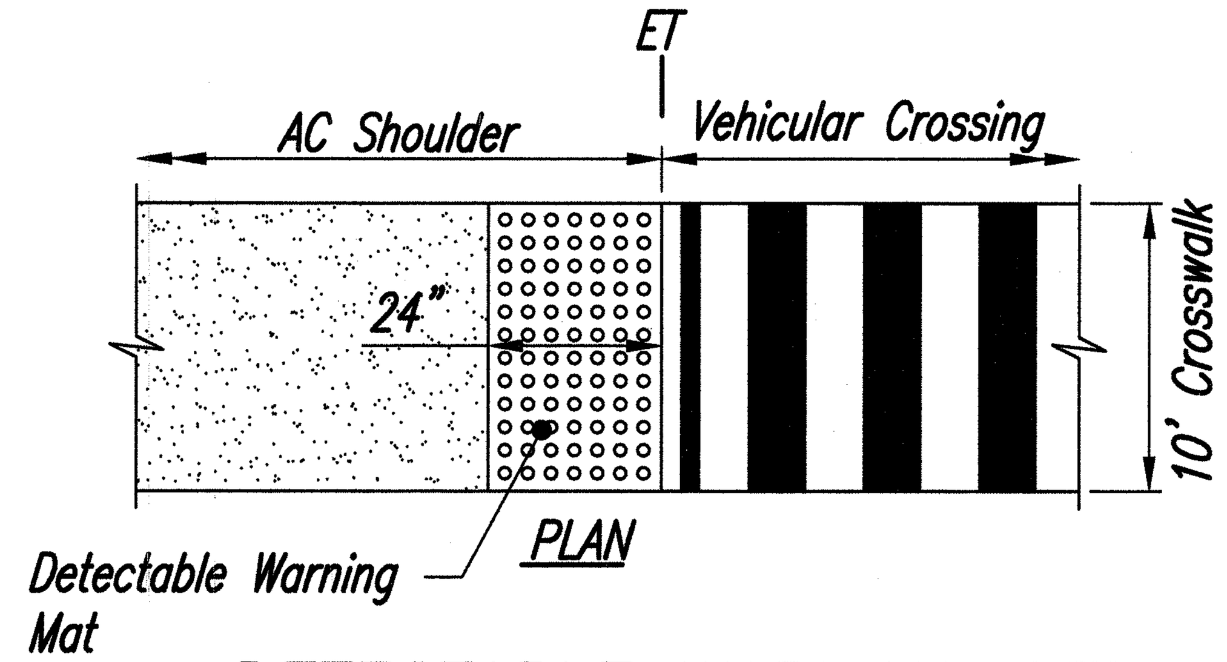
PAVEMENT MARKING SUMMARY

DESCRIPTION	QUANTITY
PAVEMENT MARKERS	
TYPE C	164 Ea
TYPE D	84 Ea
TYPE H	95 Ea
TYPE J	68 Ea
TYPE DB	3 Ea
THERMOPLASTIC EXTRUSION	
4-INCH PAVEMENT STRIPE (WHITE)	5,912 LF
4-INCH PAVEMENT STRIPE (YELLOW)	695 LF
BROKEN 4-INCH PAVEMENT STRIPE (WHITE)	510 LF
BROKEN 4-INCH PAVEMENT STRIPE (YELLOW)	40 LF
DOUBLE BROKEN 4-INCH PAVEMENT STRIPE (YELLOW)	435 LF
DOUBLE SOLID 4-INCH PAVEMENT STRIPE (YELLOW)	2,570 LF
8-INCH PAVEMENT STRIPE (WHITE)	871 LF
12-INCH PAVEMENT STRIPE (WHITE)	103 LF
12-INCH PAVEMENT STRIPE (YELLOW)	177 LF
CROSSWALK MARKINGS	9 LANES
PAVEMENT ARROW	18 Ea
PAVEMENT WORD, "ONLY"	2 Ea

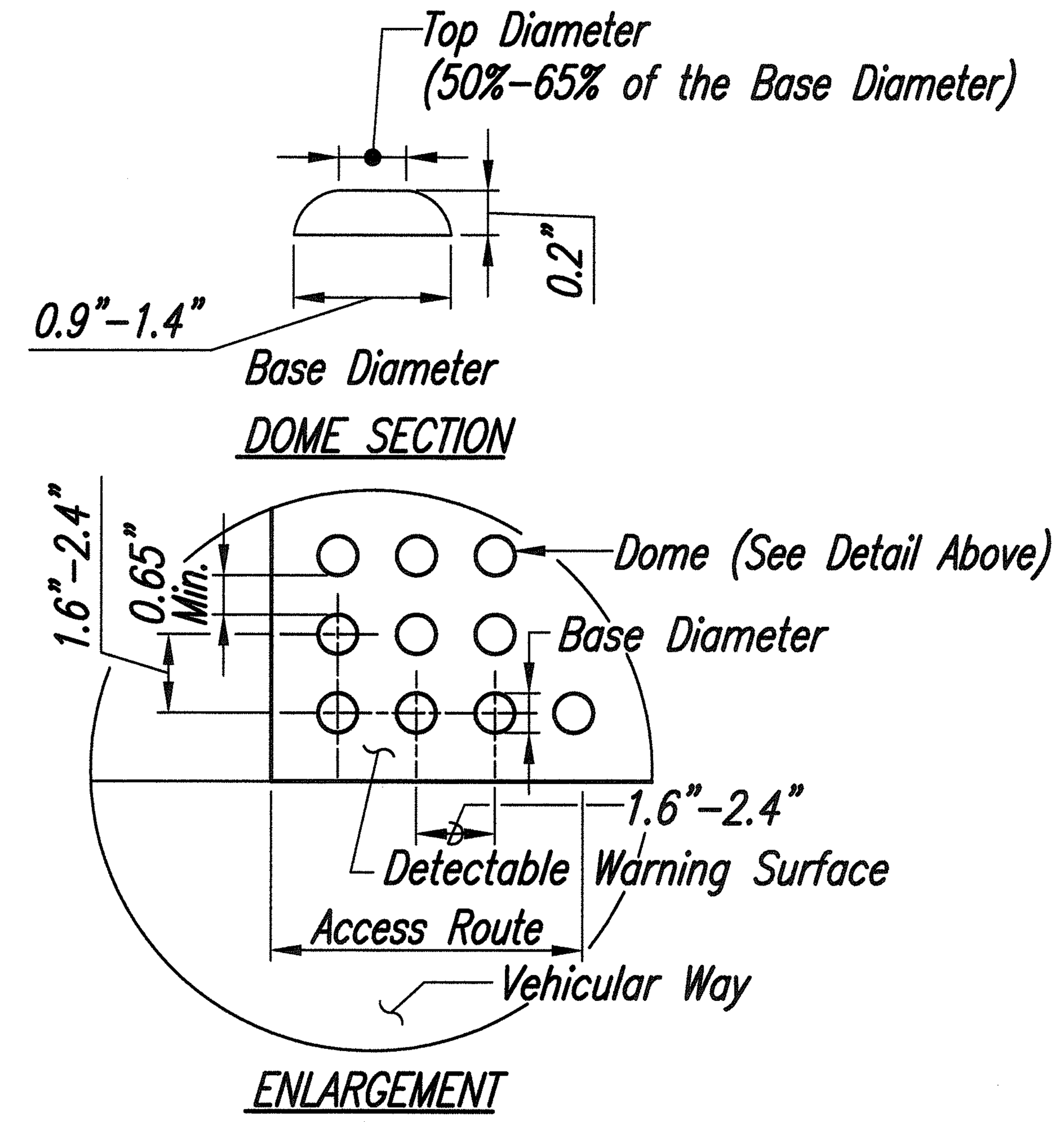
DETECTABLE WARNING NOTES:

1. Detectable warnings shall be 24 inches in the direction of travel and extend the full width of the flush surface.
2. Truncated domes shall have a diameter of 0.9 to 1.4 inch at the bottom, a diameter of 50%-65% of the base diameter at the top, a height of 0.2 inch and a center-to-center spacing of 1.6 to 2.4 inches measured along one side of a square arrangement.
3. Domes shall be aligned on a square grid in the predominant direction of travel to permit wheels to roll between the domes.
4. There shall be a minimum of 70 percent contrast in light reflectance between the detectable warning and an adjoining surface, or the detectable warning shall be "safety yellow".
5. The material used to provide visual contrast shall be an integral part of the detectable warning surface.
6. The detectable warning shall be located so that the edge nearest the curb line or other potential hazard is 6 to 8 inches from the curb line.



