Make the following Section a part of the Standard Specifications:

"SECTION 664 - EMERGENCY TELEPHONE

664.01 Description. This section is for furnishing and installing emergency telephone units and appurtenances according to the contract.

664.02 Materials.

(A) General. Furnish materials required to complete the replacement and modification work to the emergency telephone system.

(B) Concrete. Provide Class B concrete for post foundation conforming to Section 601 Structural Concrete.

(C) Steel Plate. Provide zinc-coated structural steel conforming to ASTM A 36.

(D) Mounting Pole, Anchor Pole and Extension Arm. Provide zinc-coated steel, schedule 40 or approved alternate. Submit shop drawings on mounting assembly for acceptance by the Engineer in accordance with Section 105 – Control of Work.

(E) Bolts, Nuts, Straps and Washers. Provide zinc-coated or stainless steel bolts, nuts, straps and washers as indicated.

(F) Zinc-Coating. Conform to ASTM A 123 or ASTM A 153.

(G) Stainless Steel. Type 316.

(H) Emergency Telephone Unit Identification Sign and Emergency Sign. Conform to Section 621 -Traffic Control Signs.

(I) Emergency Telephone Unit. Emergency telephone unit assembly shall include the following items, controls and functions:

(1) Weatherproof Lexan enclosure.

(2) Automatic Number Identification (ANI).

(3) Digital cellular transceiver.

(4) Multi-line message display screen.

(5) Standard telephone handset w/ armored cord.

(6) TTY interface keyboard.

(7) "Yes-No" response functions.

(8) Pole-mounted area light. 13W compact fluorescent lamp, weatherproof extruded aluminum construction with cast swivel mount, U.L. listed for wet locations, black baked polyester powdercoat finish, vandal resistant Lexan lens and mounting hardware.

(9) Pole mounted identification strobe light. Blue lens with weatherproof housing and tamper resistant hardware.

(10) Solar panel and battery.

(11) Antenna.

(12) Remote and field reprogrammability.

(13) Self-diagnostics software and alarm notification/masking.

For details on the above items and additional requirements refer to paragraph 664.03, "Construction Requirements". Submit shop drawings for acceptance by the Engineer in accordance with Section 105 – Control of Work.

(J) Emergency Telephone System Maintenance Computer. Provide one (1) each maintenance computer assembly to be installed at Administration Building of the Department of Transportation (DOT), Highways Division, Kauai District Office, 1720 Haleukana Street, Lihue, Kauai. Coordinate exact location of the maintenance computer assembly with the Engineer prior to installation.

Maintenance computer assembly shall include:

- 2.4 GHz Pentium 4 Processor
- 512MB RAM
- Windows XP Professional Operating System
- 80GB Hard Disk Drive
- 2 Serial Ports
- V.90 PCI Internal Modem
- 1.44MB Floppy Disk Drive
- 48X Internal CD-ROM
- Standard 101 Keyboard
- PS/2 Scroll Mouse
- 15-inch Flat Panel Monitor

- B/W Laser Printer, minimum 15-ppm.
- Freestanding Computer/Printer Stand.
- Plug-in Uniterruptible Power Supply (UPS), minimum 0.5-hour runtime under full-load condition.

For details on the above items and additional requirements refer to paragraph 664.03, "Construction Requirements". Submit shop drawings for acceptance by the Engineer in accordance with Section 105 – Control of Work.

664.03 Construction Requirements.

(A) Contractor's Scope of Work. The Contractor's scope of work covered under this section will include replacement and modification to the existing emergency telephone system, including but not limited to the replacement of existing emergency telephone assemblies with new digital emergency telephone assemblies with TTY functionality, assistance with integration of answering functions into the existing 911 dispatch system, provision of new maintenance computer assembly, and new digital cellular service to support new emergency telephones.

(B) Station Engineering. Locations of emergency telephone stations are shown to the closest 0.10 mile using the existing milepost system. Establish exact location in the field in compliance with installation details. All installations shall be compliant with the applicable ADA requirements.

Dispose of excess excavated material according to Section 203 - Excavation and Embankment.

(C) Mounting Pole Foundation. Brace anchor pole in proper position and height and cure concrete for not less than 72 hours. Crown top of foundation to shed water. Pole shall not be subjected to any loads until concrete reaches design strength.

(D) Mounting Pole. Install mounting pole on a concrete foundation according to the manufacturer's recommendation and as shown in the plans. Provide mounting pole with breakaway design features.

(E) Extension Arm. Attach securly to mounting post and emergency telephone backing. Extension arm post clamps shall fit firmly around the mounting post and shall not easily rotate or slip up or down the mounting post.

