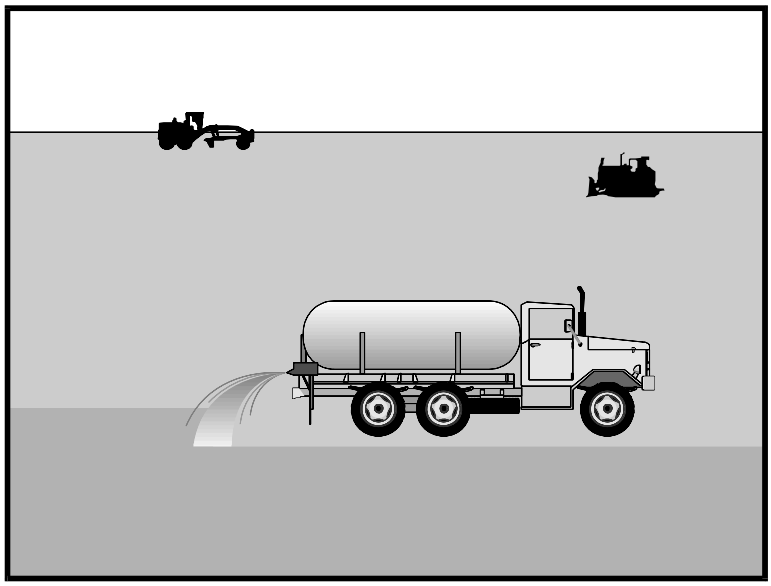
Limitations

- Requires advanced planning and coordination between the owner/ developer, contractor, and designer.
- Limited use if final site design does not incorporate existing vegetation.
- Diverse site topography may result in additional expenses to satisfy vegetation preservation and the grading required for the site improvements.

Inspections and Maintenance

Inspect protective measures and immediately repair or replace damaged protection measures.

Dust Control SM-18



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Application of water and/or dust control measures to minimize erosion due to wind or reduce the amount of dust generated by construction activities.

Applications

Dust control shall be used on all exposed soils or any construction activity generating dust. Dust control shall apply to the following:

- Clearing, grubbing, and grading;
- Construction vehicular travel on unpaved roads;
- Drilling and blasting;
- Sediment tracking onto paved roads;
- Soil and debris stockpiles;
- Batch drop from front-end loaders; and
- Unstable soil areas.

Installation and Implementation Requirements

- Minimize exposed areas through the schedule of construction activities.
- Utilize vegetation, mulching, sprinkling, and stone/gravel layering to quickly stabilize exposed soil.
- Identify and stabilize primary entrances/exits prior to commencement of construction.
- Anticipate the prevailing wind direction to minimize the amount of dust generated.
- Do not over-spray water for dust control purposes.
- Direct construction vehicular traffic to stabilized roadways.
- Comply with the 2005 Hawaii Standard Specifications for Road and Bridge in sections 209 and 620.

Dust Control SM-18

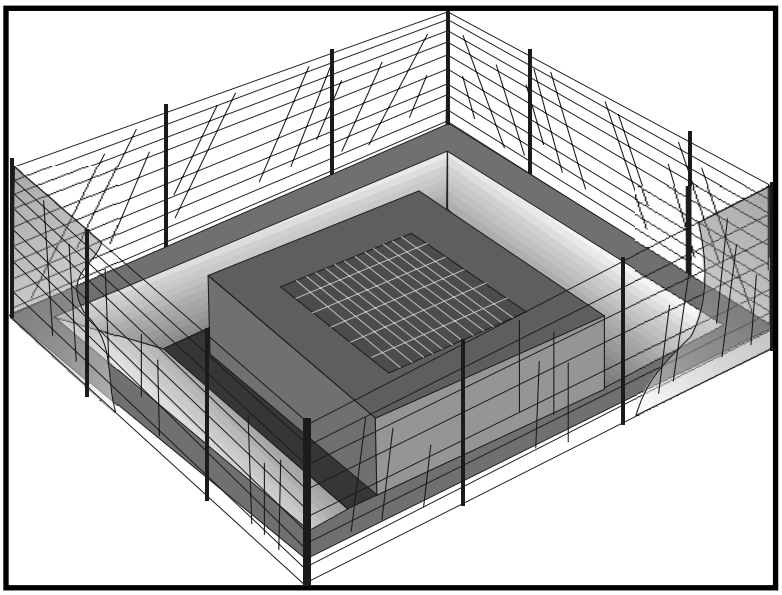
Limitations

- Daily or more frequent applications of water may be necessary since water is a short-term dust preventative.
- Erosion may result from overwatering.
- Oil may not be used for dust control since the oil may discharge into a drainageway or seep into soil.
- Some dust suppression chemicals may cause soil to be water repellent resulting in increased runoff.

Inspections and Maintenance

Inspect construction site periodically and after rain to identify areas requiring installation, repair, or replacement of additional BMPs to cover bare ground or redirect off-site runoff.

