SECTION 623 - TRAFFIC SIGNAL SYSTEM

Make the following amendments to said Section:

(I) Amend **623.01 Description** from lines 4 to 95 to read as follows:

"623.01 Description. This work includes furnishing labor, materials, tools, machinery, and equipment necessary to modify or install and construct an operating traffic signal system, including trenching, excavation and backfill, asphalt concrete pavement, aggregate base course, and aggregate subbase course, complete in place according to the contract.

The traffic signal system includes:

(1) trenching, structural excavating, backfilling, restoring work, and installing pullboxes;

(2) providing a complete and operating traffic signal system with controller, firmware, cabinet, auxiliary and support equipment, vehicle detectors, signal standards, traffic signals and appurtenances, signal head mounting, back plates for all mast arm mounted traffic signal heads, emergency vehicle preemption optical receivers, concrete foundations, cables, wiring, cleaning and adjusting signal heads, painting and restoration work.

(4) coordinating work and arranging for inspection of work with the Engineer and other agencies as required.

(4) turning over to HDOT a complete and operating traffic signal system according to the contract.

Furnish and install the incidental parts that the contract does not show and that are necessary to complete the traffic signal system as though such parts were in the contract.

Electrical equipment shall conform to the NEMA Standards and this contract. Material and workmanship shall conform to the "National Electric Code", (the Code); General Order Nos. 6 and 10 of the Hawaii Public Utilities Commission; the standards of the ASTM; the ANSI; Local Joint Pole Agreement; local power company rules; and local ordinances that may apply.

Definitions.

(1) Actuation - Operation of any type of detector.

(2) Clearance Interval - Length of time of display of signal indication following right-of-way interval.

(3) Detector for Traffic Actuation - Device that pedestrians or vehicles can register their presence with traffic-actuated controller.

(4) Extendible Portion - That part of green interval that follows initial portion.

(5) Extension Limit - Maximum time that traffic phase may retain right-of-way after actuation on another traffic phase, after timimg out initial portion.

(6) Flashing Feature - Feature incorporated to stop normal signal operation and cause flashing of predetermined combination of signal lights.

(7) Initial Portion - Part of green interval that is timed-out or separately controlled by traffic-actuated controller before extendible portion of interval takes effect.

(8) Interval - Several divisions of time cycle during which signal indications do not change.

(9) Interval Sequence - Order of appearance of signal indications during successive intervals of time cycle.

(10) Magnetic Vehicle Detector - Detector actuated by movement of vehicle passing through magnetic field.

(11) Major Street - Roadway approach or approaches at intersection normally carrying greater volume of vehicular traffic.

(12) Manual Operation - Operation of signal controller by hand-operated switch.

(13) Minimum Period - In semi-traffic-actuated controllers, shortest time for which right-of-way will be given to approaches not having detectors.

(14) Minor Movement Interval - Auxiliary phase added to controller phase (parent phase) and modified by auxiliary movement controller.

(15) Minor Street - Roadway approach or approaches at intersection normally carrying smaller volume of vehicular traffic.

(16) Non-Parent Phase - Controller phase not modified by auxiliary controlunit.

(17) Parent Phase - Controller phase modified by auxiliary control unit.

(18) Passage Period - Time allowed for vehicle to travel at selected speed from detector to nearest point of conflicting traffic.

(19) Pedestrian Detector - Detector, usually of push-button type, installed near roadway and operated by hand.

(20) Pressure-Sensitive Vehicle Detector - Detector installed in roadway, actuated by pressure of vehicle passing over its surface.

(21) Pre-Timed Controller - Automatic control device for supervising operation of traffic control signals in accordance with pre-timed cycle and divisions.

(22) Recall Switch - Manually operated switch in actuated controller to provide for automatic return of right-of-way to street.

(23) Right-of-Way - Privilege of immediate use of highway.

(24) Signal Indication - Illumination of traffic signal lens or equivalent device, or of combination of several lenses or equivalent devices.

(25) Time Cycle - Number of seconds required for one complete revolution of timing dial or complete sequence of signal indications.

(26) Traffic-Actuated Controller - Digital control device for supervising operation of traffic control signals in accordance with varying demands of traffic as registered with controller by loop detectors or pedestrian push buttons.

(27) Traffic Phase - Part of cycle allocated to traffic movements receiving right-of-way or to combinations of traffic movements receiving right-of-way simultaneously during one or more intervals.

(28) Unit Extension - Minimum time, during extendible portion, for which right-of-way must remain on traffic phases following actuation on that phase, subject to extension limit"

(III) Amend **623.02 Materials** by adding the following after line 132:

"Pedestrian Signal Push Button with Integral Sign 770.12"

(IV) Amend **Subsection 623.03(C)(7)** from lines 255 to 258 to read as follows:

"**(7) Conduits.** Lay polyvinyl chloride (PVC) conduits carefully in trenches prepared to receive conduits. Concrete encase PVC Schedule 40 conduits."