(F) Emergency Telephone Service. Prior to installation of new emergency telephones, Contractor shall conduct a site survey of the existing digital cellular coverage at each emergency telephone location

with their selected cellular provider. Adequate signal strength for reliable emergency telephone communication shall be defined as a signal strength in the range between –55dBm to –105dBm, or as otherwise specified by the emergency telephone manufacturer. Contractor shall demonstrate by means of a documented test report that adequate and consistent signal strength is provided for proper system operation at each designated emergency telephone location. Contractor shall submit documented test report for acceptance by the Engineer prior to installation of new wireless emergency telephones.

Provide telephone carrier and contact person with the carrier in particular, to ensure timely notification of service start-up for each emergency telephone unit telephone number. Notify carrier and contact person before any demonstration, testing or operational use of emergency telephones. Notify Engineer to allow for timely transfer of service at end of contract.

(G) Emergency Telephone Unit. Provide dial-up or leased Public Switch Telephone Network (PSTN) lines from the appropriate PSTN Central Office (CO) to the appropriate Communication Center (CC) as equipment for the telephone unit. CC for this project will be the existing 911 dispatch center located at the County of Kauai Police Department, 3990 Kaana Street, Suite 200, Ka Hale Makai O Kauai Building, Lihue, Kauai.

Provide emergency telephone units with the capability to automatically switch to the most suitable common carrier digital cell site.

Provide telephone units with the capability of providing Automatic Number Identification (ANI).

Provide telephone units with three discrete states of operation:

(1) TRANSMIT/RECEIVE. The TRANSMIT/RECEIVE state (Transceiver full duplex operating mode) is activated when one of the following events occur:

(a) Depression of the front panel push button;

(b) Authorized entry to the electronics compartment;

(c) Activation of a preprogrammed alarm condition; or

(d) Initiation of a preprogrammed periodic maintenance call.

(2) STANDBY. The STANDBY state (Transceiver in standby receive mode) is activated when one of the following events occur:

(a) Dropping a call in progress due to conditions in the cellular network or abnormal call termination by the CC operator. Operator termination of a call by placing the telephone "on-hook" without use of the specified termination key is considered abnormal call termination;

(b) Placement of the motorist into a VIRTUAL HOLD condition by the CC; or

(c) Opening of enclosure outer door of emergency telephone places it into STANDBY state for a pre-programmed duration.

(3) QUIESCENT. The QUIESCENT state (Transceiver inactive) is activated in one of the following ways:

(a) Normal termination of a call by the CC operator. Termination caused by the operator depressing a specified key on the telephone terminal;

(b) Completion of an alarm or maintenance status call;

(c) Expiration of a VIRTUAL HOLD or dropped call STANDBY period;

(d) Expiration of the telephone unit time-out period including CC operator extensions; or

(e) Expiration of automatic redial sequence.

A call will be considered on ACTIVE HOLD if the cellular connection remains active when the CC operator places the incoming call on hold.

A call will be considered on VIRTUAL HOLD if the cellular connection is dropped when the CC operator places the incoming call on hold or due to conditions in the cellular network.

Provide telephone units capable of detecting and identifying cellular and PSTN call progress signaling tones. Audible call progress indications are standard PSTN signaling.

Provide remote and field reprogrammability of selected system software control parameters incorporated for ease of adjusting status reporting, collecting statistical information, and for future operational changes.

Remote reprogrammability is defined as the capability to transmit reprogrammed data (instructions) via the telephone substation from a maintenance facility to a telephone unit or group of call boxes.

Field reprogrammability is defined as programming accomplished onsite by using a device that will provide a reprogramming capability, but not voice communication.

Provide the following system software control parameters with remote and field reprogramability:

(1) Maintenance Call-in-Clock Time. Provide time programmable clock with the range from 0000 to 2359 hours. Provide default values set to fall in the range from 0000 to 0500 hours and to allow all call boxes in the system to complete call in one day. Actual call-in times for each telephone unit may be set by a scheduling algorithm or by discrete assignment of times.

(2) Interval Between Initial Maintenance Call and a Maintenance Call Retry if the Initial Call is Blocked. Provide interval programmability from 0 to 240 minutes with a default value of 15 minutes.

(3) Days Between Successive Status Reports. Provide days programmable through the range of 0 to 31 days, with a minimum interval of one day and a default value of one day.

(4) Maximum Number of Ringbacks from the CC Answering Position Allowed on a Call to the CC. Provide ringbacks programmable from 0 to 60 rings with a default value of 12 rings.