Storm Drain Inlet Protection SC-2



Source: Caltrans Construction Site Best Management Practices Manual, 2003.

Description

Devices installed at storm drain inlets to detain and/or filter sediment-laden runoff. These devices trap and prevent sediment from entering into the storm drain system.

Applications

Every storm drain inlet that may intercept sediment-laden runoff shall be covered or protected.

Installation and Implementation Requirements

- Five types of inlet protection are described below.
  - o Geotextile Filter Fabric Fence: Applicable to drainage basins less than one acre and with less than a 5 percent slope.
  - o Block and Stone Filter: Applicable to flows exceeding 0.5 cfs.
  - o Stone and Wire Mesh Filter: Applicable to curb or drop inlets subjected to traffic from construction equipment.
  - o Sandbag Barrier: Applicable to sloped, paved streets; creates a small sediment trap upstream of inlets.
  - o Excavated Drop Inlet Sediment Trap: Applicable to areas requiring overflow capability due to expected high flows; an excavated area around the inlet which detains runoff and allows sediment to settle.
- In addition to the methods of inlet protection described above, there are other effective methods and proprietary devices, which may also be used.
- Limit to drainage areas less than one acre, unless a sediment trap intercepts the runoff prior to the inlet protection device.
- Provide an area for water to pond around inlet without flooding nearby structures and property.

Installation and Implementation Requirements (Continued)

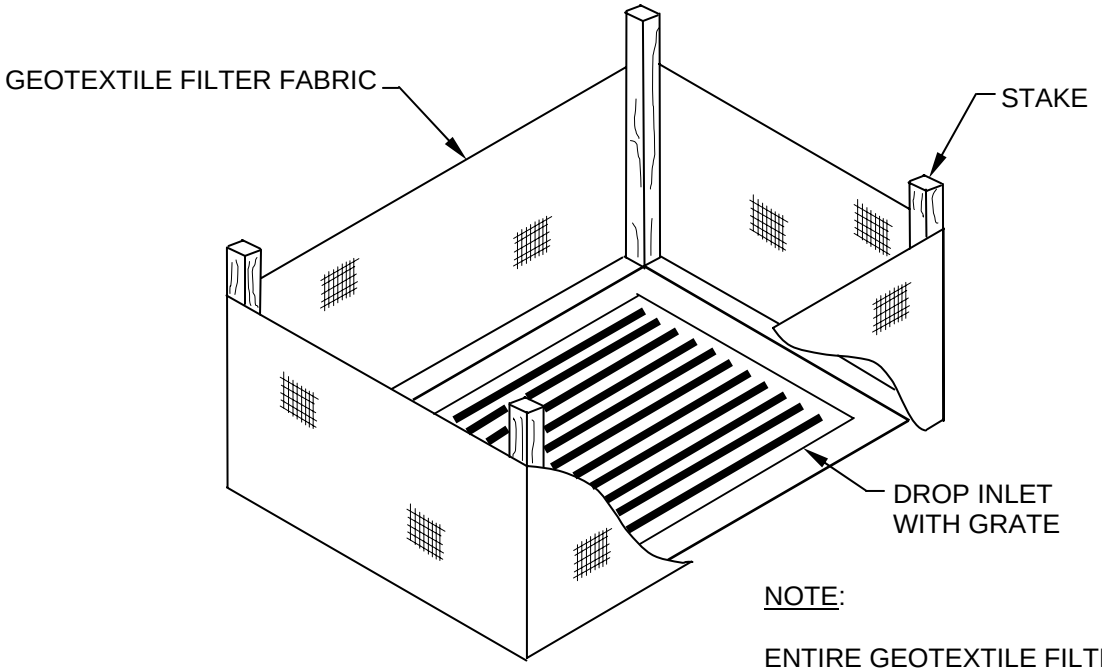
- Other proprietary devices may be used and shall be installed per manufacturer's recommendations.

Limitations

- Short-term flooding at a protected inlet will occur but must not become a traffic hazard.
- Drainage area limited to one acre or less.
- Straw bales shall not be used for inlet protection.
- Runoff on slopes may bypass protected inlets

