Honolulu Fire Department
Command Vehicle
Production Specification

Contents

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INTERNET IN-PROCESS SITE

The Bidder shall post and maintain a website where the Honolulu Fire Department will be able to view digital images of their apparatus as its being manufactured. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of the apparatus.

RESPONSIBILITY OF PURCHASER

It shall be the responsibility of the purchaser to specify the following details of the apparatus:

1) Its required performance, including where operations at elevations above 2000 ft (600 m) or on grades greater than 6 percent are required
2) The maximum number of fire fighters to ride within the apparatus
3) Specific electrical loads that are to be part of the minimum continuous electrical load defined in 13.3.3
4) Any hose, ground ladders, or equipment to be carried by the apparatus that exceed the minimum requirements of this standard
5) If a trailer for the purpose of transporting fire rescue response equipment, whether it is a Type I, Type II, or Type III configuration

After acceptance of the fire apparatus, the purchaser shall be responsible for ongoing training of personnel to develop and maintain proficiency regarding the proper and safe use of the apparatus and the associated equipment.

RESPONSIBILITY OF CONTRACTOR

The contractor shall provide a detailed description of the apparatus, a list of equipment to be furnished, and other construction and performance details to which the apparatus shall conform.

The detailed description of the apparatus shall include, but shall not be limited to, estimated in-service weight, wheelbase, turning clearance radius, principal dimensions, angle of approach, angle of departure, transmission, and axle ratios.

The contractor's detailed description shall include a statement specifically describing each aspect of the delivered apparatus that will not be fully compliant with the requirements of this standard.

The purpose of these contractor specifications shall be to define what the contractor intends to furnish and deliver to the purchaser.

Responsibility for the apparatus and equipment shall remain with the contractor until they are accepted by the purchaser.

LEGAL REQUIREMENTS

The apparatus shall comply with all applicable federal and state or provincial laws and regulations.

PERSONNEL PROTECTION

Guards, shields, or other protection shall be provided where necessary in order to prevent injury of personnel by hot, moving, or rotating parts during non maintenance operations.

Electrical insulation or isolation shall be provided where necessary in order to prevent electrical shock from onboard electrical systems.

Vehicular workmanship shall ensure an operating environment free of accessible sharp projections and edges.

Safety-related (caution, warning, danger) signs shall meet the requirements of ANSI Z535.4, *Product Safety Signs and Labels*.

CONTROLS AND INSTRUCTIONS

Illumination shall be provided for controls, switches, instruction plates, labels, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it.

If external illumination is provided, it shall be a minimum of 5 fc (50 lx) on the face of the device.

If internal illumination is provided, it shall be a minimum of 4 footlamberts (14 cd/m2).

All required signs, instruction plates, and labels shall be permanent in nature and securely attached and shall meet the requirements of NFPA and UL 969, *Standard for Marking and Labeling Systems*.

The signs, instruction plates, and labels shall have resistance to damage from temperatures between –30°F and 176°F (–35°C and 80°C) and exposure to oil, fuel, water, hydraulic fluids, or other fluids used on the apparatus.

The exterior mounted labels relating to safety or critical operational instructions shall be reflective or illuminated as required by NFPA.

The centerline of any gauge or visual display required by this standard shall be no more than 84 in. (2130 mm) above the level where the operator stands to read the instrument.

The central midpoint or centerline of any control shall be no more than 72 in. (1830 mm) vertically above the ground or platform that is designed to serve as the operator's standing position.

COMPONENT PROTECTION

Hydraulic hose lines, air system tubing, control cords, and electrical harnesses shall be mechanically attached to the frame or body structure of the apparatus with protective looms, grommets, or other devices at each point where they pass through body panels or structural members or wherever they lie against a sharp metal edge.

A through-the-frame connector shall be permitted to be used in place of protective looms or grommets.

VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS

The cab/chassis shall be equipped with a stability control system. The system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer, and individual wheel brake controls.

WEIGHT DISTRIBUTION

When the fire apparatus is loaded to its estimated in-service weight, the front-to-rear weight distribution shall be within the limits set by the chassis manufacturer.