(5) Maximum Time that the Telephone Unit Transceiver Will Be Held in a STANDBY State During a VIRTUAL HOLD. Provide time held in a standby State During a VIRTUAL HOLD. Provide time interval programmable through a minimum range from 0 to 45 minutes with a default value of 20 minutes.

(6) Capability to Call Ten (10) Different Phone Number. Provide at least three of these numbers initially used as follows:

(a) For motorist-to-CC calls,

(b) For CC alarm calls, and

(c) For maintenance system alarm/status calls.

Reserve the remaining seven numbers for future expansion. Default numbers will be determined during system installation.

(7) Alarm Masking. Provide any combination of the listed alarms or call-in events capable of being inhibited from reporting. Use alarm masks separately programmable for the maintenance system and the CC:

(a) Tilt;

(b) Solar Panel;

(c) Battery;

(d) Illumination Lamp;

(e) Microprocessor Card BIT;

(f) TTY Device;

(g) Display;

(h) Inner Door (Unauthorized Entry);

(i) Inner Door (Authorized Entry);

(j) Outer Door Open;

(k) Handset; and

(l) Maintenance Call-in (inhibiting of this event will have the effect of inhibiting periodic status reporting).

Default mask settings will allow the transmission of all alarms and the periodic maintenance call-in.

Provide remotely programmable items capable of being addressed to predesignated groups of emergency telephones. Provide assignable individual call boxes to a designated group. Provide maintenance computer capable of assigning any telephone unit to any group under software control.

New maintenance computer shall be required to support both the new digital emergency telephone units, as well as the existing analog emergency telephone units designated to remain. It is believed that the existing analog emergency telephone units are manufactured by Cubic Communications, Inc. and Comarco Wireless Technologies.

Provide telephone units capable of collecting data on certain operational events with data downloaded to the maintenance computer at selected intervals during the maintenance status calls.

Minimum operational data to be collected:

(1) Detected reorder tones;

(2) Dropped call; and

(3) Alarm activation, time of event.

For purpose of data collection, a "dropped call" is defined as any call that is terminated without receipt of the call termination Dual Tone Multifrequency (DTMF) code.

Provide a telephone unit with the capability to automatically conduct self-diagnostics tests on it's components and electronically report the status of its components, including external solar panel, on a scheduled or as-occurring basis.

Provide status reporting with unit identification automatically accomplished by the telephone unit initiating a call to a maintenance facility at scheduled clock times.

Provide emergency telephone units that meet the operational and reach requirements of the American Disabilities Act Accessibility Guidelines (ADAAG):

(1) Forward Reach. If the clear floor space only allows forward approach to an object, the maximum height of forward reach allowed shall be 48 inches.

(2) Side Reach. If the clear floor space allows parallel approach by a person in a wheelchair, the maximum height of side reach allowed shall be 54 inches.

(3) Operation. Controls and operating mechanism shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist. The force required to activate controls shall be no greater than 5 lbf.

Provide emergency telephone units with integrated TTY interface and "Yes-No" functions to assist hearing and speech impaired callers. Emergency telephone unit shall communicate TTY information with CC utilizing the standard TTY (Baudot) transmission protocol. Emergency telephone unit shall support both Voice Carry Over (VCO) and Hearing Carry Over (HCO).

Provide emergency telephone units constructed with all components contained within a single enclosure with the exception of the antenna, solar power panel, area light, identification strobe light and associated wiring.

Provide new pole mounting assembly, including antenna, solar power panel, area light, identification strobe light and associated wiring.

(1) Antenna. Provide pole top mounted antenna which provides adequate signal strength/coverage for proper operation in accordance with manufacturer's recommendation.

(2) Solar Power Panel. Pole top mounted with integral photocell sensor.

(3) Area Light. Area light shall be pole mounted above emergency telephone to provide illumination for area directly fronting the emergency telephone during evening hours while the telephone is in operation. Area light shall be illuminated upon opening of the exterior door of the emergency telephone and shall be shut off upon closure of exterior door. Area light operation shall also be limited to evening hours only via the integral solar panel photocell sensor.

(4) Identification Strobe Light. Identification strobe light shall be used to assist with locating emergency telephones during evening hours. Strobe light shall be operational during evening hours and controlled by the integral solar panel photocell sensor.

Provide telephone units with a front panel that provides all necessary controls to operate and monitor the telephone unit. Provide the following items:

(1) **Handset.** Ensure entire handset assembly is resistant to water or moisture intrusion. Provide armored cord from the telephone unit to the handset at least 29 inches long. Provide handset earpiece that is hearing aid compatible. Provide a control on the handset or front panel that allows users to adjust volume.