Inspections and Maintenance

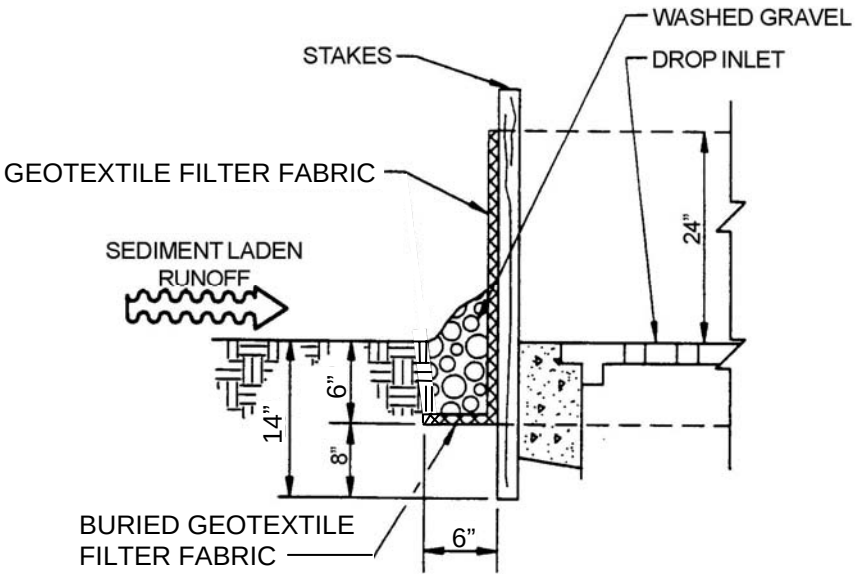
- Inspect weekly during dry periods as well as within 24 hours of any rainfall of 0.5 inch or greater which occurs in a 24-hour period and daily during periods of prolonged rainfall.
- Immediately replace clogged geotextile filter fabric or stone filters.
- Remove accumulated sediment when depth reaches half of the filter height or half of the sediment trap depth.
- Remove inlet protection after stabilization of upstream soils and sweeping of streets is completed. Properly dispose of trapped sediment.



NOTE:

ENTIRE GEOTEXTILE FILTER FABRIC NOT SHOWN FOR ILLUSTRATIVE PURPOSES.

PERSPECTIVE VIEW
NTS



SECTION
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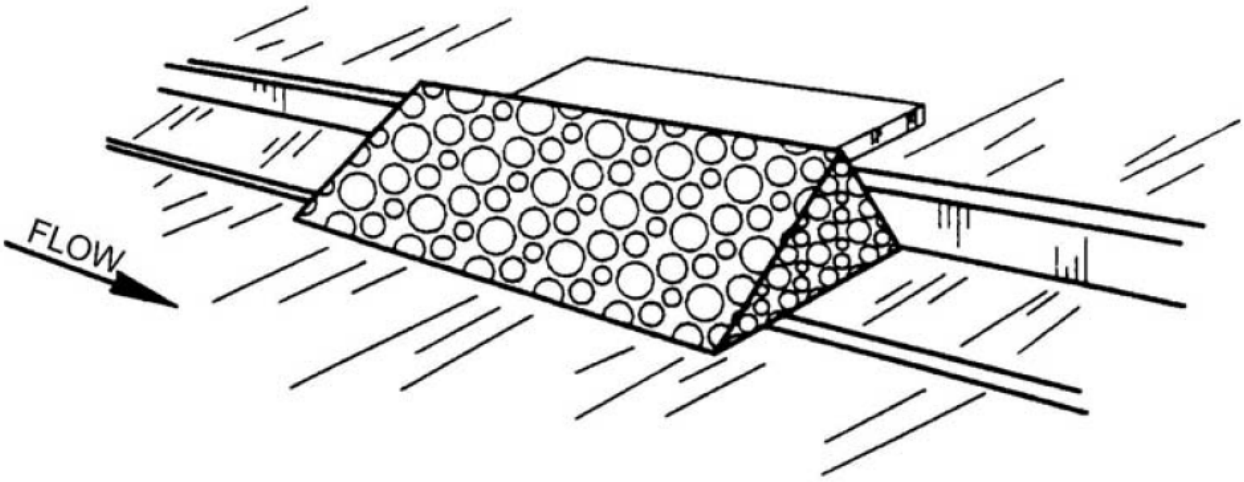
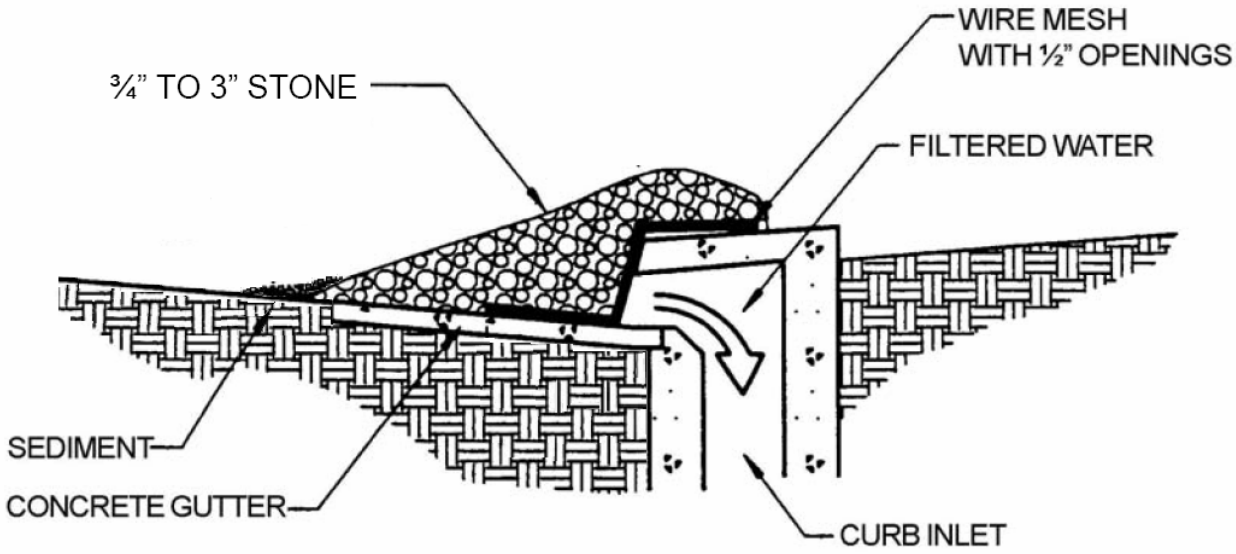
GEOTEXTILE FILTER FABRIC FENCE FOR DROP INLET FILTER