(V) Amend Section **623.04 Measurement** and **623.05 Payment** from lines 578 to 594 to read as follows:

"**623.04 Measurement.** The Engineer will not measure firmware for controller, for payment.

(A) The Engineer will measure the controller assembly, foundation for traffic signal controller, traffic signal standard, foundation for traffic signal standard, pedestrian or traffic signal assembly, pedestrian pushbutton, pullbox, loop detector sensing unit, and emergency vehicle preemption receiver per each in accordance with the contract documents.

(B) The Engineer will measure traffic signal ductline, conductors, and EVP cable per linear foot in accordance with the contract documents.

623.05 Payment. The Engineer will pay for the accepted controller assembly at the contract unit price per each complete in place. The price includes full compensation for submitting the equipment list and drawing; furnishing and mounting the controller cabinet; furnishing, assembling, wiring, firmware, and housing the controller and auxiliary equipment; painting the controller cabinet; testing; providing turn-on service; submitting warranty; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted traffic signal standard at the contract unit price per each complete in place. The price includes full compensation for submitting the equipment list and drawing; furnishing and installing the traffic signal standard; wiring; bonding and grounding; testing; providing turn-on service; submitting warranty; and furnishing equipments, tools, labor, materials, and other incidentals necessary to complete the work.

The Engineer will pay for the accepted foundation for controller cabinet and traffic signal standard at the contract unit price per each complete in place. The price includes full compensation for excavating and backfilling; forming; furnishing and placing the reinforcing steel; mixing, placing, and curing the concrete; furnishing and setting the anchor bolts; restoring the pavement; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted pedestrian and traffic signal assembly at the contract unit price per each complete in place. The price

includes full compensation for submitting the equipment list and drawing; assembling the signal heads; wiring; bonding and grounding; painting the signal head mounting; testing; providing turn-on service; submitting warranty; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted emergency vehicle preemption (EVP) optical receiver at the contract unit price per each complete in place. The price includes full compensation for submitting the equipment list and drawing; assembling the EVP; wiring; bonding and grounding; testing; providing turn-on service; submitting warranty; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted pedestrian piezo electric pushbutton with instruction sign at the contract unit price per each complete in place. The price includes full compensation for submitting the equipment list and drawing; furnishing and installing the pedestrian pushbutton with the instruction sign; wiring; bonding and grounding; testing; providing turn-on service; submitting warranty; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted traffic signal ductline at the contract unit price per linear foot complete in place. The price includes full compensation for saw cutting; trenching; excavating and backfilling, including asphalt concrete pavement, aggregate base course and aggregate subbase course for trench repair; concrete curb and/or gutter and concrete sidewalk repair; furnishing, installing, bonding, and grounding the conduits and interconnect subducts; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted pullbox at the contract unit price per each complete in place. The price includes full compensation for submitting the equipment list and drawing; furnishing and installing the pullbox at the designated locations; saw cutting; excavating and backfilling; restoration of concrete sidewalks, asphalt concrete pavement and landscaping; coating the frames and covers; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted traffic signal and EVP cables at the contract unit price per linear foot complete in place. The price includes full compensation for furnishing, installing, splicing, and taping the cable; making the connections; providing turn-on service; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will pay for the accepted loop detector sensing unit at the contract unit price per each complete in place. The price includes full

compensation for saw cutting; cleaning and blowing the saw cut area; furnishing and inserting the loop cable; splicing in the pullbox; filling the saw cut groove with epoxy sealer or hot applied rubberized sealant; and furnishing equipments, tools, labor, materials and other incidentals necessary to complete the work.

The Engineer will consider full compensation for additional materials and labor not specifically shown or called for that are necessary to complete the work incidental to the various contract items in the proposal.

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

Pay Item	**Pay Unit**
_____Controller Assembly with Firmware _____	Each
Type _____ Traffic Signal Standard _____	Each
Foundation for _____	Each
_____ Signal Assembly _____	Each
EVP Optical Receiver with _____	Each
Pedestrian Pushbutton with Instruction Sign	Each
Traffic Signal Ductline _____	Lin. Ft.
_____Type _____ Pullbox	Each
No. _____, _____ Cable	Lin. Ft.
EVP Cable	Lin. Ft.
Loop Detector Sensing Unit (6 Ft. x 6 Ft.) _____ Loops	Each

Payment shall be full compensation for the work prescribed in this section and the contract documents. The Engineer shall consider additional materials and labor not specifically shown or called for that are necessary to complete the work as incidental to the various contract items in the proposal schedule."

END OF SECTION 623