DETECTABLE WARNING DETAIL

Not to Scale



TRAFFIC SIGN SUMMARY

SIGN NO.	MESSAGE	QUANTITY W/POST > 10 SQ. FT	QUANTITY W/POST < 10 SQ. FT	QUANTITY W/O POST > 10 SQ. FT	QUANTITY W/O POST < 10 SQ. FT	REMARKS
D3-1 (36"x8")	Old Volcano Rd				1	Street Name
D3-1 (78"x18")	N Kulani Rd			1		Street Name on Mast Arm
D3-1 (78"x18")	S Kulani Rd			1		Street Name on Mast Arm
D3-1 (72"x18")	Volcano Rd			2		Street Name on Mast Arm
R1-1 (36"x36")	Stop		1			
R2-1(25) (36"x48")	Speed Limit 25			1		
R2-1(45) (36"x48")	Speed Limit 45	2				
R2-1(55) (36"x48")	Speed Limit 55	1				
R3-8LCR (30"x30")	Left Only, Straight or Right		1			
R3-8LSR (30"x30")	Straight or Left, Right Only		1			
R8-3a (24"x24")	No Parking (Symbol)		2			
R8-3b (24"x18")	Any Time				2	
R10-5 (30"x36")	Left on Green Arrow Only				2	On Mast Arm
R10-12 (30"x36")	Left Turn Yield on Green				2	On Mast Arm
S4-3 (24"x8")	School				1	Advisory
W3-3 (48"x48")	Signal Ahead	2				With Solar Powered Amber Flasher
	Buckle Up It's the Law		1			Advisory
	Click It or Ticket				1	Advisory
	TOTAL	5	6	5	9	

DESTINATION SIGN SUMMARY

SIGN NO.	LOCATION	MESSAGE	SIZE	NEW PANEL AREA (SQ. FT.) W/ POSTS
D-1	℄ Sta. 735+13± Rt. Volcano Rd.	⇦ Kulani 17	10'-0" x 2'-0"	20.00
D-2	℄ Sta. 740+59± Lt. Volcano Rd.	Kulani 17 ⇨	10'-0" x 2'-0"	20.00
			TOTAL	40.00

REFLECTOR/OBJECT MARKER SUMMARY

TYPE	QUANTITY W/FLEXIBLE POST WHITE	QUANTITY W/FLEXIBLE POST YELLOW	REMOVE
RM-3	41	-	53
OM2-2V	-	12	
TOTAL	41	12	53

DATE	REVISION
1/27/11	Addendum 2, Revised Traffic Sign Summary (2)

BARRY K. MURANAKA LICENSED PROFESSIONAL ENGINEER No.8418-C HAWAII, U.S.A.

