

**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION**

REQUEST FOR PROPOSALS

FOR

**FREEWAY MANAGEMENT SYSTEM PHASE 1B: TRAVELER INFORMATION
SYSTEM, UNIT 2:
ITS TECHNOLOGY PROCUREMENT**

FEDERAL-AID PROJECT NO. IM-0300(114)

ISLAND OF OAHU

January 2009

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**REQUEST FOR PROPOSALS
ITS TECHNOLOGY PROCUREMENT
FEDERAL-AID PROJECT NO. IM-0300(114)**

The Hawaii Department of Transportation (HDOT) is soliciting proposals to procure Intelligent Transportation System (ITS) technology and related services. Sealed Proposals will be received at the Contracts Office, Department of Transportation, 869 Punchbowl Street, Honolulu, Hawaii 96813, until 2:00 p.m., Hawaii Standard Time (HST), on March 20, 2009.

Offerors will be responsible for the provision ITS equipment and supporting services which may include training, integration advisement and documentation and warranty related services. The specific items in this RFP include dynamic message signs, license plate reader system and video encoder/decoders. It is anticipated that separate and, where beneficial to HDOT, multiple Offerer's may be selected for each technology category.

Persons, firms or entities that are interested in being considered for providing the services described in this announcement and who have the qualifications and the resources to do so may obtain a compact disc of the specifications for the proposal at the above office. Inquiries in regards to obtaining the specifications may also be made by calling (808) 587-2130.

Any person, firm, or other entity that submits a proposal must, at the time of contract execution, provide the State of Hawaii with a statement or certificate from the Hawaii State Director of Taxation and the Internal Revenue Service to the effect that all delinquent taxes, interest, and penalties levied or accrued against said person, firm, or corporation have been paid, and any other evidence

requested by and acceptable to the contracting officer to demonstrate that the offeror is not in default on any obligation due to the State of Hawaii, any of its political subdivisions, or the Internal Revenue Service.

The U.S. Department of Transportation Regulation, entitled "Nondiscrimination in Federally-Assisted Programs of the U.S. Department of Transportation", Title 49, Code of Federal Regulations (CFR) Part 21 is applicable to this project. Offerors are hereby notified that the Department of Transportation will affirmatively ensure that the contract entered into pursuant to this advertisement will be awarded without discrimination on the grounds of race, color, sex and national origin (as directed by 23 CFR Part 200).

Each proposal shall be in the form established in the specifications. For additional information concerning this project, contact Mr. Benson Chow at (808)692-7676 or by facsimile at (808)692-7690, or at 601 Kamokila Boulevard, Room 602, Kapolei, Hawaii 96707.

The Director of Transportation reserves the right to cancel this request for proposals, to reject any or all proposals in whole or in part and to waive any defects in any proposals in the best interest of the public.


BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

Internet Posting: February 12, 2009

SECTION ONE

INTRODUCTION AND KEY DATES

1.01 TERMS AND ACRONYMS USED THROUGHOUT THE SOLICITATION

ASTM	= American Society of Testing and Materials
ANSI	= American National Standards Institute
BAFO	= Best and Final Offer
CCS	= Central Control System
COGS	= Certificate of Good Standing
CPO	= Chief Procurement Officer
DAGS	= Department of Accounting and General Services
DLIR	= Hawaii State Department of Labor and Industrial Relations
DOTAX	= Hawaii State Department of Taxation
EIA	= Electronics Industries Association
GC	= General Conditions, issued by the Department of the Attorney General
GET	= General Excise Tax
HAR	= Hawaii Administrative Rules
HCE	= Hawaii Compliance Express
HDOT	= Department of Transportation Highways Division 869 Punchbowl Street, Honolulu, Hawaii 96813
HIC	= Hawaii Information Consortium
HRS	= Hawaii Revised Statutes
HST	= Hawaii Standard Time
IFB	= Invitation to Bid
ITS	= Intelligent Transportation Systems
LCD	= Liquid Crystal Display
LED	= Light Emitting Diode
LPR	= License Plate Recognition / Reader
MTBF	= Mean Time Between Failures
NEC	= National Electrical Code
NEMA	= National Electrical Manufacturers Association

NTCIP	= National Transportation Communications for Intelligent Transportation Systems (ITS) Protocol
NTP	= Notice to Proceed
Offeror	= Any individual, partnership, firm, corporation, joint venture, or representative or agent, submitting an offer in response to this solicitation.
OSHA	= Occupational Safety & Health Administration
Procurement Officer	= The contracting officer for the State of Hawaii, Department of Transportation.
RFP	= Request for Proposals
State	= State of Hawaii, including each department and political subdivisions
UL	= Underwriters Laboratory Incorporated
IEEE	= Institute of Electrical and Electronics Engineers
VCPU	= Video Camera Processor Units

1.02 INTRODUCTION

The Hawaii Department of Transportation, Highways Division is soliciting proposals for the furnishing of Intelligent Transportation System (ITS) equipment for a three year period with two one-year extension options. The State plans to install, operate and maintain the ITS equipment under other contracts.

The work under this contract consists of supplying ITS equipment, including dynamic message signs, video encoders, video decoders, license plate readers and other equipment as described in the technical specifications of this Request for Proposal (RFP).

The purpose of this RFP is to solicit technical and price proposals from prospective offerors to supply the required equipment, assist in integrating the equipment, provide fine-tuning services, supply spare parts, and provide training to the State in use of the ITS equipment. This RFP provides prospective offerors with information on the equipment and services that will be required in order to permit the offerors to prepare a technical and price proposal.

1.03 CANCELLATION

The RFP may be cancelled and any or all proposals rejected in whole or in part, without liability, when it is determined to be in the best interest of the State.

1.04 RFP SCHEDULE AND SIGNIFICANT DATES

The schedule set out herein represents the State's best estimate of the schedule that will be followed. All times indicated are in Hawaii Standard Time (HST). If a component of this schedule, such as "Proposal Due" date is delayed, the rest of the schedule will likely be shifted by the same number of days. The approximate schedule is as follows:

Advertising of Request for Proposals	February 12, 2009
Deadline to Submit Written Questions	February 26, 2009
Proposals Due	March 20, 2009 2:00 p.m. (HST)
Discussions with Priority-Listed Offerors (if necessary)	March 25 - 31, 2009
Best and Final Offer (if necessary)	April 17, 2009 2:00 p.m. (HST)
Anticipated Contractor Selection	April 27, 2009
Anticipated Contract Start Date (Notice to Proceed)	June 30, 2009

1.05 INSTRUCTIONS TO THE OFFERORS

This procurement is organized so that the ITS equipment is specified according to distinct categories. Each category of equipment is described in detail in a separate section herein. Offerors may consider each category independently when preparing their proposal. The intent is to allow offerors to submit proposals to supply equipment under any category (or categories) for which they are qualified.

The offer forms are organized according to the separate categories of equipment specified herein. Individual equipment items are listed on the offer forms under each category. When submitting a proposal for a category of equipment, **ALL ITEMS IN THAT CATEGORY MUST HAVE A PRICE** and be included in the total price proposal.

Offerors will be required to submit separate Technical and Price proposals. Technical proposals must be submitted in a three ring binder. One original, six (6) copies and one electronic version (PDF) of the Technical proposal are required. Price proposals must be submitted in a separate sealed envelope. One copy of each relevant offer form is required in the price proposal. The outside of the Price proposal envelope must be labeled to identify the name and address of the offeror, Project title, project number, and proposal due date.

1.06 ADMINISTRATIVE AND CONTRACTUAL INFORMATION

The following subsections represent several administrative points related to this RFP which should be carefully noted by those submitting a proposal.

1.06.01 Option for County and Local Governments and Their Contractors to Purchase Items at Contract Unit Prices

The offeror agrees that, if the offeror is awarded the contract with the State, the offeror will also sell to any County or Municipal government in the State of Hawaii, or their contractors, any item at the contract unit prices during the term of the contract. All references to the State of Hawaii or Department of Transportation in these specifications will also apply to any purchaser of the equipment under this contract. This may include local governments and their contractors.

1.06.02 Samples

Offerors may be asked to submit, or make available, samples of their equipment for a 30 day non-destructive testing, inspection and evaluation period, prior to selection of a vendor and award of a contract. Samples will be returned to the vendor following the 30 day period.

1.06.03 No Guarantee to Purchase

The State does not guarantee to purchase the estimated quantities shown in this RFP. The estimated quantities are for bidding purposes only and are not to be construed as a guarantee to purchase.

The State may choose to issue more than one contract for any bid item. If more than one contract is awarded, the quantities indicated on the Offer Form may be significantly decreased. Offerors shall indicate in the proposal if the offeror WILL or WILL NOT accept a contract at their unit prices for only a portion of the indicated quantities.

1.06.04 New Products

If new products are developed by the Contractor after award of the contract, the State may buy those items under the terms of this contract. The price for new products will be based on a percentage discount from the Contractor's published retail price list for such products. The bid proposal form shall indicate the Offeror's proposed percent discount offered to the State for new products not specifically described in the technical specifications

1.06.05 Contractor Right To Purchase

HDOT is currently planning that the installation of much of the ITS equipment selected under this RFP will be installed by an ITS contractor(s) selected by HDOT. However, HDOT wishes to have an optional means to complete the equipment ordering, delivery, and acceptance process. Therefore, the following provisions will apply to the successful Offerors selected through this RFP:

1. Successful Offerors will enter into a contract with HDOT which will establish unit prices and other conditions specified in this RFP, such as payment terms, guarantees, field support and delivery dates.
2. HDOT may authorize its ITS construction contractor to purchase equipment directly from HDOT's equipment contractor. The ITS construction contractor will have the right to purchase from the equipment contractor under the terms of the State contract.
3. In the event that either the construction contractor or the equipment contractor does not fully comply with the terms of the contract, the other party may choose to follow HDOT's typical process: i.e. the equipment vendor will sell the equipment directly to HDOT, and HDOT will provide it to the construction contractor.

SECTION TWO

BACKGROUND AND SCOPE OF WORK

2.01 PROJECT OVERVIEW AND HISTORY

The Hawaii Department of Transportation is upgrading and expanding its Intelligent Transportation System (ITS) by replacing and installing additional ITS equipment on State roadways. Current expansion is focused on Oahu facilities but the State will be expanding its system to other islands and this procurement contract will apply throughout the State of Hawaii.

2.02 SCOPE OF WORK

The Scope of Work for this procurement is to furnish the ITS equipment listed below and specified in the technical sections of this RFP:

1. Dynamic Message Signs (Section 2.04).
2. Video Encoders and Video Decoders (Section 2.05).
3. Travel Time Monitoring Equipment and Software (Section 2.06).

The equipment will be installed under separate contracts by HDOT. Offerors may consider each category independently when preparing their proposal. The intent is to allow offerors to submit proposals to supply equipment under any category (or categories) for which they are qualified.

In addition to supplying the required ITS equipment, the offeror(s) may be called on to provide services when requested by HDOT. Payment for such services will be made at contract prices. These services may include, but not be limited to:

1. Assisting the State with bringing the ITS equipment on line.
2. Installing vendor software.
3. Bench testing systems to ensure proper operation of hardware and programming.
4. Providing formal classroom training to State personnel.
5. Providing various field engineering services for inspection of ITS equipment installation.

Detailed specifications for the equipment and services are contained in the technical descriptions of this RFP.

The chosen Offeror(s) will be responsible for the delivery, integration support and warranty of any equipment supplied under this procurement.

HDOT will be contracting with a separate installer(s) that will install all Offerer(s) provided equipment.

The duration of this contract will be three (3) years from the date specified in the Notice to Proceed with an option for a fourth year and another option for a fifth year.

2.03 GENERAL PROVISIONS

2.03.01 Regulations and Codes

All equipment furnished shall be new and shall conform to the applicable requirements of the Underwriters Laboratory Incorporated (UL), the Institute of Electrical and Electronics Engineers (IEEE), the Electronics Industries Association (EIA), the National Electronic Code (NEC), the American Society of Testing and Materials (ASTM), the American National Standards Institute (ANSI), and the applicable standards, specifications, and regulations of the Hawaii Department of Transportation.

2.03.02 Certification to NEMA Standards

Controller units, master controllers and all other associated equipment shall meet current applicable NEMA standards. Proposers shall supply a certified letter from an independent testing laboratory stating the equipment has been tested and meets NEMA environmental standards and test procedures.

2.03.03 Equipment Guarantees

All equipment, parts, materials, and workmanship supplied under these specifications shall be fully guaranteed. All equipment shall be guaranteed for the following minimum durations:

1. Dynamic Message Sign pixels (LED clusters): Five (5) years from date of acceptance
2. All other equipment: Two (2) years from date of acceptance.

This guarantee shall cover all parts and labor necessary or incidental to the repair of any defect in equipment, parts, materials, or workmanship and malfunctions that arise during the guarantee period. The period of guarantee coverage shall, in no case, be less than the manufacturer's usual and customary guarantee period. All guarantees that are customarily issued by the vendor and/or manufacturer shall be provided to the Hawaii Department of Transportation.

Minor repairs may, at their discretion, be made by the Hawaii Department of Transportation, or their appointee, with the consent of the manufacturer. All other repairs under warranty will be made by the manufacturer. The manufacturer will bear all costs including labor, parts, and shipping charges.

2.04 CATEGORY I - TYPE I AND TYPE II DYNAMIC MESSAGE SIGNS

This work shall consist of furnishing Type I and Type II Dynamic Message Sign (DMS) assemblies consisting of LED elements in a full matrix configuration in accordance with these technical specifications. The installation of the DMS will be performed under separate contracts. This item shall include all sign modules, sign housing, DMS controller, DMS software, fittings and cabling to make the sign compatible with the control software defined in this document. This item shall also include integration support services for the integration of the DMS control functions with the Central Control System software.

2.04.01 Dynamic Message Sign

Type I: Walk-in Dynamic Message Sign Assembly, LED Full Matrix

The DMS shall consist of amber Light Emitting Diode (LED) pixel based matrix modules arranged to form a full matrix display. The DMS modular display shall contain a minimum of 120 pixels across and 27 pixels high (3,240 pixels). The matrix shall be capable of displaying, at a minimum, three (3) rows of twenty (20) characters each, with a nominal character size of 460 mm (18 in) high and 320 mm (12 in) wide using a 7x5 pixel matrix for each character. The character size shall be variable with a maximum character height equal to the display matrix height. DMS assemblies shall comply with the following:

1. Legible messages within a distance range of 45.72 m (150 ft) to 274.3 m (900 ft) from the DMS display face when the DMS is mounted so its bottom side is positioned between 5,350 mm (17.5 ft) and 6,096 mm (20 ft) above the roadway surface.
2. Walk-In Accessible
3. Pixel Spacing of not greater than 68 mm (2.7 in) center-to-center.
4. Total weight of the DMS not to exceed 2270 kg (5000 lbs).
5. The DMS housing shall include an internal fluorescent lighting system to provide the maintenance personnel with ample working lighting in day and night conditions. These lights shall be powered from an isolated, separately controllable electrical circuit. The fluorescent ballast shall be UL listed. The fluorescent lamps shall be Toxicity Characteristic Leaching Procedure compliant.
6. Minimum headroom of 1,829 mm (6 ft) shall be provided. This free space shall be maintained across the entire width of the DMS housing, with the exception of structural frame members. Structural members shall be designed not to obstruct the free movement of maintenance personnel throughout the DMS interior.
7. A level walkway shall be installed in the bottom of the DMS housing. The walkway shall be a minimum of 610 mm (2 ft) wide, and it shall run the entire length of the housing, from access door to access door. The walkway's top surface shall be non-slip and shall be free of obstructions that could trip service personnel. The walkway shall support a load of 136 kg (300 lbs) per linear foot, and it shall be constructed of multiple, removable panels.

8. A weatherproof, secure access door shall be provided on the right side of the DMS housing (as seen from the front) with a minimum dimension of 1520 mm (5 ft) high by 610 mm (2 ft) wide.
9. The door shall be lockable from the outside to prevent intrusion or vandalism but shall allow a person from the inside to leave the housing without keys or tools.
10. A device shall be provided to hold the door open in the 90 degree position.
11. Two keys shall be provided to the Engineer for each lock on the DMS enclosure.
12. The door opening shall be positioned such that the step to the bottom door threshold does not exceed 0.3 m (1 ft). Additional stairs and a safety platform shall be provided if required to provide safe access to the sign.
13. The access door status shall be monitored with an electrical contact, such that the contact shall be closed when the door is closed and open when the door is open. The contact shall be wired to the DMS controller and shall cause a bit to be set in the status message returned to the CCS when the contact is open.
14. All maintenance performed from within the sign or within the controller cabinet.
15. The DMS controller shall be housed within the DMS assembly walk-in enclosure and mounted on an equipment rack. The DMS assembly shall be designed in a manner such that if HDOT prefers to house the DMS controller in a separate ground mounted enclosure, the DMS controller shall be easily transferable without modifying the DMS assembly. The ground enclosures will be provided by others. See the DMS Controller section for the DMS controller requirements.

Type II: Arterial Dynamic Message Sign Assembly, LED Full Matrix

The DMS shall consist of amber Light Emitting Diode (LED) pixel based matrix modules arranged to form a full matrix display. The DMS modular display shall contain a minimum of 96 pixels across and 16 pixels high (1,536 pixels). The matrix shall be capable of displaying, at a minimum, two (2) rows of sixteen (16) characters each, with a nominal character size of 320 mm (12.5 in) high and 228 mm (9 in) wide using a 7x5 pixel matrix for each character. The character size shall be variable with a maximum character height equal to the display matrix height. DMS assemblies shall comply with the following:

1. Legible messages within a distance range of 45.72 m (150 ft) to 274.3 m (900 ft) from the DMS display face when the DMS is mounted so its bottom side is positioned between 5,350 mm (17.5 ft) and 6,096 mm (20 ft) above the roadway surface.
2. Front Accessible
3. Pixel spacing of not greater than 46 mm (1.8 in) center-to-center.
4. Total weight of the DMS not to exceed 500 kg (1,100 lbs).
5. The DMS controller shall be housed in a separate ground mounted cabinet and mounted on an equipment rack. The ground enclosures will be provided by others. See the DMS Controller section for the DMS controller requirements.

For the Type I and Type II DMS assemblies, the signs and modules shall be constructed such that the sign is legible under the following conditions:

1. Whenever the DMS is displaying alphanumeric text that is 460 mm (18 in) high.
2. All natural lighting levels encountered 24 hours per day.
3. During dawn and dusk hours when sunlight is shining directly on the display face or when the sun is directly behind (silhouetting) the DMS.
4. When viewed by motorists and travelers that have 20-20 corrected vision.
5. When motorists' and travelers' eye level is 914 mm (3 ft) to 3,658 mm (12 ft) above the roadway surface.
6. Motorists are within a thirty (30) degrees viewing cone.

For the Type I and Type II DMS assemblies, the signs and modules shall be constructed to meet the following requirements:

1. Equal horizontal and vertical pixel spacing.
2. Maximum current required by the DMS not to exceed 50 amps total.
3. Power source: 120/240 VAC, 60 Hz, 3 wire single phase plus neutral and ground.
4. Each display pixel shall be comprised of multiple monochrome amber LEDs. Other pixel technologies, such as fiber optic, flip disk, combination flip disk-fiber optic, combination flip disk LED, liquid crystal, and incandescent lamp, will not be accepted.
5. All pixel modules, assemblies and components compatible and interchangeable between signs provided under this item.
6. The replacement of any display module, or pixel on a display module, shall not require any other unit to be removed, and shall not require the use of any special tools.
7. All wiring interconnecting individual components or assemblies shall be modular harness assemblies and shall be mechanically keyed to prevent insertion into the wrong socket or connector.
8. Shielding of the electronics to prevent radiation of any electrical or electromagnetic signals that could adversely affect any other electrical or electronic device, as per FCC rule Part 15, Class B.
9. The presence of ambient noise generated within 0.3 m (1 ft) of any of the components of the DMS shall not adversely affect the performance of the DMS. The sources of ambient noise shall include, but not be limited to, radio signals, magnetic or electromagnetic interference, including those from power lines, roadway lights, transformers or motors.
10. Each pixel shall be individually addressable and controllable to allow for the display, on any portion of the message face, of static text or the flashing of all or any part of the text, together with message formation by alternating between two or more static or flashing text messages.
11. The electronics for the DMS shall be fully configured to drive the total required number of LEDs. The failure of anyone pixel shall not affect the operation of any other pixel.
12. The power driver circuitry shall be designed to minimize power consumption.
13. Each pixel shall be comprised of a symmetrical cluster of LEDs.

14. LED lighting source for the pixels shall be as follows:
 - a. The LEDs shall be amber, with a peak wavelength centered at 590 ± 5 nanometers.
 - b. The quantity of LEDs used in each pixel shall be sufficient to provide a minimum pixel output of 40 candelas for the amber color.
15. LED grouping and mounting angle shall be optimized for maximum readability.
16. The LED mean time between failure (MTBF) shall be a minimum of 100,000 hours of permanent use at an operating temperature of 60 degrees Celsius (140 degrees Fahrenheit), when driven at the specific forward current used for normal daylight LED DMS display operation. Where failure is defined as a maximum drop in candela output of 70% over 100,000 hours.
17. The Contractor shall provide LED manufacturer's data to the Engineer on the LEDs intended for the signs in this Contract.
18. As part of the LED manufacturer's technical specification sheet submittal, the specific forward current shall be noted.
19. The LEDs used in the display shall be obtained from batches sorted for luminous output, where the highest luminosity LED in the batch shall not be more than fifteen percent (15%) more luminous than the lowest luminosity LED in the batch.
20. To ensure uniformity of display and operational life, all LEDs used to make up a display module shall be obtained from the same manufacturing batch. The Contractor shall submit LED manufacturer's certification identifying the batch and bin numbers of the LEDs used.
21. Monitoring of each pixel by the DMS controller for subsequent transmission of pixel status information to the control center.
22. The LED display modules shall be protected from degradation due to sunlight.
23. Each pixel consists of a cluster of LEDs, switched on and off via commands from the sign controller and warranted for 5 years against defective operation. The LEDs in each pixel shall be configured in two or more strings such that the failure of an LED in one string shall not cause the failure of the LEDs in the other strings. The strings shall be distributed in each pixel such that the failure of one string will not result in an asymmetrical pattern being displayed.
24. The removal or failure of a single pixel or module shall not affect the operation of any other pixel or module.
25. Power supplies shall be redundant such that the failure of a single power supply will produce no noticeable effect on the message display.
26. All printed circuit boards shall be for industrial applications (e.g. FR4 or G10 fiberglass epoxy material, double-sided with plated through holes).
27. All etched connector fingers and board connectors that are not integral part of the printed circuit are to be gold plated to prevent corrosion.

2.04.02 DMS Housing (Type I and Type II)

The DMS housing shall meet the following requirements:

1. The housing shall conform to the requirements of a NEMA 3R enclosure.

2. The housings shall be fabricated from 3.2 mm (minimum) thick aluminum alloy 3003-H14, 6061-T6 or 5154-H38.
3. Fabrication shall be such that performance shall not be impaired after the equipment has been subjected to shock and vibration caused by normal installation, transportation and maintenance handling.
4. The housing shall be constructed to present a clean, neat appearance. Particular attention shall be given to neatness and thoroughness of soldering, wiring, welding, plating, riveting, finishes and machine operations. All parts shall be free from burrs and sharp edges or any other defect that could make the part or equipment unsatisfactory for the operation or function intended in this specification.
5. DMS housing's right, left, and rear walls shall be vertical. The top and bottom sides shall be horizontal. The front DMS wall shall be built with a permanent forward tilt angle of three (3) degrees, so that the top of the DMS housing is deeper than its bottom. LED display modules shall be mounted parallel to the front wall, so they are tilted three degrees forward toward the viewing motorists and use of the legible LED viewing area is optimized.
6. Permanent corrosion protection shall be provided between all dissimilar metals.
7. Seals, baffles, neoprene gaskets and screens to prevent the entry of water, dust and insects shall be used to protect equipment located within the housing from moisture, dust, dirt and corrosion.
8. Screened weep holes shall be provided at each corner of the enclosure to allow the drainage of any water that may collect in the housing.
9. All exterior seams shall be continuously welded by an inert process only in the shop such that each weld has a uniform flow.
10. The housing shall contain an interior non-corrosive metal cage support frame to mount the display elements. The cage support frame shall withstand and minimize vibration when the sign is mounted with any number of display elements.
11. The housing and cage support frame shall be configured such that there shall be a continuous unobstructed horizontal clearance from electrical components as required by the National Electric Code.
12. Multiple mounting brackets in the form of I-beams or Z-extrusions shall be bolted to the DMS housing's exterior rear wall to facilitate attachment of the DMS to the support structure. Mounting brackets shall be:
 - a. Extruded from aluminum alloy.
 - b. Attached to the DMS structural frame members, not just the exterior sheet metal.
 - c. Installed at the DMS manufacturer's factory.
 - d. Attached to the DMS using stainless steel bolts.
 - e. Attached to the DMS using direct tension indicators to verify that mounting hardware is tightened with the proper amount of force.
 - f. Installed such that all bracket-to-DMS attachment points are sealed and water-tight.