(2) **Operating Instructions.** Provide operating instructions in universally recognized English symbology and text. Provide supplemental instructions for activating TTY interface.

Affix all instructions to the surface of the front panel on adhesive light reflective material in an uninsured location.

(3) **Low Current Drain Panel Illumination.** Provide panel illumination to sufficiently read operating instructions at night or in the periods of low visibility.

(4) **Multi-Line Message Display Screen.** High intensity electroluminescent display. Minimum of four lines of legible text.

(5) **TTY Keyboard and "Yes-No" Function Keys.** Provide TTY keyboard in accordance with standard TTY layout. Provide "Yes-No" function keys to allow caller option to use "yes-no" buttons for quick response to simple questions from the CC.

Provide an outer door designed to protect the handset, operating instructions, illumination source, TTY keyboard, and "yes-no" keys from the weather.

Mount the outer door to open to the right as seen by a motorist standing in front of the telephone unit and facing oncoming traffic. Provide self-closing outer door constructed to allow easy storage of the handset cord when the door is in the closed position.

Provide a telephone unit enclosure made from high strength Lexan polycarbonate structural foam or equivalent non-corrosive material.

Coat the entire telephone enclosure with a high gloss, UV-stabilized polyurethane enamel, yellow No. 13655 (Federal Standard 595-A-Table V) paint, or equivalent at a thickness of 0.002 inch minimum.

Provide a secure electronics compartment containing the following equipment:

(1) Telephone Unit Digital Cellular Transceiver. Able to transmit to and receive from the CC and maintenance computer via the digital cellular network.

Transceiver shall include Global Positioning System (GPS) devices for interface with enhanced 911 system being installed by Verizon Hawaii under the "Wireless Phases 1 and 2" project in accordance with FCC 940-102.

Conform the transceiver to EIA and FCC technical requirements with a two- watt minimum capacity.

Provide logic module with the capability to automatically tune the transceiver to any of 832 Wireline and/or Nonwireline or reserved growth frequencies when commanded by the controlling cell site.

Provide logic assembly capable of initiating calls to any of a minimum of ten (10) preprogrammed phone numbers.

Program transceiver assembly with a 32-bit electronic serial number, the telephone unit ten-digit telephone number and a Station Class Mark.

(2) Telephone Unit Controller. Provide the controller software and/or firmware-controlled logic functions for telephone unit remote and field programming, automatic reporting, alarms and system control.

Provide controller module external to the transceiver for controlling operational features specific to the telephone unit system, functionally equivalent to the control head in a cellular mobile subscriber installation. Provide controller that is remote and field reprogrammable.

(3) Telephone Unit Solar/Battery Power System. Provide rechargeable battery pack(s), rated at a minimum of 17-amp/hours at 13VDC to power the emergency telephone unit. Use a solar power cell assembly mounted in the support standard to recharge the battery pack. Provide battery system capable of providing the manufacturer's specified transceiver input voltage throughout the operating temperature range of minus 30 degrees to plus 60 degrees Centigrade.

Incorporate normal duty cycle calculations allowing a 100 percent margin for reduced solar panel efficiency due to the accumulation of road particle and dirt on the collector panel surface.

Design the battery and solar power system for a minimum life of five years with scheduled maintenance at intervals not less than three months during the contract period. Review factors bearing on system use estimates and warrants that if the power system designed and proposed is inadequate for the actual demand at any site, the Contractor will increase the solar panel and/or battery capacity at no cost to the State.

Provide equipment to automatically regulate the rate of battery charge to compensate for temperature effects and the current state of battery charge. Design the regulator to maintain a trickle charge or constant voltage float with the battery pack(s) at full charge.

Provide battery packs that are easily removable for maintenance exchange purposes.

Provide telephone unit assemblies of high quality, fully solid state, engineered for high reliability and a minimum ten-year life cycle.

Provide controller boards within the telephone unit assembly conformally coated to resist moisture and humidity deterioration. Provide all connectors used in removable or modular assemblies in the telephone unit electronics compartments designated to resist corrosion and loosening of components due to highway vibrations.

Provide a secure inner door to provide weather protections for, and to preclude unauthorized access to the electronic compartment. Provide a weep hole in the bottom of the electronics compartment to allow for drainage of moisture due to condensation.

Provide an internal hinge on one side and a tamper-proof, high security key lock assembly on the other side to fasten the inner door to the enclosure. Other means of fastening that meet weather resistance and vandal resistance requirements may be substituted, except that the key lock assembly is mandatory and no externally-accessible fastener hardware is prohibited.