LICENSE EXPIRES 4/30/12

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

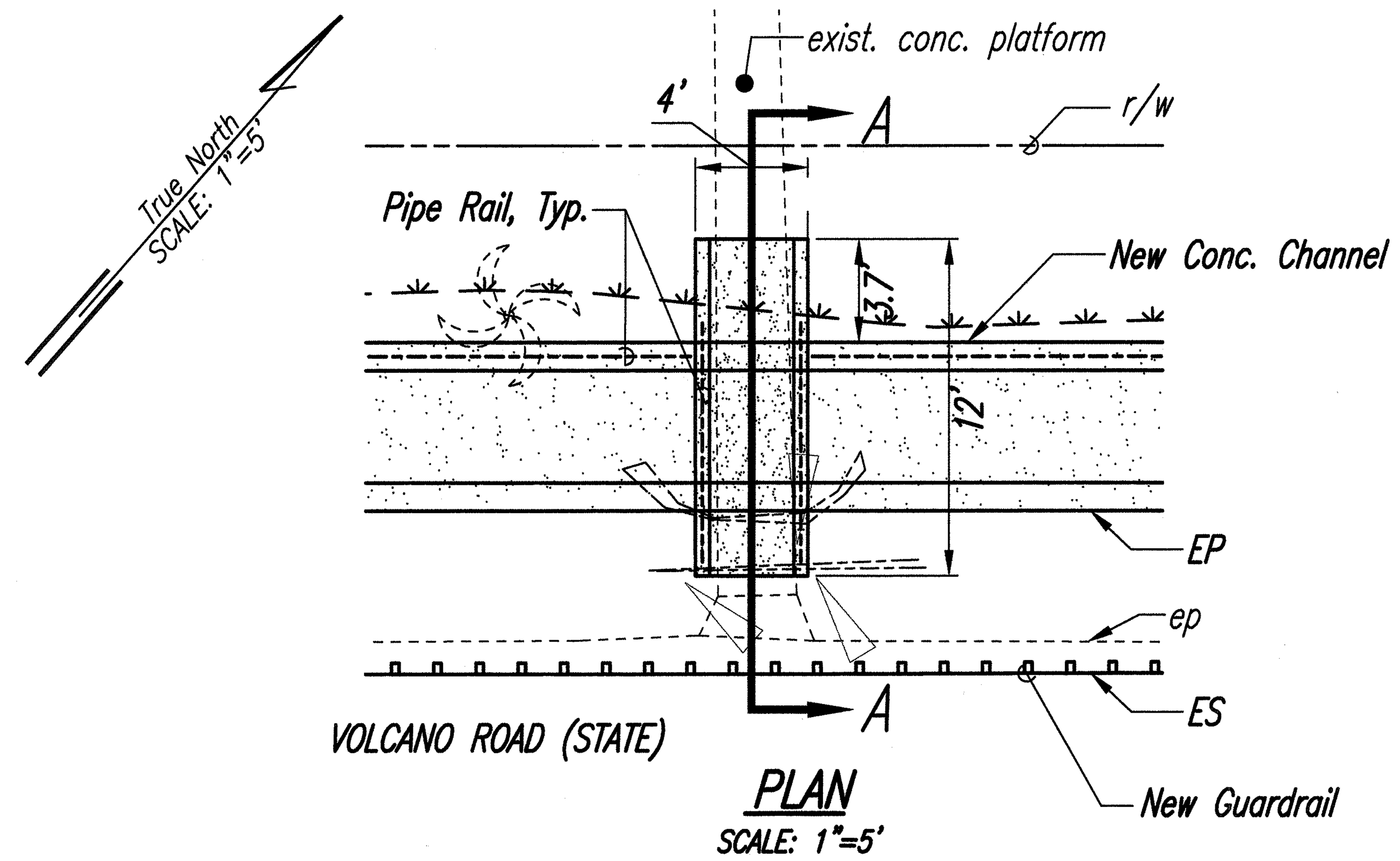
TRAFFIC SUMMARIES

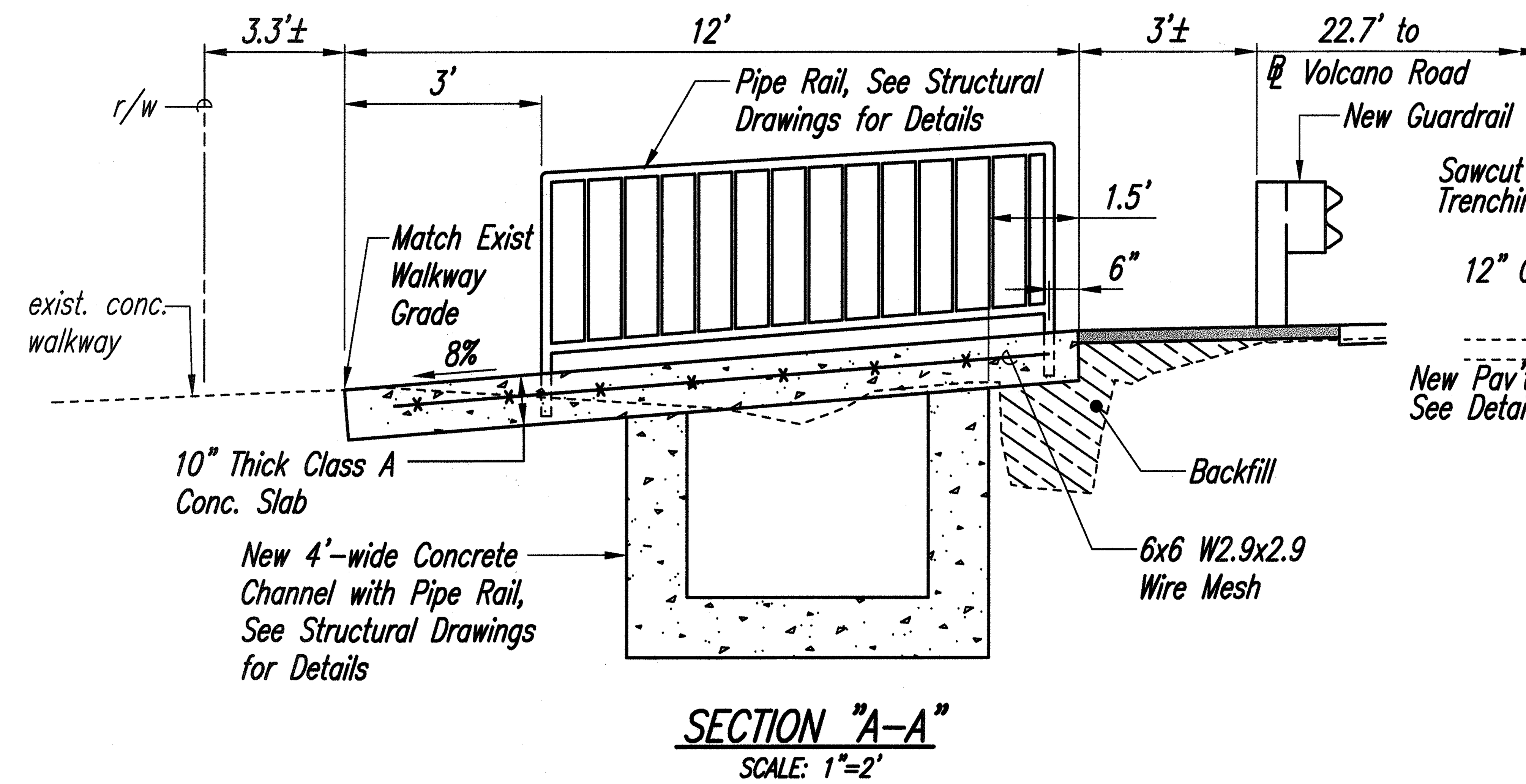
Volcano Road Intersection and Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: None Date: November 2010

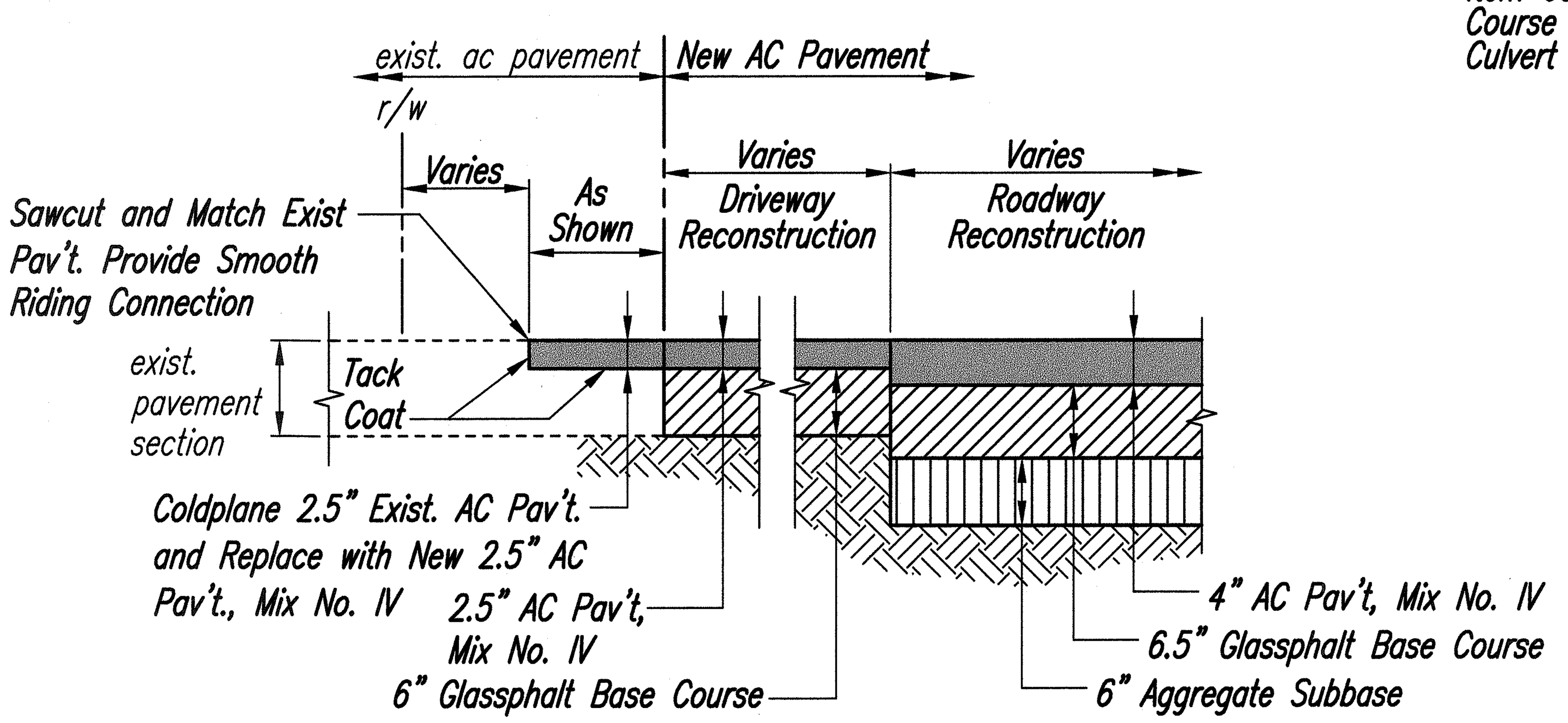
SHEET No. 1 OF 1 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HS-STP-011-2(38)	2010	ADD. 99	141