Source: Modified from CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

Storm Drain Inlet Protection SC-2



PERSPECTIVE
NTS



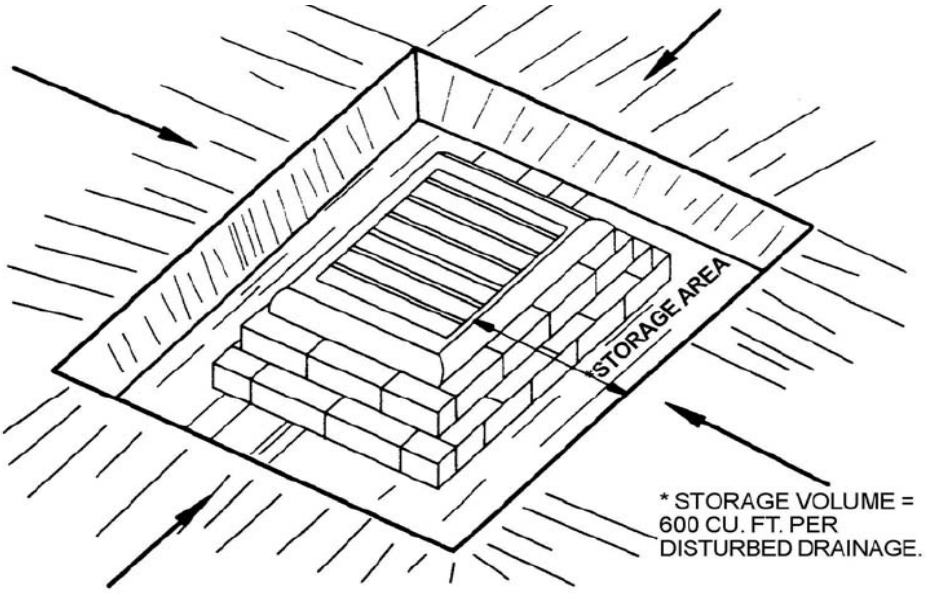
SECTION
NTS

NOTE: NOT APPLICABLE TO AREAS WITH HIGH TRAFFIC VOLUMES.