Provide a pick-proof and drill proof keylock with registered, nonduplicatable keys. Use a combination cam/switch lock or equivalent quality assembly. Protect the key lock entry-way with a cover plate to

prevent acts of vandalism to the key lock assembly. Fasten cover plate with tamper-proof hardware. All emergency telephones shall be master keyed. Prior to end of the warranty period, Contractor shall provide eight (8) sets of keys to the Engineer.

Provide telephone unit assembly capable of operating reliably in a hostile, unprotected highway environment in all conditions of weather and climate expected in the State of Hawaii.

Conform for vandal resistance as defined by Underwriters Laboratory (UL) test method 1037, Sections 50 and 51.

(H) Emergency Telephone Unit Identification Number. Identify each emergency telephone unit with a two-part numeric sequence containing highway and telephone unit milepost information as follows:

(1) First numeric element. Indicate the Interstate or state route number, including directional modifiers as appropriate (e.g., Route No. H-1 traveling in a westerly direction. First numeric element shall be "H1W").

(2) Second numeric element (four digits). Indicate the milepost (MP) location of the telephone unit, rounded to the nearest tenth of a mile (e.g., Telephone at milepost 6.7. Second numeric element shall be "0067")

(3) Submit the telephone unit identification-numbering scheme for acceptance by the Engineer before actual implementation.

(I) Emergency Telephone Subsystem. Provide interface requirements for the emergency telephone subsystem as follows:

(1) Answering functions shall be integrated with the existing enhanced 911 system operations. Contractor shall work with existing enhanced 911 systems engineers (Verizon Hawaii) and Kauai Police Department 911 Dispatch Personnel to seamlessly integrate the answering functions for the new digital emergency telephones into the enhanced 911 system operations. Integration will include both voice and non-voice (TTY) communication. Existing enhanced 911 system currently has the capacity to handle TTY communication.

(2) Provide displayable Automatic Number Identification (ANI) data in a format equivalent to the accepted telephone unit terminal numbering system.

(3) Use Dual Tone Multifrequency (DTMF) signaling for data communications between emergency telephones and the CC. Conform received signal levels at the Communication Center (CC) telephone unit decoding equipment/system to minus twenty to zero dBm.

(4) Provide control for DTMF signaling be standard touch tone telephone instruments.

(5) Provide telephone service terminal or telephone unit originated DTMF sourced with a signal level in the range of minus twelve to zero dBm.

(6) The DTMF character streams passed between the telephone service equipment and telephone unit will be random length and sequence from any or all of the 16 Standard tone groups.

(7) All related equipment will remain transparent to any of these characters or character sequences except as required to use such characters or sequences for automatic telephone unit control functions.

(J) Emergency Telephone Unit Operation. Provide automatic dial with direct access to the appropriate Communications Center.

Initiate unit operation by opening the outer door of the emergency telephone unit and pressing a clearly-marked push button to select type of communication, voice or non-voice (TTY). During evening hours, opening of the outer door will also illuminate the pole mounted area light above.

Place initiated call within an active call queue to be automatically processed without reinitiating the call if a maintenance status or alarm call is in progress at the time the push button is activated.

Provide the capability to reinitiate a call by push button depression if the telephone unit is in the STANDBY or QUIESCENT state.

Provide telephone unit control logic to redial the communications network without motorist intervention until the call is completed to the Communication Center (CC) answering position. Continue redialing for a specified number of attempts. The number of attempts will be provided before system installation.

Provide audible indication that the call was not completed after the maximum number of redial attempts has expired without completion of the call. This indication may be an internally generated busy signal or dial

tone.

(1) Once the incoming call has reached the CC answering position through the Central Office (CO), one of the following events will occur: The call will be immediately answered if a CC operator is available to answer the call; if the operator determines that the call is a TTY call, the operator will transfer the call to the integral tele-type (TTY) interface module.

(2) The call may be manually placed on a temporary hold by the CC operator; or

(3) The queue will be full and the incoming call will receive a busy signal.

If the CC operator answers the call and subsequently places the motorist in a hold condition (for example, to complete call processing or to answer a higher priority call), the motorist will be either verbally instructed or given text instructions via the TTY display to remain on the line until the operator returns. Provide the operator the capability of placing the caller into either an ACTIVE HOLD or a VIRTUAL HOLD condition.

Provide the CC operator the capability to initiate a call back to the telephone unit on virtual hold for a remotely programmable interval. When this period expires, transition the telephone unit from the STANDBY to the QUIESCENT state. Receipt of a CC call-back resets the telephone unit interval timer to the zero condition.

