FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-037-1(23)R	2005	14	22

TRAFFIC SIGNAL NOTES

1. The locations of the Traffic Signal Standards, Traffic Signal Standards w/Mast Arms, Pedestrian Push Buttons, Traffic Controller, Pullboxes, Conduits and Loop Detectors shall be staked out in the field by the Contractor and approval of the locations shall be obtained from the Engineer prior to construction and installation.
2. All splicing shall be done in the pullboxes.
3. Furnishing and installing the conduit stubouts (pullboxes to edge of pavement) will not be paid for separately but shall be considered incidental to the various contract items.
4. A solid #8 bare copper wire shall be pulled with the traffic signal control cable for equipment ground. Cost shall be incidental to the installation of the control cable.
5. All Traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the plans.
6. The loop amplifier units furnished for this project shall be capable of operating the loop detector configurations shown on the plans. Cost for the loop amplifier shall be incidental to the installation of the loop detector.
7. Should any defect be encountered during the warranty period, the manufacturer will be notified and he shall promptly correct such defect. Service call (by factory qualified representative) during the warranty period for repairs or other maintenance shall be answered within 24 hours and shall be done at no expense to the State. All repairs shall be done as soon as possible.
8. All traffic signal work shall conform to the requirements of the "Manual On Uniform Traffic Control Devices For Streets And Highways", Federal Highway Administration (1988) and Amendments.
9. Locations of traffic markings and markers (lane lines, Stop lines, crosswalk, etc.) shown on the plans shall be verified with the Engineer prior to the installation of the traffic signal system.
10. All Conduits between pullboxes and Traffic Signal/Highway Lighting Standards shall not be paid for separately but shall be considered incidental to the various contract items.
11. All Signal-Drop Cables (Type 5 Cables) from the various Types of Traffic Signal Head on the traffic signal standards and mast arms to the pullboxes shall not be paid for separately but considered incidental to the Traffic Signal Head.
12. After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and traffic signal controller cabinet concrete base. The duct seal material shall be approved by the Traffic Signal Inspector/Engineer and shall not be paid for separately but considered incidental to the direct buried and/or concrete encased conduits.
13. After installing the Traffic Signal System, the Contractor shall apply grease to all parts of the Traffic Signal System (i.e. fittings, brackets, nipples, elbows, screws, signal head assemblies, bolts, hinges, etc.) as directed by the Traffic Signal Inspector, to prevent rust and corrosion. The grease material shall be approved by the Signal Inspector, and shall not be paid for separately but considered incidental to the various Traffic Signal items.
14. Connecting into existing traffic signal system and making all necessary adjustments shall not be paid for separately, but considered incidental to the various traffic signal contract items.
15. The Contractor shall notify the State two weeks prior to commencing any work on the traffic signal system.
16. The concrete jacket for the Conduit By-Pass Details shown on Sheet X, shall not be paid for separately but considered incidental to the various contract items. The Engineer shall determine if a concrete jacket is required.
17. The Contractor shall provide a switch/jack and 15-foot switch cord assembly for each police compartment. The cost shall not be paid for separately but shall be considered incidental to the controller.

TRAFFIC SIGNAL LEGEND

NEW	EXISTING	
		Traffic Signal Conduit
1 2 3	1 2 3	Conduit Run Numbers
A B C	A B C	Equipment description, installation or item no.
M	M	Traffic Signal Master Controller Door Indicates Front of Cabinet
C	C	Traffic Signal Controller Door Indicates Front of Cabinet
		Meter Pedestal
		12" RYG Traffic Signal Head
		12" RY↑ Traffic Signal Head
		12" R ← Y G Traffic Signal Head
		12" R ← Y G Traffic Signal Head (Programmed Visibility)
		12" RYG ← G Y Fiber Optic Traffic Signal Head
		Type I Standard and Attached Signals
24' 12'		Type II Standard with Signal Mast Arm and Attached Signals (Nos. indicates mast arm length & distance between signal heads as specified on plans)
8' 24' 12'		Type III Standard with Luminaire and Signal Mast Arm and Attached Signals (Nos. indicates mast arm lengths & distance between signal heads as specified on plans)
Y	Y	Flashing Beacon, One Signal Section, "Y" indicates 12" Yellow Lens
		Opticom Receiver (Arrow indicates direction detector faces)
		Pipe Guard
		Pedestrain Signal Head
	tspb	Type A Pullbox
	tspb	Type B Pullbox
	tspb	Type C Pullbox
		Loop Detectors