- g. Designed and fabricated such that the installing contractor can drill into them without penetrating the DMS housing and compromising the housing's ability to shed water
- 13. Louvered vents shall be provided on both sides of the housing and below the housing, as necessary, to provide sufficient ventilation. All fans or other forced air devices shall be thermostatically controlled and shall use standard-size removable dust filters. Filters provided with the DMS shall have a MERV rating of 8 or better. All fans shall have ball or roller bearings.
- 14. Two lifting eyes shall be provided on the DMS housings to permit lifting of the sign housing on to the sign structure. Though the fully assembled sign shall be lifted into place using both lifting eyes, each lifting eye shall be of sufficient structural strength to allow the sign be lifted or moved using only a single lifting eye without damage or permanent deformation to any part of the sign.
- 15. For each type of DMS assembly, shop drawings and calculations that show the sign's ability to withstand the design loads identify in this document shall be submitted to the Engineer for approval, and shall be signed by a Professional Structural Engineer licensed and registered to practice in the State of Hawaii.
- 16. The front face of the DMS housing shall be extended 300 mm (12 in) beyond the message area of the sign creating a blank, flat black border area that is integral to the housing. Add-on elements to create the border are not allowed.
- 17. Safety labels in accordance with OSHA, NEMA and NEC requirements shall be used to indicate potential dangerous or hazardous situations. The contents of the labels shall be in accordance with the ANSI Z535.4 standard, Product Safety Signs and Labels.
- 18. At least two (2) fifteen (15) amps 120 VAC duplex electrical outlets, with ground fault circuit interrupters, for use by maintenance personnel shall be mounted along the rear interior panels. At least one duplex outlet shall be located at each end of the DMS housing. These outlets shall be powered from an isolated, separately controllable electrical circuit. The outlets shall be UL listed.
- 19. Separate circuits shall be provided to energize the DMS, power the maintenance lights and power the maintenance outlets. A breaker box sized for a minimum of three circuits rated for 120 VAC 50 AMP source shall be provided. The breaker box shall be furnished with a minimum of three circuit breakers rated at 22,000 AIC and sized as following:
 - a. As required to energize the DMS.
 - b. 15 amps for the maintenance lights.
 - c. 15 amps for the maintenance outlets.
 - d. Two threaded conduit hubs shall be located on the rear wall of the DMS housing. One hub shall be for incoming AC power and the other shall be for incoming DMS signal cabling or a communications line.
- 20. Surge protection devices for all external cabling entering the assembly shall be provided. The surge protection shall be mounted as close to the cable entry as possible. The surge protectors shall be grounded in accordance with the manufacturer's recommendation. The AC power line surge protector shall be installed between the load side of the input power circuit breaker or fuse and ground. The surge protector shall meet the following requirements:

- a. Working Voltage Rating: AC power line with a voltage rating of 130 V RMS and 184 V peak.
 - b. Surge Voltage: Limit the surge voltage applied to the equipment to 650 V peak while conducting a peak surge current of at least 20,000 A. The surge current shall be an unsymmetrical triangle wave (8 x 20 us) that requires 8 us to reach its peak value and 20 us to fall to half the peak value.
- 21. Energy Rating: Dissipate 50 joules of surge energy without damage to itself and shall have a 15watt power dissipation rating.
 - 22. Sensors shall be provided to monitor the internal and external temperature of the sign. The sensors shall be monitored continuously by the sign controller. If the temperature exceeds a user defined threshold, the sign ventilation system shall be activated and an error message shall be returned with the sign status. If the temperature exceeds a higher preset threshold, the sign shall shut down and an error message shall be returned with the sign status.
 - 23. Current carrying capacity of all conductors shall comply with the NEC.
 - 24. All conductors, terminals, and parts which could be hazardous to maintenance personnel shall be protected with suitable insulating material.
 - 25. Safety labels in accordance with OSHA, NEMA, and NEC requirements shall be used to indicate potentially dangerous or hazardous situations. The contents of safety labels shall be in accordance with the ANSI Z535.4 standard, *Product Safety Signs and Labels*.
 - 26. The housing shall be thoroughly cleaned and then neutralized for priming. The housing shall then be treated with a phosphate coating solution and sealed as per U. S. Government Specification MIL-C-5541. The surface shall be prepared for priming per the manufacturer's recommended pretreatment procedure.
 - 27. All metallic exterior surfaces visually exposed are to be powder coated with a Urethane or Triglycidyl Isocyanurate (TGIC) polyester powder to a minimum dry film thickness of 2.0 mils or coated with a matte-black. The powder coating shall comply with ASTM A775 and ASHTO M284 standards. The Contractor shall provide certification of compliance with these requirements. The Contractor has the option to submit for approval an equivalent method for powder coating the exterior surfaces.
 - 28. Front face panels shall provide a high-contrast background for the DMS display matrix. The aluminum mask of each panel shall be painted black and contain an opening optimizing the contrast ratio for each LED pixel. Openings shall be large enough to not block any portion of the LED-viewing angle.
 - 29. The pixels within the message area of the sign shall be covered and protected with a single sheet, UV stabilized, anti-glare polycarbonate front panel. The panel shall be a minimum of 6.35 mm (0.25 in) thick. The front panel shall be mounted to withstand a 193 kmph (120 mph) wind load without deflecting sufficiently to obscure any of the pixels in the sign. The panel shall be replaceable and shatter resistant.
 - 30. The sign shall be equipped to prevent fogging build-up along the faceplate through the use of a heater strips or a forced heated air system. The defogging system shall be automatically activated when conditions for fogging build-up occur.

31. All internal diagonals and other structural supports shall be spaced so as not to hinder the movement of maintenance personnel within the sign nor interfere with the maintenance or replacement of any of the components mounted within the sign.
32. Installation Labels: Labels shall be provided so that the installation contractor can write in the contract number, pay-item number, and month and year of installation shall be using permanent ink, paint or stamping into the wall. Characters will be 25-45 mm (1-1.75 in) high, horizontal when the dynamic message sign is in its final position, and be located in the following locations:
 - a. The end panel of the DMS so as to be visible from the shoulder closest to the DMS.
 - b. On the inside near the middle of the panel opposite the door.
 - c. The manufacturer's name, product name, model number, serial number and city and state or province of manufacturer also shall be permanently marked on the outside and an easily accessible location inside the DMS.
33. The labels shall not be visible when viewing the DMS straight-on from the ground.
34. Housings shall have interior non-corrosive metal cage support frames to mount the display elements. The cage support frame shall be designed to withstand and minimize vibrational effects to the display and/or electronic elements. The DMS housing shall meet all wind loading requirements as specified in the most current AASHTO wind loading design criteria (AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals). The sign housing shall be capable of withstanding the wind loading without permanent deformation or other damages. The DMS housing shall also meet all HDOT structural engineering requirements as specified in Attachment 5, Design Criteria for Bridges and Structures (HWY-DB 2.6843), dated February 14, 2005.

2.04.03 DMS Controller (Type I or Type II DMS Assemblies)

Each sign shall be operated by a microprocessor-based controller that provides the electronics necessary to receive and interpret commands from the Central Control System (CSS), to issue a response to the CCS, and to display messages on the sign. The DMS controller shall be housed within the DMS assembly walk-in enclosure and mounted on an equipment rack. The DMS assembly shall be designed in a manner such that if HDOT prefers to house the DMS controller in a separate ground mounted enclosure, the DMS controller shall be easily transferable without modifying the DMS assembly. The ground enclosures will be provided by others. The DMS controller shall provide the following features:

1. The sign controller shall be designed to mount in a standard 19-inch rack, occupying a maximum of 5U rack space. The depth of the controller shall not exceed 380mm (15 in).
2. The sign controller shall support full duplex serial communications between the CCS and the DMS controller.

3. Provide two NTCIP-compatible RS232 ports for communication between the sign controller and the CCS with each port connected to a separate communication channel through an external modem. The controller shall respond to the last command received, which may be on either channel, and respond on both channels. The CCS will only transmit commands over one channel at a time.
4. Provide a third NTCIP-compatible RS232 port for communication between the sign controller and a local laptop through a direct null-modem connection.
5. Communications between the DMS controller and the CCS and notebook computer shall comply with the NTCIP as detailed in the following NEMA Standards Publications:
 - a. NTCIP 1101:1996 and Amendment 1 - Simple Transportation management Framework (STMF)
 - b. NTCIP 1102 v1.12 (recommended) - Octet Encoding Rules (OER) Based Protocol
 - c. NTCIP 1201:1996 and Amendment 1- Global Object (GO) Definitions
 - d. NTCIP 1203:1997 and Amendment 1 - NTCIP Object Definitions for Dynamic Message Signs
 - e. NTCIP 2001:1996 and Amendment 1- NTCIP Class B Profile
 - f. NTCIP 2101:2001 - Point-to-Multi-Point Protocol (PMPP) Using RS-232 Sub-network Profile
 - g. NTCIP 2103 v1.13 - Point-to-Point Protocol Over RS-232 Sub-network Profile
 - h. NTCIP 2104 v1.10 - Ethernet Sub-network Profile
 - i. NTCIP 2201 v1.14 - Transportation Transport Profile
 - j. NTCIP 2202:2001- Internet (TCP/IP and UDP/IP) Transport Profile
 - k. NTCIP 2301 - AP-STMF (Simple Transportation Management Framework)
6. Unless otherwise stated, the software shall comply with the versions of the NTCIP standards that are current at the date of Contract award.
7. As part of the 30-day submission the DMS manufacturer shall submit details of the specific standards to be implemented, applicable conformance groups, applicable data objects and their associated range values, and any other information, including, but not limited to manufacturer specific MIBs, that are pertinent to the implementation of this specification.
8. The sign controller shall have sufficient non-volatile memory for downloading and uploading messages, and configuration, status, and alarm data as specified herein.
9. Storage of all local messages and configuration parameters in non-volatile memory that shall not be affected by complete loss of power at any point in its operation.
10. The sign controller shall instruct the LED driver circuitry in a manner that causes the desired message to display on the DMS sign controller. At a minimum, the sign controller shall support the following features as described in the DMS specification:
 - a. Display of alpha numeric character fonts and graphic pictures.

- b. Message format details such as centering text on a display line, right justification, left justification, and legible spacing of letters and words.
 - c. Selection of a particular character font style.
 - d. Display of static messages.
 - e. Flashing of all or part of a message.
 - f. Message scrolling.
 - g. Alternating between pages of a multi-page message.
- 11. Operate when located up to a minimum of 100 m (330 ft) from the sign electronics housed in the sign enclosure.
- 12. The sign controller shall incorporate a watchdog timer to detect an out-of-program condition and reset the microprocessor.
- 13. The sign controller shall operate on a multi-drop communications channel, with a user-assigned and user-adjustable address from 1 to 255.
- 14. The DMS controller shall have a means of reading its drop address, either from switches, an I/O port, or via operator input at initialization. The drop address shall be stored in non-volatile memory, and may be changed either at the controller or via the CCS. The CCS expects the DMS controller to behave in a specific manner in response to commands from the central. Listed below are the various areas which define the controller's behavior.
- 15. The sign controller shall be designed for fail-safe prevention of improper information display in the case of malfunction. As a minimum, this shall include an automatic blanking feature that immediately clears the message displayed on the sign in the event of a power failure, communication failure or invalid transmission from the CCS. Automatic blanking shall also occur if a downloaded message does not fit the sign. A message does not fit if any of the pages of the message do not fit on the sign or if the sign does not support an operation included in the message.
- 16. Diagnostic software to detect and identify failed pixels, display drivers, power supplies, and alarm conditions shall be provided.
- 17. The sign shall have a local control mode where the following operations may be initiated:
 - a. Operator selection of dimming levels.
 - b. Operator selection of configuration parameters.
 - c. Diagnostic routines capable of testing full sign operation.
- 18. Provide for the continuous monitoring of the temperature within the sign enclosure and automatically activate the enclosure's ventilating system when the temperature exceeds a user defined limit. If the temperature exceeds a second user defined temperature limit, an error condition shall be generated and reported to the CCS when the sign is polled. If a manufacture's set temperature limit is exceeded, the sign shall automatically shut down and an error condition shall be generated and reported to the CCS when the sign is polled.
- 19. A switch shall be provided on the front of the DMS controller to activate local control and a keypad and menu-driven LCD display on the controller's front panel to select the operations.
- 20. The switch must be in the local position to permit entry from the keypad.

21. While in the local control mode, the CCS software shall continue to monitor the sign's status and display. The DMS controller, however, shall not respond to any commands from the CCS while in local control mode.
22. The sign controller's front panel shall be capable of performing the following functions with the sign controller and the DMS:
 - a. Monitor the current status of the sign controller, including the status of all sensors and a representation of the message visible on the display face.
 - b. Perform diagnostics testing of various system components, including pixels, power systems and sensors.
 - c. Activate messages stored in memory.
 - d. Configure display parameters, including display size, colors, and communications.
23. The front panel interface shall also include:
 - a. Power switch to turn the controller on and off and an LED "on" indicator.
 - b. A "local/remote" switch with an LED indicator that places the controller in local mode such that it can be controlled from the front panel interface, instead of via the primary communication channel.
 - c. Reset switch to quickly restart the controller.
 - d. LED "Active" indicator blinks when the controller is operating.
 - e. LED to indicate when any of the NTCIP communication channels are active.
24. The baud rate, connection type, and NTCIP communication protocol shall be configurable. The baud rate for each port shall be set to any typical serial baud rate ranging from 1200 to 115,200. All three (3) ports shall be capable of supporting either of the following sub network profiles: NTCIP 2101 (PMPP) or NTCIP 2103 (PPP). They shall also be capable of supporting either NTCIP 2201 (Null) or NTCIP 2202 (Internet) profiles. Only one of each of the transport and sub network profiles shall be active at any time on each port.
25. Each port's default settings shall be set as listed below:

Port	Baud Rate	Connection Type	NTCIP Sub-network Profile	NTCIP Transport Profile
Auxiliary Control	9600	Modem (External)	NTCIP 2103 - PPP	NTCIP 2202 - Internet
Central Control	9600	Direct	NTCIP 2101 - PMPP	NTCIP 2201 - Null
Local	9600	Direct	NTCIP 2101 - PMPP	NTCIP 2201 - Null

26. The DMS sign controller shall contain one (1) 10/100 Ethernet communication port. This port shall be available for optional use for communicating from the central control system to the DMS sign controller when an Ethernet network is available. Communications on this port shall be NTCIP-compatible using the NTCIP 2202 Internet transport profile and the NTCIP 2104 Ethernet sub network

profile. This shall permit the controller to be operated on any typical Ethernet network using the TCP/IP and UDP/IP protocols.

27. An EIA-232 port for plugging in a notebook computer (provided under a separate bid item) for running diagnostics, selecting messages, monitoring status and downloading/uploading messages. A minimum data rate of 19.2 kbps shall be supported through this port. A password must be entered for commands from the notebook to be considered valid.
28. The DMS sign controller shall use multiple types of addressing when operating on NTCIP communication networks. The addressing shall be configurable through the front panel user interface.
 - a. When operating over PMPP serial networks (NTCIP 2101), the controller's address shall be configured in the range 1 to 255. The default address shall be 1.
 - b. When operating on Ethernet networks (NTCIP 2104) a static IP address and subnet shall be used. If a dial-up or direct connect serial network is configured for PPP (NTCIP 2103), then no addressing shall be required.
29. The DMS sign controller shall be capable of automatically informing a central control system of the occurrence of important event or subsystem failures. This shall be handled via NTCIP "traps." When one of these events occur, the sign controller shall create a data packet for transmission to the central controller that shall contain details about the event. Traps shall be generated for the following events:
 - a. Sign controller restart - Indicates that the sign controller restarted due to a power interruption, intentional restart, or other event.
 - b. Power supply failure - Indicates that a diagnostic sensor detected a power supply that is not operating correctly.
 - c. Door open - Indicates that one of the doors on the DMS housing or control equipment cabinet has been opened. Note: This feature requires that a sensor be installed in the Sign.

2.04.04 Power Distribution (Type I and Type II)

All power shall be routed through the controller cabinet which shall contain a main circuit breaker to remove all power to the controller cabinet and sign housing. A separate breaker shall be provided to protect the sign controller and communications modem. The Contractor shall run the power cables to energize the DMS, power the maintenance lights, power the heating and ventilating equipment and power the maintenance outlets as separate circuits. A UL listed breaker box sized for a minimum of six circuits and appropriately sized shall be provided. The circuit breakers shall be approved and listed by the Underwriters Laboratories. The operating mechanism shall be enclosed, trip free from operating handle on overload and trip indicating. Contacts shall be silver alloy enclosed in an arc quenching chamber. Properly rated equipment circuit breaker(s) shall be provided for the equipment complement shown on the plans. Breakers shall have a minimum interrupt capacity of 5000 A. Thermal magnetic breakers are not acceptable.

The neutral conductor from the controller cabinet to the sign enclosure shall be 200% rated.

All electrical circuits shall be permanently identified.

2.04.05 Electrical Circuitry Protection (Type I and Type II)

Appropriate devices shall be installed in the sign enclosure and local control cabinets to protect the LED DMS electronics from over-voltage situations, such as lightning strikes and power surges over the lines.

Circuitry protection shall include, but not be limited to:

1. Over-current protection devices. All A.C. power circuit(s) to the LED DMS and associated control equipment enclosures shall be protected by Ground Fault Circuit Interrupting type devices.
2. Surge protector to guard against circuit damage resulting from voltage surges on all incoming power lines. The surge suppressor shall meet the following minimum specifications:
 - a. Maximum clamp voltage: 340 V.
 - b. Peak Current: 20,000 amps.
 - c. Response Time: 5 nanoseconds.
 - d. Occurrences: 20 times at peak current.
 - e. Maximum Series Inductance: 200 micro henries.
 - f. Temperature Range: -40 degrees Celsius to +85 degrees Celsius (-40 degrees Fahrenheit to +185 degrees Fahrenheit).
3. Data Line protectors to guard against circuit damage resulting from voltage surges on all data/communication lines which enter the DMS enclosure, such as between the DMS and cabinet.
4. DMS lightning protection equipment shall be supplied for grounding the sign and its gantry structure. The Contractor shall supply protection devices for the installation by others and shall be readily accessible for ease of replacement. The components shall be plug-in or screw-in units. The devices shall be clearly and permanently labeled.
5. The DMS assemblies will be electrically bonded to the support structures. The DMS assembly shall be properly prepared with a contact point for grounding the assembly by others.

2.04.06 Power Supplies (Type I and Type II)

The LED display shall be operated at a low internal DC nominal voltage not exceeding 24 volts.

Multiple power supplies shall be provided and employed such that the failure of any individual power supply does not inhibit full operation of the DMS.

The quantity of power supplies shall also provide at least 50% spare capacity over that required to light every pixel of the LED DMS. The Contractor shall provide details of methodology proposed for the integration of the spare capacity to Engineer for approval

All power supply voltages shall be continuously measured by the sign controller. The sign controller shall provide these voltage readings to the central controller or notebook computer when the sign controller is polled.

The DMS Controller shall have redundant power supplies wired so that the failure of one power supply shall not interrupt the operation of the controller.

The power supplies shall be short circuit protected. They shall also have suitable over-current protection devices and shall reset automatically after 5 seconds of AC power off.

Power supplies shall be UL listed, have an efficiency rating of 85% minimum, and shall operate over an ambient temperature range of -20 degrees Celsius to +60 degrees Celsius (-4 degrees Fahrenheit to +140 degrees Fahrenheit).

2.04.07 Sign Dimming System (Type I and Type II)

Each sign shall be provided with a system that senses the background ambient light level and provides field-adjustable intensities (dimming). Pixel luminance levels shall be controlled both directly (through operator input) and automatically (based on ambient light levels obtained from the photocells). Adjustments to the photo sensor control thresholds shall be available to ensure the legibility distance is maintained under all ambient light conditions.

The sign dimming system shall meet the following requirements:

1. Consist of commercially available photo-electric sensors installed as part of the DMS housing in such a manner that does not compromise the watertight integrity of the DMS housing.
2. Each of the photo-electric sensors will have a 161 sq. mm (0.25 sq. in.) minimum photo-sensitive area and will be capable of being continually exposed to direct sunlight without impairment of performance.
3. The photocells will each have a 645 sq. mm (1 sq. in.) minimum glass window area to view through the DMS housing.
4. The photo-electric sensors shall be placed such a way that they view the front, rear, and top of each sign.
5. The photo-electric sensors shall be mounted in a way that permits adjustment of the aiming angle and shall be placed in an easily accessible location for maintenance, as approved by the Engineer.

6. Luminance levels shall be stored in the DMS Controller and shall be adjustable, in a range of 30/0 to 100%, on either:
 - a. A continuous logarithmic basis, to match the normal human eye luminous response characteristic.
 - b. A half incremental dimming basis, where each lower dimming level is half the previous level.
7. Dimming sign circuitry shall be provided to select a luminance level based on the ambient light sensed by the photocells and a lookup table of intensity level vs. photocell reading.
8. The lookup tables shall be downloadable from the CCS. Each row shall contain a range of photocell readings.
9. The dimming level selected shall be determined by the row whose range corresponds to the sensed level of ambient light.
10. Overlap shall be provided in the table's ranges to prevent flickering of the sign caused by subtle changes in the ambient light.
11. The intensity levels shall be adjustable by means of a software control through the field controller, or other method approved by the Engineer.
12. Continuous current drive shall be used at the maximum brightness level and at all lower levels of brightness.
13. The current used for maximum brightness shall not exceed the current used to achieve the rated MTBF. The current used for maximum brightness shall be indicated as part of the shop drawing submittal.
14. The LED dimming circuit shall incorporate temperature controlled dimming, which shall reduce the current through the LEDs based on the temperature inside the sign enclosure, such that the LED current does not exceed the rated LED current at that temperature.
15. If the temperature of the sign exceeds the rated operating temperature of the LEDs, the sign shall blank-out until the temperature has returned to safe operating levels.
16. A complete schematic of the LED display power, driver and dimming circuits shall be provided for approval by the Engineer.

2.04.08 Central Control of the DMS (Type I and Type II)

The DMS system uses a poll-response method of communications over a multi-drop channel or link. The CCS initiates all communications and only one DMS controller on the channel will respond to a command from the CCS. Each controller on a channel is given a unique drop address. One drop address is reserved as a broadcast address. All controllers on a channel listen to transmissions to the broadcast address, but no controllers respond, thus avoiding any conflicts on the channel.

The DMS controller shall have a means of reading its drop address, either from switches, an I/O port, or via operator input at initialization. The drop address shall be stored in non-volatile memory, and may be changed only at the controller.

2.04.08.01 Message Creation (Type I and Type II)

For message creation, the DMS, DMS sign controller, and DMS control software shall support the storage and use of a minimum of eight (8) alphanumeric character font files. Each font file shall include the following characters:

- The letters "A" through "Z", in both upper and lower case
- Decimal digits "0" through "9"
- A blank or space
- Eight (8) directional arrows
- Punctuation marks, such as: .,!?-'" ""
- Other characters, such as: #&*+/() [] < >

The following character font files shall be supplied with the DMS, at a minimum:

- 7x4 Single Stroke - a typical font is seven (7) pixel rows high by four (4) pixel columns wide, has a single-pixel stroke width, and provides one pixel column of inter-character spacing.
- 7x6 Double Stroke - a typical font is seven (7) pixel rows high by six (6) pixel columns wide, has a two-pixel stroke width, and provides one pixel column of inter-character spacing.
- 7x5 Single Stroke - a typical font is seven (7) pixel rows high by five (5) pixel columns wide, has a single-pixel stroke width, and provides one pixel column of inter-character spacing.
- 11x7 Double Stroke - a typical font is eleven (11) pixel rows high by seven (7) pixel columns wide, has a two-pixel stroke width, and provides two pixel columns of inter- character spacing.

2.04.08.02 Communications Protocol (Type I and Type II)

Each NTCIP Component covered by these project specifications shall implement the most recent version of the standard that is at the stage of Recommended or higher as of the date of this letting, including any and all Approved or Recommended Amendments to these standards as of the letting date. It is the ultimate responsibility of the sign manufacturer to monitor NTCIP activities to discover any more recent documents.

2.04.09 NTCIP Requirements (Type I and Type II)

Dynamic Message Sign assemblies shall be compliant with the latest version of the NTCIP Standards, as defined by AASHTO, ITE, and NEMA.

2.04.09.01 Sub-Network Profiles

Each serial or modem port on each NTCIP device shall be configurable to support both NTCIP 2101 and NTCIP 2103. Only one of these profiles shall be active at any given time. Serial ports shall support external dial-up, leased line, radio, cellular and fiber optic modems.

Each Ethernet port on the NTCIP device shall comply with NTCIP 2104.

The NTCIP device(s) may support additional Subnet Profiles at the manufacturer's option. At any one time, only one subnet profile shall be active on a given port of the NTCIP device. All response datagram packets shall use the same transport profile used in the request. The NTCIP device shall be configurable to allow a field technician to activate the desired subnet profile and shall provide a visual indication of the currently selected subnet profile.

2.04.09.02 Transport Profiles

Each serial or modem port on each NTCIP device shall be configurable to support both NTCIP 2201 and NTCIP 2202.

Each Ethernet port on the NTCIP device shall comply with NTCIP 2202.

The NTCIP device(s) may support additional transport profiles at the manufacturer's option. Response data-grams shall use the same transport profile used in the request. Each NTCIP device shall support the receipt of data-grams conforming to any of the supported transport profiles at any time.

2.04.09.03 Application Profiles

Each NTCIP device shall comply with NTCIP 2301 and shall meet the requirements for Conformance Level One (1).

An NTCIP device may support additional application profiles at the manufacturer's option. Responses shall use the same application profile used by the request. Each NTCIP device shall support the receipt of application data packets at any time allowed by the subject standards.

The following conformance groups within the NTCIP 1203: 1997 and Amendment One (1) standard shall be supported with the values defined in these tables. For the purposes of this specification NTCIP 1203 Conformance Statements shall be considered mandatory, except where noted.

Each NTCIP device shall support all mandatory objects in all optional conformance groups that are required herein. All optional objects listed in these specifications as mandatory, shall be supported.