If a conversation in progress is disconnected due to abnormal conditions anywhere in the communications network, or operator termination without the Dual Tone Multiple Frequency (DTMF) termination code, provide the CC operator handling the call at time of disconnect the capability to redial the telephone unit for a set interval. Provide interval not to exceed five minutes and be a firmware parameter set before installation.

Provide the capability to automatically terminate a call in progress by reverting the telephone unit to the QUIESCENT state after a specified, firmware-controlled interval. Provide ability to extend this initial interval for a second, or subsequent firmware-controlled fixed interval by operator action. The State will determine these intervals before installation.

Provide for an automatic system to request the Automatic Number Identification (ANI) from the calling telephone unit at the time the telephone unit is answered. Provide the capability for the CC operator to manually interrogate the telephone unit for ANI data.

At the option of the State, location and other geographically- keyed data will be provided at no additional cost to the State.

Provide that ANI data activate an appropriate operator's display device to show incoming telephone unit identification and if provided, location and other geographically-keyed data.

(K) Radio Frequency (RF) Coverage. Certify RF propagation survey data is consistent with the cellular technology provided and clearly indicate complete RF coverage of all emergency telephones. For sites with inadequate RF coverage, coordinate with the Engineer to determine new emergency telephone locations. Indicate on certification the method of propagation survey, whether synthetic modeling, actual field measurements, or both. Provide all relevant documentation of coverage surveys such as contour overlays, coverage plots, annotated Geodetic Survey charts. Design RF coverage for telephone unit sites to provide P02 access service for signals received at cell sites.

(L) Emergency Telephone Installation. Perform system optimization if required for satisfactory RF coverage by installing and siting a directional antenna assembly on the support standard for maximum signal strength relative to a designated cell site.

Design and provide all components including mounting clamps, brackets, bolts and nuts to minimize the potential damage due to vandalism. Provide tamperproof exposed fastening hardware. Run wiring such as ground straps and antenna cables inside the mounting pole or steel conduit.

Mount and firmly secure telephone unit, antenna, solar panel, grounding rod (as required), mounting hardware and other equipment required for successful operation of the telephone unit secured to the breakaway pole except where details indicate otherwise. Install the emergency telephone unit facing opposite the flow of traffic unless otherwise shown on plans.

Attach the solar panel assembly to the support standard in such a way that the panel can easily be initially oriented or adjusted during the afternoon checks to face in the optimum direction for solar recharging. Assure that final telephone unit sites have adequate access to the sun for solar charging during all seasons. Notify the Engineer if vegetation clearance may be required.

Mount solar power panels at a minimum height of 12 feet above the edge of shoulder elevation.

Design the antenna assembly for installation on top of the telephone unit support standard. Modify the support standard shaft cap accordingly. Antenna assembly shall be vandal resistant and secured with vandal resistant hardware.

Maximum antenna height is 20 feet from existing ground elevation.

Repair damaged zinc-coated surfaces according to Subsection 501.03(G)(2) -Repairing of Damaged Zinc-Coated Surfaces.

Existing emergency telephone system must remain in operation to the maximum extent possible. Therefore, the Contractor shall phase his work to minimize downtime for all existing emergency telephones. Contractor shall coordinate all outages to emergency telephones with the Engineer a minimum of two weeks prior to disconnecting any device. The Engineer shall notify maintenance and Dispatch personnel of any outages.

Upon removal of existing emergency telephone assemblies, Contractor shall deliver existing emergency telephone, area lights, identification strobe lights, solar panels, and antennas to the Department of Transportation, Highways Division, Kauai District baseyard located at 1720 Haleukana Street, Lihue, Kauai for salvage.

(M) Testing. Test each telephone unit in the factory or local service shop for specified equipment performance characteristics before installing the unit in the field. Submit bidder-supplied equipment check sheets to the Engineer before field installation. Incorporate the following information concerning the cellular transceiver: output power, transmit frequency, receiver sensitivity, and modulation deviation, serial number, equipment type and operating frequencies.

After the telephone unit and support standard assembly is installed and before acceptance, test each unit in the field. Inspection consists of checking the front panel and associated illumination lights, checking for proper door and mechanical operation, checking internal electronics compartment, checking for proper system operational sequence, checking for quality of choice reception (both at box and at the Communications Center desk position), checking with the CC for proper reception of box identification and any alarms programmed for the CC monitoring, checking for proper operation of status and alarm reporting feature shall be successfully completed for a minimum of five consecutive days (with the telephone unit bagged to prevent public use) before final acceptance.