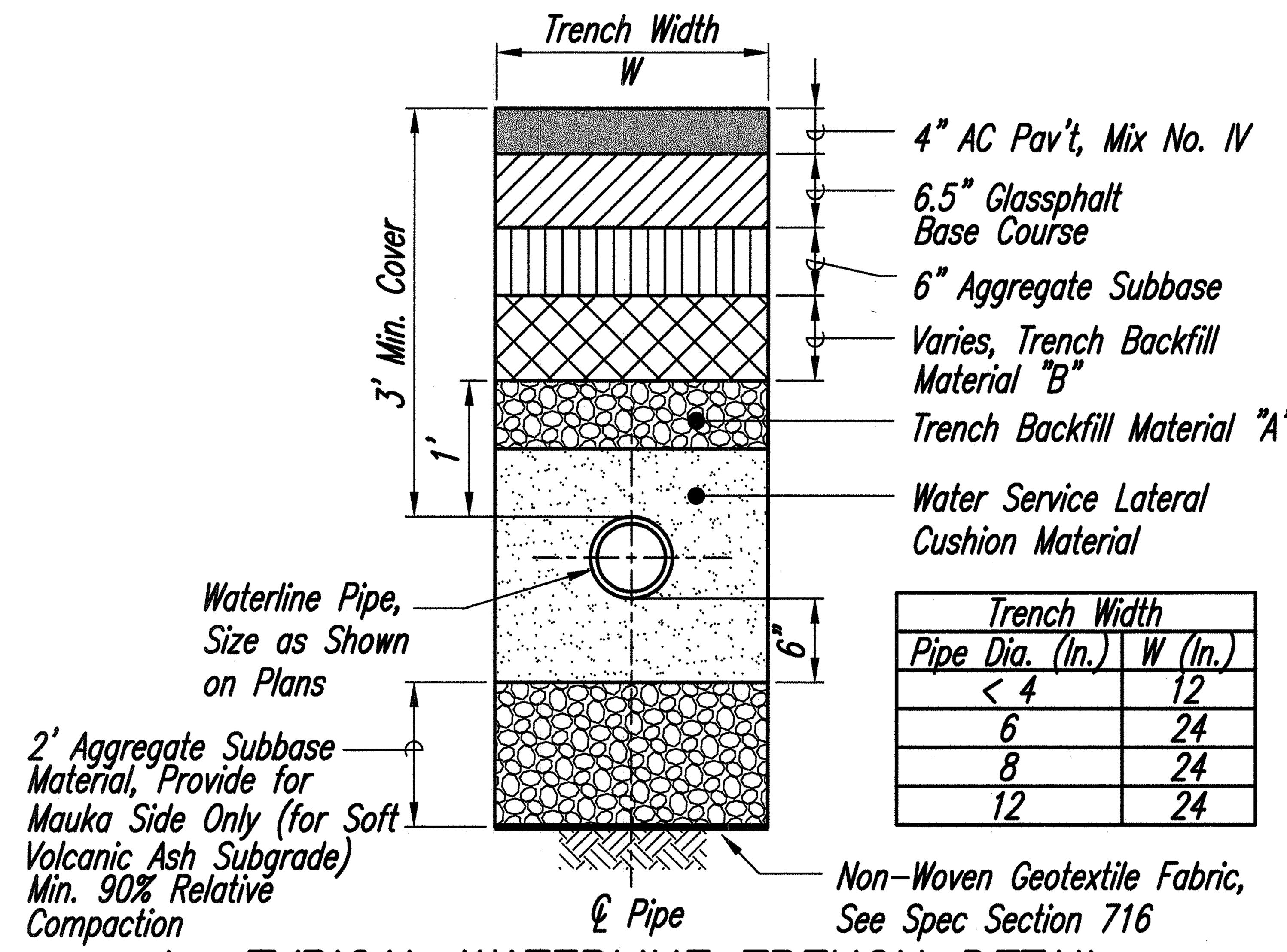


CONCRETE PLATFORM DETAIL



TYPICAL DRIVEWAY RECONSTRUCTION SECTION

Not To Scale



Trench Width	
Pipe Dia. (In.)	W (In.)
< 4	12
6	24
8	24
12	24

△2 TYPICAL WATERLINE TRENCH DETAIL

Not to Scale

TYPICAL TRENCH NOTES:

TRENCH BACKFILL MATERIAL "A"

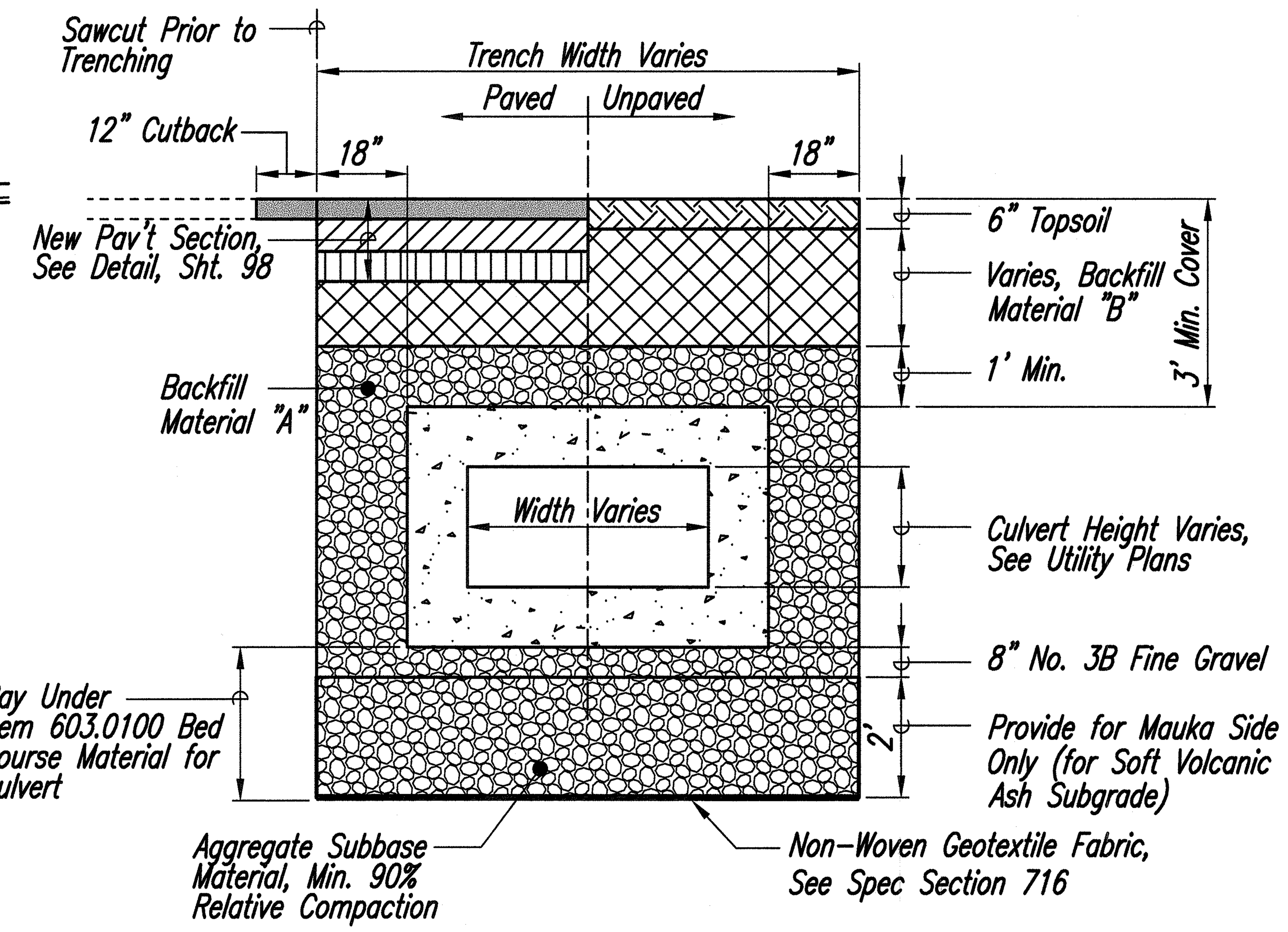
1. Sand Equivalent (S.E.) ≥20
2. 8" Maximum Lifts
3. 95% compaction

TRENCH BACKFILL MATERIAL "B"

1. S.E. must not be less than the area being filled and in no case shall the S.E. be <2 regardless of where it is used.
2. 8" Maximum Lifts
3. 95% Compaction