2.04.09.04 Conformance Statements

Conformance Group	Reference	Conformance Requirement
Configuration	NTCIP 1201:1996	Mandatory
Time Management	NTCIP 1201:1996	Mandatory
Timebase Event Schedule	NTCIP 1201:1996	Mandatory
Report	NTCIP 1201:1996	Mandatory
STMF	NTCIP 1201:1996	Optional
PMPP	NTCIP 1201:1996	Mandatory
Sign Configuration	NTCIP 1203:1997	Mandatory
GUI Appearance	NTCIP 1203:1997	Optional
Font Configuration	NTCIP 1203:1997	Mandatory
DMS Sign Configuration	NTCIP 1203:1997	Mandatory
MULTI Configuration	NTCIP 1203:1997	Mandatory
Message Table	NTCIP 1203:1997	Mandatory
Sign Control	NTCIP 1203:1997	Mandatory
Default Message Control	NTCIP 1203:1997	Optional
Pixel Service Control	NTCIP 1203:1997	Optional
MULTI Error Control	NTCIP 1203:1997	Mandatory
Illumination/Brightness Control	NTCIP 1203:1997	Mandatory
Scheduling	NTCIP 1203:1997	Mandatory
Auxiliary I/O	NTCIP 1203:1997	Mandatory
Sign Status	NTCIP 1203:1997	Mandatory
Status Error	NTCIP 1203:1997	Mandatory
Pixel Error Status	NTCIP 1203:1997	Mandatory
Fan Error Status	NTCIP 1203:1997	Mandatory
Power Status	NTCIP 1203:1997	Mandatory
Temperature Status	NTCIP 1203:1997	Mandatory

2.04.09.05 Sign Configuration Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.2.1.1.1.2	dmsSignType	NTCIP 1203: 1997	1	6
2.2.1.1.1.8	dmsBeaconType	NTCIP 1203:1997	-	2

2.04.09.06 Font Configuration Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.4.1.1.1.1	numFonts	NTCIP 1203:1997	9.2	8..255
2.4.1.1.1.2	fontTable	NTCIP 1203:1997	9.2	Sequence
2.4.1.1.1.3	maxFontCharacters	NTCIP 1203:1997	9.2	1..65535
2.4.1.1.1.4	characterTable	NTCIP 1203:1997	9.2	Sequence

2.04.09.07 DMS Sign Configuration Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.3.1.1.1.1	vrnsCharacterHeightPixels	NTCIP 1203:1997	1	0
2.3.1.1.1.2	vmsCharacterWidthPixels	NTCIP 1203:1997	1	0
2.3.1.1.1.3	vmsSignHeightPixels	NTCIP 1203:1997	1	27..65535
2.3.1.1.1.4	vmsSignWidthPixels	NTCIP 1203:1997	1	120..65535
2.3.1.1.1.5	vmsHorizontalPitch	NTCIP 1203:1997	1.4	0..68
2.3.1.1.1.6	vmsVerticalPitch	NTCIP 1203:1997	1.4	0..68

2.04.09.08 Multi Configuration Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.5.1.1.1.1	defaultBackgroundColor	NTCIP 1203:1997	2.37	0
2.5.1.1.1.2	defaultForegroundColor	NTCIP 1203:1997	1.9,1.19	9
2.5.1.1.1.3	defaultFlashOn	NTCIP 1203:1997	-	1..99
2.5.1.1.1.4	defaultFlashOff	NTCIP 1203:1997	-	1..99
2.5.1.1.1.5	defaultFont	NTCIP 1203:1997	9.3	1..255
2.5.1.1.1.6	defaultJustificationLine	NTCIP 1203:1997	3.8	1..5
2.5.1.1.1.7	defaultJustificationPage	NTCIP 1203:1997	3.8	1..4
2.5.1.1.1.8	defaultPageOnTime	NTCIP 1203:1997	-	1..255
2.5.1.1.1.9	defaultPageOffTime	NTCIP 1203:1997	-	0..255
2.5.1.1.1.10	defaultCharacterSet	NTCIP 1203:1997	-	1,2

2.04.09.09**Message Table Conformance Group**

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.6.1.1.1.1	dmsNumPermanentMsg	NTCIP 1203:1997	-	0..65535
2.6.1.1.1.2	dmsNumChangeableMsg	NTCIP 1203:1997	-	0..65535
2.6.1.1.1.3	dmsMaxChangeableMsg	NTCIP 1203:1997	-	128..65535
2.6.1.1.1.4	dmsFreeChangeableMemory	NTCIP 1203:1997	-	0..4294967295
2.6.1.1.1.5	dmsNumVolatileMsg	NTCIP 1203:1997	-	0..65535
2.6.1.1.1.6	dmsMaxVolatileMsg	NTCIP 1203:1997	-	0..65535
2.6.1.1.1.7	dmsFreeVolatileMemory	NTCIP 1203:1997	-	0..4294967295
2.6.1.1.1.8	dmsMessageTable	NTCIP 1203:1997		Sequence
2.6.1.1.2	dmsValidateMessageError	NTCIP 1203:1997	-	1..5

2.04.09.10**Sign Control Conformance Group**

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.7.1.1.1.1	dmsControlMode	NTCIP 1203:1997	3	1..6
2.7.1.1.1.2	dmsSWReset	NTCIP 1203:1997	-	0..1
2.7.1.1.1.3	dmsActivateMessage	NTCIP 1203:1997		Code
2.7.1.1.1.4	dmsMessageTimeRemaining	NTCIP 1203:1997	-	0.65535
2.7.1.1.1.5	dmsMsgTableSource	NTCIP 1203:1997	-	Code
2.7.1.1.1.6	dmsMsgRequesterID	NTCIP 1203:1997	-	IP Address
2.7.1.1.1.7	dmsMsgSourceMode	NTCIP 1203:1997	-	1..14
2.7.1.1.1.16	dmsMemoryMgmt	NTCIP 1203:1997	-	1..4
2.7.1.1.1.17	dmsActivateMsgError	NTCIP 1203:1997	-	1..9

2.04.09.11**Multi Error Conformance Group**

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.7.1.1.1.18	dmsMultiSyntaxError	NTCIP 1203:1997	-	1..12
2.7.1.1.1.19	dmsMultiSyntaxErrorPosition	NTCIP 1203:1997	-	0..65535
2.7.1.1.1.20	dmsMultiOtherErrorDescription	NTCIP 1203:1997	-	0..50

2.04.09.12 Illumination Brightness Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.8.1.1.1.1	dmsIllumControl	NTCIP 1203:1997	8.1	1..4
2.8.1.1.1.2	dmsIllumMaxPhotocellLevel	NTCIP 1203:1997	8.6	0..65535
2.8.1.1.1.3	dmsIllumPhotocellLevelStatus	NTCIP 1203:1997	8.7	0..65535
2.8.1.1.1.4	dmsIllumNumBrightLevels	NTCIP 1203:1997	8.6	0..255
2.8.1.1.1.5	dmsIllumBrightLevelStatus	NTCIP 1203:1997	8.6	0..255
2.8.1.1.1.6	dmsIllumManLevel	NTCIP 1203:1997	8.6	0..255
2.8.1.1.1.7	dmsIllumBrightnessValues	NTCIP 1203:1997	8.7	Octet String
2.8.1.1.1.8	dmsIllumBrightnessValuesError	NTCIP 1203:1997	-	1..6
2.8.1.1.1.9	dmsIllumLightOutputStatus	NTCIP 1203:1997	8.7	0.65535

2.04.09.13 Scheduling Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.4.3.1	maxTimeBaseScheduleEntries	NTCIP 1201:1996	-	0..65535
2.4.3.2	timebaseScheduleTable	NTCIP 1201:1996		Sequence
2.4.4.2	maxDayPlanEvents	NTCIP 1201:1996	-	1..255
2.4.4.3	timeBaseDayPlanTable	NTCIP 1201:1996		Sequence
2.4.4.4	dayPlanStatus	NTCIP 1201:1996	-	0..255
2.9.1.1.1.1	numActionTableEntries	NTCIP 1203:1997	-	0..255
2.9.1.1.1.2	dmsActionTable	NTCIP 1203:1997		Sequence

2.04.09.14 Sign Status Conformance Group

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.11.1.1.1.1	statMultiFieldRows	NTCIP 1203:1997	-	0..255
2.11.1.1.1.2	statMultiFieldTable	NTCIP 1203:1997		Sequence
2.11.1.1.1.5	watchdogFailureCount	NTCIP 1203:1997	3.10	Counter
2.11.1.1.1.6	dmsStatDoorOpen	NTCIP 1203:1997	2.17 3.30.3	0..255

2.04.09.15**Status Error Sub-conformance Group**

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.11.2.1.1.1	shortErrorStatus	NTCIP 1203:1997	-	0..65535
2.11.2.1.1.10	controllerErrorStatus	NTCIP 1203:1997	-	0..255

2.04.09.16**Pixel Error Status Sub-conformance Group**

MIB	Object Or Table Name	NTCIP Reference	Spec. Ref.	Expected Value
2.11.2.1.1.2	pixelFailureTableNumRows	NTCIP 1203:1997	-	0..65535
2.11.2.1.1.3	pixelFailureTable	NTCIP 1203:1997		Sequence
2.11.2.1.1.4	pixelTestActivation	NTCIP 1203:1997	3.22.2	1..4

2.04.09.17**Multi Tags**

Each NTCIP device shall support the following message formatting MULTI tags. The manufacturer may choose to support additional standard or manufacturer-specific MULTI tags.

MULTI Tag	Description
f1	Field 1-time (12 hr)
f2	Field 1-time (24 hr)
f8	Field 8-day of month
f9	Field 9-month
f10	Field 10-2 digit year
f11	Field 11-4 digit year
fl (and /£1)	Flashing text on a line-by-line basis with flash rates controllable in 0.1-second increments.
Fo	Font
j12	Justification-line-left
j13	Justification-line-center
j14	Justification-line-right
jp2	Justification-page-top
jp3	Justification-page-middle
jp4	Justification-page-bottom
mv	Moving text
nl	New line
np	New page up to 5 instances in a message (i.e. up to 6 pages/frame in a message counting first page)
pt	Page times controllable in 0.1-second increments

2.04.09.18 Documentation

NTCIP documentation shall be provided on a CD-ROM and shall contain ASCII versions of the following Management Information Base (MID) files in Abstract Syntax Notation 1 (ASN.1) format:

1. The relevant version of each official standard MID modules referenced by the device functionality.
2. If the device does not support the full range of any given object within a standard MID Module, a manufacturer specific version of the official standard MID Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields of the associated OBJECT TYPE macro. The filename of this file shall be identical to the standard MID Module except that it will have the extension ".man".
3. A MID module in ASN.1 format containing any and all manufacturer specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
4. A MID containing any other objects supported by the device

2.04.09.19 Acceptance Testing

The acceptance test will use the NTCIP Exerciser, Trevilon's NTester, Intelligent Devices' Device Tester for NTCIP, or other testing tool approved by the Engineer. If the vendor implements any vendor-specific Multi tags, the DMS shall provide meaningful error messages within the NTCIP Standard DMS MI:

DMSMULTIOTHERERRORDESCRIPTION whenever one of these tags generates an error.

The DMS manufacturer will submit an NTCIP test plan to the Engineer a minimum of 90 days prior to NTCIP acceptance testing. NTCIP acceptance testing will be performed on one of the DMS manufactured under this contract. Testing will be performed at the manufacturer's or agency's facility.

2.04.09.20 Interpretation Resolution

If the Engineer or DMS manufacturer discovers an ambiguous statement in the standards referenced by this procurement specification, the issue shall be submitted to the NTCIP DMS Working Group for resolution. If the Working Group fails to respond within 90 days, the Engineer shall provide an interpretation of the specification for use on the project.

2.04.10 Internal Cabling (Type I and Type II)

The neutral bus shall be capable to be isolated from the cabinet and equipment ground.

All cabling in the DMS assembly shall be neatly racked in the DMS enclosure or controller cabinet complying with the minimum bend radius for the cable. All wire shall be cut to the appropriate length. All cabling shall be neatly routed and tied back so as not to interfere with access to other cabling or equipment or maintenance of the sign. All cabling shall be permanently identified as to its termination point. All cable shields shall be grounded using an approved grounding termination kit.

2.04.11 DMS Software (Type I and Type II)

The Contractor shall provide DMS software that will run on a notebook computer under the Microsoft Windows operating system to emulate the central software for testing and backup purposes. This software shall permit downloading and uploading of the commands and responses through the RS-232 port or the Ethernet port of the DMS controller. The DMS software shall run the DMS assembly locally in case the Central Software System fails. Three copies of the DMS software on disk or CD-ROM shall be delivered to the Engineer.

2.04.12 Documentation (Type I and Type II)

Sign Control Parameters

The Contractor shall include a definition of all required control parameters necessary for the proper operation of this sign and not defined in this document. These shall include but not be limited to the following:

1. Range and definition of photocell readings.
2. Diagnostic tests.
3. Error and status bits.
4. Manufacturer specific NTCIP data objects and their associated range values.

Shop Drawings

1. The Contractor shall submit ten (10) copies of manufacturer's shop drawings, schematics, performance specifications, circuit descriptions, and catalog cut sheets to the Engineer for approval prior to ordering the piece of equipment.
2. The Contractor shall develop and deliver calculations, approved by a Licensed Professional Engineer in the State of Hawaii, demonstrating the DMS enclosure's ability to withstand the design loads.
3. Included in the shop drawings shall be parts lists, schematics, wiring lists, mechanical details including material, dimensions, and finish, and assembly drawings.
4. The Contractor shall develop and deliver shop drawings approved by a licensed Professional Engineer in the State of Hawaii which illustrates, in detail, how to

mount and connect the DMS enclosure to a typical sign structure. All mounting fasteners and hardware shall be made of stainless steel.

5. The submission shall be of adequate detail for the Engineer to determine compliance with the specification and shall be neatly drawn and legible.
6. The submission shall be complete and clearly indicate the contract item for which the submission is being made and the model or part number for which approval is being sought.
7. Incomplete submissions shall be returned for re-submission.

2.04.13 Manuals (Type I and Type II)

Manuals that detail the operation of the system shall be furnished as part of the DMS System. One (1) copy of each manual shall be furnished with each DMS. These manuals are in addition to the manuals provided during training courses. All manuals of each type shall be identical and shall be originals, not reproduced copies. A CD containing all electronic files of the documentation shall be supplied.

Options identified in a manual, which are not furnished with the DMS System shall be marked "NOT USED."

The manuals shall consist of sturdy, hard cover, 3-ring, loose-leaf binders made for 8 1/2" by 11" sheets. They shall be provided with a table of contents clearly itemizing the catalog and with loose-leaf hole reinforcements, except for those sheets where the full length of the fastener-edge is, in an approved manner, either reinforced or made of a high-strength material. Loose-leaf holes shall not be punched through the body of drawings or other sheets. They shall be punched in the margin only, and each drawing and other large sheet shall have the margin trimmed and the sheet properly folded so that it may be unfolded and viewed without the need to remove it from the binder.

Labels, protected by plastic covering, shall be securely affixed to both the face and spine of each binder. The labels shall contain the title of the manual, the manual number, the Contract title, and the Contract number.

2.04.13.01 User Manuals

A quantity of six (6) User Manuals shall be provided for each type of system component ordered. The User Manuals shall fully identify the system's, or the component's, features and functions and give detailed step-by-step instructions on how to operate and adjust the system or component and how to respond to system or component failures.

2.04.13.02 Operation Manuals

Operations Manuals shall be provided and shall, as a minimum, include:

1. Detailed description of normal system operation.
2. Detailed description of sign control software operation and procedures. The manual shall clearly describe all functions supported by the sign control software. The software operations manual shall be written for beginner personal computer users who are not familiar with detailed computer operations and terms. It shall contain step-by-step procedures with examples containing pictures of the computer screens.
3. Error and alarm handling procedures, including recovery from communications failures.
4. System start-up and shutdown procedures.
5. Detailed procedures on how to create, save, transmit and display messages, including all graphic features, back-up and restore message libraries, sign configurations, error and event logs.
6. The sections covering system administration features such as password management, setting access levels, installing, backing-up and restoring the sign control software shall be contained in a separate "System Administration Operations Manual."

2.04.13.03 Detailed Maintenance Manuals

Maintenance Manuals shall provide diagnostic routines for troubleshooting the system from the system computer and from each sign location. The manuals shall contain theory of operation, specifications, installation instructions, mechanical details, detailed alignment procedures, schematic drawings, photographs or drawings detailing component layouts, parts lists, including manufacturer's part numbers and trouble shooting procedures for repair/replacement of all component parts, including printed circuit board replacement. The Maintenance Manuals shall include, but not be limited to:

1. All the requirements for the Operations manuals.
2. Detailed description of procedures for modifying the LED DMS, sign controller and sign control software configuration settings.
3. Description of operating procedures and troubleshooting procedures for each subsystem. This shall include step-by-step field and bench troubleshooting procedures to isolate and repair faults, as well as normal waveforms and test voltages.
4. System message and configuration editing back-up and restore procedures, including procedures for changing any messages stored in non-volatile memory.
5. Hard copy listing for all non-volatile or similar memory devices used in the equipment. The Contractor shall also supply complete instructions for the hardware and software equipment that shall enable HDOT to change, add and delete messages stored in non-volatile memory.
6. As installed color-coded interconnection wiring diagrams at the factory.
7. Equipment wiring and all circuit board schematic diagrams indicating "factory" and "typical field" wiring. This shall include drawings showing the physical

location of each component, as well as logic diagrams and stage-by-stage explanation of the circuit theory for each circuit board.

8. Complete nomenclature and commercial number of replacement parts, including current prices, listing of spare parts initially provided, and a second source of supply where applicable, cross-referenced as to component designation.
9. Each manufacturer's product data sheet annotated to clearly identify product or part.
10. Each manufacturer's printed operating and maintenance instructions.
11. List of recommended cleaning agents, maintenance procedures and schedules.
12. List of recommended test equipment including manufacturer's name, address, and model number.

2.04.14 Testing (Type I and Type II)

For all custom application software necessary to operate the DMS, the Contractor shall provide HDOT with the software source code, and compiler necessary to compile it. The Contractor shall also demonstrate the compiling, linking, and loading of the source code as part of this test.

2.04.14.01 Design Approval Tests

The following tests shall be performed as part of the design approval test. The Design Approval Test shall be performed on a complete DMS assembly. While performing these tests a test set shall be used to issue commands to the sign controller to verify that the sign remains operational throughout the test.

1. Power variation: Test the sign with the line voltage at the maximum, minimum and nominal specified values. Using a power interruption meter, at each of these voltages interrupt the power for 0.1 sec five times. Repeat for a 0.5 second interruption and for a 1 second interruption.
2. Transient immunity: Using a transient generator set to the following conditions:
 - a. Amplitude: 300 volts +5 percent, positive and negative polarity
 - b. Peak power: 5000 watts
 - c. Repetition: One pulse every other cycle moving uniformly over the full wave in order to sweep once every 3 seconds across 360 degrees of line cycle.
 - d. Pulse rise time: 500 ns.
3. Power line surge: Discharge a 25 uF capacitor charged to plus and minus 2000 volts applied directly across the incoming AC line at a rate of once every 10 seconds. Perform the test 10 times for each polarity. The unit shall be operated at 120 ± 12 VAC.
4. Temperature: All functional operations of the equipment shall be successfully performed under the following conditions and in the order specified below:

- a. The equipment shall be stabilized at 0 degrees Celsius (32 degrees Fahrenheit). After stabilization at this temperature, the equipment shall be operated without degradation for two (2) hours.
 - b. The equipment shall be stabilized at 62 degrees Celsius (144 degrees Fahrenheit). After stabilization, the equipment shall be operated without degradation for two (2) hours.
 - c. The equipment shall be subjected to temperature shock of 17 degrees Celsius (63 degrees Fahrenheit) per hour, during which time the relative humidity shall not exceed 95%. The equipment shall be operated without failure during and after the temperature shock.
5. Relative Humidity: All equipment shall meet its performance requirements when subjected to temperature and relative humidity of 43 degrees Celsius (110 degrees Fahrenheit) and 95%, respectively. The equipment shall be maintained at this condition for 48 hours. At the conclusion of the soak, within 30 minutes, the equipment shall meet all of its operational requirements.
 6. Vibration: The equipment shall show no degradation of mechanical structure, soldered components, plug-in components or satisfactory operation in accordance with the manufacturer's specification after being subjected to the following vibration test:

The equipment shall be secured to the head of suitable electro-mechanical shaker in the vertical, lateral, and longitudinal planes, respectively. The object of the test is to vibrate the equipment in each of the three (3) mutually perpendicular axes, in accordance with the following parameters:

- i. Amplitude: 2.0 mm "Double Amplitude" (peak to peak).
- ii. Linear Acceleration (g's): 5 maximum.
- iii. Linear Velocity: approximately 190 mm/s (7.5 in/sec).
- iv. Frequency: 40 Hz.
- v. Duration: five (5) minute dwell in each axis.

If the equipment fails the design approval test, the design fault shall be corrected and the entire design approval test shall be repeated. All deliverable equipment shall be modified, without additional cost to the State Department of Transportation, to include design changes required to pass the design approval tests.

2.04.14.02 Factory Demonstration Tests

Following Design Acceptance Testing and prior to shipping of any signs, the Contractor shall perform a factory demonstration test on each sign. Factory Demonstration Tests shall test the full functionality of a sign, controller, central control and maintenance software and communications between them.

Using a notebook computer loaded with test software provided by the sign manufacturer demonstrate the following with the computer connected to the input (remote) port of the controller:

1. Exercising of all sign functions as defined in this document.
2. Simulation of error and fault conditions to demonstrate the detection and reporting of the status conditions defined in this document. Including, but not limited to, open cabinet door, bad pixels, bad drivers, illegal message, and illegal character.
3. With the fiber optic communications interface installed, operate the sign via a simulated communications network.
4. With the notebook computer loaded with the test software provided by the sign manufacturer demonstrate operation through the local port of the sign controller.
5. Demonstrate compliance with the NTCIP specific standards to be implemented, applicable conformance groups, applicable data objects and their associated range values that are pertinent to the implementation of this specification. Test cases are attached as an appendix to this specification.
6. Water Test: A water spray test shall be performed to demonstrate that the enclosure meets the requirements of the NEMA 3R rating for the DMS housing. At the completion of the test, verify that the inside of the housing is dry.

If the DMS fails the factory demonstration test, the fault(s) shall be corrected and the entire factory demonstration test shall be repeated. All deliverable equipment shall be modified, without additional cost to the HDOT, to include any changes required to satisfactorily complete the factory demonstration tests.

2.04.15 Training (Type I and Type II)

The Contractor shall provide training for HDOT engineering, maintenance and operations staff at a facility provided by the State. The training shall include all material and manuals required for each participant. The training shall be as follows:

1. Engineering and Maintenance Training: Training shall be provided for a minimum of eight (8) hours for up to ten (10) engineers and technicians. The training shall include operation instructions, theory of operations, equipment functions, preventive maintenance procedures, troubleshooting and repair of all equipment. Hands-on use of the DMS controller, laptop, and assembly shall be included in the training.
2. Operations Training: Training shall be provided for a minimum of eight (8) hours for up to ten (10) control center operators. The training shall include a complete demonstration of the system operations and the control of the DMS.

2.04.16 Spare Parts (Type I and Type II)

Offerors shall list those spare parts, which are typically needed for their DMS systems, with their prices in the offer forms. The following spare parts identified in the table below are an estimation of those parts which may be purchased through the duration of this contract.

Item Description	Estimated Quantity of Spares
DMS Controller	2
Display Modules	20 of each type
Driver Boards	20 of each type
Diagnostic Boards	20 of each type
Power Supplies	4 of each type
Photo-Electric Sensors	4 of each type
LEDs	5,000

All spare parts shall be certified by the manufacturer that they are suitable for use on the signs provided under this contract, and are in a working condition. Manufacturer's certification shall include tests conducted, date of such tests, and the pass/fail criteria for these tests.

The Engineer shall reserve the right to witness any such testing of spare parts.

2.04.17 Delivery and Schedule (Type I and Type II)

The Contractor shall deliver the equipment to the HDOT H-3 Maintenance Yard.

The Contractor shall be responsible for unloading the equipment where directed by the Engineer at the delivery site.

To confirm that the sign was not damaged during its delivery, the Contractor shall perform an on-site verification test on each sign. The on-site verification test procedure shall be submitted for approval by the Engineer. Equipment damaged during delivery shall be replaced by the Contractor to the Engineer's satisfaction at no cost to HDOT.

Five days written advance notice shall be given to both the Engineer and at the address listed above. Delivery shall occur between the hours of 8:00 a.m. and 2:00 p.m. Monday through Friday. Material will not be accepted without the required advance notice.

HDOT anticipates procurement of DMS to begin in late 2009/early 2010.

2.04.18 Integration Support Services (Type I and Type II)

The Contractor shall provide services when requested by HDOT, including, but not limited to:

1. Fully program DMS controllers and for all default and user programmable settings
2. Install vendor's DMS system software on controllers and computers
3. Bench test systems to ensure proper operation of hardware and programming of coordination plans
4. Provide field services for State personnel in connection with DMS operation, system software, troubleshooting, and bench repair of equipment
5. Provide field services for inspection of installation and fine-tuning
6. Provide software support services for integrating the DMS software with the Central Control Software

Field services shall be provided by experienced personnel familiar with use of the equipment and software. Experienced personnel shall include, but not be limited to, instructors, engineers, and field technicians.

Payment for on-site services will be on an 8-hour 'person-day' basis with a minimum order of two (2) full days.

Time required to travel from out of state to Hawaii shall not be eligible for payment. Travel time within Hawaii between DOT sites is included in the 'person-day'.

All direct costs of travel, accommodations, and meals shall be included in the unit bid price per day for on-site services. No separate payments will be made for these travel costs.

On-site services may be required anywhere in the State of Hawaii. Field services will be scheduled at least two weeks in advance.

No payment will be made for on-site services which are required to trouble-shoot or resolve problems caused by malfunctions or failures of equipment supplied by the vendor or for work done under warranty.

2.04.19 Method of Measurement

Type I Walk-in Dynamic Message Sign Assembly, LED Full Matrix, will be measured as a unit furnished and successfully tested.

Type II Arterial Dynamic Message Sign Assembly, LED Full Matrix, will be measured as a unit furnished and successfully tested.

Training will be paid on a lump sum basis. Measurement for payment will not apply.

Integration Support Services will be measured as days, with each day consisting of an eight hours "person-day".

2.04.20 Basis of Payment

The unit price for each DMS Assembly shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. All miscellaneous hardware and software, required for the furnishing and testing of the unit shall be included under this item. Payment for all documentation, testing, guaranties, and test equipment and software shall be included under this item.

HDOT will pay for training on a lump sum basis. Payment will be full compensation for the work prescribed above.