The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer under full load and all other loading conditions.

LOAD DISTRIBUTION

The apparatus manufacturer shall calculate the load distribution for the apparatus, and that load distribution plan shall be delivered with the fire apparatus.

The manufacturer shall engineer the fire apparatus to comply with the gross axle weight ratings (GAWR), the overall gross vehicle weight rating (GVWR), and the chassis manufacturer's load balance guidelines.

The fire apparatus, when loaded to its estimated in service weight, shall have a side-to-side tire load variation of no more than 7 percent of the total tire load for that axle.

Each tire shall be equipped with a visual indicator or monitoring system that indicates tire pressure.

ROADABILITY

The apparatus, when loaded to its estimated in-service weight, shall be capable of the following performance while on dry, paved roads that are in good condition:

6) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
7) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
8) The apparatus shall be able to maintain a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.

The maximum top speed of fire apparatus with a GVWR over 26,000 lb (11,800 kg) shall not exceed either 68 mph (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (85 km/ hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

SERVICEABILITY

The fire apparatus shall be designed to allow the manufacturer's recommended routine maintenance checks of lubricant and fluid levels to be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

CONSTRUCTION DOCUMENTATION

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

The manufacturers record of apparatus construction details, including the following information:

9) Owner's name and address
10) Apparatus manufacturer, model, and serial number
11) Chassis make, model, and serial number
    a) GAWR of front and rear axles and GVWR
    b) Front tire size and total rated capacity in pounds (kilograms)
    c) Rear tire size and total rated capacity in pounds (kilograms)
    d) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
    e) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
    f) Type of fuel and fuel tank capacity
    g) Electrical system voltage and alternator output in amps
    h) Battery make, model, and capacity in cold cranking amps (CCA)
    i) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
12) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
13) Pump transmission make, model, serial number, and gear ratio
14) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
15) Water and Foam tank certified capacity in gallons or liters
16) Paint manufacturer and paint number(s)
17) Company name and signature of responsible company representative
18) If the apparatus is a mobile foam fire apparatus, the certification of foam tank capacity
19) Certification of compliance of the optical warning system
20) Siren manufacturer's certification of the siren
21) Written load analysis and results of the electrical system performance tests
22) Certification of slip resistance of all stepping, standing, and walking surfaces
23) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
24) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions
25) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
26) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
27) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
28) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
29) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
30) When the apparatus is equipped with a water tank, the certification of water tank capacity
31) If the apparatus has an aerial device, the certification of inspection and test for the aerial device
32) If the apparatus has an aerial device, all the technical information required for inspections to comply with NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus
33) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
34) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
35) If the apparatus has a line voltage power source, the certification of the test for the power source
36) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification, and the results of the testing of the air system installation
37) Any other required manufacturer test data or reports.

OPERATIONS AND SERVICE DOCUMENTATION

The contractor shall deliver with the fire apparatus at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

The contractor shall also deliver with the fire apparatus the following documentation for the entire apparatus and each major operating system or major component of the apparatus:

38) Manufacturer's name and address
39) Country of manufacture
40) Source for service and technical information
41) Parts replacement information
42) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
43) Wiring diagrams for low voltage and line voltage systems to include the following information:
    j) Pictorial representations of circuit logic for all electrical components and wiring
    k) Circuit identification
    l) Connector pin identification
    m) Zone location of electrical components
    n) Safety interlocks
    o) Alternator–battery power distribution circuits
    p) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
44) Lubrication charts
45) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
46) Precautions related to multiple configurations of aerial devices, if applicable
47) Instructions regarding the frequency and procedure for recommended maintenance
48) Overall apparatus operating instructions
49) Safety considerations
50) Limitations of use
51) Inspection procedures
52) Recommended service procedures
53) Troubleshooting guide
54) Apparatus body, chassis, and other component manufacturer's warranties
55) Special data required by this standard
56) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The contractor shall deliver with the apparatus all manufacturers' operations and service documents supplied with components and equipment that are installed or supplied by the contractor.