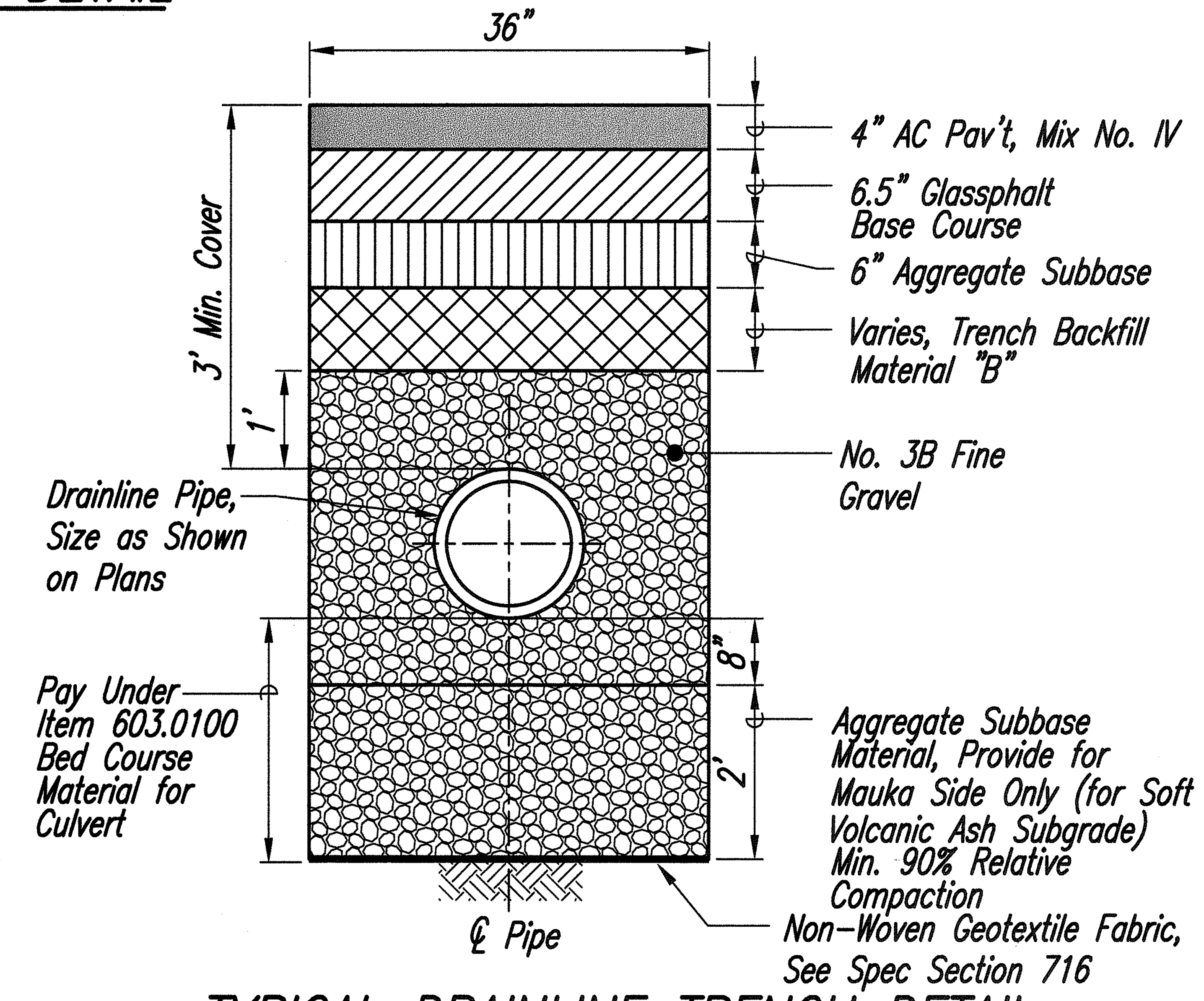
WATER SERVICE LATERAL CUSHION MATERIAL

1. Provide 6" minimum cushion material around water service laterals.
2. Cushion material shall be No. 4 sand or other material approved by the County of Hawaii, Department of Water Supply.



TYPICAL BOX CULVERT TRENCH DETAIL △2

Not to Scale



TYPICAL DRAINLINE TRENCH DETAIL △2

Not to Scale

0 2 4 6
SCALE: 1" = 2' FEET

0 5 10 15
SCALE: 1" = 5' FEET

	DATE	REVISION
△2	1/27/11	Addendum 2, Revised Typical Box Culvert, Drainline Trench and Waterline Trench Details

BARRY K. MURANAKA, LICENSED PROFESSIONAL ENGINEER No. 8418-C, HAWAII, U.S.A.

LICENSE EXPIRES 4/30/12

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS

Volcano Road Intersection and Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: As Noted   Date: November 2010

SHEET No. 2 OF 2 SHEETS

ADD. 99

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HS-STP-011-2(38)	2010	ADD. 103	141

STRUCTURAL GENERAL NOTES

1. General:
   - A. Workmanship and materials shall conform to the AASHTO LRFD Bridge Design Specification, 5th Edition, and the Hawaii Standard Specifications for Bridge and Road Construction (2005 Edition), and all applicable special provisions by the State of Hawaii Department of Transportation.
   - B. The Contractor shall compare the Civil, Electrical and Structural drawings with each other and report in writing to the Engineer, inconsistencies or omissions.
   - C. The Contractor shall take field measurements and verify field conditions and shall compare such field measurements and conditions with the drawings before commencing the work. Report in writing to the Engineer all inconsistencies or omissions.
   - D. The Contractor shall be responsible for means and methods of construction, workmanship and job safety. The Contractor shall provide temporary shoring and bracing as required for stability of structural members and systems.
   - E. Details noted as typical on structural drawings shall apply in all conditions unless specifically shown or noted otherwise.
   - F. The Contractor shall be responsible for coordinating the work of all trades.
   - G. The Contractor shall be responsible for protection of the adjacent properties, structures, streets, and utilities during the construction period. Any damage or deteriorated property shall be restored to the condition prior to the beginning of work or better at no cost to the State.
   - H. Construction loading shall not exceed design live load unless special shoring is provided. Permitted construction loads shall be properly reduced in areas where the structure has not attained full design strength.
2. Design Criteria:
   - A. Dead Load
     Weight of all components of the structures, appurtenances attached thereto, and earth covers.
   - B. Live Load
     AASHTO HL-93 Loading
   - C. Seismic
     Seismic design is in accordance with the AASHTO Guide Specifications for LRFD Seismic Bridge Design (May 2007), as modified by the State of Hawaii Department of Transportation.
     0.2-second spectral response acceleration coefficient, Ss = 1.75
     1.0-second spectral response acceleration coefficient, S_1 = 0.80
     Horizontal peak ground acceleration coefficient, PGA = 0.85 (2)
   - D. Soil Properties
     1. Static Lateral Earth Pressure:
        - a. Active condition ——— = 40 pcf
     2. Dynamic Lateral Earth Pressure:
        - a. Structural design ——— = 210.0 H^2 pcf (2)
        - b. Overturning design ——— = 70.0 H^2 pcf (2)

        Where: H = Height of retained soil or backfill in feet
     3. Bearing Pressure:
        - a. Extreme event limit state ——— = 4,500 pcf
        - b. Strength limit state ——— = 2,250 pcf
     4. Coefficient of Friction:
        - a. Extreme event limit state ——— = 0.55
        - b. Strength limit state ——— = 0.44
     5. Passive Earth Pressure:
        - a. Extreme event limit state ——— = 300 pcf
        - b. Strength limit state ——— = 150 pcf
3. Foundation:
   - A. Contractor shall provide for de-watering of excavation from either surface water, ground water or seepage. NPDES permit required for discharging into State waters.
   - B. Contractor shall provide for design and installation of all cofferdams, cribbing, sheeting, and shoring necessary for personnel safety and to preserve excavations and earth banks, and adjacent structures and property for damage.
   - C. Excavation boundaries and grade elevations for footing shall be approved by the Engineer prior to placing the concrete and reinforcing.

Foundation (Continued):
- D. Backfill behind the retaining wall structures shall be Type A structural backfill, conforming to Section 703.20 of the Hawaii Standard Specifications for Roads, Bridges and Public Works Construction, 2005.
- E. Hard rock may be encountered during excavation.