STONE AND WIRE MESH FILTER FOR CRUB INLET

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

Storm Drain Inlet Protection SC-2



PERSPECTIVE
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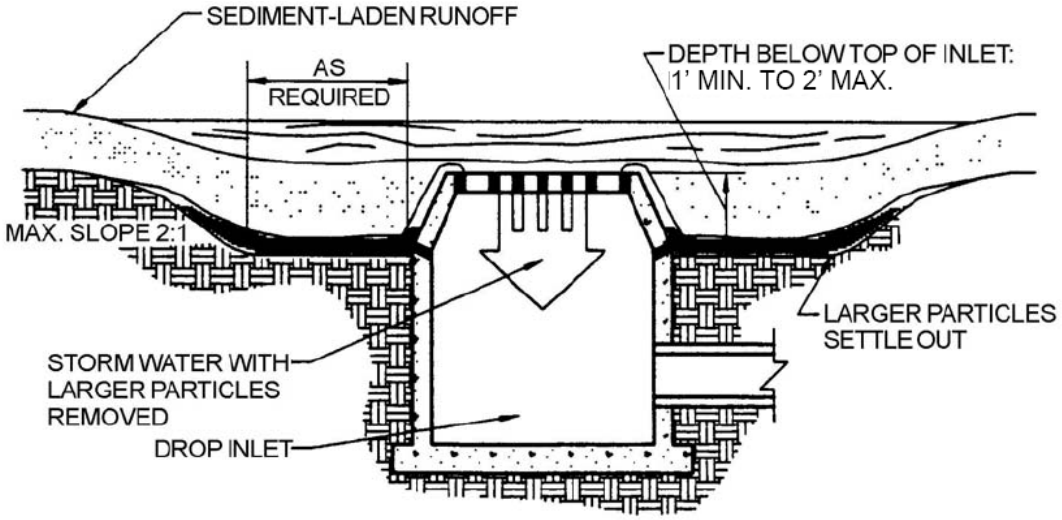
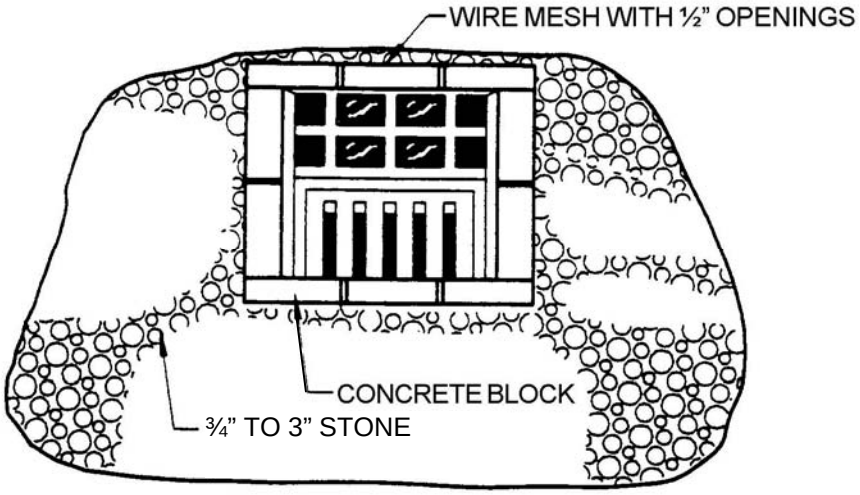


SECTION
NTS

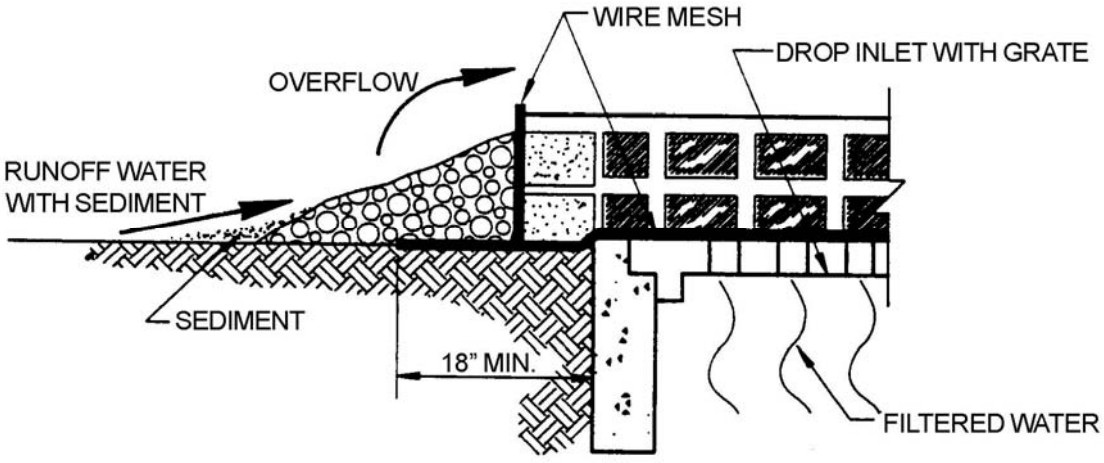
NOTE: THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY FLOWS ARE EXPECTED AND WHERE OVERFLOW CAPABILITY AND EASE OF MAINTENANCE ARE DESIRABLE.

EXCAVATED DROP INLET SEDIMENT TRAP

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.