Integration Support Services, measured as provided above, will be paid for at the contract unit price per day, which price shall be full compensation for furnishing field personnel to provide the support services; and for all labor, equipment, transportation, and incidentals necessary to complete this item of work.

2.05 CATEGORY II – VIDEO ENCODERS, VIDEO DECODERS

DESCRIPTION

The work for this item shall consist of furnishing an MPEG-4 Video Encoder, Dual Channel unit and MPEG-4 Video Decoder, herein called the Encoder and the Decoder, in accordance with these technical specifications. This item shall include the Encoder, Decoder, mounting bracket, connectors, cabling and setup software as defined in this document.

MATERIALS

The following specification outlines the requirements for furnishing an MPEG4 Video encoder and decoder. Although the units must adhere to the following technical specifications, preference will be given to vendors that can provide a migration path to the H.264 video standard.

The encoder/decoder must comply to these basic requirements. More detailed requirements are found in the section Specific Requirements below.

1. The encoder must have a single video input and dual streaming capabilities

2. The units must support the MPEG-4 Part 2 video compression standard as the primary stream, and MJPEG as the secondary
3. Both MPEG-4 and MJPEG streams must be capable of delivering and maintaining 30 fps at a minimum of 2CIF resolution
4. The units must support both Unicast and Multicast.
5. The units must support the Real Time Streaming Protocol (RTSP) for control of Unicast video delivery.
6. The units must support the Real Time Transport Protocol (RTP/UDP) for control of Multicast video delivery.
7. The units must provide a transparent TCP data interface for RS232/422/485 serial control of 3rd party devices.

The design life of all components, operating 24 hours per day, shall be seven (7) years minimum.

The Engineer will do an onsite verification test to ensure compliance with all requirements.

Specific Requirements

Video

1. Video Inputs = 1x NTSC
2. Input level = 1 Vpp (+/- 3 dB)
3. Video protocol = MPEG-4 Part 2, MJPEG
4. Transport protocol = RTSP and RTP/UDP
5. Number output streams = Up to 20 for Unicast. Unlimited for Multicast.
6. Input Impedance = 75Ω (Hi-Z selectable if units support looping)
7. Encoding latency = <130ms
8. Resolution = D1, ½ D1, 2CIF, CIF, QCIF
9. Frame rate = 1 to 30 fps
10. Output data rate = 9.6Kb/s – 8Mb/s (minimum)
11. Connector type = BNC 75Ω (Hi-Z selectable if units support looping)

Ethernet Interface

1. Number of interfaces = 1
2. Interface = 10/100Base-TX Fast Ethernet
3. Protocols = TCP, UDP, IGMPv3, HTTP, QoS, SNMP v2, Telnet
4. Connector type = RJ45

Environmental

1. Operating temperature = 0° C to +74° C
2. Relative humidity = <95% (no condensation)
3. MTBF = >200,000 h

Mechanical

1. Housing = Rack-mount or Stand-alone

Transparent Data Ports

1. Number of channels = 2 (full-duplex)
2. Interfaces = 1x RS232/RS422/RS485 (2 or 4 wire)
3. Protocol = TCP/UDP
4. Data rate = 300B/s to 230.4KB/s
5. Connector type = RJ45 or Terminal Block

The decoder will be the same brand as the encoder, and will decode in accordance to the above specifications.

The Decoder units will be rack-mounted in central location with up to eight (8) units in a rack. A typical mounting configuration and connection to the rack shall be provided by the manufacturer.

Cable and Connections

The Contractor shall prepare a shop drawing which details the complete Encoder and Decoder unit assemblies, all components to be supplied and the mounting hardware. These drawings shall detail a typical placement of an Encoder and Decoder.

One copy of all operations and maintenance manuals for each Encoder and Decoder unit shall be delivered for each unit installed.

2.05.01 User Manuals

A quantity of six (6) User Manuals shall be provided for each type of system component ordered. The User Manuals shall fully identify the system's, or the component's, features and functions and give detailed step-by-step instructions on how to operate and adjust the system or component and how to respond to system or component failures.

All manufacturer supplied software and integration tools shall be provided with the delivered product.

2.05.02 Method of Measurement

This item shall be measured for payment by the actual number of Encoder and Decoder units furnished, tested, and accepted.

2.05.03 Basis of Payment

Payment will be made at the contract unit price for each Encoder and Decoder which shall include all equipment, material, documentation, and labor detailed in the contract documents for this bid item.

Payment shall be made after the client confirms completion of operational testing.

2.06 CATEGORY III - TRAVEL TIME MONITORING EQUIPMENT AND SOFTWARE

Description

Under this item, the Contractor shall furnish equipment and software for monitoring travel times in a roadway network and provide support services with its integration with the HDOT Traffic Operation Center (TOC) systems in accordance with these specifications and as directed by the Engineer.

The purpose of the equipment and software is real time collection of vehicle travel times by identifying vehicles license plates at two or more points in a roadway network and accurately calculating the average travel times for each defined roadway segment.

The Contractor shall provide support services when requested by HDOT as specified below and directed by the Engineer.

2.06.01 Travel Time Monitoring Equipment and Software

The equipment and software includes the following components:

1. Video Camera Processor Units (VCPUs) - integrated license plate recognition camera incorporating the camera, illuminator and the automatic license plate recognition (ALPR) processor within a single sealed enclosure. The VCPU shall include the application software that reads the license plate, analyzes the plate and interfaces with other systems.
2. VCPU Interface Box – interface box that provides the VCPU with hardware interface for power and communications. There will be three types of VCPU interface boxes; one, two or four VCPU interfaces boxes.
3. Maintenance Laptop for configuration and diagnostic operations for the VCPU
4. Travel Time Monitoring Software – application software that controls the VCPUs, process data provided by the VCPUs and provides travel times for defined roadway segments and interfaces with other applications and systems

The furnishing for the VCPUs, interface boxes and software shall be paid under these items. The installation of the VCPUs and interface boxes will be performed by others under separate contracts.

2.06.02 Video Camera Processor Units

The Video Camera Processor Unit (VCPU) shall be a field hardened device for outdoor operations and mountable on traffic poles, light poles, overpass structures or sign gantries typically found in a highway environment. The VCPU will utilize automatic license plate recognition technology (ALPR) for distinguishing license plates and

determining travel times. The VCPU shall be a fully integrated digital number plate reading camera incorporating the camera, illuminator and the LPR processor within a single sealed enclosure.

The VCPU shall have the following functionalities:

1. Ability to operate under night and day light conditions by integrating a controlled light (e.g. infra-red light) that will illuminate the retro-reflective nature of the plate, and allow day and night operation. The illumination shall be invisible to the drivers.
2. Process the images and run the application algorithms on license plates to recognize vehicle plates
3. License plate recognition with 90% accuracy minimum
4. Fully functional with vehicles traveling between 0 to 100 miles per hour
5. Low pressure notification to TMC

To ensure raw data adheres to ITS America's Fair Information and Privacy Principles, the VCPU's transmission of data to the TMC shall adhere to the following requirements:

1. Transmission shall be limited to data only. Pictures shall not be transmitted to the TMC.
2. All data shall be encrypted to prevent a protected piece of identification data from being traced back to a non-protected unique license plate number of license plate ID.
3. All data, including pictures, shall be deleted from the VCPU once the data is transmitted to the TMC.
4. HDOT shall be provided with the option to truncate the first character from each plate read prior to encryption of this data for transmission to the TMC. The manufacturer shall ensure that any such truncation process does not adversely impact the ability of the travel time processor to create matched links between license plate reader stations.

The VCPU assembly shall comply with the following specifications:

Max. Dimensions:	350 mm (13.8 in) long, 250mm (9.8 in) wide, 350 mm (13.8 in) deep including sunshield
Max. Weight:	4 kg (8.8 lbs)
Input voltage range:	11.5 VDC to 18.0 VDC
Power consumption:	20 Watts +/- 5 watts
Operating temperature range:	0 to 60 °C (32 to 140 degrees Fahrenheit)
Humidity:	Up to 100% relative humidity
Video inputs:	One NTSC video
Video type:	black and white

Data communications:	RS 232, RS485, IP connectivity over GPRS
Communication device:	wireless GPRS modem
Communication standard:	TCP/IP compliant
Vibration and shock:	As per NEMA Standard TS1
Wind:	Survivability: 110 mph with 30% gust factor
EMI:	FCC rules, Part 15, Subpart J
Mounting:	Supplied with associated wall mounting hardware
Enclosure:	Sealed and pressurized enclosure; external parts corrosion protected with stainless steel fasteners; internal screws/fasteners: nylon or loctite thread-locking; construction/Finish- Aluminum/Powder Coated

Minimum camera requirements:

Image Sensor:	1/4", EIA format
Total Pixels:	NTSC: 768 x 494
Min. Resolution:	500 Horizontal TV lines; 375 Vertical TV lines
Operations:	for day or night
Minimum Sensitivity:	max gain, AGC off: 3 lux (mono/day) to 0.1 lux (mono/night)
Video Output:	1.0 Volt peak to peak at 75 ohms
Synchronization:	Crystal
Lens:	8mm

To comply with the accuracy requirements and depending on accuracy of the other devices in the integrated unit, the above camera requirements may be increased by the Contractor.

2.06.03 VCPU Interface Box

The VCPU Interface Box will interface the VCPU with the field power drop and communications link. There will be three types of VCPU interface boxes; one, two or four VCPU interfaces. Each VCPU interface box shall, as a minimum, comply with the following:

1. Accepts a three wire 120VAC power feed and supplies the VCPU with the necessary DC voltage to the VCPU(s)
2. Provides interface hardware connections for communication links including Ethernet, LAN and GPRS wireless to the VCPU(s)

2.06.04 Maintenance Laptop

The maintenance laptop shall be a notebook PC complying with the following specifications. The notebook workstation shall be a standard product of an established brand name company with a good track record of providing long term support and maintenance service. The company shall have been producing leading edge PC based components for a minimum of five years prior to the bid. The company shall be able to provide nation-wide service and support on a 7 days a week, 24 hours per day basis and shall maintain a toll-free customer support service. All major components such as the motherboard, power supply, processor, memory, hard disk, DVD, integrated network interface card, audio and video components, shall be designed, assembled and warranted by the manufacturer. The workstation, as configured, shall be a standard model number of the manufacturer. Computers that are assembled from brand name components by system integrators or re-sellers shall be considered "Clones" and are not acceptable.

The maintenance laptop shall be equipped with the following:

Operating System:	Windows XP Professional
Processor:	3.0 GHz (minimum), dual processor
Hard Disk:	160 GB(minimum)
Memory:	2 GB (minimum)
Video Screen:	15" Active Matrix Color Display capable of displaying a minimum of SVGA (800 X 600) resolution or above
Battery Time:	Two smart lithium ion batteries with advanced power management
DVDICD-ROM:	Internal 8X DVD±RW
Pointing Device:	An integrated 2- button mouse trackball and external PS/2 3-button wheel mouse
Multimedia:	Integrated 16-bit sound card
Network Interface:	Combination PC modem (56 bps) and 10/10/1000BaseT LAN PC card
Carry Case:	Soft carrying case suitable for notebook and accessories shall be provided
Interface Ports:	One 9-pin, RS232 port, one USB port, one infrared port, and one parallel Centronics port

In addition to the major components comprising the maintenance laptop as listed above, provide all incidental components, including all interconnecting cables, adapters, utility software, and other minor components which are required to perform maintenance services on the hardware.

The maintenance laptop shall be furnished with diagnostic software that configures controls and monitors the VCPU equipment. This software shall display the status of all alarms and provide the capability for the maintenance staff to:

1. configure ports of equipment
2. establish operating modes
3. monitor the alarm status of all equipment
4. download current configuration of equipment

2.06.05 Travel Time Monitoring Software

The software shall run on a standard Operating System Windows 2000 or Windows XP server. The software shall be installed and configured at the TMC as directed by the Engineer. The software shall have the following functionalities:

1. Continuously communicate with the VCPUs on the system.
2. Ability to decode the VCPU's data encryption.
3. Provide a database of the decrypted information for processing by a third party algorithm.
4. Ability to log and display travel data collected by VCPUs.
5. Capability to communicate with up to 200 VCPUs.
6. Utilize user-friendly software interfaces to:
 - a. Setup and configure the system.
 - b. Visualize alarms, live travel times and equipment status with no disruption to the travel time measurement process.
 - c. Print system and travel data reports. The types and format of the reports shall be as directed by the Operators and Engineer.
7. Remote Maintenance: software must be accessible remotely. The following operations shall be available remotely:
 - a. Perform diagnosis.
 - b. Download new software versions.
 - c. Perform or change equipment configurations.
8. Communicate with the TMC System provided by others. The software shall be capable to provide raw data dumps to other systems.
9. Travel time measurements shall also be calculated under the following specific scenarios:
 - a. Vehicle stop.
 - b. Congestion.
 - c. Slow moving vehicles.
 - d. Inclement weather: fog, rain (visibility loss).
10. Ability to depict roadway segments between highway exits and roadways typically found in Hawaii and define traveling thresholds on specific roadway segments for AM, PM and off-peak periods.
11. The detection of traveling times larger than the thresholds shall generate a visual and/or sound alarm. Thresholds shall be detected within two minutes. The accuracy of the traveling measurement software and hardware shall be at least 90% accurate.

12. Utilize security features to encrypt data and provide a high level of security to the database used for the storage of vehicle information. The Contractor shall ensure that security of the software and equipment is not breached.
13. The software shall have a friendly graphical user interface with the following system interfaces:
 - a. Map interface showing VCPU locations.
 - b. Map interface showing a schematic of the roadway with equipment icons.
 - c. Visualize the travel time measurements on the map.
 - d. Visualize the status of all system components.
 - e. Visually identify the equipment under alarm(s).
 - f. Access each equipment setup.
 - g. Access report archives.

User Access and Privileges

A three level (at least) password system shall restrict access to some functions of the system interface. The following levels shall apply:

- Level 1: Operator- view travel time measurements, view alarms, acknowledge alarms
- Level 2: Maintenance- same as Level 1 plus the privileges to change setup and configuration
- Level 3: Administrator- same as Level 2 plus the privileges to archive/delete data

2.06.06 Specific Site Requirements

Site Condition:

The contractor shall provide HDOT with a manufacturer's signed and approved certificate that the proposed Travel Time Monitoring System is capable of meeting the enclosed specifications under the following physical site characteristics:

1. Mounted directly above the center of the lane.
2. Mounted at any height between 15'-0" and 25'-0" above grade.
3. Available horizontal read range between zero and 150 feet.
4. Maximum horizontal license plate skew of five degrees.

Reversible Lanes:

The proposed system shall be capable of calculating travel time measurements with the use of reversible lanes. The user shall define the direction of travel by indicating the

timeframe that vehicles are expected to travel in each direction, including a black-out period where data will not be collected. When vehicles are traveling in the secondary direction of travel, the VCPU shall be expected to capture front license plates.

2.06.07 Experience

The hardware and software proposed for this item shall be manufactured by a firm established in the production and installation of such equipment. The manufacturer shall meet the following requirements at a minimum:

- Five (5) years experience in the successful manufacture and installation of vehicle travel time measurement equipment for highway applications utilizing LPR technology
- Two (2) systems in continuous satisfactory operation for at least two (2) years. The Contractor shall submit, as proof, the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the systems. The Contractor shall arrange for a demonstration(s) of the hardware and software, to the Engineer upon request

2.06.08 Equipment and Software Submittals

The Contractor shall submit equipment and software submittals for the proposed VCPU components and software for review and approval by the Engineer. Three copies of the submittal along with a CD containing all electronic files of the documentation shall be supplied. The equipment and software submittal, as a minimum, shall include the following:

1. Electrical, mechanical and environmental specifications for each device.
2. Functional features of the equipment.
3. Complete and accurate schematic diagrams depicting the equipment and their installation.
4. Installation procedures.
5. Stage-by-stage explanation of operation of the system.

Only approved equipment shall be furnished by the Contractor. A minimum of ten (10) work days shall be allowed for the Engineer's review and approval for each submittal.

2.06.09 Design Approval Test

The Contractor shall perform a Design Approval Test to demonstrate the equipment complies with the specific requirements for temperature, power, vibration, and typical operations. The following tests shall be performed as part of the design approval test. The Design Approval Test shall be performed on a complete VCPU assembly. While

performing these tests a test set shall be used to issue commands to the VCPU to verify that the unit remains operational throughout the test.

1. Power variation: Test the unit with the line voltage at the maximum, minimum and nominal values. Using a power interruption meter, at each of these voltages interrupt the power for 0.1 sec five times. Repeat for a 0.5 second interruption and for a 1 second interruption.
2. Temperature: All functional operations of the equipment shall be successfully performed under the following conditions and in the order specified below:
 - a. The equipment shall be stabilized at 0 degrees Celsius (32 degrees Fahrenheit). After stabilization at this temperature, the equipment shall be operated without degradation for two (2) hours.
 - b. The equipment shall be stabilized at 60 degrees Celsius (140 degrees Fahrenheit). After stabilization, the equipment shall be operated without degradation for two (2) hours.
2. Relative Humidity: All equipment shall meet its performance requirements when subjected to temperature and relative humidity of 43 degrees Celsius (110 degrees Fahrenheit) and 95%, respectively. The equipment shall be maintained at this condition for 48 hours. At the conclusion of the soak, within 30 minutes, the equipment shall meet all of its operational requirements.
3. Vibration: The equipment shall show no degradation of mechanical structure, soldered components, plug-in components or satisfactory operation in accordance with the manufacturer's specification after being subjected to a vibration test as per the NEMA Standards TS1.
4. Water Test: A water spray test shall be performed to demonstrate that the interface box meets the requirements of the NEMA 4 rating and that the VCPU is for outdoor applications. At the completion of the test, verify that the inside of the VCPU, interface box and connectors are dry.
5. Field operational test: The Contractor shall perform an operational test out in the field to demonstrate the VCPUs operate accurately under the following conditions:
 - a. Varying vehicle speeds
 - b. Different volumes of vehicle flow
 - c. Various ambient illuminations (day, night, sun, shadow)
 - d. Include one test during inclement weather
 - e. Various vehicle types (passenger car, truck, tractor-trailer, etc.)
 - f. Different plate mounting locations (rear only or front and rear)
 - g. Typical vehicle plates from the state of Hawaii
 - h. Various camera-to-plate distances

The field location for the operational test will be selected by the Engineer. Contractor will be responsible for the installation of the equipment and perform the operational test.

If the equipment fails the design approval test, the design fault shall be corrected and the entire design approval test shall be repeated. All deliverable equipment shall be

modified, without additional cost to the State Department of Transportation, to include design changes required to pass the design approval tests.

2.06.10 Factory Demonstration Tests

Following Design Acceptance Testing and prior to shipping of any equipment, the Contractor shall perform a factory demonstration test on each unit. Factory Demonstration Tests shall include an examination of the product to verify a complete unit with excellent workmanship and test the full functionality of each unit as follows:

Using a notebook computer loaded with test software provided by the manufacturer, demonstrate the following:

1. Exercising of all functions as defined in this document
2. Simulation of error and fault conditions to demonstrate the detection and reporting of the status conditions defined in this document.
3. With the interface box installed, operate the VCPU via a simulated communications network.
4. With the notebook computer loaded with the test software provided by the manufacturer demonstrate operation through the local port of the VCPU.

If the equipment fails the factory demonstration test, the fault(s) shall be corrected and the entire factory demonstration test shall be repeated. All deliverable equipment shall be modified, without additional cost to the HDOT, to include any changes required to satisfactorily complete the factory demonstration tests.

2.06.11 Test Procedures

The Contractor shall be responsible for developing detailed test procedures for the Design Approval Test and the Factory Demonstration Tests and conducting the specified tests to verify satisfactory operation of the equipment for each test. The test procedures shall be submitted to the Engineer for review and approval prior to the tests. Only approved test procedures shall be used during the tests. A minimum of ten (10) work days shall be allowed for the Engineer's review and approval of the test procedures.

Tests shall not be performed unless the Engineer or designated representative is present.

The test results shall be compared with the requirements specified herein. Failure to conform to the requirements of any test shall be counted as a defect, and equipment shall be subject to rejection by the Engineer.

Rejected equipment may be offered again for retest provided all non-compliances have been corrected and retested by the Contractor and evidence thereof submitted to the

Engineer. Final inspection and acceptance of equipment shall be made after installation at the locations specified on the plans and as specified herein.

2.06.12 System Documentation

Three complete sets of operation and maintenance manuals shall be provided. The documentation, as a minimum, shall include the following:

1. Complete and accurate schematic diagrams
2. Installation procedures
3. Complete performance specifications (functional, electrical, mechanical, and environmental) on the equipment
4. Maintenance and trouble-shooting procedures
5. Stage-by-stage explanation of operation of the system

2.06.13 Training

The Contractor shall provide training for HDOT engineering, maintenance and operations staff at a facility provided by the Department and in the field. The training shall include all material and manuals required for each participant. The training shall be as follows:

1. Engineering and Maintenance Training: Training shall be provided for a minimum of eight (8) hours for up to ten (10) engineers and technicians. The training shall include operation instructions, theory of operations, equipment functions, preventive maintenance procedures, troubleshooting and repair of all equipment. Hands-on use of the VCPU and software.
2. Operations Training: Training shall be provided for a minimum of eight (8) hours for up to ten (10) control center operators. The training shall include a complete demonstration of the system operations and the control of the equipment.
3. Component Testing & Installation Training: Training shall be provided for a minimum of eight (8) hours for up to ten (10) engineers and technicians. The training shall include the procedures for testing and installing equipment delivered to the client in order to confirm all equipment is operational upon delivery and train installers that will be completing field installation. Training shall be performed with the first order of equipment made by the client with field support for initial installation.

2.06.14 Integration Support Services

The Contractor shall provide services when requested by HDOT, including, but not limited to:

1. Fully program VCPUs and for all default and user programmable settings
2. Install vendor's software on field equipment and central computers
3. Bench test systems to ensure proper operation of hardware and software
4. Provide field services for State personnel in connection with operation, system software, troubleshooting, and bench repair of equipment
5. Provide assistance, as requested by the Engineer, to the installation contractor to ensure system works as designed. Installation of these devices may occur during nighttime closure of freeway lanes. Provide field services for inspection of installation and fine-tuning.
6. Provide software support services for integrating the software with the Central Control Software

Field services shall be provided by experienced personnel familiar with use of the equipment and software. Experienced personnel shall include, but not be limited to, instructors, engineers, and field technicians.

Payment for on-site services will be on an 8-hour 'person-day' basis with a minimum order of two (2) full days.

Time required to travel from out of state to Hawaii shall not be eligible for payment. Travel time within Hawaii between DOT sites is included in the 'person-day'.

All direct costs of travel, accommodations, and meals shall be included in the unit bid price per day for on-site services. No separate payments will be made for these travel costs.

On-site services may be required anywhere in the State of Hawaii. Field services will be scheduled at least two weeks in advance.

No payment will be made for on-site services which are required to trouble-shoot or resolve problems caused by malfunctions or failures of equipment supplied by the vendor or for work done under warranty.

2.06.15 Method of Measurement

The Video Camera Processor Units will be measured as a unit furnished and successfully tested.

VCPU Interface Box will be measured as a unit furnished and successfully tested.

The Travel Time Monitoring Software and the maintenance laptop will be measured as a lump sum item furnished and successfully tested.

Training will be paid on a lump sum basis. Measurement for payment will not apply.

Integration Support Services will be measured as days, with each day consisting of an eight hours "person-day".

2.06.16 Basis of Payment

The unit prices for the VCPUs, VCPU interface-one input, VCPU interface-two inputs, VCPU interface-four inputs, shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. All miscellaneous hardware and software, required for the furnishing and testing of the unit shall be included under these items. Payment for all documentation, testing, guaranties, and test equipment and software shall be included under these items.

The Travel Time Monitoring Software shall include the cost of furnishing all labor, materials, licensing, maintenance laptop and equipment necessary to complete the work. All miscellaneous hardware and software, required for the furnishing and testing the software shall be included under this item. Payment for all documentation, testing, guaranties, and test equipment and software shall be included under this item.

Payment for equipment shall be made after the client confirms completion of operational testing.

HDOT will pay for training on a lump sum basis. Payment will be full compensation for the work prescribed above.

Integration Support Services, measured as provided above, will be paid for at the contract unit price per day, which price shall be full compensation for furnishing field personnel to provide the support services; and for all labor, equipment, transportation, and incidentals necessary to complete this item of work.

2.07 ESTIMATED QUANTITIES

Below is a listing of estimated quantities based on current anticipated funding.

License Plate Recognition

Travel Time Monitoring Equipment / VCPU (Active, Spares, and all required interface boxes):	43
Maintenance Laptop and Travel Time Monitoring Software	Lump Sum
Training	Lump Sum

Integration Support Services	2 person-days
<u>Video Encoders, Video Decoders</u>	
Video Encoders	15
Video Decoders	5
<u>Dynamic Message Signs:</u>	
Type I- Walk-In	1
Type II- Arterial	1
Training	Lump Sum
Integration Support Services	2 person-days

SECTION THREE

PROPOSAL FORMAT AND CONTENT

3.01 INTRODUCTION

One of the objectives of this RFP is to make proposal preparation easy and efficient, while giving Offerors ample opportunity to highlight their proposals. The evaluation process must also be manageable and effective. When an Offeror submits a proposal, it shall be considered a complete plan for accomplishing the tasks described in this RFP and any supplemental tasks the Offeror has identified as necessary to successfully complete the obligations outlined in this RFP.

The proposal shall describe in detail the Offeror's ability and availability of services to meet the goals and objectives of this RFP as stated in **Section 2 BACKGROUND AND SCOPE OF WORK**.

The contents of any proposal shall not be disclosed during the review, evaluation, or discussion process. Once notice of the award is posted, all proposals, successful and unsuccessful, become available for public inspection. Those sections that the Offerors and the State agree are confidential and/or proprietary shall be identified by the Offerors and will be excluded from access. Price is not considered confidential and will not be withheld.