4. Concrete:
   - A. Concrete shall be regular weight concrete and shall have a 4,000 psi minimum 28-day compressive strength. All concrete shall have maximum w/c ratio of 0.45.
   - B. All inserts, anchor bolts, plates, etc. embedded in concrete shall be hot-dip galvanized unless otherwise noted.
   - C. Conduits, pipes, and sleeves passing through a wall not conforming to typical details shall be located and submitted to the Engineer for approval.
   - D. Construction joints may be relocated by the Contractor and submitted to the Engineer for approval. Construction joints shall be made and relocated as not to impair the strength of the structure and to minimize shrinkage stresses. All construction joints shall be cleaned, laitance removed and wetted. See typical details for specific requirements.
   - E. Non-shrink grouts shall be a premixed compound consisting of non-staining, non-metallic aggregate, cement, water reducing and plasticizing agents capable of developing minimum compressive strength of 4,000 psi in 3 days and 7,000 psi in 28 days.
   - F. Unless otherwise noted, chamfer all exposed concrete edges 3/4".
   - G. Concrete delivery tickets shall record all free water in the mix: at batching by plant, for consistency by driver, and any additional request by Contractor if permitted by the mix design.
   - H. Reinforcing bars, anchor bolts, inserts and other items to be cast in the concrete shall be secured in position prior to placement of concrete.
5. Reinforcing Steel:
   - A. Reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60, unless unless noted otherwise.
   - B. Clear concrete coverage for reinforcing bars shall be as follows, unless otherwise noted:
     - a. Footing, grade beams, etc. cast against earth ——— 3"
     - b. Footing, grade beams, etc. formed and exposed to earth ——— 2"
     - c. Wall faces, slabs, etc. exposed to earth or weather ——— 2"
   - C. Splices:
     - a. Reinforcing steel shall be spliced only where indicated on plans. Provide lap splice length per typical details and schedule sheet S-2, unless otherwise noted.
   - D. Bar bends and hook shall be "standard hooks" in accordance with Typical Details on sheet S-2.
6. Structural Steel:
   - A. Fabrication and erection of structural steel shall conform to the AASHTO LRFD Bridge Construction Specifications, Third Edition, including it's subsequent interim specifications.
   - B. Structural steel shall conform to ASTM A36, unless otherwise noted.
   - C. Stainless Steel shall conform to ASTM A240, Type 316L.
   - D. Steel wide flange sections shall conform to ASTM A992.
   - E. Steel pipes shall conform to ASTM A53, Grade B.
   - F. Steel tubes shall conform to ASTM A500, Grade B.
   - G. Bolts shall conform to ASTM A307, Grade A, unless otherwise noted.
   - H. Welds and welding procedures shall conform to the structural welding code AWS D1.1 of the American Welding Society.
   - I. Welding shall be performed by welders prequalified for welding procedures to be used.
   - J. Welding electrodes shall be E70XX.
7. Metal Hand Railing:
   - A. All metal pedestrian railings shall be hot-dip galvanized after fabrication and shop painted according to Paint Schedule, sheet S-3.

(2)	01/27/11	Addendum 2, Revised Note 2.
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

Volcano Road Intersection and Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: As Noted Date: November 2010

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

EXPIRATION DATE OF THE LICENSE 4/30/2012
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION

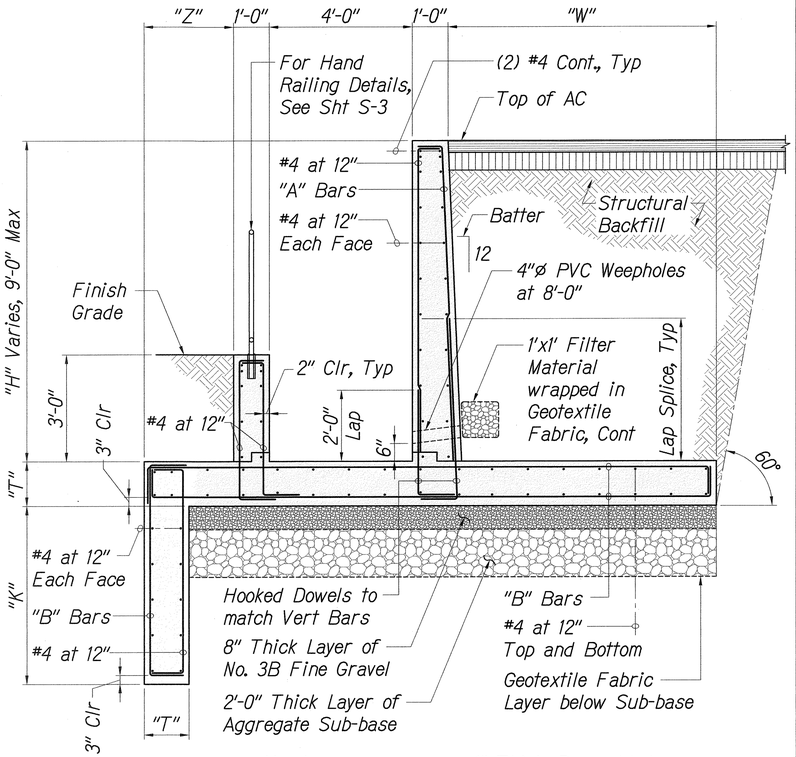
ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

SHEET No. S-1 OF 141 SHEETS

ADD. 103

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HS-STP-011-2(38)	2010	ADD. 106	141

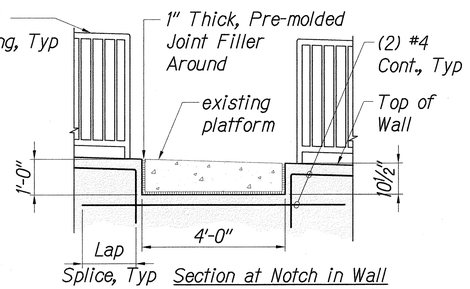
CONCRETE CHANNEL SCHEDULE							
HEIGHT "H"	"T"	"W"	"Z"	"K"	Batter	"A"	"B"
≤ 9'-0"	1'-6"	6'-0"	2'-6"	5'-0"	2 : 12	#6 at 4"	#8 at 4"
≤ 8'-0"	1'-6"	4'-6"	2'-6"	4'-0"	2 : 12	#6 at 6"	#8 at 6"
≤ 7'-0"	1'-3"	3'-0"	2'-6"	3'-0"	1 : 12	#6 at 6"	#7 at 6"
≤ 6'-0"	1'-3"	2'-0"	2'-6"	2'-6"	1 : 12	#5 at 6"	#6 at 6"
≤ 5'-0"	1'-0"	0'-6"	2'-6"	1'-6"	0 : 12	#5 at 6"	#5 at 6"
≤ 4'-0"	1'-0"	0'-0"	1'-6"	1'-0"	0 : 12	#4 at 6"	#4 at 6"



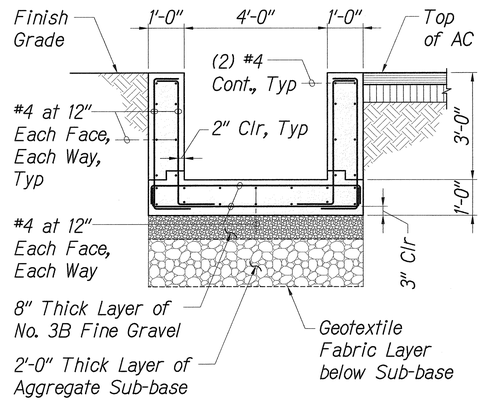
TYPICAL CONCRETE CHANNEL SECTION — 1 (S-4 | S-4) △2

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

Notes:
1. See Civil Dwgs for Elevations.
2. Wall Expansion Joints shall be located every 40'-0" maximum.



Notes:
1. See Civil Dwgs for Elevations.
2. Wall Expansion Joints shall be located every 40'-0" maximum.