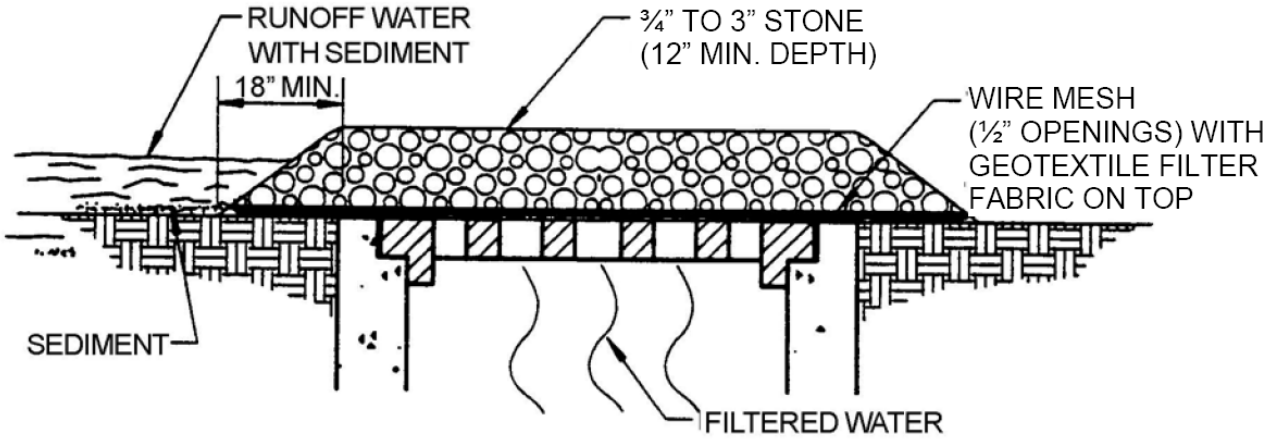
PLAN
NTS



SECTION
NTS

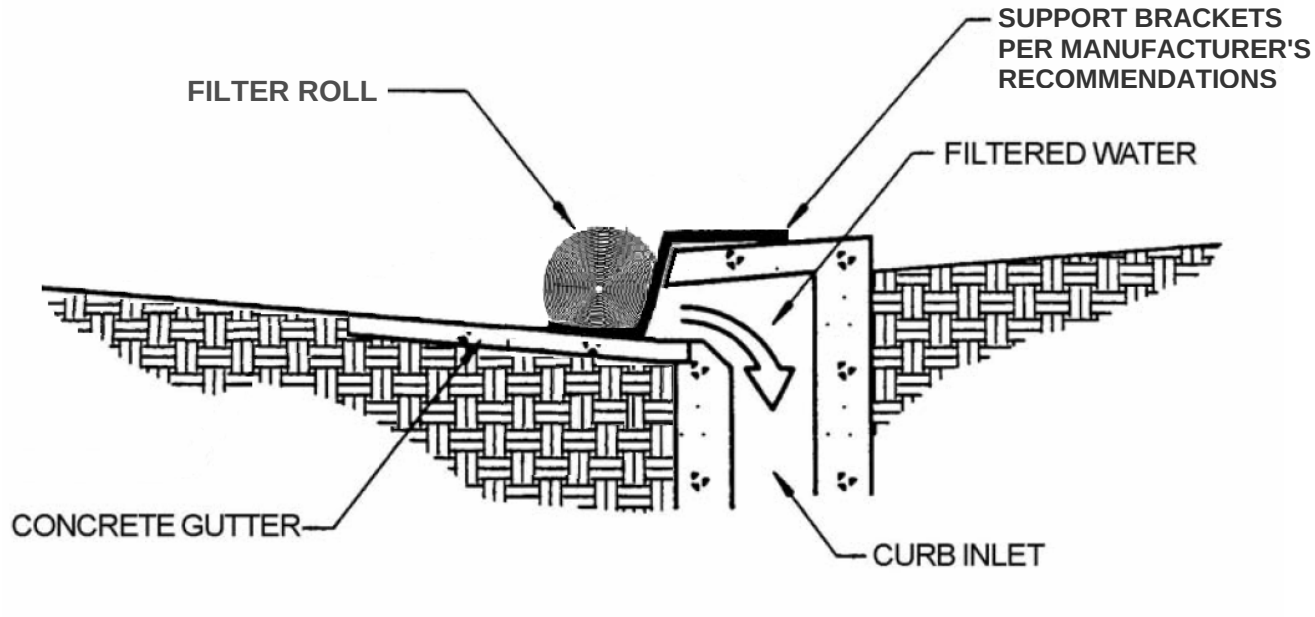
BLOCK AND STONE FILTER AT DROP INLET

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.



STONE AND WIRE MESH FILTER FOR DROP INLET

NTS



FILTER ROLL WITH SUPPORTS FOR CURB INLET

NTS

Source: CCH Best Management Practices Manual for Construction Sites in Honolulu, 1999.

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Attachment A-10
MS4 MOU Between HDOT and City and County of Honolulu

HWY 2.5622

February 5, 2002

Mr. Timothy E. Steinberger, P.E.
Director
Department of Environmental Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

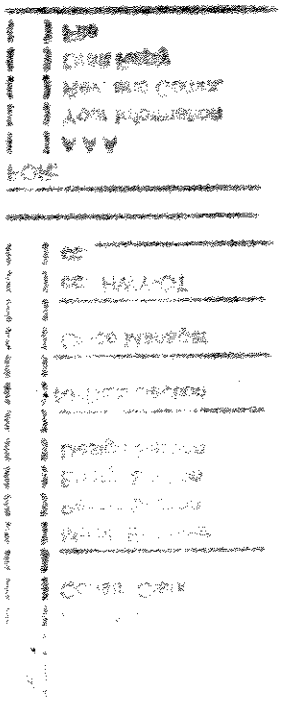
Dear Mr. Steinberger:

Subject: Memorandum of Understanding (MOU) – State DOT Highways Division And City Departments of Environmental Services and Facilities Maintenance

Forwarded for your files and distribution are two (2) signed copies of the Memorandum of Understanding that addresses the cooperation between the State and the City for the municipal separate storm sewer systems.