Submission of a proposal shall constitute an incontrovertible representation by the Offeror's of understanding, acceptance, and compliance with every requirement of this RFP, and that the RFP documents are sufficient in scope and detail to indicate and convey reasonable understanding of all terms and conditions of performance of the work. Proposals must:

1. Include a transmittal letter to confirm that the Offeror shall comply with the requirements, provisions, terms, and conditions specified in this RFP.
2. Include signed Offer Form OF-1 with the complete name and address of Offeror's firm and the name, e-mail, mailing address, telephone number, and fax number of the person the HDOT should contact regarding the Offeror's proposal.
3. If subcontractor(s) will be used, append a statement to the transmittal letter from each subcontractor, signed by an individual authorized to legally bind the subcontractor and stating:
 - a. The general scope of work to be performed by the subcontractor;
 - b. The subcontractor's willingness to perform for the indicated Offeror.
4. Provide all of the information requested in this RFP in the order specified.

5. Be organized into sections, following the exact format using all titles, subtitles, and numbering, with tabs separating each section described below. Each section must be addressed individually and pages must be numbered.
 - a. Transmittal Letter
See Section Six, Attachment 1, Offer Form OF-1.
 - b. Experience and Capabilities.
See Section 3.02 – Experience and Capabilities.
 - c. Technical Information:
 - i. Technical features, including conformity of equipment to desired specifications. Include in this section drawings, diagrams, etc. which illustrate technical and functional features of the hardware and systems.
 - ii. Additional features or benefits of equipment.
 - iii. Proven reliability of equipment.
 - iv. Ease of use of hardware and software.
 - v. Quality of field services and engineering assistance. Proposals shall include descriptions of training and test equipment to be supplied under the training items.
 - vi. Guarantees and factory service provided by the vendor.
 - vii. Financial stability of manufacturer and vendor.
 - viii. Typical production rate and delivery schedule, and time required to deliver based on quantity ordered
 - d. Pricing. Note that pricing should be effective for three (3) years from NTP. See Section Six, Attachment 2, Offer Form OF-2.
 - e. Exceptions.

3.02 EXPERIENCE AND CAPABILITIES

1. Offerors must demonstrate previously installed and operating equipment in other locations. Offerors unable to demonstrate this level of experience will not be considered for this project. As applicable, Offerors must include all existing documentation that shows the accuracy of these existing deployments. Documentation and testing done by third parties will be given greater weight than internal documentation and testing.
2. Indicate the number of years Offeror has been in business and the number of years Offeror has performed the type of services specified by this RFP.
3. For Offerer's submitting on the travel time monitoring equipment and software, include a list of key personnel and associated resumes for those who will be assigned to this project.
4. Offeror shall include a list of at least three (3) references from the Offeror's client listing that may be contacted by the State as to the Offeror's past and current job

performance. Offeror shall provide names, titles, organizations, telephone numbers, email and postal addresses. At least two of these references must be public sector transportation agencies.

5. Provide a summary listing of judgments or pending lawsuits or actions against; adverse contract actions, including termination(s), suspension, imposition of penalties, or other actions relating to failure to perform or deficiencies in fulfilling contractual obligations against your firm. If none, so state.
6. Provide a general description of the firm's financial condition and identify any conditions (e.g., bankruptcy, planned office closures, impending merger) that may impede Offeror's ability to complete the project.

3.03 DELIVERY SCHEDULE

Offeror shall submit anticipated delivery times for all proposed equipment after receipt of order. If delivery times vary by item, provide a list detailing delivery time for each item, or group of items.

3.04 PRICING

Refer to Section Six, Attachment 2, for Offer Form OF-2.

3.05 EXCEPTIONS

Offeror shall list any exceptions taken to the terms, conditions, specifications, or other requirements listed herein. Offeror shall reference the RFP section where exception is taken, a description of the exception taken, and the proposed alternative, if any. Absent any exception, Offeror represents compliance with every requirement of this RFP.

Offeror shall not substitute its organization's terms and conditions, standard contracts, or other agreements for HDOT provisions. General references to such items or attempts at complete substitution of such items may result in disqualification of Offeror's proposal. Offerors are encouraged to submit specific alternate language to HDOT's terms and conditions, if such changes are desired.

SECTION FOUR

EVALUATION CRITERIA

The evaluation of proposals received in response to the RFP will be conducted comprehensively, fairly and impartially. Structural, quantitative scoring techniques will be utilized to maximize the objectivity of the evaluation. The Evaluation Committee will evaluate each proposal in accordance with the criteria set forth below. The evaluation criteria and corresponding points are listed below. The award will be made to one or more responsive, responsible Offeror(s) whose proposal is determined to be the most advantageous to the State of Hawaii based on the evaluation criteria listed in this section.

The total number of points used to score each Category is 100.

Category I – Type I and Type II Dynamic Message Signs

- 1) Previous experience, and capability to supply the required equipment (10)
- 2) Strength of technical information (40).
- 3) Cost (40), calculated using the following formula:
$$[\text{Lowest cost proposal} \times 40 \text{ points (max.)}] / [\text{Offeror's Proposal Cost}] = \text{Points}$$

For the purposes of evaluation, quantities will be assumed to be one of each listed item. Cost of listed spare parts will not be a factor in the evaluation of proposals.
- 4) Proposal and Documentation (10)
 - a. Organization
 - b. Completeness
 - c. Readability

Category II – Video Encoders and Video Decoders

- 1) Previous experience, and capability to supply the required equipment (10)
- 2) Strength of technical information (40).
- 3) Cost (40), calculated using the following formula:
$$[\text{Lowest cost proposal} \times 40 \text{ points (max.)}] / [\text{Offeror's Proposal Cost}] = \text{Points}$$

For the purposes of evaluation, quantities will be assumed to be one of each listed item.

- 4) Proposal and Documentation (10)
 - a. Organization
 - b. Completeness
 - c. Readability

Category III – Travel Time Monitoring Equipment and Software

- 1) Previous experience, and capability to supply the required equipment (20)
- 2) Strength of technical information (35).
- 3) Cost (35), calculated using the following formula:

$$[\text{Lowest cost proposal} \times 35 \text{ points (max.)}] / [\text{Offeror's Proposal Cost}] = \text{Points}$$

For the purposes of evaluation, quantities will be assumed to be one of each listed item.

- 4) Proposal and Documentation (10)
 - a. Organization
 - b. Completeness
 - c. Readability

SECTION FIVE

SPECIAL PROVISIONS

5.01 SCOPE

All services for the Department of Transportation, Highways Division shall be in accordance with this RFP, including the special provisions in this section, the Scope of Work specified herein, and the General Conditions (GC), included by reference and available at the:

State of Hawaii
Department of Transportation
Contracts Office
869 Punchbowl Street
Honolulu, Hawaii 96813

5.02 RESPONSIBILITY OF OFFERORS

Offeror is advised that if awarded a contract under this solicitation, Offeror shall, upon award of the contract, furnish proof of compliance with the requirements of §103D-310(c), HRS:

1. Chapter 237, tax clearance;
2. Chapter 383, unemployment insurance;
3. Chapter 386, workers' compensation;
4. Chapter 392, temporary disability insurance;
5. Chapter 393, prepaid health care; and
6. Chapter 103D-310(c), Certificate of Good Standing (COGS) for entities doing business in the State.

Refer to the Award of Contract provision herein for instructions on furnishing the documents that are acceptable to the State as proof of compliance with the above-mentioned requirements.

5.03 OFFEROR QUALIFICATIONS

Offeror shall meet all of the qualifications required by this RFP. Failure to meet the qualifications as specified in Section 3.02, Experience and Capabilities, will likely have an adverse affect on Offeror's proposal evaluation.

5.04 TERM OF CONTRACT

Successful Offeror shall be required to enter into a formal written contract to commence work on this project.

The contract shall be for a period of thirty-six (36) months from the Contract Start Date (Notice to Proceed).

Unless terminated, the Contract shall be extended for not more than two (2) additional twelve (12) month periods without the necessity of re-bidding, upon mutual agreement in writing at least four (4) months prior to the expiration, provided that the contract price for the extended period shall remain the same or lower than the initial bid price.

5.05 CONTACT PERSON

For the purposes of this contract, Mr. Benson Chow, State of Hawaii Department of Transportation Highways Division, Traffic Branch, 601 Kamokila Boulevard, Room 602 Kapolei, Hawaii, 96707, Telephone: (808) 692-7676, Facsimile: (808) 692-7690, or authorized representative, is designated as the Contact Person for this contract.

5.06 OVERVIEW OF THE RFP PROCESS

- a. The RFP is issued pursuant to Subchapter 6 of HAR Chapter 3-122, implementing HRS Section 103D-303.
- b. The procurement process begins with the issuance of the RFP by HDOT and the formal response by HDOT to any written questions or inquiries regarding the RFP. Changes to the RFP will be made only by Addendum.
- c. Proposals shall not be opened publicly, but shall be opened in the presence of two (2) or more procurement officials. The register of proposals and Offerors' proposals shall be open to public inspection after posting of the award.

All proposals and other material submitted by Offerors become the property of the State and may be returned only at the State's option.

- d. The Procurement Officer, or an evaluation committee selected by the Procurement Officer, shall evaluate the proposals in accordance with the evaluation criteria in Section Four. The proposals shall be classified initially as acceptable, potentially acceptable, or unacceptable.
- e. Proposals may be accepted on evaluation without discussion. However, if deemed necessary, prior to entering into discussions, a "priority list" of responsible Offerors submitting acceptable and potentially acceptable proposals shall be generated. The priority list may be limited to a

minimum of three responsible Offerors who submitted the highest-ranked proposals. The objective of these discussions is to clarify issues regarding the Offeror's proposal before the BAFO is tendered.

- f. If there is a need for any substantial clarification or change in the RFP, the RFP shall be amended by an addendum to incorporate such clarification or change. Addenda to the RFP shall be distributed only to priority listed Offerors who submit acceptable or potentially acceptable proposals.
- g. Following any discussions, priority listed Offerors will be invited to submit their BAFO, if required. The Procurement Officer or an evaluation committee reserves the right to have additional rounds of discussions with the top three (3) priority listed Offerors prior to the submission of the BAFO. If Offeror does not submit a notice of withdrawal or a BAFO, the Offeror's immediate previous offer shall be construed as its BAFO proposals.
- h. After receipt and evaluation of the BAFOs in accordance with the evaluation criteria in Section Four, the Procurement Officer or an evaluation committee will make its recommendation. The Procurement Officer will award the contract to the Offeror whose proposal is determined to be the most advantageous to the State taking into consideration price and the evaluation factors set forth in Section Four.
- i. The contents of any proposal shall not be disclosed during the review, evaluation, discussion, or negotiation process. Once award notice is posted, all proposals, successful and unsuccessful, become available for public inspection. Those sections that the Offeror and the State agree are confidential and/or proprietary should be identified by the Offerors and shall be excluded from access.
- j. The Procurement Officer or an evaluation committee reserves the right to determine what is in the best interest of the State for purposes of reviewing and evaluating proposals submitted in response to the RFP. The Procurement Officer or an evaluation committee will conduct a comprehensive, fair and impartial evaluation of proposals received in response to the RFP.
- k. The RFP, any addenda issued, and the successful Offeror's proposal shall become a part of the contract. All proposals shall become the property of the State of Hawaii.

5.07 CONFIDENTIAL INFORMATION

If a person believes that any portion of a proposal, offer, specification, protest, or correspondence contains information that should be withheld as confidential, then the Procurement Officer named on the cover of this RFP should be so advised in writing and provided with justification to support a confidentiality claim. Price is not considered confidential and will not be withheld.

An Offeror shall request in writing nondisclosure of designated trade secrets or other proprietary data considered confidential. Such data shall accompany the proposal, be clearly marked, and shall be readily separable from the proposal in order to facilitate eventual public inspection of the non-confidential portion of the proposal.

Pursuant to HAR Section 3-122-58, the head of the purchasing agency or designee shall consult with the Attorney General and make a written determination in accordance with HRS Chapter 92F. If the request for confidentiality is denied, such information shall be disclosed as public information, unless the person appeals the denial to the Office of Information Practices in accordance with HRS Section 92F-42(12).

5.08 REQUIRED REVIEW

Offeror shall carefully review this solicitation for defects and questionable or objectionable matter. Comments concerning defects and questionable or objectionable matter **must be made in writing and should be received by the State of Hawaii, Department of Transportation, Highways Division, prior to the deadline for written questions as stated in the RFP Schedule and Significant Dates.** This will allow issuance of any necessary corrections and/or amendments to the RFP. It will help prevent the opening of a defective solicitation and exposure of Offeror's proposal upon which award could not be made. Any exceptions taken to the terms, conditions, specifications, or other requirements listed herein, must be listed in the *Exceptions* section of the Offeror's proposal, if the exception is unresolved by the Proposal Due date.

5.09 QUESTIONS PRIOR TO OPENING OF PROPOSALS

A prospective Offeror may submit a request, in writing, to the Contact person identified in Section 5.05 for clarification or interpretation of any aspect of this request for proposal. If it should appear to a prospective Offeror that the performance of the work under the request for proposal, or any matter relating thereto, is not sufficiently described or explained in this request for proposals, or that any conflict or inconsistency exists between different parts of this proposal is in conflict with Federal, State, or County law, statutes, ordinance, rules, or regulations, then the prospective Offeror shall submit a request for clarification. No responses will be made to oral inquiries. Written requests for clarification or interpretation of this request for proposal may be submitted by facsimile number (808) 692-7690 or sent to the following:

State of Hawaii Department of Transportation
Highways Division/Traffic Branch
601 Kamokila Blvd., Rm. #602
Kapolei, HI 96707
Attn: Benson Chow

5.10 CANCELLATION OF RFP AND PROPOSAL REJECTION

The State reserves the right to cancel this RFP and to reject any and all proposals in whole or in part when it is determined to be in the best interest of the State, pursuant to HAR Section 3-122-96 through 3-122-97.

5.11 PROPOSAL AS PART OF THE CONTRACT

This RFP and all or part of the successful proposal will be incorporated into the contract.

5.12 CONTRACT MODIFICATIONS - UNANTICIPATED AMENDMENTS

During the course of this contract, the Contractor may be required to perform additional work that will be within the general scope of the initial contract. When additional work is required, the Engineer will provide the Contractor a written description of the additional work and request the Contractor to submit a firm time schedule for accomplishing the additional work and a firm price for the additional work.

Changes to the contract may be modified only by written document (contract modification) signed by the State of Hawaii, Department of Transportation, Highways Division and Contractor personnel authorized to sign contracts on behalf of the Contractor.

The Contractor will not commence additional work until a signed contract modification has been issued.

5.13 PROTEST

A protest shall be submitted in writing within five (5) working days after the aggrieved person knows or should have known of the facts giving rise thereto; provided that a protest based upon the content of the solicitation shall be submitted in writing prior to the date set for receipt of offers. Further provided that a protest of an award or proposed award shall be submitted within five (5) working days after the posting of award of the contract.

The notice of award, if any, resulting from this solicitation shall be posted on the Procurement Reporting System, which is available on the SPO website: <http://www.hawaii.gov/spo2/source/>.

Any protest pursuant to §103D-701, HRS, and Section 3-126-3, HAR, shall be submitted in writing to the Contact Person listed in Section 5.05.

5.14 GOVERNING LAW: COST OF LITIGATION

The validity of this contract and any of its terms or provisions, as well as the rights and duties of the parties to this contract, shall be governed by the laws of the State of Hawaii. Any action of law or equity to enforce or interpret the provisions of this contract shall be brought in a state court or competent jurisdiction in Honolulu, Hawaii.

In case the State shall, without any fault on its part, be made a part to any litigation commenced by or against the Contractor in connection with this contract, the Contractor, shall pay all costs and expenses incurred by or imposed on the State, including attorneys' fees.

5.15 SUBMISSION OF PROPOSAL

The submission of a proposal shall constitute an incontrovertible representation by the Offeror of compliance with every requirement of the RFP, and that the RFP documents are sufficient in scope and detail to indicate and convey reasonable understanding of all terms and conditions of performance of the work.

Before submitting a proposal, each Offeror must:

- a. Examine the solicitation documents thoroughly. Solicitation documents include this RFP, any attachments, plans referred to herein, and any other relevant documents;
- b. Become familiar with State, local, and federal laws, statutes, ordinances, rules, and regulations that may in any manner affect cost, progress, or performance of the work.

5.16 PROPOSAL PREPARATION

- a. **OFFER FORM, page OF-1.** See Attachment 1. Proposals shall be submitted using Offeror's exact legal name as registered with the Department of Commerce and Consumer Affairs, if applicable; and to indicate exact legal name in the appropriate spaces on Offer Form page OF-1. Failure to do so may delay proper execution of the contract.

The authorized signature on the first page of the Offer Form shall be an original signature in ink. If unsigned or the affixed signature is a facsimile or a photocopy, the offer shall be automatically rejected unless accompanied by other material, containing an original signature, indicating the Offeror's intent to be bound.

- b. **Offer Guaranty.** An offer guaranty is NOT required for this RFP.
- c. **Tax Liability.** Work to be performed under this solicitation is a business activity taxable under HRS Chapter 237, and if applicable, taxable under HRS Chapter 238. Vendors are advised that they are liable for the Hawaii

GET at the current 4.712% rate and the applicable use tax at the current 1/2% rate. If, however, an Offeror is a person exempt by the HRS from paying the GET and therefore not liable for the taxes on this solicitation, Offeror shall state its tax exempt status and cite the HRS chapter or section allowing the exemption.

- d. **Taxpayer Preference.** For evaluation purposes, pursuant to HRS §103D-1008, the Offeror's tax-exempt price offer submitted in response to an IFB shall be increased by the applicable retail rate of general excise tax and the applicable use tax. Under no circumstance shall the dollar amount of the award include the aforementioned adjustment.

- e. **Original Proposal and Copies to be Submitted.** Offeror shall submit one original proposal marked "ORIGINAL" and six **copies** of the original marked "COPY". It is imperative to note that the Offeror submit only one original and the required number of copies. DO NOT SUBMIT MORE THAN ONE ORIGINAL.

Offeror is encouraged to submit typewritten offers. If handwritten, it should be clearly printed. Offeror is cautioned that illegible offers or any items within an offer may be automatically rejected to avoid any errors in interpretation by the reviewers during the evaluation process.

Offeror shall also submit one electronic copy, in a format readable by Adobe Reader, on a CD.

- f. Costs for developing the Proposal are solely the responsibility of the Offeror, whether or not any award results from this solicitation. The State of Hawaii will not reimburse such costs.
- g. All proposals become the property of the State of Hawaii.
- h. Copies of documents transmitted by Offerors via facsimile machines shall be limited to the modifications or withdrawal of an offer pursuant to HAR Sections 3-122-108 and 3-122-28, respectively.

5.17 SUBMISSION OF PROPOSAL

All requests shall be submitted no later than 2:00 P.M., Hawaii Standard Time (HST), on the date specified in Section 1.04, RFP Schedule and Significant Dates, or as amended. Offers shall be received at the following:

State of Hawaii
Department of Transportation
Contracts Office
869 Punchbowl Street
Honolulu, Hawaii 96813

Timely receipt of offers shall be evidenced by the date and time registered by the State of Hawaii, Department of Transportation, Contracts Office. Offers received after the deadline shall be returned unopened.

If the Offeror chooses to deliver its offer by United States Postal Service (USPS), please be aware that the USPS does not deliver directly to the State of Hawaii, Department of Transportation, Contracts Office, but to a central mailroom. This may cause a delay in receipt by the State of Hawaii, Department of Transportation, Contracts Office and the offer may reach the State of Hawaii, Department of Transportation, Contracts Office after the deadline, resulting in automatic rejection.

5.18 PRICING

Pricing shall include labor, materials, supplies, all applicable taxes, **except the GET, currently 4.712%, which may be added as a separate line item and shall not exceed the current rate**, and any other costs incurred to provide the specified services.

The pricing shall be the all-inclusive cost, except the GET, to the State and no other costs will be honored.

5.19 ECONOMY OF PRESENTATION

Proposals shall be prepared in a straightforward and concise manner, in a format that is reasonably consistent and appropriate for the purpose. Emphasis will be on completeness and clarity and content. If any additional information is required by the State regarding any aspects of the Offeror's proposal, it shall be provided within four (4) business days.

5.20 PROPOSAL OPENING

Proposals will be opened at the date, time, and place specified in Section One, or as amended. Proposals shall not be opened publicly, but shall be opened in the presence of two or more procurement officials. The register of proposals and Offeror's proposals shall be open to public inspection after all parties sign the contract.

5.21 EVALUATION OF PROPOSALS

The Procurement Officer, or an evaluation committee of at least three (3) qualified state employees selected by the Procurement Officer shall evaluate proposals. The evaluation will be based solely on the evaluation criteria set out in Section Four of this RFP.

Proposals shall be classified initially as acceptable, potentially acceptable, or unacceptable. Discussion may be conducted with priority listed Offerors who submit proposals determined to be acceptable or potentially acceptable of being

selected for award, but proposals may be accepted without such discussions. The objective of these discussions is to clarify issues regarding the Offeror's proposals before the best and final offer, if necessary.

If numerous acceptable and potentially acceptable proposals are submitted, the evaluation committee may rank the proposals and limit the priority list to three responsive, responsible offerors who submitted the highest-ranked proposals.

5.22 DISCUSSION WITH PRIORITY LISTED OFFERORS

Priority listed offerors may have a discussion with the evaluation committee to discuss their proposal to ensure thorough, mutual understanding. The State in its sole discretion shall schedule the time and location for these discussions, normally within the timeframe indicated in Section 1.04, RFP Schedule and Significant Dates.

5.23 CANCELLATION OF RFP AND PROPOSAL REJECTION

The State reserves the right to cancel this RFP and to reject any and all proposals in whole or in part when it is determined to be in the best interest of the State, pursuant to HAR Section 3-122-96 through 3-122-97.

The State shall not be liable for any costs, expenses, loss of profits or damages whatsoever, incurred by the Offeror in the event this RFP is cancelled or a proposal is rejected.

5.24 ADDITIONAL TERMS AND CONDITIONS

The State reserves the right to add terms and conditions during the contract negotiations. These terms and conditions will be within the scope of the RFP and will not affect the proposal evaluation.

5.25 CONTRACT EXECUTION

Successful Offeror receiving award shall enter into a formal written contract. No performance or payment bond is required for this contract.

No work is to be undertaken by the Contractor prior to the commencement date. The State of Hawaii is not liable for any work, contract, costs, expenses, loss of profits, or any damages whatsoever incurred by the Contractor prior to the official starting date.

If an option to extend is mutually agreed upon, the Contractor shall be required to execute a supplement to the contract for the additional extension period.

5.26 PAYMENT

Payments for the equipment shall be made to the awarded Offeror(s) on a per unit basis, upon receipt of invoices that meet the expectations of the RFP. The Contractor shall submit invoices on a monthly basis. If services are provided then each invoice must include a progress report, names and titles of the staff that performed the work, number of hours spent on each task, hourly rates and receipt for each expense on the project. Payment will not be made if the documentation is not provided with the invoice.

HRS Section 103-10, provides that the State shall have thirty (30) calendar days after receipt of invoice or satisfactory completion of contract to make payment. For this reason, the State will reject any offer submitted with a condition requiring payment within a shorter period. Further, the State will reject any offer submitted with a condition requiring interest payments greater than that allowed by HRS §103-10, as amended.

The State will not recognize any requirement established by the Contractor and communicated to the State after award of the contract, which requires payment within a shorter period or interest payment not in conformance with statute.

5.27 AWARD

Method of Award. The award will be made to the responsive, responsible Offeror whose proposal is determined to be the most advantageous to the State based on the evaluation criteria.

Responsibility of Lowest Responsive Offeror. Reference HRS Chapter 103D-310(c). If compliance documents have not been submitted to the State of Hawaii, Department of Transportation, Highways Division, prior to award, the lowest responsive offeror shall produce documents to the procurement officer to demonstrate compliance with this section.

HRS Chapter 237 tax clearance requirement for award. Instructions are as follows:

Pursuant to HRS §103D-328, lowest responsive Offeror shall be required to submit a tax clearance certificate issued by the Hawaii State Department of Taxation (DOTAX) and the Internal Revenue Service (IRS). The certificate shall have an original green certified copy stamp and shall be valid for six (6) months from the most recent approval stamp date on the certificate. It must be valid on the date it is received by the State of Hawaii, Department of Transportation, Highways Division.

The tax clearance certificate shall be obtained on the State of Hawaii, DOTAX *TAX CLEARANCE APPLICATION* Form A-6 (Rev. 2003) which is available at the DOTAX and IRS offices in the State of Hawaii or the DOTAX website, and by mail or fax:

DOTAX Website (Forms & Information):
http://www.hawaii.gov/tax/a1_1alphalist.htm

DOTAX Forms by Fax/Mail: (808) 587-7572
1-800-222-7572

Completed tax clearance applications may be mailed, faxed, or submitted in person to the Department of Taxation, Taxpayer Services Branch, to the address listed on the application. Facsimile numbers are:

DOTAX: (808) 587-1488
IRS: (808) 539-1573

The application for the clearance is the responsibility of the Offeror, and must be submitted directly to the DOTAX or IRS and not to the State of Hawaii, Department of Transportation, Highways Division. However, the tax clearance certificate shall be submitted to the State of Hawaii, Department of Transportation, Highways Division.

HRS Chapters 383 (Unemployment Insurance), 386 (Workers' Compensation), 392 (Temporary Disability Insurance), and 393 (Prepaid Health Care) requirements for award.

Instructions are as follows:

Pursuant to HRS §103D-310(c), the lowest responsive Offeror shall be required to submit a certificate of compliance issued by the Hawaii State Department of Labor and Industrial Relations (DLIR). The certificate is valid for six (6) months from the date of issue and must be valid on the date it is received by the State of Hawaii, Department of Transportation, Highways Division. A photocopy of the certificate is acceptable to the State of Hawaii, Department of Transportation, Highways Division.