Record the above-mentioned checks on a standard sheet and accepted by the Engineer before activating the telephone unit for public

use. Adjust or repair if any abnormal or out-of-tolerance operation is noted while measuring and checking the above items. Repeat seven-day maintenance checks if any of the following components are replaced as a consequence of required repairs: antenna, solar panel, battery pack, controller card, and transceiver.

(N) Warranty. Provide a minimum two-year warranty, from the date of acceptance, by the Engineer, of the complete installation of the new emergency telephones against defective parts. Immediately replace all defective parts and make all necessary adjustments occasioned by such defective parts during the warranty period.

No payments whether partial or final shall be construed to be an acceptance of defective equipment.

Provide repair service during the warranty period for all installed equipment Monday through Friday, except for State holidays. If the equipment cannot be repaired to normal working condition within one working day, replace the equipment immediately pending its repair and return.

Prior to completion of the warranty period, coordinate with the State for the turn over of all equipment to provide continuous operation of the emergency telephones at the end of the warranty period.

(O) Maintenance. The Contractor shall maintain the new emergency telephones during the interim construction period, as well as during the two-year warranty period. This maintenance shall include:

(1) Quarterly Cleaning and Semi-annual Preventive Maintenance. The Contractor shall provide quarterly cleaning and semi-annual preventive maintenance of the new emergency telephones.

Quarterly cleaning shall include the entire telephone assembly, which includes the telephone, cabinet, signs, solar panel, antenna, area light, and strobe light. These quarters are defined as January through March, April through June, July through September, and October through December. Quarterly cleanings shall not occur in consecutive months (e.g., March and April).

The Contractor shall provide preventive maintenance in accordance with the manufacturer's recommendations. Preventive maintenance shall be performed at the sixth, twelfth, eighteenth, and twenty-fourth months of the warranty period.

The Contractor shall submit to the Engineer, annual reports of system status based on its assessment of preventive maintenance and performance inspection records. The report shall be submitted no later than thirty (30) days after each 12-month period and include as a minimum, an assessment of system adequacy and recommendations for system upgrade.

The Contractor shall provide all materials, equipment, traffic control, and tools necessary to complete this work.

(2) Daily Monitoring. The Contractor shall provide daily monitoring of the new emergency telephones.

The Contractor shall utilize the new emergency telephone manufacturer's computer program to check on the following items: processor status, cellular phone status, handset status, tilt status, solar panel status, lamp status, bite status, and inner door alarm status. The Contractor shall remedy these items within 24 hours.

The Contractor shall provide all materials, equipment, traffic control, and tools necessary to complete this work.

(3) Annual Cleaning and Preventive Maintenance for the Maintenance Computer. The Contractor shall clean and maintain the computer, monitors, telephones, and keypads housed at the DOT Kauai District Office. Cleaning shall be done at least once a year and shall include wiping down the exterior of all equipment and the removal of dust from the interior of the computer and monitor. Annual preventive maintenance shall be performed at least once a year and shall include a comprehensive check of the system to ensure that all hardware and software operates properly.

(4) Miscellaneous Requirements.

(a) The Contractor shall record and submit to the Engineer, each maintenance activity per piece of equipment. The record shall consist of work tickets, which contain identification and location of equipment, services, "as found" and "as adjusted to" measurements and FCC check. The record shall be legible and suitable for making legible photocopies.

(b) All reasonable effort shall be expended by the Contractor to restore the system to full operations as soon as possible after notifcation of equipment failure.

(c) The Contractor shall maintain equipment at a level to assure satisfactory operation of the system and in accordance with applicable manufacturer's published specification.

(d) All maintenance work shall be done by a qualified person, either licensed by the FCC, certified by the equipment manufacturer, or one of the various electronic programs now in existence.

(e) The Contractor shall possess a FCC Radio License and have a minimum of two years experience repairing cellular phones and prior experience with cellular call box operation.

(f) The Contractor shall possess a Marconi Cellular Tester Model 2955B or similar for the performance testing of all emergency cellular telephones.

(g) The Contractor shall have a minimum of one spare call box, including telephone, in stock and available for use should replacement be necessary. Should it become necessary for the Contractor to use the spare box, a replacement shall be made available within four weeks of installation.