Very truly yours,

BRIAN K. MINAAI
Director of Transportation
/wb
Enclosures
Bc: HWY-O



ORIGINAL

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION, STATE OF HAWAII

AND

THE DEPARTMENT OF ENVIRONMENTAL SERVICES AND
THE DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU

I. Purpose

The purpose of this Memorandum of Understanding (MOU) is to define the roles and responsibilities of the State Department of Transportation, Highways Division, (DOT), and the City and County of Honolulu (City) Department of Environmental Services, (ENV) and Department of Facility Maintenance (DFM), as part of permit requirements on the control of illicit discharges and nonpoint sources of pollution into the DOT's municipal separate storm sewer system on Oahu, and the City's municipal separate storm sewer system.

II. Background

The goal of the National Pollutant Discharge Elimination System (NPDES) program is to effectively prohibit nonstorm water discharges into storm sewers by the use of measures to reduce the discharge of pollutants to the "maximum extent practicable" ("MEP") including best management practices, control technique and systems, and design and engineering methods deemed appropriate for the control of such pollutants. In Hawaii, the EPA has delegated NPDES permitting authority to the State Department of Health (DOH), which issues and enforces the requirements of NPDES permits.

On Oahu, the regulations require both the DOT and the City to have NPDES permits for their respective municipal storm sewer systems. Because the DOT and City systems are interconnected, DOH regulations require that an interagency agreement between the DOT and the City or a Memorandum of Understanding (MOU), be executed that delineates policies governing interconnection and enforcement that will control the discharge of pollutants from the upper portions of the municipal separate storm sewer systems into the lower portions of both DOT and City systems to waters of the United States.

III. Objectives

The objectives of this MOU are to: a) establish effective intergovernmental coordination between the DOT and the City; b) to clearly delineate the roles and responsibilities of each agency in an effort to minimize, to the maximum extent practicable, the discharge of any

pollutant from one municipal separate storm sewer system to the other municipal separate storm sewer system ; c) minimize duplication of effort; and d) ensure accountability through judicious application of best management practices, design and engineering methods, and periodic water quality monitoring.

IV. Responsibilities

A. The DOT, through the Oahu District Engineer, will

1. Attend regular scheduled meetings with the City to exchange information and improve communication.

2. Coordinate the processing of any DOT NPDES permit for the discharge of any pollutants or nonstorm waters with the Department of Health, State of Hawaii.

3. Implement a storm water monitoring program in conformance with the requirements of the DOT municipal NPDES permit, and provide analytical data of storm water discharges to the ENV whenever such discharges are conveyed into the City's municipal separate storm sewer system.

4. Upon request by the City, provide an inventory, location, and other available data of all municipal separate storm sewer system outfalls that are owned, operated, and maintained by the DOT .

5. Conduct regular scheduled maintenance of the DOT's municipal separate storm sewer system.

6. Conduct regular, scheduled highway sweeping to minimize the discharge of pollutants from the DOT's highway system into the storm sewer system.

7. Encourage ridership program(s) which will reduce vehicular traffic volumes on the DOT's highway system, thereby reducing the emission of air and other pollutants generated by vehicles.

8. Conduct timely maintenance on the DOT's highway system, including slope maintenance.

9. Inspect DOT highway construction projects and require implementation of erosion control measures and best management practices to the maximum extent practicable.

10. Implement a program to detect and eliminate illicit and improper discharges into the DOT's municipal separate storm sewer system on Oahu.

11. Investigate violations of and enforce compliance with NPDES regulations, to prevent illegal private drain connections to the DOT's municipal separate storm sewer system, as well as, illicit discharges and improper drainage into the DOT's municipal separate storm sewer system. The DOT will be responsible for all investigations of illegal discharges that first enter DOT facilities and flow to other systems, including the City's municipal separate storm sewer system.

B. The City and County of Honolulu, Department of Environmental Services (ENV) will

1. Attend regular scheduled meetings with the DOT and DFM to exchange information and improve communication.

2. Coordinate the processing of any City NPDES permits for the discharge of any pollutants or nonstorm water with the Department of Health, State of Hawaii.

3. Implement a storm water monitoring program in conformance with the requirements of the City's municipal NPDES permit, and provide, upon request, analytical data of storm water discharges to the DOT whenever such discharges are conveyed into the DOT's municipal separate storm sewer system.

4. Provide support for the educational program to encourage ridership on mass and/or rapid transit system(s) to reduce the emission of air and other pollutants generated by vehicles, which constitute a major nonpoint source.

5. Seek adequate funding and institute a program to promote public reporting of illicit discharges into the City's municipal separate storm sewer system, and noticeable water quality impacts from storm sewer discharges.

6. Implement a program for the collection of household hazardous wastes in conjunction with the State Department of Health's hazardous wastes disposal program.