The certificate of compliance shall be obtained on the State of Hawaii, DLIR *APPLICATION FOR CERTIFICATE OF COMPLIANCE WITH HAR SECTION 3-122-112*, Form LIR#27 which is available at <http://hawaii.gov/labor/formsall.shtml> or at the neighbor island DLIR District Offices. The DLIR will return the form to the Offeror who in turn shall submit it to the State of Hawaii, Department of Transportation, Highways Division.

The application for the certificate is the responsibility of the Offeror, and must be submitted directly to the DLIR and not to the State of Hawaii, Department of Transportation, Highways Division. However, the certificate shall be submitted to the State of Hawaii, Department of Transportation, Highways Division.

Compliance with Section 103D-310(c), HRS, for an entity doing business in the State. The lowest responsive Offeror shall be required to submit a *CERTIFICATE OF GOOD STANDING* (Certificate) issued by the State of Hawaii Department of Commerce and Consumer Affairs Business Registration Division (BREG). The Certificate is valid for six months from date of issue and must be valid on the date it is received by the State of Hawaii, Department of

Transportation, Highways Division. A photocopy of the certificate is acceptable to the State of Hawaii, Department of Transportation, Highways Division.

To obtain the Certificate, the Offeror must first be registered with the BREG. A sole proprietorship, however, is not required to register with the BREG, and therefore not required to submit the certificate.

On-line business registration and the Certificate are available at www.BusinessRegistrations.com. To register or to obtain the Certificate by phone, call (808) 586-2727 (M-F 7:45 to 4:30 HST). Offerors are advised that there are costs associated with registering and obtaining the Certificate.

Final Payment Requirements. Contractor is required to submit a tax clearance certificate for final payment on the contract. A tax clearance certificate, not over two months old, with an original green certified copy stamp, must accompany the invoice for final payment on the contract.

In addition to the tax clearance certificate, an original "Certification of Compliance for Final Payment" (SPO Form-22), attached, will be required for final payment. A copy of the Form is also available at www.spo.hawaii.gov. Select "Forms for Vendors/Contractors" menu.

Hawaii Compliance Express. Alternately, instead of separately applying for these paper certificates at the various state agencies, vendors may choose to use the Hawaii Compliance Express (HCE), which allows businesses to register online through a simple wizard interface at <http://vendors.ehawaii.gov> to acquire a "Certificate of Vendor Compliance." The HCE provides current compliance status as of the issuance date. The "Certificate of Vendor Compliance" indicating that vendor's status is compliant with the requirements of HRS Chapter 103D-310(c), shall be accepted for both contracting purposes and final payment. Vendors that elect to use the new HCE services will be required to pay an annual fee of \$15.00 to the Hawaii Information Consortium, LLC (HIC). Vendors choosing not to participate in the HCE program will be required to provide the paper certificates as instructed in the prior sections.

Timely Submission of all Certificates. The above certificates should be applied for and submitted to the State of Hawaii Department of Transportation, Highways Division, as soon as possible. If a valid certificate is not submitted on a timely basis for award of a contract, an offer otherwise responsive and responsible may not receive the award.

5.28 SUBCONTRACTING

No work or services shall be subcontracted or assigned without the prior written approval of the State. No subcontract shall under any circumstances relieve the Contractor of his/her obligations and liability under this contract with the State. All persons engaged in performing the work covered by the contract shall be considered employees of the Contractor.

5.29 CONTRACT INVALIDATION

If any provision of this contract is found to be invalid, such invalidation will not be construed to invalidate the entire contract.

5.30 NON-DISCRIMINATION

The Contractor shall comply with all applicable federal and state laws prohibiting discrimination against any person on the grounds of race, color, national origin, religion, creed, sex, age, sexual orientation, marital status, handicap, or arrest and court records in employment and any condition of employment with the Contractor or in participation in the benefits of any program or activity funded in whole or in part by the State.

5.31 CONFLICTS OF INTEREST

The Contractor represents that neither the Contractor, nor any employee or agent of the Contractor, presently has any interest, and promises that no such interest, direct or indirect, shall be acquired, that would or might conflict in any manner or degree with the Contractor's performance of this contract.

5.32 WAIVER

The failure of the State to insist upon the strict compliance with any term, provision or condition of this contract shall not constitute or be deemed to constitute a waiver or relinquishment of the State's right to enforce the same in accordance with this contract.

5.33 SEVERABILITY

In the event that any provision of this contract is declared invalid or unenforceable by a court, such invalidity or unenforceability shall not affect the validity or enforceability of the remaining terms of this contract.

5.34 CAMPAIGN CONTRIBUTIONS BY STATE AND COUNTY CONTRACTORS

It has been determined that funds for this contract have been appropriated by a legislative body.

Therefore, Offeror, if awarded a contract in response to this solicitation, agrees to comply with HRS Section 11-205.5, which states that campaign contributions are prohibited from a State and county government contractor during the term of the contract if the contractor is paid with funds appropriated by a legislative body.

5.35 ADDITIONS, AMENDMENTS AND CLARIFICATIONS

Approvals. Any agreement arising out of this offer may be subject to the approval of the Department of the Attorney General as to form, and is subject to all further approvals, including the approval of the Governor, required by statute, regulation, rule, order, or other directive.

Cancellation of Solicitations and Rejection of Offers. The solicitation may be cancelled or the offers may be rejected, in whole or in part, when in the best interest of the purchasing agency, as provided in HAR §§3-122-95 through 3-122-97.

Confidentiality of Material. All material given to or made available to the Contractor by virtue of this contract, which is identified as proprietary or confidential information, will be safeguarded by the CONTRACTOR and shall not be disclosed to any individual or organization without the prior written approval of the STATE.

All information, data, or other material provided by the Offeror or the Contractor to the State shall be subject to the Uniform Information Practices Act, HRS chapter 92F. The Offeror shall designate in writing to the Procurement Officer those portions of its unpriced offer or any subsequent submittal that are trade secrets or other proprietary data that the Offeror desires to remain confidential, subject to HAR §3-122-58, in the case of an RFP, or HAR §3-122-30, in the case of an IFB. The Offeror shall state in its written communication to the Procurement Officer, the reason(s) for designating the material as confidential, for example, trade secrets. The Offeror shall submit the material designated as confidential in such manner that the material is readily separable from the offer in order to facilitate inspection of the non-confidential portion of the offer.

Price is not confidential and will not be withheld. In addition, in the case of an IFB, makes and models, catalogue numbers of items offered, deliveries, and terms of payment shall be publicly available at the time of opening regardless of any designation to the contrary.

If a request is made to inspect the confidential material, the inspection shall be subject to written determination by the Department of the Attorney General in accordance with HRS chapter 92F. If it is determined that the material designated as confidential is subject to disclosure, the material shall be open to public inspection, unless the Offeror protests under HAR chapter 3-126. If the request to inspect the confidential material is denied, the decision may be appealed to the Office of Information Practices in accordance with HRS §92F-15.5.

Nondiscrimination. No person performing work under this Agreement, including any subcontractor, employee, or agency of the Contractor, shall engage in any discrimination that is prohibited by any applicable federal, state, or county law.

Records Retention. The Contractor and any subcontractors shall maintain the books and records that relate to the Agreement and any cost or pricing data for three (3) years from the date of final payment under the Agreement.

Correctional Industries. Goods and services available through Hawaii Correctional Industries (HCI) programs may be the same or similar to those awarded by competitive sealed bids or proposals. Agencies participating in State of Hawaii, Department of Transportation, Highways Division, requirements (price list) contracts may also procure directly from CI and shall not be considered in violation of the terms and conditions of any State of Hawaii, Department of Transportation, Highways Division, contract.

Competency of Offeror. Prospective Offeror must be capable of performing the work for which offers are being called. Either before or after the deadline for an offer, the purchasing agency may require Offeror to submit answers to questions regarding facilities, equipment, experience, personnel, financial status or any other factors relating to the ability of the Offeror to furnish satisfactorily the goods or services being solicited by the STATE. Any such inquiries shall be made and replied to in writing; replies shall be submitted over the signatures of the person who signs the offer. Any Offeror who refuses to answer such inquiries will be considered non-responsive.

Preparation of Offer. An Offeror may submit only one offer in response to a solicitation. If an Offeror submits more than one offer in response to a solicitation, then all such offers shall be rejected. Similarly, an Offeror may submit only one offer for each line item (if any) of a solicitation. If an Offeror submits more than one offer per line item, then all offers for that line item shall be rejected.

SECTION SIX

ATTACHMENTS AND EXHIBITS

- Attachment 1: OFFER FORM, OF-1
- Attachment 2: OFFER FORM, OF-2
- Attachment 3: CERTIFICATE OF COMPLIANCE FOR FINAL PAYMENT
- Attachment 4: SAMPLE CONTRACT FORMS
- Attachment 5: HDOT DESIGN CRITERIA FOR BRIDGES AND STRUCTURES

**OFFER FORM
OF-1**

ITS TECHNOLOGY PROCUREMENT
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
FAP # IM-0300(114)

State of Hawaii, Department of Transportation, Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned has carefully read and understands the terms and conditions specified in the RFP including the Specifications and Special Provisions attached hereto, and in the General Conditions, by reference made a part hereof and available upon request; and hereby submits the following offer to perform the work specified herein, all in accordance with the true intent and meaning thereof. The undersigned further understands and agrees that by submitting this offer, 1) he/she is declaring his/her offer is not in violation of Chapter 84, Hawaii Revised Statutes, concerning prohibited State contracts, and 2) he/she is certifying that the price(s) submitted was (were) independently arrived at without collusion.

Offeror is:

☐ Sole Proprietor ☐ Partnership ☐ *Corporation ☐ Joint Venture
☐ Other _____

*State of incorporation: _____

Hawaii General Excise Tax License I.D. No. _____

Payment address (other than street address below): _____
City, State, Zip Code: _____

Business address (street address): _____
City, State, Zip Code: _____

Respectfully submitted:

Date: _____ (x) _____
Authorized (Original) Signature

Telephone No.: _____
Fax No.: _____
Name and Title (Please Type or Print)

E-mail Address: _____
** _____
Exact Legal Name of Company (Offeror)

**If Offeror is a "dba" or a "division" of a corporation, furnish the exact legal name of the corporation under which the awarded contract will be executed:

ATTACHMENT 1

**OFFER FORM
OF-2**

[illegible]

Note: Pricing shall include labor, materials, supplies, all applicable taxes, and any other costs incurred to provide the specified equipment and services.

Offeror _____
Name of Company _____

**OFFER FORM
OF-2**

[illegible]

Note: Pricing shall include labor, materials, supplies, all applicable taxes, and any other costs incurred to provide the specified equipment and services.

Offeror _____
Name of Company _____

**OFFER FORM
OF-2**

[illegible]

Note: Pricing shall include labor, materials, supplies, all applicable taxes, and any other costs incurred to provide the specified equipment and services.

Offeror _____
Name of Company _____

CERTIFICATION OF COMPLIANCE FOR FINAL PAYMENT
(Reference §3-122-112, HAR)

Reference: _____
(Contract Number) (IFB/RFP Number)

_____ affirms it is in
(Company Name)
compliance with all laws, as applicable, governing doing business in the State of Hawaii
to include the following:

1. Chapter 383, HRS, Hawaii Employment Security Law – Unemployment Insurance;
2. Chapter 386, HRS, Worker's Compensation Law;
3. Chapter 392, HRS, Temporary Disability Insurance;
4. Chapter 393, HRS, Prepaid Health Care Act; and

maintains a "Certificate of Good Standing" from the Department of Commerce and Consumer Affairs, Business Registration Division.

Moreover, _____
(Company Name)
acknowledges that making a false statement shall cause its suspension and may cause its debarment from future awards of contracts.

Signature: _____

Print Name: _____

Title: _____

Date: _____

ATTACHMENT 3



STATE OF HAWAII
CONTRACT FOR GOODS OR SERVICES
BASED UPON
COMPETITIVE SEALED PROPOSALS

This Contract, executed on the respective dates indicated below, is effective as of _____, between _____,
(Insert name of state department, agency, board or commission)
State of Hawaii ("STATE"), by its _____,
(Insert title of person signing for State)
(hereafter also referred to as the HEAD OF THE PURCHASING AGENCY or designee ("HOPA")),
whose address is _____ and _____
("CONTRACTOR"), a _____
(Insert corporation, partnership, joint venture, sole proprietorship, or other legal form of the Contractor)
under the laws of the State of _____, whose business address and federal
and state taxpayer identification numbers are as follows: _____

RECITALS

A. The STATE desires to retain and engage the CONTRACTOR to provide the goods or services, or both, described in this Contract and its attachments, and the CONTRACTOR is agreeable to providing said goods or services or both.

B. The STATE has issued a request for competitive sealed proposals, and has received and reviewed proposals submitted in response to the request.

C. The solicitation for proposals and the selection of the CONTRACTOR were made in accordance with section 103D-303, Hawaii Revised Statutes ("HRS"), Hawaii Administrative Rules, Title 3, Department of Accounting and General Services, Subtitle 11 ("HAR"), Chapter 122, Subchapter 6, and applicable procedures established by the appropriate Chief Procurement Officer ("CPO").

D. The CONTRACTOR has been identified as the responsible and responsive offeror whose proposal is the most advantageous for the STATE, taking into consideration price and the evaluation factors set forth in the request.

E. Pursuant to _____, the STATE
(Legal authority to enter into this Contract)
is authorized to enter into this Contract.

F. Money is available to fund this Contract pursuant to:

(1) _____
(Identify state sources)

or (2) _____
(Identify federal sources)

or both, in the following amounts: State \$ _____
Federal \$ _____

NOW, THEREFORE, in consideration of the promises contained in this Contract, the STATE and the CONTRACTOR agree as follows:

1. Scope of Services. The CONTRACTOR shall, in a proper and satisfactory manner as determined by the STATE, provide all the goods or services, or both, set forth in the request for competitive sealed proposals number _____ ("RFP") and the CONTRACTOR'S accepted proposal ("Proposal"), both of which, even if not physically attached to this Contract, are made a part of this Contract.

2. Compensation. The CONTRACTOR shall be compensated for goods supplied

or services performed, or both, under this Contract in a total amount not to exceed _____ DOLLARS

(\$ _____), including approved costs incurred and taxes, at the time and in the manner set forth in the RFP and CONTRACTOR'S Proposal.

3. Time of Performance. The services or goods required of the CONTRACTOR under this Contract shall be performed and completed in accordance with the Time of Performance set forth in Attachment-S3, which is made a part of this Contract.

4. Bonds. The CONTRACTOR ☐ is required to provide or ☐ is not required to provide: ☐ a performance bond, ☐ a payment bond, ☐ a performance and payment bond in the amount of _____ DOLLARS (\$ _____).

5. Standards of Conduct Declaration. The Standards of Conduct Declaration of the CONTRACTOR is attached to and made a part of this Contract.

6. Other Terms and Conditions. The General Conditions and any Special Conditions are attached to and made a part of this Contract. In the event of a conflict between the General Conditions and the Special Conditions, the Special Conditions shall control. In the event of a conflict among the documents, the order of precedence shall be as follows: (1) this Contract, including all attachments and addenda; (2) the RFP, including all attachments and addenda; and (3) the Proposal.

7. Liquidated Damages. Liquidated damages shall be assessed in the amount of _____ DOLLARS (\$ _____) per day, in accordance with the terms of paragraph 9 of the General Conditions.

8. Notices. Any written notice required to be given by a party to this Contract shall be (a) delivered personally, or (b) sent by United States first class mail, postage prepaid. Notice to the STATE shall be sent to the HOPA'S address indicated in the Contract. Notice to the CONTRACTOR shall be sent to the CONTRACTOR'S address indicated in the Contract. A notice shall be deemed to have been received three (3) days after mailing or at the time of actual receipt, whichever is earlier. The CONTRACTOR is responsible for notifying the STATE in writing of any change of address.

IN VIEW OF THE ABOVE, the parties execute this Contract by their signatures, on the dates below, to be effective as of the date first above written.

STATE

(Signature)

(Print Name)

(Print Title)

(Date)

CONTRACTOR

(Name of Contractor)

(Signature)

(Print Name)

(Print Title)

(Date)

CORPORATE SEAL
(If available)

APPROVED AS TO FORM:

Deputy Attorney General

* Evidence of authority of the CONTRACTOR'S representative to sign this Contract for the CONTRACTOR must be attached.



STATE OF HAWAII

CONTRACTOR'S ACKNOWLEDGMENT

STATE OF _____)
) SS.
_____ COUNTY OF _____)

On this _____ day of _____, _____ before me appeared
_____ and _____, to me
known, to be the person(s) described in and, who, being by me duly sworn, did say that he/she/they is/are
_____ and _____ of
_____, the
CONTRACTOR named in the foregoing instrument, and that he/she/they is/are authorized to sign said
instrument on behalf of the CONTRACTOR, and acknowledges that he/she/they executed said
instrument as the free act and deed of the CONTRACTOR.

(Notary Stamp or Seal)

(Signature)

(Print Name)

Notary Public, State of _____

My commission expires: _____

Doc. Date: _____ # Pages: _____

Notary Name: _____ Circuit _____

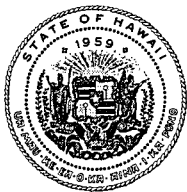
Doc. Description: _____

(Notary Stamp or Seal)

Notary Signature

Date

NOTARY CERTIFICATION



STATE OF HAWAII

CONTRACTOR'S STANDARDS OF CONDUCT DECLARATION

For the purposes of this declaration:

"Agency" means and includes the State, the legislature and its committees, all executive departments, boards, commissions, committees, bureaus, offices; and all independent commissions and other establishments of the state government but excluding the courts.

"Controlling interest" means an interest in a business or other undertaking which is sufficient in fact to control, whether the interest is greater or less than fifty per cent (50%).

"Employee" means any nominated, appointed, or elected officer or employee of the State, including members of boards, commissions, and committees, and employees under contract to the State or of the constitutional convention, but excluding legislators, delegates to the constitutional convention, justices, and judges. (Section 84-3, HRS).

On behalf of _____, CONTRACTOR, the undersigned does declare as follows:

1. CONTRACTOR ☐ is ☐ is not a legislator or an employee or a business in which a legislator or an employee has a controlling interest. (Section 84-15(a), HRS).
2. CONTRACTOR has not been represented or assisted personally in the matter by an individual who has been an employee of the agency awarding this Contract within the preceding two years and who participated while so employed in the matter with which the Contract is directly concerned. (Section 84-15(b), HRS).
3. CONTRACTOR has not been assisted or represented by a legislator or employee for a fee or other compensation to obtain this Contract and will not be assisted or represented by a legislator or employee for a fee or other compensation in the performance of this Contract, if the legislator or employee had been involved in the development or award of the Contract. (Section 84-14 (d), HRS).
4. CONTRACTOR has not been represented on matters related to this Contract, for a fee or other consideration by an individual who, within the past twelve (12) months, has been an agency employee, or in the case of the Legislature, a legislator, and participated while an employee or legislator on matters related to this Contract. (Sections 84-18(b) and (c), HRS).

CONTRACTOR understands that the Contract to which this document is attached is voidable on behalf of the STATE if this Contract was entered into in violation of any provision of chapter 84, Hawaii Revised Statutes, commonly referred to as the Code of Ethics, including the provisions which are the source of the declarations above. Additionally, any fee, compensation, gift, or profit received by any person as a result of a violation of the Code of Ethics may be recovered by the STATE.

*** Reminder to Agency:** If the "is" block is checked and if the Contract involves goods or services of a value in excess of \$10,000, the Contract must be awarded by competitive sealed bidding under section 103D-302, HRS, or a competitive sealed proposal under section 103D-303, HRS. Otherwise, the Agency may not award the Contract unless it posts a notice of its intent to award it and files a copy of the notice with the State Ethics Commission. (Section 84-15(a), HRS).

CONTRACTOR

By _____

(Signature)

Print Name _____

Print Title _____

Name of Contractor _____

Date _____

GENERAL CONDITIONS

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GENERAL CONDITIONS

1. Coordination of Services by the STATE. The head of the purchasing agency ("HOPA") (which term includes the designee of the HOPA) shall coordinate the services to be provided by the CONTRACTOR in order to complete the performance required in the Contract. The CONTRACTOR shall maintain communications with HOPA at all stages of the CONTRACTOR'S work, and submit to HOPA for resolution any questions which may arise as to the performance of this Contract. "Purchasing agency" as used in these General Conditions means and includes any governmental body which is authorized under chapter 103D, HRS, or its implementing rules and procedures, or by way of delegation, to enter into contracts for the procurement of goods or services or both.
2. Relationship of Parties: Independent Contractor Status and Responsibilities, Including Tax Responsibilities.
 - a. In the performance of services required under this Contract, the CONTRACTOR is an "independent contractor," with the authority and responsibility to control and direct the performance and details of the work and services required under this Contract; however, the STATE shall have a general right to inspect work in progress to determine whether, in the STATE'S opinion, the services are being performed by the CONTRACTOR in compliance with this Contract. Unless otherwise provided by special condition, it is understood that the STATE does not agree to use the CONTRACTOR exclusively, and that the CONTRACTOR is free to contract to provide services to other individuals or entities while under contract with the STATE.
 - b. The CONTRACTOR and the CONTRACTOR'S employees and agents are not by reason of this Contract, agents or employees of the State for any purpose, and the CONTRACTOR and the CONTRACTOR'S employees and agents shall not be entitled to claim or receive from the State any vacation, sick leave, retirement, workers' compensation, unemployment insurance, or other benefits provided to state employees.
 - c. The CONTRACTOR shall be responsible for the accuracy, completeness, and adequacy of the CONTRACTOR'S performance under this Contract. Furthermore, the CONTRACTOR intentionally, voluntarily, and knowingly assumes the sole and entire liability to the CONTRACTOR'S employees and agents, and to any individual not a party to this Contract, for all loss, damage, or injury caused by the CONTRACTOR, or the CONTRACTOR'S employees or agents in the course of their employment.
 - d. The CONTRACTOR shall be responsible for payment of all applicable federal, state, and county taxes and fees which may become due and owing by the CONTRACTOR by reason of this Contract, including but not limited to (i) income taxes, (ii) employment related fees, assessments, and taxes, and (iii) general excise taxes. The CONTRACTOR also is responsible for obtaining all licenses, permits, and certificates that may be required in order to perform this Contract.
 - e. The CONTRACTOR shall obtain a general excise tax license from the Department of Taxation, State of Hawaii, in accordance with section 237-9, HRS, and shall comply with all requirements thereof. The CONTRACTOR shall obtain a tax clearance certificate from the Director of Taxation, State of Hawaii, and the Internal Revenue Service, U.S. Department of the Treasury, showing that all delinquent taxes, if any, levied or accrued under state law and the Internal Revenue Code of 1986, as amended, against the CONTRACTOR have been paid and submit the same to the STATE prior to commencing any performance under this Contract. The CONTRACTOR shall also be solely responsible for meeting all requirements necessary to obtain the tax clearance certificate required for final payment under sections 103-53 and 103D-328, HRS, and paragraph 17 of these General Conditions.
 - f. The CONTRACTOR is responsible for securing all employee-related insurance coverage for the CONTRACTOR and the CONTRACTOR'S employees and agents that is or may be required by law, and for payment of all premiums, costs, and other liabilities associated with securing the insurance coverage.

- g. The CONTRACTOR shall obtain a certificate of compliance issued by the Department of Labor and Industrial Relations, State of Hawaii, in accordance with section 103D-310, HRS, and section 3-122-112, HAR, that is current within six months of the date of issuance.
- h. The CONTRACTOR shall obtain a certificate of good standing issued by the Department of Commerce and Consumer Affairs, State of Hawaii, in accordance with section 103D-310, HRS, and section 3-122-112, HAR, that is current within six months of the date of issuance.
- i. In lieu of the above certificates from the Department of Taxation, Labor and Industrial Relations, and Commerce and Consumer Affairs, the CONTRACTOR may submit proof of compliance through the State Procurement Office's designated certification process.

3. Personnel Requirements.

- a. The CONTRACTOR shall secure, at the CONTRACTOR'S own expense, all personnel required to perform this Contract.
- b. The CONTRACTOR shall ensure that the CONTRACTOR'S employees or agents are experienced and fully qualified to engage in the activities and perform the services required under this Contract, and that all applicable licensing and operating requirements imposed or required under federal, state, or county law, and all applicable accreditation and other standards of quality generally accepted in the field of the activities of such employees and agents are complied with and satisfied.

4. Nondiscrimination. No person performing work under this Contract, including any subcontractor, employee, or agent of the CONTRACTOR, shall engage in any discrimination that is prohibited by any applicable federal, state, or county law.

5. Conflicts of Interest. The CONTRACTOR represents that neither the CONTRACTOR, nor any employee or agent of the CONTRACTOR, presently has any interest, and promises that no such interest, direct or indirect, shall be acquired, that would or might conflict in any manner or degree with the CONTRACTOR'S performance under this Contract.

6. Subcontracts and Assignments. The CONTRACTOR shall not assign or subcontract any of the CONTRACTOR'S duties, obligations, or interests under this Contract and no such assignment or subcontract shall be effective unless (i) the CONTRACTOR obtains the prior written consent of the STATE, and (ii) the CONTRACTOR'S assignee or subcontractor submits to the STATE a tax clearance certificate from the Director of Taxation, State of Hawaii, and the Internal Revenue Service, U.S. Department of Treasury, showing that all delinquent taxes, if any, levied or accrued under state law and the Internal Revenue Code of 1986, as amended, against the CONTRACTOR'S assignee or subcontractor have been paid. Additionally, no assignment by the CONTRACTOR of the CONTRACTOR'S right to compensation under this Contract shall be effective unless and until the assignment is approved by the Comptroller of the State of Hawaii, as provided in section 40-58, HRS.

- a. Recognition of a successor in interest. When in the best interest of the State, a successor in interest may be recognized in an assignment contract in which the STATE, the CONTRACTOR and the assignee or transferee (hereinafter referred to as the "Assignee") agree that:

- (1) The Assignee assumes all of the CONTRACTOR'S obligations;
- (2) The CONTRACTOR remains liable for all obligations under this Contract but waives all rights under this Contract as against the STATE; and
- (3) The CONTRACTOR shall continue to furnish, and the Assignee shall also furnish, all required bonds.