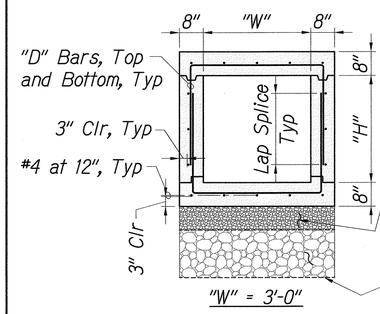


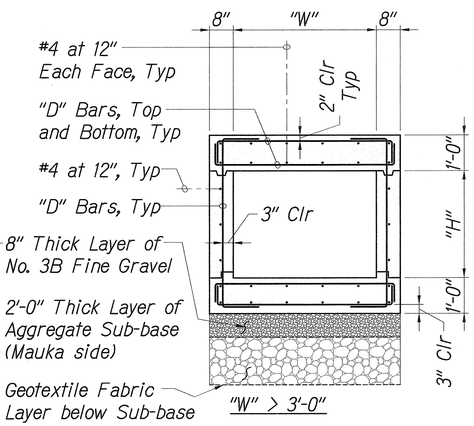
3' HIGH CONCRETE CHANNEL SECTION — 2 (S-4 | S-4) △2

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

CONCRETE CULVERT		
WIDTH "W"	"H"	"D"
6'-0"	2'-0"	#5 at 8"
5'-0"	3'-0"	#5 at 8"
4'-0"	3'-0"	#5 at 12"
4'-0"	2'-0"	#5 at 12"
3'-0"	3'-0"	#5 at 8"
3'-0"	2'-0"	#5 at 8"

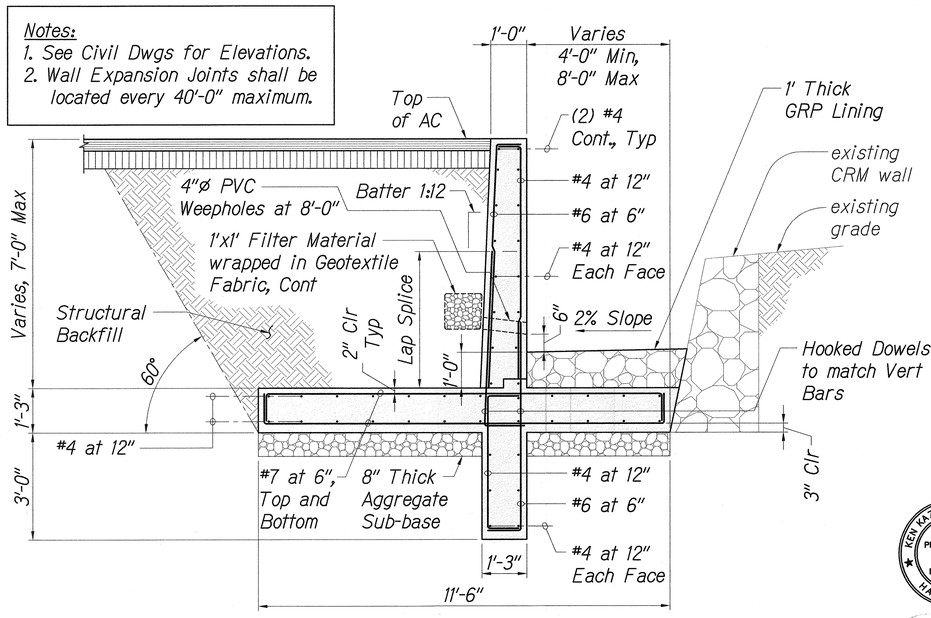
Notes:
1. See Civil Dwgs for Elevations.
2. Wall Expansion Joints shall be located every 40'-0" maximum.





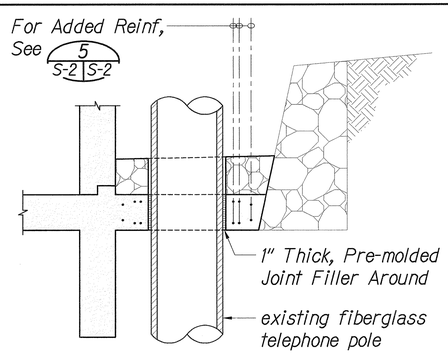
TYPICAL CONCRETE CULVERT SECTION — 3 (S-4 | S-4) △2

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



TYPICAL RETAINING WALL SECTION — 4 (S-4 | S-4) △2

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



Section at Footing Penetration

△2	01/27/11	Addendum 2, Revision of Details
	DATE	REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL CHANNEL, CULVERT, AND RETAINING WALL SECTIONS

Volcano Road Intersection and Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: As Noted — Date: November 2010

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

EXPIRATION DATE OF THE LICENSE 4/30/2012
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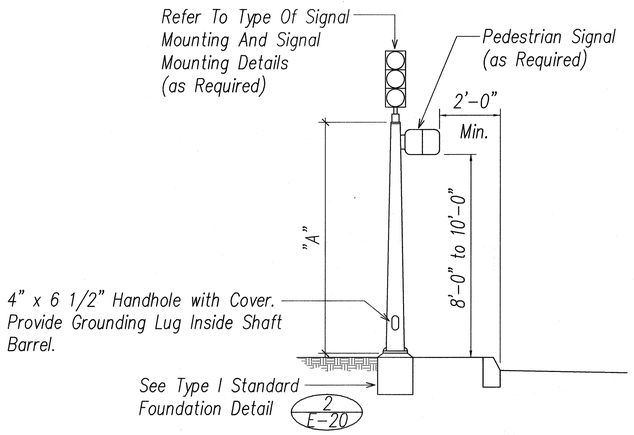
SHEET No. S-4 OF 141 SHEETS

ADD. 106

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HS-STP-011-2(38)	2010	ADD. 135	141



TYPE OF STANDARD	"A"
Type I-10	10
Type I-12	12

Height "A" Type

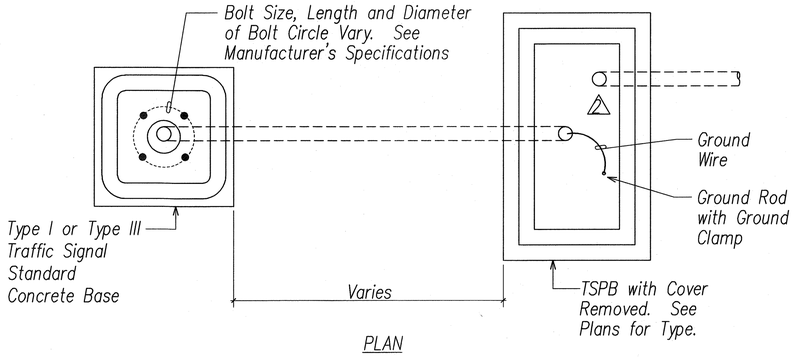
Typical Designation: I-10

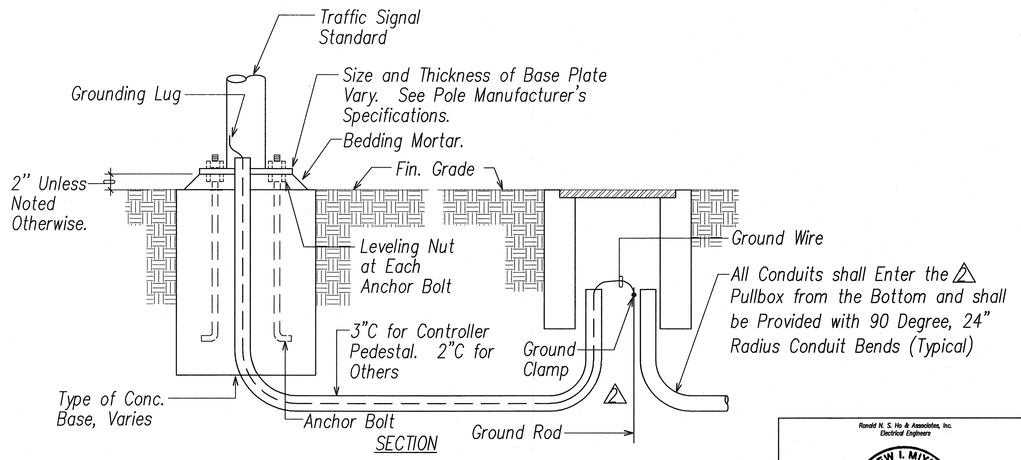
NOTES FOR TYPE I STANDARD;

1. Standards Shall be Designed in Accordance With the Latest Edition of "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals", with Design Revisions Noted on Sheet E-19.
2. Submit Shop Drawings and Structural Calculations for Approval,
3. For Additional Type I Traffic Signal Standard Details, See Standard Sheet TE-32.