HIGHWAY LIGHTING LEGEND

NEW	EXISTING	
HL	hl	Highway Lighting Conduit
	hl	Type A Pullbox (Hwy. Ltg.)
		Highway Lighting Standard

ORIGINAL PLAN
SURVEY PLOTTED BY _____ DATE 10/1/03
DRAWN BY J.T.
TRACED BY _____
DESIGNED BY F. Chan
QUANTITIES BY _____
CHECKED BY _____
NOTE BOOK dated

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL LEGEND AND NOTES

HALEAKALA HIGHWAY
Intersection Improvements at Makani Road
F.A. Project No. STP-037-1(23)R

Scale: As Shown Date: May 2005

SHEET No. TSI OF 9 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-037-1(23)R	2005	15	22

NEW DESIGN REQUIREMENTS FOR LUMINAIRES, POLE STANDARDS AND TRAFFIC SIGNAL STANDARDS

1. *Highway Lighting Pole Standards, Bracket Arms, Traffic Signal Standards and Mast Arms to be furnished for this project shall conform to the 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", 4th Edition, and the 2002 Interim Revisions, published by the American Association of State Highway and Transportation Officials.*

2. *In addition, the following modifications for the 2001 AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" shall be used in the design and manufacture of structural supports for highway luminaires and traffic signals.*

3. *Basic Wind Speed [Article 3.8.2] to determine the design wind pressure shall be 105 mph. For unusual or differing exposure conditions, the Basic Wind Speed should be increased using rational procedures and sound engineering judgement. Alternatively, the design wind pressure may be increased by using a higher Wind Importance Factor [Table 3-2] corresponding to a recurrence interval of at least one level greater than recommended.*

4. *Wind Importance Factor [Article 3.8.3] noted in Table 3-2 used to determine the design wind pressure for overhead cantilevered sign support structures over:*

   a. *freeways shall be based on a recurrence interval of 100 years.*

   b. *ramps and other highways with "high" ADT shall be based on a recurrence interval of 100 years unless otherwise directed.*

5. *Height and Exposure Factor [Article 3.8.4]. For sign and luminaire support structures on bridges, the Height and Exposure Factor shall be determined based on the maximum height they are above the surrounding ground. For severe exposure conditions such as along the coastline, the factor shall be increased based on the latest ASCE Standard No. 7, Minimum Design Loads for Buildings and Other Structures.*

6. *Fatigue Importance Factors [Article 11.6] noted in Table 11-1 for Overhead Cantilevered Sign, Traffic Signal and Luminaire Support Structures shall be based on the following:*

   a. *Fatigue Category I - for all structures where failure would result in the structure falling onto the travel way.*

   b. *Fatigue Category II - for all others.*

7. *Galloping [Article 11.7.1]. Overhead cantilevered sign and traffic signal support structures shall be designed for Galloping-induced cyclic loads unless approved vibration mitigation devices are installed.*

8. *Vortex Shedding [Article 11.7.2]. Nontapered lighting structures shall be designed to resist Vortex Shedding-induced loads including cantilevered mast arms and lighting structures that have tapers less than 0.14 in/ft.*

9. *Natural Wind Gust [Article 11.7.3]. Overhead cantilevered sign, traffic signal and high-level lighting support structures shall be designed to resist an equivalent static Natural Wind Gust pressure. For unusual or differing exposure conditions, the equivalent static Natural Wind Gust pressure should be increased using references noted in the specifications.*

10. *Truck-Induced Gust [Article 11.7.4]. Overhead cantilevered sign and traffic signal support structures shall be designed to resist an equivalent static Truck Gust pressure range based on a truck speed of 65 mph. At the option of the State of Hawaii, Department of Transportation, a lower truck speed may be used in areas with design speeds not exceeding 45 mph.*

11. *The Contractor shall submit shop drawings accompanied by complete and detailed engineering computations from the equipment manufacturer to the Engineer for approval.*

ORIGINAL PLAN
NOTE BOOK td1.lynne
No. 8halttsleg2
SURVEY PLOTTED BY ____ DATE 10/30/03
DRAWN BY L.H.
TRACED BY
DESIGNED BY P. Chan/L. Kuo
QUANTITIES BY
CHECKED BY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL LEGEND AND NOTES

HALEAKALA HIGHWAY
Intersection Improvements at Makani Road
F.A. Project No. STP-037-1(23)R

Scale: As Shown — Date: May 2005

SHEET No. TS2 OF 9 SHEETS