- b. Change of name. When the CONTRACTOR asks to change the name in which it holds this Contract with the STATE, the procurement officer of the purchasing agency (hereinafter referred to as the "Agency procurement officer") shall, upon receipt of a document acceptable or satisfactory to the

Agency procurement officer indicating such change of name (for example, an amendment to the CONTRACTOR'S articles of incorporation), enter into an amendment to this Contract with the CONTRACTOR to effect such a change of name. The amendment to this Contract changing the CONTRACTOR'S name shall specifically indicate that no other terms and conditions of this Contract are thereby changed.

- c. Reports. All assignment contracts and amendments to this Contract effecting changes of the CONTRACTOR'S name or novations hereunder shall be reported to the chief procurement officer (CPO) as defined in section 103D-203(a), HRS, within thirty days of the date that the assignment contract or amendment becomes effective.
 - d. Actions affecting more than one purchasing agency. Notwithstanding the provisions of subparagraphs 6a through 6c herein, when the CONTRACTOR holds contracts with more than one purchasing agency of the State, the assignment contracts and the novation and change of name amendments herein authorized shall be processed only through the CPO's office.
- 7. Indemnification and Defense. The CONTRACTOR shall defend, indemnify, and hold harmless the State of Hawaii, the contracting agency, and their officers, employees, and agents from and against all liability, loss, damage, cost, and expense, including all attorneys' fees, and all claims, suits, and demands therefore, arising out of or resulting from the acts or omissions of the CONTRACTOR or the CONTRACTOR'S employees, officers, agents, or subcontractors under this Contract. The provisions of this paragraph shall remain in full force and effect notwithstanding the expiration or early termination of this Contract.
 - 8. Cost of Litigation. In case the STATE shall, without any fault on its part, be made a party to any litigation commenced by or against the CONTRACTOR in connection with this Contract, the CONTRACTOR shall pay all costs and expenses incurred by or imposed on the STATE, including attorneys' fees.
 - 9. Liquidated Damages. When the CONTRACTOR is given notice of delay or nonperformance as specified in paragraph 13 (Termination for Default) and fails to cure in the time specified, it is agreed the CONTRACTOR shall pay to the STATE the amount, if any, set forth in this Contract per calendar day from the date set for cure until either (i) the STATE reasonably obtains similar goods or services, or both, if the CONTRACTOR is terminated for default, or (ii) until the CONTRACTOR provides the goods or services, or both, if the CONTRACTOR is not terminated for default. To the extent that the CONTRACTOR'S delay or nonperformance is excused under paragraph 13d (Excuse for Nonperformance or Delay Performance), liquidated damages shall not be assessable against the CONTRACTOR. The CONTRACTOR remains liable for damages caused other than by delay.
 - 10. STATE'S Right of Offset. The STATE may offset against any monies or other obligations the STATE owes to the CONTRACTOR under this Contract, any amounts owed to the State of Hawaii by the CONTRACTOR under this Contract or any other contracts, or pursuant to any law or other obligation owed to the State of Hawaii by the CONTRACTOR, including, without limitation, the payment of any taxes or levies of any kind or nature. The STATE will notify the CONTRACTOR in writing of any offset and the nature of such offset. For purposes of this paragraph, amounts owed to the State of Hawaii shall not include debts or obligations which have been liquidated, agreed to by the CONTRACTOR, and are covered by an installment payment or other settlement plan approved by the State of Hawaii, provided, however, that the CONTRACTOR shall be entitled to such exclusion only to the extent that the CONTRACTOR is current with, and not delinquent on, any payments or obligations owed to the State of Hawaii under such payment or other settlement plan.
 - 11. Disputes. Disputes shall be resolved in accordance with section 103D-703, HRS, and chapter 3-126, Hawaii Administrative Rules ("HAR"), as the same may be amended from time to time.
 - 12. Suspension of Contract. The STATE reserves the right at any time and for any reason to suspend this Contract for any reasonable period, upon written notice to the CONTRACTOR in accordance with the provisions herein.
 - a. Order to stop performance. The Agency procurement officer may, by written order to the CONTRACTOR, at any time, and without notice to any surety, require the CONTRACTOR to stop all or any part of the performance called for by this Contract. This order shall be for a specified period

not exceeding sixty (60) days after the order is delivered to the CONTRACTOR, unless the parties agree to any further period. Any such order shall be identified specifically as a stop performance order issued pursuant to this section. Stop performance orders shall include, as appropriate: (1) A clear description of the work to be suspended; (2) Instructions as to the issuance of further orders by the CONTRACTOR for material or services; (3) Guidance as to action to be taken on subcontracts; and (4) Other instructions and suggestions to the CONTRACTOR for minimizing costs. Upon receipt of such an order, the CONTRACTOR shall forthwith comply with its terms and suspend all performance under this Contract at the time stated, provided, however, the CONTRACTOR shall take all reasonable steps to minimize the occurrence of costs allocable to the performance covered by the order during the period of performance stoppage. Before the stop performance order expires, or within any further period to which the parties shall have agreed, the Agency procurement officer shall either:

- (1) Cancel the stop performance order; or
- (2) Terminate the performance covered by such order as provided in the termination for default provision or the termination for convenience provision of this Contract.

b. Cancellation or expiration of the order. If a stop performance order issued under this section is cancelled at any time during the period specified in the order, or if the period of the order or any extension thereof expires, the CONTRACTOR shall have the right to resume performance. An appropriate adjustment shall be made in the delivery schedule or contract price, or both, and the Contract shall be modified in writing accordingly, if:

- (1) The stop performance order results in an increase in the time required for, or in the CONTRACTOR'S cost properly allocable to, the performance of any part of this Contract; and
- (2) The CONTRACTOR asserts a claim for such an adjustment within thirty (30) days after the end of the period of performance stoppage; provided that, if the Agency procurement officer decides that the facts justify such action, any such claim asserted may be received and acted upon at any time prior to final payment under this Contract.

c. Termination of stopped performance. If a stop performance order is not cancelled and the performance covered by such order is terminated for default or convenience, the reasonable costs resulting from the stop performance order shall be allowable by adjustment or otherwise.

d. Adjustment of price. Any adjustment in contract price made pursuant to this paragraph shall be determined in accordance with the price adjustment provision of this Contract.

13. Termination for Default.

a. Default. If the CONTRACTOR refuses or fails to perform any of the provisions of this Contract with such diligence as will ensure its completion within the time specified in this Contract, or any extension thereof, otherwise fails to timely satisfy the Contract provisions, or commits any other substantial breach of this Contract, the Agency procurement officer may notify the CONTRACTOR in writing of the delay or non-performance and if not cured in ten (10) days or any longer time specified in writing by the Agency procurement officer, such officer may terminate the CONTRACTOR'S right to proceed with the Contract or such part of the Contract as to which there has been delay or a failure to properly perform. In the event of termination in whole or in part, the Agency procurement officer may procure similar goods or services in a manner and upon the terms deemed appropriate by the Agency procurement officer. The CONTRACTOR shall continue performance of the Contract to the extent it is not terminated and shall be liable for excess costs incurred in procuring similar goods or services.

b. CONTRACTOR'S duties. Notwithstanding termination of the Contract and subject to any directions from the Agency procurement officer, the CONTRACTOR shall take timely, reasonable, and necessary action to protect and preserve property in the possession of the CONTRACTOR in which the STATE has an interest.

- c. Compensation. Payment for completed goods and services delivered and accepted by the STATE shall be at the price set forth in the Contract. Payment for the protection and preservation of property shall be in an amount agreed upon by the CONTRACTOR and the Agency procurement officer. If the parties fail to agree, the Agency procurement officer shall set an amount subject to the CONTRACTOR'S rights under chapter 3-126, HAR. The STATE may withhold from amounts due the CONTRACTOR such sums as the Agency procurement officer deems to be necessary to protect the STATE against loss because of outstanding liens or claims and to reimburse the STATE for the excess costs expected to be incurred by the STATE in procuring similar goods and services.
- d. Excuse for nonperformance or delayed performance. The CONTRACTOR shall not be in default by reason of any failure in performance of this Contract in accordance with its terms, including any failure by the CONTRACTOR to make progress in the prosecution of the performance hereunder which endangers such performance, if the CONTRACTOR has notified the Agency procurement officer within fifteen (15) days after the cause of the delay and the failure arises out of causes such as: acts of God; acts of a public enemy; acts of the State and any other governmental body in its sovereign or contractual capacity; fires; floods; epidemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; or unusually severe weather. If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the CONTRACTOR shall not be deemed to be in default, unless the goods and services to be furnished by the subcontractor were reasonably obtainable from other sources in sufficient time to permit the CONTRACTOR to meet the requirements of the Contract. Upon request of the CONTRACTOR, the Agency procurement officer shall ascertain the facts and extent of such failure, and, if such officer determines that any failure to perform was occasioned by any one or more of the excusable causes, and that, but for the excusable cause, the CONTRACTOR'S progress and performance would have met the terms of the Contract, the delivery schedule shall be revised accordingly, subject to the rights of the STATE under this Contract. As used in this paragraph, the term "subcontractor" means subcontractor at any tier.
- e. Erroneous termination for default. If, after notice of termination of the CONTRACTOR'S right to proceed under this paragraph, it is determined for any reason that the CONTRACTOR was not in default under this paragraph, or that the delay was excusable under the provisions of subparagraph 13d, "Excuse for nonperformance or delayed performance," the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to paragraph 14.
- f. Additional rights and remedies. The rights and remedies provided in this paragraph are in addition to any other rights and remedies provided by law or under this Contract.

14. Termination for Convenience.

- a. Termination. The Agency procurement officer may, when the interests of the STATE so require, terminate this Contract in whole or in part, for the convenience of the STATE. The Agency procurement officer shall give written notice of the termination to the CONTRACTOR specifying the part of the Contract terminated and when termination becomes effective.
- b. CONTRACTOR'S obligations. The CONTRACTOR shall incur no further obligations in connection with the terminated performance and on the date(s) set in the notice of termination the CONTRACTOR will stop performance to the extent specified. The CONTRACTOR shall also terminate outstanding orders and subcontracts as they relate to the terminated performance. The CONTRACTOR shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated performance subject to the STATE'S approval. The Agency procurement officer may direct the CONTRACTOR to assign the CONTRACTOR'S right, title, and interest under terminated orders or subcontracts to the STATE. The CONTRACTOR must still complete the performance not terminated by the notice of termination and may incur obligations as necessary to do so.
- c. Right to goods and work product. The Agency procurement officer may require the CONTRACTOR to transfer title and deliver to the STATE in the manner and to the extent directed by the Agency procurement officer:

- (1) Any completed goods or work product; and
- (2) The partially completed goods and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (hereinafter called "manufacturing material") as the CONTRACTOR has specifically produced or specially acquired for the performance of the terminated part of this Contract.

The CONTRACTOR shall, upon direction of the Agency procurement officer, protect and preserve property in the possession of the CONTRACTOR in which the STATE has an interest. If the Agency procurement officer does not exercise this right, the CONTRACTOR shall use best efforts to sell such goods and manufacturing materials. Use of this paragraph in no way implies that the STATE has breached the Contract by exercise of the termination for convenience provision.

d. Compensation.

- (1) The CONTRACTOR shall submit a termination claim specifying the amounts due because of the termination for convenience together with the cost or pricing data, submitted to the extent required by chapter 3-122, HAR, bearing on such claim. If the CONTRACTOR fails to file a termination claim within one year from the effective date of termination, the Agency procurement officer may pay the CONTRACTOR, if at all, an amount set in accordance with subparagraph 14d(3) below.
- (2) The Agency procurement officer and the CONTRACTOR may agree to a settlement provided the CONTRACTOR has filed a termination claim supported by cost or pricing data submitted as required and that the settlement does not exceed the total Contract price plus settlement costs reduced by payments previously made by the STATE, the proceeds of any sales of goods and manufacturing materials under subparagraph 14c, and the Contract price of the performance not terminated.
- (3) Absent complete agreement under subparagraph 14d(2) the Agency procurement officer shall pay the CONTRACTOR the following amounts, provided payments agreed to under subparagraph 14d(2) shall not duplicate payments under this subparagraph for the following:
 - (A) Contract prices for goods or services accepted under the Contract;
 - (B) Costs incurred in preparing to perform and performing the terminated portion of the performance plus a fair and reasonable profit on such portion of the performance, such profit shall not include anticipatory profit or consequential damages, less amounts paid or to be paid for accepted goods or services; provided, however, that if it appears that the CONTRACTOR would have sustained a loss if the entire Contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss;
 - (C) Costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to subparagraph 14b. These costs must not include costs paid in accordance with subparagraph 14d(3)(B);
 - (D) The reasonable settlement costs of the CONTRACTOR, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the Contract and for the termination of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to the terminated portion of this Contract. The total sum to be paid the CONTRACTOR under this subparagraph shall not exceed the total Contract price plus the reasonable settlement costs of the CONTRACTOR reduced by the amount of payments otherwise made, the proceeds of any sales of

supplies and manufacturing materials under subparagraph 14d(2), and the contract price of performance not terminated.

- (4) Costs claimed, agreed to, or established under subparagraphs 14d(2) and 14d(3) shall be in accordance with Chapter 3-123 (Cost Principles) of the Procurement Rules.

15. Claims Based on the Agency Procurement Officer's Actions or Omissions.

- a. Changes in scope. If any action or omission on the part of the Agency procurement officer (which term includes the designee of such officer for purposes of this paragraph 15) requiring performance changes within the scope of the Contract constitutes the basis for a claim by the CONTRACTOR for additional compensation, damages, or an extension of time for completion, the CONTRACTOR shall continue with performance of the Contract in compliance with the directions or orders of such officials, but by so doing, the CONTRACTOR shall not be deemed to have prejudiced any claim for additional compensation, damages, or an extension of time for completion; provided:

- (1) Written notice required. The CONTRACTOR shall give written notice to the Agency procurement officer:

- (A) Prior to the commencement of the performance involved, if at that time the CONTRACTOR knows of the occurrence of such action or omission;
- (B) Within thirty (30) days after the CONTRACTOR knows of the occurrence of such action or omission, if the CONTRACTOR did not have such knowledge prior to the commencement of the performance; or
- (C) Within such further time as may be allowed by the Agency procurement officer in writing.

- (2) Notice content. This notice shall state that the CONTRACTOR regards the act or omission as a reason which may entitle the CONTRACTOR to additional compensation, damages, or an extension of time. The Agency procurement officer, upon receipt of such notice, may rescind such action, remedy such omission, or take such other steps as may be deemed advisable in the discretion of the Agency procurement officer;

- (3) Basis must be explained. The notice required by subparagraph 15a(1) describes as clearly as practicable at the time the reasons why the CONTRACTOR believes that additional compensation, damages, or an extension of time may be remedies to which the CONTRACTOR is entitled; and

- (4) Claim must be justified. The CONTRACTOR must maintain and, upon request, make available to the Agency procurement officer within a reasonable time, detailed records to the extent practicable, and other documentation and evidence satisfactory to the STATE, justifying the claimed additional costs or an extension of time in connection with such changes.

- b. CONTRACTOR not excused. Nothing herein contained, however, shall excuse the CONTRACTOR from compliance with any rules or laws precluding any state officers and CONTRACTOR from acting in collusion or bad faith in issuing or performing change orders which are clearly not within the scope of the Contract.

- c. Price adjustment. Any adjustment in the price made pursuant to this paragraph shall be determined in accordance with the price adjustment provision of this Contract.

16. Costs and Expenses. Any reimbursement due the CONTRACTOR for per diem and transportation expenses under this Contract shall be subject to chapter 3-123 (Cost Principles), HAR, and the following guidelines:

- a. Reimbursement for air transportation shall be for actual cost or coach class air fare, whichever is less.

- b. Reimbursement for ground transportation costs shall not exceed the actual cost of renting an intermediate-sized vehicle.
- c. Unless prior written approval of the HOPA is obtained, reimbursement for subsistence allowance (i.e., hotel and meals, etc.) shall not exceed the applicable daily authorized rates for inter-island or out-of-state travel that are set forth in the current Governor's Executive Order authorizing adjustments in salaries and benefits for state officers and employees in the executive branch who are excluded from collective bargaining coverage.

17. Payment Procedures; Final Payment; Tax Clearance.

- a. Original invoices required. All payments under this Contract shall be made only upon submission by the CONTRACTOR of original invoices specifying the amount due and certifying that services requested under the Contract have been performed by the CONTRACTOR according to the Contract.
- b. Subject to available funds. Such payments are subject to availability of funds and allotment by the Director of Finance in accordance with chapter 37, HRS. Further, all payments shall be made in accordance with and subject to chapter 40, HRS.
- c. Prompt payment.
 - (1) Any money, other than retainage, paid to the CONTRACTOR shall be disbursed to subcontractors within ten (10) days after receipt of the money in accordance with the terms of the subcontract; provided that the subcontractor has met all the terms and conditions of the subcontract and there are no bona fide disputes; and
 - (2) Upon final payment to the CONTRACTOR, full payment to the subcontractor, including retainage, shall be made within ten (10) days after receipt of the money; provided that there are no bona fide disputes over the subcontractor's performance under the subcontract.
- d. Final payment. Final payment under this Contract shall be subject to sections 103-53 and 103D-328, HRS, which require a tax clearance from the Director of Taxation, State of Hawaii, and the Internal Revenue Service, U.S. Department of Treasury, showing that all delinquent taxes, if any, levied or accrued under state law and the Internal Revenue Code of 1986, as amended, against the CONTRACTOR have been paid. Further, in accordance with section 3-122-112, HAR, CONTRACTOR shall provide a certificate affirming that the CONTRACTOR has remained in compliance with all applicable laws as required by this section.

18. Federal Funds. If this Contract is payable in whole or in part from federal funds, CONTRACTOR agrees that, as to the portion of the compensation under this Contract to be payable from federal funds, the CONTRACTOR shall be paid only from such funds received from the federal government, and shall not be paid from any other funds. Failure of the STATE to receive anticipated federal funds shall not be considered a breach by the STATE or an excuse for nonperformance by the CONTRACTOR.

19. Modifications of Contract.

- a. In writing. Any modification, alteration, amendment, change, or extension of any term, provision, or condition of this Contract permitted by this Contract shall be made by written amendment to this Contract, signed by the CONTRACTOR and the STATE, provided that change orders shall be made in accordance with paragraph 20 herein.
- b. No oral modification. No oral modification, alteration, amendment, change, or extension of any term, provision, or condition of this Contract shall be permitted.
- c. Agency procurement officer. By written order, at any time, and without notice to any surety, the Agency procurement officer may unilaterally order of the CONTRACTOR:

- (A) Changes in the work within the scope of the Contract; and
 - (B) Changes in the time of performance of the Contract that do not alter the scope of the Contract work.
- d. Adjustments of price or time for performance. If any modification increases or decreases the CONTRACTOR'S cost of, or the time required for, performance of any part of the work under this Contract, an adjustment shall be made and this Contract modified in writing accordingly. Any adjustment in contract price made pursuant to this clause shall be determined, where applicable, in accordance with the price adjustment clause of this Contract or as negotiated.
 - e. Claim barred after final payment. No claim by the CONTRACTOR for an adjustment hereunder shall be allowed if written modification of the Contract is not made prior to final payment under this Contract.
 - f. Claims not barred. In the absence of a written contract modification, nothing in this clause shall be deemed to restrict the CONTRACTOR'S right to pursue a claim under this Contract or for a breach of contract.
 - g. CPO approval. If this is a professional services contract awarded pursuant to section 103D-303 or 103D-304, HRS, any modification, alteration, amendment, change, or extension of any term, provision, or condition of this Contract which increases the amount payable to the CONTRACTOR by at least \$25,000.00 or ten per cent (10%) of the initial contract price, whichever increase is higher, must receive the prior approval of the CPO.
 - h. Tax clearance. The STATE may, at its discretion, require the CONTRACTOR to submit to the STATE, prior to the STATE'S approval of any modification, alteration, amendment, change, or extension of any term, provision, or condition of this Contract, a tax clearance from the Director of Taxation, State of Hawaii, and the Internal Revenue Service, U.S. Department of Treasury, showing that all delinquent taxes, if any, levied or accrued under state law and the Internal Revenue Code of 1986, as amended, against the CONTRACTOR have been paid.
 - i. Sole source contracts. Amendments to sole source contracts that would change the original scope of the Contract may only be made with the approval of the CPO. Annual renewal of a sole source contract for services should not be submitted as an amendment.
20. Change Order. The Agency procurement officer may, by a written order signed only by the STATE, at any time, and without notice to any surety, and subject to all appropriate adjustments, make changes within the general scope of this Contract in any one or more of the following:
- (1) Drawings, designs, or specifications, if the goods or services to be furnished are to be specially provided to the STATE in accordance therewith;
 - (2) Method of delivery; or
 - (3) Place of delivery.
- a. Adjustments of price or time for performance. If any change order increases or decreases the CONTRACTOR'S cost of, or the time required for, performance of any part of the work under this Contract, whether or not changed by the order, an adjustment shall be made and the Contract modified in writing accordingly. Any adjustment in the Contract price made pursuant to this provision shall be determined in accordance with the price adjustment provision of this Contract. Failure of the parties to agree to an adjustment shall not excuse the CONTRACTOR from proceeding with the Contract as changed, provided that the Agency procurement officer promptly and duly makes the provisional adjustments in payment or time for performance as may be reasonable. By proceeding with the work, the CONTRACTOR shall not be deemed to have prejudiced any claim for additional compensation, or any extension of time for completion.

- b. Time period for claim. Within ten (10) days after receipt of a written change order under subparagraph 20a, unless the period is extended by the Agency procurement officer in writing, the CONTRACTOR shall respond with a claim for an adjustment. The requirement for a timely written response by CONTRACTOR cannot be waived and shall be a condition precedent to the assertion of a claim.
- c. Claim barred after final payment. No claim by the CONTRACTOR for an adjustment hereunder shall be allowed if a written response is not given prior to final payment under this Contract.
- d. Other claims not barred. In the absence of a change order, nothing in this paragraph 20 shall be deemed to restrict the CONTRACTOR'S right to pursue a claim under the Contract or for breach of contract.

21. Price Adjustment.

- a. Price adjustment. Any adjustment in the contract price pursuant to a provision in this Contract shall be made in one or more of the following ways:
 - (1) By agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable;
 - (2) By unit prices specified in the Contract or subsequently agreed upon;
 - (3) By the costs attributable to the event or situation covered by the provision, plus appropriate profit or fee, all as specified in the Contract or subsequently agreed upon;
 - (4) In such other manner as the parties may mutually agree; or
 - (5) In the absence of agreement between the parties, by a unilateral determination by the Agency procurement officer of the costs attributable to the event or situation covered by the provision, plus appropriate profit or fee, all as computed by the Agency procurement officer in accordance with generally accepted accounting principles and applicable sections of chapters 3-123 and 3-126, HAR.
- b. Submission of cost or pricing data. The CONTRACTOR shall provide cost or pricing data for any price adjustments subject to the provisions of chapter 3-122, HAR.

22. Variation in Quantity for Definite Quantity Contracts. Upon the agreement of the STATE and the CONTRACTOR, the quantity of goods or services, or both, if a definite quantity is specified in this Contract, may be increased by a maximum of ten per cent (10%); provided the unit prices will remain the same except for any price adjustments otherwise applicable; and the Agency procurement officer makes a written determination that such an increase will either be more economical than awarding another contract or that it would not be practical to award another contract.

23. Changes in Cost-Reimbursement Contract. If this Contract is a cost-reimbursement contract, the following provisions shall apply:

- a. The Agency procurement officer may at any time by written order, and without notice to the sureties, if any, make changes within the general scope of the Contract in any one or more of the following:
 - (1) Description of performance (Attachment 1);
 - (2) Time of performance (i.e., hours of the day, days of the week, etc.);
 - (3) Place of performance of services;

- (4) Drawings, designs, or specifications when the supplies to be furnished are to be specially manufactured for the STATE in accordance with the drawings, designs, or specifications;
 - (5) Method of shipment or packing of supplies; or
 - (6) Place of delivery.
- b. If any change causes an increase or decrease in the estimated cost of, or the time required for performance of, any part of the performance under this Contract, whether or not changed by the order, or otherwise affects any other terms and conditions of this Contract, the Agency procurement officer shall make an equitable adjustment in the (1) estimated cost, delivery or completion schedule, or both; (2) amount of any fixed fee; and (3) other affected terms and shall modify the Contract accordingly.
 - c. The CONTRACTOR must assert the CONTRACTOR'S rights to an adjustment under this provision within thirty (30) days from the day of receipt of the written order. However, if the Agency procurement officer decides that the facts justify it, the Agency procurement officer may receive and act upon a proposal submitted before final payment under the Contract.
 - d. Failure to agree to any adjustment shall be a dispute under paragraph 11 of this Contract. However, nothing in this provision shall excuse the CONTRACTOR from proceeding with the Contract as changed.
 - e. Notwithstanding the terms and conditions of subparagraphs 23a and 23b, the estimated cost of this Contract and, if this Contract is incrementally funded, the funds allotted for the performance of this Contract, shall not be increased or considered to be increased except by specific written modification of the Contract indicating the new contract estimated cost and, if this contract is incrementally funded, the new amount allotted to the contract.
24. Confidentiality of Material.
- a. All material given to or made available to the CONTRACTOR by virtue of this Contract, which is identified as proprietary or confidential information, will be safeguarded by the CONTRACTOR and shall not be disclosed to any individual or organization without the prior written approval of the STATE.
 - b. All information, data, or other material provided by the CONTRACTOR to the STATE shall be subject to the Uniform Information Practices Act, chapter 92F, HRS.
25. Publicity. The CONTRACTOR shall not refer to the STATE, or any office, agency, or officer thereof, or any state employee, including the HOPA, the CPO, the Agency procurement officer, or to the services or goods, or both, provided under this Contract, in any of the CONTRACTOR'S brochures, advertisements, or other publicity of the CONTRACTOR. All media contacts with the CONTRACTOR about the subject matter of this Contract shall be referred to the Agency procurement officer.
26. Ownership Rights and Copyright. The STATE shall have complete ownership of all material, both finished and unfinished, which is developed, prepared, assembled, or conceived by the CONTRACTOR pursuant to this Contract, and all such material shall be considered "works made for hire." All such material shall be delivered to the STATE upon expiration or termination of this Contract. The STATE, in its sole discretion, shall have the exclusive right to copyright any product, concept, or material developed, prepared, assembled, or conceived by the CONTRACTOR pursuant to this Contract.
27. Liens and Warranties. Goods provided under this Contract shall be provided free of all liens and provided together with all applicable warranties, or with the warranties described in the Contract documents, whichever are greater.
28. Audit of Books and Records of the CONTRACTOR. The STATE may, at reasonable times and places, audit the books and records of the CONTRACTOR, prospective contractor, subcontractor, or prospective subcontractor which are related to:

- a. The cost or pricing data, and
- b. A state contract, including subcontracts, other than a firm fixed-price contract.