1 / E-20 TYPE I TRAFFIC SIGNAL STANDARD

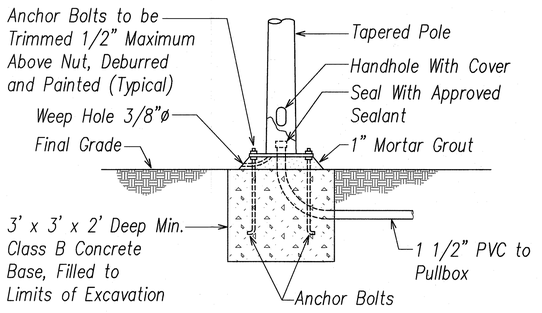
NOT TO SCALE





3 / E-20 TYPICAL STANDARD & PEDESTAL DETAIL

NOT TO SCALE



Note:

1. For Additional Type I Signal Standard Footing Details, See Standard Plan Sheet TE-32.

2 / E-20 TYPE I STANDARD FOUNDATION DETAIL

Not to Scale

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

DATE	REVISION
1/27/11	⚠2 Revised Duct Entry Into Traffic Signal Pullbox

Ronald N. S. Ho & Associates, Inc.
Electrical Engineers

ANDREW I. MIYASATO
LICENSED PROFESSIONAL ENGINEER
No. 4340-E
HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

Signature 2011.02.03

License Exp. Date: 04.30.2012

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL
DETAILS VII

Volcano Road Intersection and Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

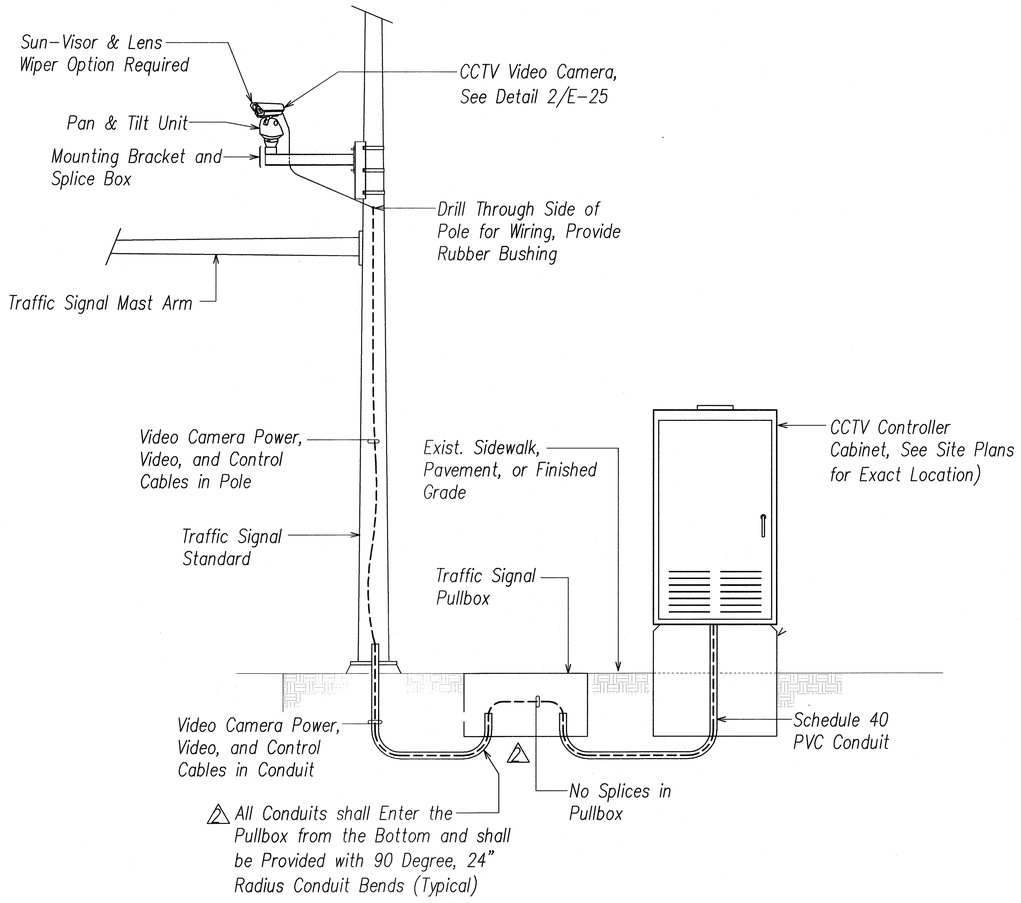
Scale: AS NOTED Date: November 2010

SHEET No. E-20 OF 26 SHEETS

ADD. 135

FILE PATH: Z:\ACAD\PROJECTS\26020\e020_26020-ts details vii-add2.dwg CAD USER: andy PLOT DATE: 2011.02.03 XREFS:|_x26020-ts details|
LAST SAVE: 01/25/11 @ 11:52:14 BY: AM PLOT SC 1'-0"=1'

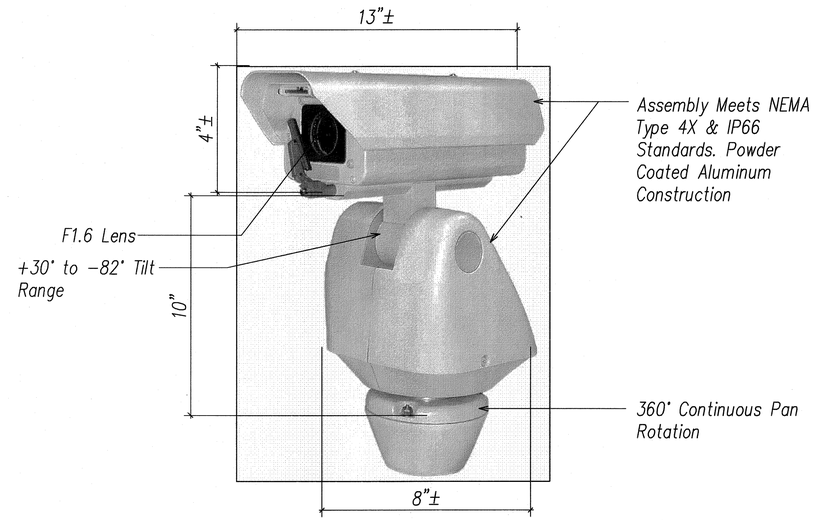
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HS-STP-011-2(38)	2010	ADD. 140	141



Notes:

1. Coordinate Aiming of All Cameras with the Hawaii County Department of Public Works Traffic Division

1/E-25 CCTV VIDEO CAMERA MOUNTING DETAIL
Not to Scale



Notes:

1. Digital Position and Zoom Control Feedback Using "D" Protocal.
2. UL Listed, Rated for Full Continuous Duty, CE Class B.
3. Assembly Rated for 90 MPH Operation.
4. Do Not Select Optional Window Wiper.

2/E-25 CCTV VIDEO CAMERA DETAIL
Not to Scale

DATE	REVISION
1/27/11	⚠2 Revised Duct Entry Into Traffic Signal Pullbox

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

Ronald N. S. Ho & Associates, Inc.
Electrical Engineers

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

Andrew I. Miyasato
Signature 2011.02.03

License Exp. Date: 04.30.2012

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL
DETAILS XII

Volcano Road Intersection and Drainage Improvements
Federal-Aid Project No. HS-STP-011-2(38)

Scale: AS NOTED Date: November 2010

SHEET No. E-25 OF 26 SHEETS

ADD. 140

FILE PATH: Z:\ACAD\PROJECTS\26020\e025-26020-ts details xl-add2.dwg CAD USER: andy PLOT DATE: 2011.02.03 XREFS:[_e26020-ts details]
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