(P) Repairs. In the event items are damaged as a result of unforeseen circumstances beyond that covered under the warranty described above, such as an automobile knockdown or an act of god, the Contractor shall immediately notify the Engineer of these circumstances. Upon authorization from the Engineer, the Contractor shall troubleshoot, update, reprogram, and repair the new emergency telephones in accordance with the manufacturer's recommendations. This work shall also include, but not be limited to the replacement or repair of any damaged phone, cabinet, sign, solar panel, pole, and/or antenna caused by motor vehicle crashes or vandalism. Original manufacturer's parts or equivalent shall be used for all repairs. The Contractor shall provide all materials, equipment, traffic control, and tools necessary to complete this work.

The Contractor shall respond to every request from the Engineer to address system malfunction and repair issues within 24 hours. The Contractor shall be accessible 24 hours a day to the Kauai Police Department and the Engineer. A 24-hour telephone or pager number shall be submitted to the Kauai Police Department and the Engineer upon contract award.

(Q) Training. Provide instruction for operating staff of 10 people in system operation and operator troubleshooting. Instruction shall consist of one man-day, 8 hours per day, and shall be held during normal business hours. Submit training schedule for acceptance by the Engineer.

Provide instruction for the maintenance staff of 10 people in troubleshooting and preventative maintenance procedures. Instruction shall consist of one man-day, 8 hours per day, and shall be held during normal business hours. Submit training schedule for acceptance by the Engineer.

(R) Digital Cellular Service. The Contractor shall provide new digital cellular service for the new emergency telephones during the construction period, as well as during the two-year warranty period.

Prior to completion of the warranty period, coordinate with the State for the turn over of the digital cellular service to provide continuous operation of the emergency telephones at the end of the warranty period.

664.04 Method of Measurement. The Engineer will measure the emergency telephone assembly per each complete in place.

The Engineer will measure the work associated with integrating answering options of the new emergency telephone system into the existing 911 system operations on a force account basis according to Subsection 109.04 - Extra and Force Account Work.

The Engineer will not measure the installation of the maintenance computer assembly for payment.

The Engineer will measure repair of new emergency telephone assembly on a force account basis according to Subsection 109.04 - Extra and Force Account Work.

The Engineer will not measure the training of operation and maintenance personnel for payment.

The Engineer will measure digital cellular service during warranty period for new emergency telephone per each, per month.

664.05 Basis of Payment. The Engineer will pay for the accepted emergency telephone assembly at the contract unit price per each, complete in place. The price includes full compensation for removing and salvaging existing emergency telephone including telephone unit and appurtenances, and mounting post; removing and disposing existing concrete pad and walkway; removing existing signs; excavating and backfilling; grading; furnishing and installing

mounting post to existing foundation; conducting pre-installation site survey to validate cellular service at emerency telephone location; furnishing and installing emergency telephone unit, wiring, solar power system, and appurtenances; transferring emergency telephone signs to new mounting post; testing; interim cellular service for emergency telephones from installation to final acceptance; getting and furnishing the warranty; maintenance from installation to completion of the warranty period; and furnishing materials, equipment, tools, labors and other incidentals necessary to complete the work.

The Engineer will pay for the accepted 911 system integration on a force account basis according to Subsection 109.04 - Extra and Force Account Work. . The price includes full compensation for all coordination work with the State, Verizon Hawaii and Kauai Police 911 Dispatch; all utility service charges; implementation of system integration procedures; system operational tests; furnishing labor, materials, equipment, tools, and incidentals necessary to complete the work.

The Engineer will pay for the installation of the maintenance computer assembly on a contract lump sum basis. The price includes full compensation for furnishing and installing the maintenance computer assembly and associated software; programming for collection of maintenance information from both new callboxes and existing callboxes to remain; making required tests; cleaning and maintenance; furnishing labor, materials, equipment, tools, and incidentals necessary to complete the work.

The Engineer will pay for the repair of new emergency telephone assembly on a force account basis according to Subsection 109.04- Extra and Force Account Work.

The Engineer will pay for the training of operation and maintenance personnel on a contract lump sum basis. The price includes full compensation for conducting training sessions for operators and maintenance personnel on system operation, troubleshooting, and preventative maintenance procedures; furnishing labor, materials, equipment, tools and incidentals necessary to complete work.

The Engineer will pay for digital cellular service during warranty period for new emergency telephones per month. The price includes full compensation for furnishing materials, equipment, tools, labors and other incidentals necessary to complete the work.

Pay Item	**Pay Unit**
Emergency Telephone Assembly	Each
Answering System Integration into Existing 911 System	Force Account

Maintenance Computer Assembly	Lump Sum
Repair of New Emergency Telephone Assembly	Force Account
Training of Operation and Maintenance Personnel	Lump Sum
Digital Cellular Service During Warranty Period for New Emergency Telephone	Per Month"

END OF SECTION