7. Implement , through the ENV's Division of Refuse, an educational and public information program to inform the public on the proper management and disposal of used oil and toxic material.

8. Implement , with the assistance of the State Department of Agriculture, an educational program for the general public on appropriate pesticide and fertilizer application and disposal.

9. Implement a program to detect and eliminate illicit and improper discharges into the City's municipal separate storm sewer system.

10. Investigate violations of and enforce compliance with NPDES regulations, to prevent illegal private drain connection to the City's municipal separate storm sewer system, as well as, illicit discharges and improper discharges into the City's municipal separate storm sewer system. The City will be responsible for all investigations of illegal discharges that first enter City facilities and flow to other systems, including the DOT's municipal separate storm sewer system.

11. Conduct follow-up construction inspections and require effective erosion control measures for projects requiring grading or grubbing permits.

C. The City and County of Honolulu, Department of Facility Maintenance (DFM) will

1. Attend regular scheduled meetings with the DOT and ENV to exchange information and improve communication.

2. Upon request by the DOT, provide an inventory, location, and other available data of all municipal separate storm sewer system outfalls that are owned, operated, and maintained by the DFM upon request to the DOT.

3. Conduct regular, scheduled maintenance of the City's municipal separate storm sewer system.

4. Conduct regular, scheduled street sweeping to minimize the discharge of pollutants from City streets.

5. Conduct timely maintenance on City streets.

V. Other Provisions

A. This MOU does not alter the statutory authority and responsibilities or the respective permit requirements under the National Pollutant Discharge Elimination System (NPDES) of the DOT and the ENV. The intent of the MOU is to form a basis by which the aforementioned goals and objectives can be carried out by each agency in a cooperative manner.

B. It is agreed that interconnections between the DOT's municipal separate storm sewer system and the City's municipal separate storm sewer system are not considered private drain connections, and therefore do not require private drain connection licenses.

C. This MOU does not obligate any DOT, ENV or DFM funds. The DOT, ENV and/or DFM may contribute funds or in-kind services to any program which will mutually benefit any or all the parties.

D. The MOU may be amended or terminated at any time by mutual consent of the DOT, ENV or DFM. Additionally, the MOU may be terminated by any agency alone by giving sixty day written notice to the other.

DEPARTMENT OF
ENVIRONMENTAL SERVICES
City and County of Honolulu

12/19/01
Director Date

DEPARTMENT OF
FACILITY MAINTENANCE
City and County of Honolulu

27DEC01
Director Date

DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
State of Hawaii

2/1/02
Administration , Highways Division Date

Attachment E
HDOT Inspection and Maintenance Report Forms (SSCBMP Section 3.4)

SITE-SPECIFIC BEST MANAGEMENT PRACTICE PLAN

INSPECTION AND MAINTENANCE REPORT FORM

(TO BE COMPLETED EVERY 7 DAYS AND/OR WITHIN 24 HOURS OF A RAINFALL EVENT OF 0.5 INCHES OR MORE)

Project Title: _____ NGPC No.: _____

Project No.: _____

Contractor: _____

Prepared By, Title: _____ Date: _____

EROSION CONTROL - SLOPES/EXPOSED AREAS

Location	Date Disturbed	Erosion Control Measure established	Type of Erosion Control used	Acceptable (yes/no)	Comments

Notes/Actions:

_____

_____

_____

To be performed by: _____ on or before: _____

SEDIMENT CONTROL

Location	Type of Control (Silt fence, inlet protection,etc.)	Acceptable? (Yes/No)	*Rate Effectiveness of Control	Comments

(* Effectiveness Rating: Excellent, Very Good, Good, Fair, Poor)

Notes/Actions:

_____

_____

_____

To be performed by: _____ on or before: _____

STABILIZED CONSTRUCTION ENTRANCE

Location	Type of Stabilization	Acceptable? (Yes/No)	*Effectiveness of method used	Comments

(* Effectiveness Rating: Excellent, Very Good, Good, Fair, Poor)

Notes/Actions:

_____

_____

_____

To be performed by: _____ on or before: _____

STRUCTURAL CONTROLS (SEDIMENT BASINS)

(Check for Condition of Basin and Condition of outfall)

Location	Type of Sediment Basin	Acceptable? (Yes/No)	*Effectiveness of Sediment Basin	Comments

(* Effectiveness Rating: Excellent, Very Good, Good, Fair, Poor)

Notes/Actions:

_____

_____

_____

To be performed by: _____ on or before: _____

OTHER CONSTRUCTION ACTIVITIES

Activity	Adequate BMPs? (Yes/No)	Comments
Sawcutting		
Dust Control		
Material Storage		
Dewatering		

CONTRACTOR ACTIVITIES

Activity	Adequate BMPs? (Yes/No)	Comments
Concrete Washout/Waste		
Vehicle/Equipment Fueling		
Vehicle/Equipment Cleaning		
Vehicle/Equipment Maintenance		
Material Storage		
Spill Prevention/Control		