29. Cost or Pricing Data. Cost or pricing data must be submitted to the Agency procurement officer and timely certified as accurate for contracts over \$100,000 unless the contract is for a multiple-term or as otherwise specified by the Agency procurement officer. Unless otherwise required by the Agency procurement officer, cost or pricing data submission is not required for contracts awarded pursuant to competitive sealed bid procedures.

If certified cost or pricing data are subsequently found to have been inaccurate, incomplete, or noncurrent as of the date stated in the certificate, the STATE is entitled to an adjustment of the contract price, including profit or fee, to exclude any significant sum by which the price, including profit or fee, was increased because of the defective data. It is presumed that overstated cost or pricing data increased the contract price in the amount of the defect plus related overhead and profit or fee. Therefore, unless there is a clear indication that the defective data was not used or relied upon, the price will be reduced in such amount.

30. Audit of Cost or Pricing Data. When cost or pricing principles are applicable, the STATE may require an audit of cost or pricing data.
31. Records Retention. The CONTRACTOR and any subcontractors shall maintain the books and records that relate to the Contract and any cost or pricing data for three (3) years from the date of final payment under the Contract.
32. Antitrust Claims. The STATE and the CONTRACTOR recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, the CONTRACTOR hereby assigns to STATE any and all claims for overcharges as to goods and materials purchased in connection with this Contract, except as to overcharges which result from violations commencing after the price is established under this Contract and which are not passed on to the STATE under an escalation clause.
33. Patented Articles. The CONTRACTOR shall defend, indemnify, and hold harmless the STATE, and its officers, employees, and agents from and against all liability, loss, damage, cost, and expense, including all attorneys fees, and all claims, suits, and demands arising out of or resulting from any claims, demands, or actions by the patent holder for infringement or other improper or unauthorized use of any patented article, patented process, or patented appliance in connection with this Contract. The CONTRACTOR shall be solely responsible for correcting or curing to the satisfaction of the STATE any such infringement or improper or unauthorized use, including, without limitation: (a) furnishing at no cost to the STATE a substitute article, process, or appliance acceptable to the STATE, (b) paying royalties or other required payments to the patent holder, (c) obtaining proper authorizations or releases from the patent holder, and (d) furnishing such security to or making such arrangements with the patent holder as may be necessary to correct or cure any such infringement or improper or unauthorized use.
34. Governing Law. The validity of this Contract and any of its terms or provisions, as well as the rights and duties of the parties to this Contract, shall be governed by the laws of the State of Hawaii. Any action at law or in equity to enforce or interpret the provisions of this Contract shall be brought in a state court of competent jurisdiction in Honolulu, Hawaii.
35. Compliance with Laws. The CONTRACTOR shall comply with all federal, state, and county laws, ordinances, codes, rules, and regulations, as the same may be amended from time to time, that in any way affect the CONTRACTOR'S performance of this Contract.
36. Conflict Between General Conditions and Procurement Rules. In the event of a conflict between the General Conditions and the procurement rules, the procurement rules in effect on the date this Contract became effective shall control and are hereby incorporated by reference.

37. Entire Contract. This Contract sets forth all of the agreements, conditions, understandings, promises, warranties, and representations between the STATE and the CONTRACTOR relative to this Contract. This Contract supersedes all prior agreements, conditions, understandings, promises, warranties, and representations, which shall have no further force or effect. There are no agreements, conditions, understandings, promises, warranties, or representations, oral or written, express or implied, between the STATE and the CONTRACTOR other than as set forth or as referred to herein.
38. Severability. In the event that any provision of this Contract is declared invalid or unenforceable by a court, such invalidity or unenforceability shall not affect the validity or enforceability of the remaining terms of this Contract.
39. Waiver. The failure of the STATE to insist upon the strict compliance with any term, provision, or condition of this Contract shall not constitute or be deemed to constitute a waiver or relinquishment of the STATE'S right to enforce the same in accordance with this Contract. The fact that the STATE specifically refers to one provision of the procurement rules or one section of the Hawaii Revised Statutes, and does not include other provisions or statutory sections in this Contract shall not constitute a waiver or relinquishment of the STATE'S rights or the CONTRACTOR'S obligations under the procurement rules or statutes.
40. Pollution Control. If during the performance of this Contract, the CONTRACTOR encounters a "release" or a "threatened release" of a reportable quantity of a "hazardous substance," "pollutant," or "contaminant" as those terms are defined in section 128D-1, HRS, the CONTRACTOR shall immediately notify the STATE and all other appropriate state, county, or federal agencies as required by law. The Contractor shall take all necessary actions, including stopping work, to avoid causing, contributing to, or making worse a release of a hazardous substance, pollutant, or contaminant, and shall promptly obey any orders the Environmental Protection Agency or the state Department of Health issues in response to the release. In the event there is an ensuing cease-work period, and the STATE determines that this Contract requires an adjustment of the time for performance, the Contract shall be modified in writing accordingly.
41. Campaign Contributions. The CONTRACTOR is hereby notified of the applicability of 11-205.5, HRS, which states that campaign contributions are prohibited from specified state or county government contractors during the terms of their contracts if the contractors are paid with funds appropriated by a legislative body.
42. Confidentiality of Personal Information.
- a. Definitions.
- "Personal information" means an individual's first name or first initial and last name in combination with any one or more of the following data elements, when either name or data elements are not encrypted:
- (1) Social security number;
 - (2) Driver's license number or Hawaii identification card number; or
 - (3) Account number, credit or debit card number, access code, or password that would permit access to an individual's financial information.
- Personal information does not include publicly available information that is lawfully made available to the general public from federal, state, or local government records.
- "Technological safeguards" means the technology and the policy and procedures for use of the technology to protect and control access to personal information.
- b. Confidentiality of Material.
- (1) All material given to or made available to the CONTRACTOR by the STATE by virtue of

this Contract which is identified as personal information, shall be safeguarded by the CONTRACTOR and shall not be disclosed without the prior written approval of the STATE.

- (2) CONTRACTOR agrees not to retain, use, or disclose personal information for any purpose other than as permitted or required by this Contract.
- (3) CONTRACTOR agrees to implement appropriate "technological safeguards" that are acceptable to the STATE to reduce the risk of unauthorized access to personal information.
- (4) CONTRACTOR shall report to the STATE in a prompt and complete manner any security breaches involving personal information.
- (5) CONTRACTOR agrees to mitigate, to the extent practicable, any harmful effect that is known to CONTRACTOR because of a use or disclosure of personal information by CONTRACTOR in violation of the requirements of this paragraph.
- (6) CONTRACTOR shall complete and retain a log of all disclosures made of personal information received from the STATE, or personal information created or received by CONTRACTOR on behalf of the STATE.

c. Security Awareness Training and Confidentiality Agreements.

- (1) CONTRACTOR certifies that all of its employees who will have access to the personal information have completed training on security awareness topics relating to protecting personal information.
- (2) CONTRACTOR certifies that confidentiality agreements have been signed by all of its employees who will have access to the personal information acknowledging that:
 - (A) The personal information collected, used, or maintained by the CONTRACTOR will be treated as confidential;
 - (B) Access to the personal information will be allowed only as necessary to perform the Contract; and
 - (C) Use of the personal information will be restricted to uses consistent with the services subject to this Contract.

d. Termination for Cause. In addition to any other remedies provided for by this Contract, if the STATE learns of a material breach by CONTRACTOR of this paragraph by CONTRACTOR, the STATE may at its sole discretion:

- (1) Provide an opportunity for the CONTRACTOR to cure the breach or end the violation; or
- (2) Immediately terminate this Contract.

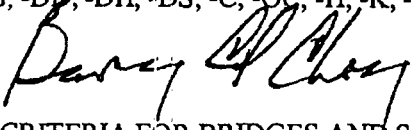
In either instance, the CONTRACTOR and the STATE shall follow chapter 487N, HRS, with respect to notification of a security breach of personal information.

e. Records Retention.

- (1) Upon any termination of this Contract, CONTRACTOR shall pursuant to chapter 487R, HRS, destroy all copies (paper or electronic form) of personal information received from the STATE.
- (2) The CONTRACTOR and any subcontractors shall maintain the files, books, and records, that relate to the Contract, including any personal information created or received by the CONTRACTOR on behalf of the STATE, and any cost or pricing data, for three (3) years after the date of final payment under the Contract. The personal information shall continue to be confidential and shall not be disclosed without the prior written approval of the STATE. After the three (3) year retention period has ended, the files, books, and records that contain personal information shall be destroyed pursuant to chapter 487R, HRS.

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

HWY-DB 2.6843
DATE: February 14, 2005

TO: HWY-DB, -DD, -DH, -DS, -C, -OC, -H, -K, -M, -T
FROM: HWY-D 
SUBJECT: DESIGN CRITERIA FOR BRIDGES AND STRUCTURES

This memo supersedes memo HWY-DB 2.7490 dated August 13, 2002 that superseded previous HWY-DB memos 2.4915, 2.4895, 2.5065, 2.6408 and 2.94571.

- DESIGN REFERENCES
- MODIFICATIONS TO *AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS*
- MODIFICATIONS TO *AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS*
- ADDITIONAL GUIDELINES

DESIGN REFERENCES

AASHTO LRFD Bridge Design Specifications, 3rd edition (2004) including all subsequent interim revisions. This shall govern all structural designs for bridges including retaining walls, culverts, traffic barriers, catch basins, drain manholes, inlet boxes, pull boxes, and similar structures within the State's right-of-way and similar structures subject to review by the Bridge Design Section except as modified herein. The use of *AASHTO Standard Specifications for Highway Bridges*, 17th edition, shall only be allowed when checking the adequacy of existing structures designed prior to January 1997 unless the Bridge Engineer grants an exception. The Standard Specification will no longer be supported/updated by AASHTO after October 2007.

AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4th edition (2001) including all subsequent interim revisions. This shall govern design of structural supports for highway signs, luminaires and traffic signals including those attached to bridge structures except as modified herein.

AASHTO Guide Specifications for Structural Design of Sound Barriers, current edition including all subsequent interim revisions. Design for sound barrier walls shall be governed by the stricter of this guide or the latest adopted building code of the City and County of Honolulu.

Building Code of the City and County of Honolulu, latest adopted. Unless otherwise directed, this shall govern structural designs for State of Hawaii DOT buildings and other structures not covered by AASHTO guidelines and specifications. Seismic and wind requirements shall be verified prior to commencing with design.

ATTACHMENT 5

Earthquake Retrofit Guidelines for Bridges, California Department of Transportation (Caltrans) Memo 20-4, latest version. All design for seismic retrofitting of existing bridges shall be in accordance with Caltrans seismic retrofit methodology unless otherwise directed. FHWA publication *Seismic Retrofitting Manual for Highway Bridges*, FHWA-RD-94-052, May 1995, may be referenced for supplemental information.

Standard Specifications for Tolerances for Concrete Construction and Materials (ACI 117), latest adopted. Tolerances for Concrete Construction and Materials shall conform to all requirements of ACI 117 published by the ACI except as modified herein and the project documents.

AASHTO Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges, October 2003 including all subsequent interim revisions. Load capacity ratings shall be computed using both the LRFR method and the alternate load factor (LF) method using this manual and as modified herein.

MODIFICATIONS TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1. **Load Factors and Load Combinations** [Article 3.4.1]. The effects of scour (SC) shall be considered in the design of bridges. Scour is not a load but is an extreme event that alters the geometry of the structure and foundation possibly causing structural collapse or the amplification of the effects of applied loads. Based on the 100-year flood scour depth, the following scour factors shall be applied:
 - a. A scour factor of 2.00 shall be used in combination with dead loads of structure only. When scour is possible, the bridge foundation shall always be checked to ensure that the foundation depth exceeds 2.00 SC.
 - b. A scour factor of 0.50 shall be used in combination with earthquake loads. When analyzing for effects due to earthquake loads, the case of zero scour depth shall also be investigated.

If approved scour mitigation measures are implemented, the full effects of scour need not be considered.

For design of temporary bridges, scour shall be based on a flood with an expected recurrence of at least twice the number of years the temporary bridge is expected to exist but not less than 5 years.

2. **Dead Loads** [Article 3.5.1]. The following additional dead loads shall be considered in design of new bridges and as applicable for bridge rehabilitation.
 - a. Weight of future wearing surface of 25 psf from curb to curb.
 - b. Future utilities load on each side of the bridge of 150 plf.

3. **Unit Weights** [Table 3.5.1-1]

- a. Concrete (Normal): 160 pcf. Use 150 pcf for the determination of the modulus of elasticity and when the material reduces the effect of another force.
- b. Concrete (Lightweight): As specified. Consult with Material Testing and Research Branch.
- c. Compacted Earth: 120 pcf minimum. Based on soil type, design may require 140 pcf. Consult with Material Testing and Research Branch or Geotechnical Engineer. Use 100 pcf when the material reduces the effect of another force.

4. **Seismic Acceleration Coefficients for Hawaii** [Figure 3.10.2-3] modified as shown on Figure 1.

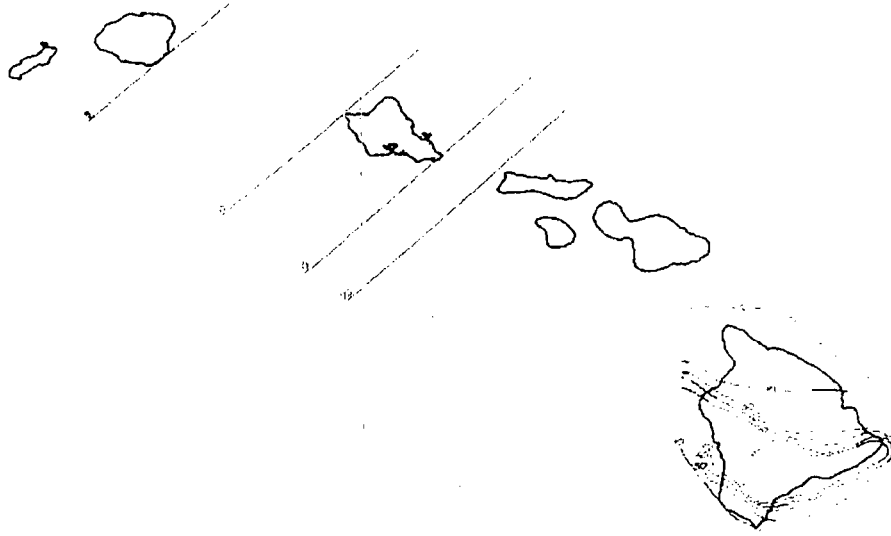


Figure 1 - Seismic Acceleration Coefficients for Hawaii

5. **Importance Categories** [Article 3.10.3]. Unless otherwise directed, classification for design of bridges shall conform to the following importance categories:

- a. **Critical Bridges:** All new vehicular bridges not including temporary bridges.
- b. **Essential Bridges:** Bridges to be seismically retrofitted.
- c. **Other Bridges:** Pedestrian bridges and temporary bridges.

6. **Temporary Bridges and Stage Construction** [Article 3.10.10]. The seismic acceleration coefficients to be used for design of temporary bridges and bridges constructed in stages and expected to carry traffic and/or pass over routes that carry traffic shall not be less than 75 percent of the modified values for Hawaii shown in Figure 1.

7. **Temperature Range** [Article 3.12.2]. Concrete superstructures shall be designed using [Article 3.12.2.2] Procedure B with a temperature range of 60 degrees Fahrenheit.
8. **Shrinkage** [Article 5.4.2.3.3]. Concrete shrinkage strain shall be in accordance with Equation 5.4.2.3.3-1 but not be less than 0.0003.
9. **Tension Stresses** [Article 5.9.4.2.2] in prestressed concrete. No tension stresses are allowed in precompressed tensile zone after all losses have occurred except when computing load capacity ratings at the operating level and for legal and permit loads.
10. **Concrete Cover** [Article 5.12.3]. The following changes shall be made to this article.
 - a. Cover to ties and stirrups shall not be less than 1.5 inches except cover for stirrups in webs of precast prestressed girders may be 1.25 inches.
 - b. Cover for main reinforcing steel shall be in accordance with Table 5.12.3-1 and as modified herein. Cover for main reinforcing steel shall be adjusted where minimum cover for ties and stirrups govern.
 - c. Cover for the top deck slab reinforcing steel measured perpendicular to the concrete surface shall be 2 inches with a tolerance of -0 in., and +3/8 in. This tolerance shall be noted on the plans and/or special provisions. Alternatively, a concrete cover for the top deck reinforcing steel of 2.5 inches may be used with no special notation on the plans or special provisions.
 - d. Cover for the bottom layer reinforcing steel of cast-in-place or precast concrete slabs shall not be less than 1.5 inches for No. 11 bars and smaller.
11. **Shear in Footings** [Article 5.13.3.6]. Minimum shear reinforcement for Seismic Zones 2, 3 and 4.
 - a. Column footings. Vertical No. 5 bars at 12 inches spacing in each direction in a band between "d" of the footing from the face of the column and 6 inches maximum from the column reinforcement. Shear bars shall be hooked around the top and bottom reinforcement mat in the footing. The top hook shall be 135 degrees minimum and the bottom 90 degrees.
 - b. Wall-type bridge footings including bridge abutments. Vertical No. 5 bars at 12 inches spacing in the direction perpendicular to the wall face and No. 5 bars at 24 inches spacing in the direction parallel to the wall face in the band between "d" of the footing from the face of the wall and 6 inches maximum from the column or abutment vertical reinforcement. Shear bars shall be hooked around the top and bottom reinforcement mat in the footing. The top hook shall be 135 degrees minimum and the bottom 90 degrees.

12. **Test Level Selection Criteria** [Article 13.7.2] for traffic railings. Also refer to memo HWY-TD 2.2822, *Statewide Policy for Permanent Highway Safety Hardware*, dated March 1, 1999. Unless otherwise directed, all traffic railings shall conform to the following test levels:
 - a. TL-2 (Test Level Two) – For design speed of 45 mph or less.
 - b. TL-4 (Test Level Four) – For design speed greater than 45 mph.
 - c. For unusual conditions, such as high truck volume roadways, higher test level criteria may be warranted.

MODIFICATIONS TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS

Note: For manufacturer designed support structures, all affected design parameters contained herein shall be noted on the construction plans.

1. **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 judgment. 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.
2. **Wind Importance Factor** [Article 3.8.3] noted in Table 3-2 used to determine the design wind pressures shall be based on the following recurrence intervals:
 - a. For overhead cantilevered sign structures: 100 years
 - b. For traffic signal structures: 50 years
 - c. For luminaire support structures: 25 years
(Except use 50 years when luminaire mounted on a traffic signal structure.)
 - d. For temporary support structures 10 years
3. **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*.
4. **Fatigue Importance Factors** [Article 11.6] noted in Table 11-1 for overhead cantilevered sign and traffic signal structures shall be based on Fatigue Category I.

Luminaire support structures with round cross sections under 50 feet and roadside sign structures do not need to be designed for fatigue.

5. **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.
6. **Vortex Shedding** [Article 11.7.2]. Non-tapered 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.
7. **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.
8. **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 20 mph over the posted speed.

ADDITIONAL GUIDELINES

1. **Approach Slabs.** Approach slabs shall be provided on all new bridges unless otherwise directed. If an existing bridge is being widened and it has an approach slab, slabs shall be provided at widening.
 - a. Length of approach slab shall be such that influence of live load on slab does not impose lateral earth pressure on the abutments. A Geotechnical Engineer or the Material Testing and Research Branch shall determine the length.
 - b. Slabs shall be designed to span simply supported. Center of support at approach end shall be based on centerline of bearing of thickened edge. Width of thickened edge shall be determined based on the given soil parameters.
2. **Design of Covers for Junction Boxes, Handholes, and Other Gaps, Holes, or Cavities ("Boxes") in Concrete Guardrails.**
 - a. It is preferred that all "boxes" be located on the opposite side of the traffic face of concrete guardrails.
 - b. If not possible to locate on opposite side, then try to locate "boxes" above the minimum guardrail height but not less than 32 inches above the roadway or shoulder surface.

- c. If the "boxes" must be located under 32 inches or under the minimum guardrail height, then the covers for the "boxes" shall be designed for a linear transverse force acting parallel to the roadway surface and applied anywhere along the vertical face of the cover. The minimum linear load shall be as follows:
 - 1) For TL-2: 8 klf (27 kips maximum total)
 - 2) For TL-3 & TL-4: 16 klf (54 kips maximum total)
 - d. The concrete guardrail around the "boxes" shall be appropriately designed to account for their presence.
 - e. The above design loads are not in-lieu of any wheel loads that may be applied to the covers for the "boxes". The covers shall also be designed for wheel loads and wheel impact if applicable.
3. **Concrete Box Culvert Fillets.** Fillets are required at the top corners. Bottom fillets are recommended if water will "sit" for an extended period of time at the wall construction joint. Otherwise, bottom fillets are optional.
4. **Load Capacity Ratings** for all bridges shall comply with both the Load and Resistance Factor Rating (LRFR) and the alternate Load Factor (LF) Methods of the AASHTO *Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges*.
- a. Load rating factors for each bridge element shall be computed and shown on the structural drawings following the structural notes for all new, replaced and rehabilitated bridge projects.
 - b. Modifications for prestressed concrete members shall be as follows:
 - 1) Inventory level -- no tension allowed in concrete.
 - 2) Operating level -- tension of $0.19(f_c')^{1/2}$ allowed in concrete where f_c' expressed in ksi units.
5. **Vertical Clearances for Separation Structures**
- a. Over Interstate Highways. 16'-6" minimum over the entire roadway width including the usable width of the shoulders.
 - b. Over Other State Highways. 15'-6" minimum over the entire roadway width including the usable width of the shoulders.
 - c. Under Pedestrian Bridges. 17'-6" minimum over the entire roadway width including the usable width of the shoulders.

- d. Under Sign Structures and Light Fixtures. Clearance shall be a minimum of one foot greater than specified in 5a, 5b and 5c.
 - e. For resurfacing projects under an existing bridge, the clearance shall be verified. If the clearance will be less than the minimum required vertical clearance, the existing clearances shall be maintained or improved.
6. **Bridge Endposts/Guardrail Transitions – Trailing End on Divided Highways**
- a. For fill slopes at trailing end of bridges greater than 3H:1V, provide guardrail transition similar to approach end unless otherwise directed.
 - b. For fill slopes at trailing end of bridges equal to or less than 3H:1V, no guardrail transition required at trailing end unless an obstruction or obstacle occurs within 25'-0" from the end of the bridge within the minimum recommended clear zone.
 - c. For cut slopes at trailing end of bridges, decision for guardrail requirement shall be based on likelihood of impact and site specific circumstances.
7. **Additional Structural Notes**
- a. **Bottom fillets of girder stems** for concrete box girders are optional unless required to satisfy stresses by design. If bottom fillets are shown on the plans, a note should be added that they are not required by design. Top fillets for girder stems are required.
 - b. **Falsework traffic openings** (widths and heights), if required, shall be indicated on the plans and in the specifications.
 - c. **Design of falsework** shall consider any increased or readjusted loads caused by prestressing, post-tensioning, or secondary forces imposed during construction. The design engineer shall indicate these loads on the plans.
8. **Seismic Retrofitting of Existing Bridges.** Unless otherwise directed, procedures for designs for seismic retrofitting of existing bridges shall be in accordance with Caltrans *Earthquake Retrofit Guidelines for Bridges*. In addition FHWA publication *Seismic Retrofitting Manual for Highway Bridges*, FHWA-RD-94-052, May 1995, may be referenced for supplemental information.
9. **Retrofitting of Existing Overhead Sign Structures.** The retrofitting philosophy shall be "no collapse". Retrofitting of existing footings or other items that may have an impact on traffic should be minimized. Any item whose failure may be a safety concern shall be upgraded and designed in accordance with the latest *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals*.

10. **Required Data for Consultant Designed or Design-Build Bridge or Structurally Related Projects.** The following items are essential for construction and effective maintenance of the structures and shall be submitted to the Bridge Design Section.
 - a. Design calculations for all structural items including bridges, buildings, retaining walls, culverts, manholes, sign structures, etc. Any diagrams used in the calculations shall be submitted. If computer inputs/outputs are included, computer software User's Manual or adequate description of inputs/outputs shall be submitted.
 - b. Calculations of estimated quantities for structural items.
 - c. Load Capacity Ratings for all bridges using both the LRFR and the alternate LF methods.
 - d. All reports, e.g. basis of designs, engineering reports, major structures reports, soils investigation reports, etc.
11. **Review of Structural Documents Prepared by Consultants.** To assure better quality submittal documents, all structural plans and calculations shall be reviewed by a licensed structural engineer other than the designer prior to each submittal to the State. Initials of the reviewer shall be placed on each sheet of the plans and calculations, or a signed letter accompanying the submittal stating that the signee, a licensed structural engineer other than the designer, had conducted a thorough review. Failure to do this will be grounds for rejection and no review will be conducted by the Bridge Design Section until this criteria is met. No extension of design time will be allowed for noncompliance.

If there are any questions, contact the Bridge Design Engineer of the Highways Division, Design Branch, Bridge Section.

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