NFPA REQUIRED DOCUMENTATION FORMAT - CD-ROM

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a CD-ROM. These manuals shall be divided into sections for ease of reference. There shall be two (2) copies of the CD-ROM provided with the completed vehicle.

There shall be two (2) printed copies of the manual provided with the apparatus.

TESTING

ROAD TEST

Road test shall be conducted in accordance with this section to verify that the completed apparatus is capable of compliance with Roadability Section.

The tests shall be conducted at a location and in a manner that does not violate local, state or provincial, or federal traffic laws.

The tests shall be conducted on dry, level, paved roads that are in good condition. The apparatus shall be loaded to its estimated in service weight.

The engine shall not operate in excess of the maximum governed speed. Acceleration tests shall consist of two runs in opposite directions over the same route. The fire apparatus shall attain a speed of 35 mph (55 km/hr) from a standing start within 25 seconds. The fire apparatus shall attain a minimum top speed of 50 mph (80 km/hr).

If the apparatus is equipped with an auxiliary braking system, the manufacturer shall road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

If the apparatus is equipped with an air brake system, the service brakes shall bring the apparatus, when loaded to it's GVWR, to a complete stop from an initial speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil, or grease.

If the apparatus is equipped with a hydraulic brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil, or grease.

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

The vehicles low voltage electrical system shall be tested and certified by the manufacturer. The certified test results shall be delivered with the completed vehicle. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C).

TEST SEQUENCE

The following three (3) tests shall be performed in the order in which they appear below. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for 10 minutes. Failure of any of these tests shall require a repeat of the sequence.

1. RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off, and the minimum continuous electrical load shall be activated for 10 minutes.

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure of the battery system.

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of 2 hours. Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the warning system required in 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system, 23.6 V dc for a 24 V nominal system, or 35.4 V dc for a 42 V nominal system for more than 120 seconds shall be considered a test failure.

3. LOW VOLTAGE ALARM TEST

The following test shall be started with the engine off and the battery voltage at or above 12 V for a 12 V nominal system, 24 V for a 24 V nominal system, or 36 V for a 42 V nominal system.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm does not sound in less than 140 seconds after the voltage drops to 11.70 V for a 12 V nominal system, 23.4 V dc for a 24 V nominal system, or 35.1 V for a 42 V nominal system.

The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

57) Documentation of the electrical system performance tests
58) A written electrical load analysis, including the following:
    q) The nameplate rating of the alternator
    r) The alternator rating
    s) Each of the component loads specified that make up the minimum continuous electrical load
    t) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
    u) Each individual intermittent electrical load.

UL 120/240 VAC CERTIFICATION

The 120/240 volt electrical system shall be tested and certified by Underwriters Laboratories, to perform as listed below;

The prime mover shall be started from a cold start condition, and the unloaded voltage and frequency shall be recorded.

The line voltage electrical system shall be loaded to at least 100 % of the continuous rated wattage stated on the power source specification label. Testing with a resistive load bank shall be permitted.

The power source shall be operated in the manner specified by the apparatus manufacturer as documented on instruction plates or in operation manuals. The power source shall be operated at a minimum of 100 % of the continuous rated wattage as stated on the power source specification label for a minimum of 2 hours.

The load shall be adjusted to maintain the output wattage at or above the continuous rated wattage during the entire 2-hour test.

The following conditions shall be recorded at least every 1/2 hour during the test:

59) The power source output voltage, frequency, and amperes
60) The prime mover's oil pressure, water temperature, and transmission temperature, if applicable
61) The power source hydraulic fluid temperature, if applicable
62) The ambient temperature and power source air inlet temperature

The following conditions shall be recorded once during the test for power sources driven by dedicated auxiliary internal combustion engines:

1) Altitude
2) Barometric pressure
3) Relative humidity

If the generator is driven by the chassis engine and the generator allows for operation at variable speeds, the chassis engine speed shall be reduced to the lowest rpm allowed for generator operation and the voltage and frequency shall be recorded.

The load shall be removed, and the unloaded voltage and frequency shall be recorded.

Voltage shall be maintained within ±10 % of the voltage stated on the power source specification label during the entire test. Frequency shall be maintained within ±3 Hz of the frequency stated on the power source specification label during the entire test.

The total continuous electrical loads, excluding those loads associated with the equipment defined in NFPA 22.15.7.3.11.2, shall be applied during the testing unless an auxiliary engine drives the power source.

If the apparatus is equipped with a fire pump, the 2-hour certification test of the power source shall be completed with the fire pump pumping at 100 % capacity at 150 psi (1000 kPa) net pump pressure. The test shall be permitted to be run concurrently with the pump certification test.

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

The results of each test shall be recorded on an appropriate form and provided with the delivery of the fire apparatus.

DIELECTRIC VOLTAGE WITHSTAND TEST

The line voltage wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for 1 minute. The testing shall be performed after all body work has been completed.

The test shall be conducted as follows:

4) Isolate the power source from the panel board and disconnect any solid state low voltage components
5) Connect one lead of the dielectric tester to all the hot and neutral buses tied together
6) Connect the other lead to the fire apparatus frame or body
7) Close any switches and circuit breakers in the circuit(s)
8) Apply the dielectric voltage for 1 minute in accordance with the testing equipment manufacturer's instructions

The electrical polarity of all permanently wired equipment, cord reels, and receptacles shall be tested to verify that wiring connections have been properly made.

Electrical continuity shall be verified from the chassis or body to all line voltage electrical enclosures, light housings, motor housings, light poles, switch boxes, and receptacle ground connections that are accessible to fire fighters in normal operations.

If the apparatus is equipped with a transfer switch, it shall be tested to verify operation and that all non grounded conductors are switched.

Electrical light towers, floodlights, motors, fixed appliances, and portable generators shall be operated at their full rating or capacity for 30 minutes to ensure proper operation.

PERFORMANCE BOND

The successful Bidder will be required to provide a 100% performance bond in the amount equivalent to the total amount of its bid including any additional options that may have been given. Performance bond shall be provided within two (2) weeks after notice of award.

If the Bidder to whom the contract is awarded, refuses or neglects to execute, or fails to furnish the required 100% performance bond within two (2) weeks after notice, the amount of his deposit may be forfeited and retained by the Honolulu Fire Department as liquidated damages.

The terms of the performance bond shallcontinue one (1) year after completion and delivery of the apparatus.

WARRANTY BOND

A warranty bond shall be provided by the successful Contractor. The bond shall ensure prompt and complete compliance with all provisions of the standard one (1) year warranty as described in these specifications. Warranty bond shall provide for one (1) additional year, for a total of two (2) years of warranty performance.

WARRANTY

A full statement shall be provided of the warranties for the vehicle(s) being bid. Warranties should clearly describe the terms under which the vehicle manufacturer accepts responsibility for the cost to repair defects caused by faulty design, quality of work or material, and for the applicable period of time after delivery.

Cost of repairs refers to all costs related thereto including, but not limited to, the cost of materials, and the cost of labor.

The Body Manufacturer shall warrant all materials and accessories used on the vehicle(s), whether fabricated by manufacturer or purchased from an outside source, and will deal directly with the Honolulu Fire Department on all warranty work.

GENERAL LIMITED WARRANTY - ONE (1) YEAR

The vehicle shall be free of defects in material and workmanship for a period of one (1) year or 12,000 miles, whichever occurs first starting thirty (30) days after the original invoice date.

The contractor must be the "single source" coordinator of all warranties on the vehicle.

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

The vehicle low voltage electrical system shall be free of defects in material and workmanship for a period of five (5) years or 60,000 miles, whichever occurs first, starting thirty (30) days after the original invoice date.

STRUCTURAL WARRANTY - TEN (10) YEARS

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles whichever occurs first, starting thirty (30) days after the original invoice date.

PAINT LIMITED WARRANTY - TEN (10) YEARS

The body shall be free of bubbling, or peeling as a result of a defect in the method of manufacture for a period of ten (10) years, or 100,000 miles whichever occurs first, starting thirty (30) days after the original invoice date.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred sixty five (365) days after receipt of a purchase order, or contract.

Contractor shall not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor shall provide immediate written notice to Honolulu Fire Department as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT

The overall height (OAH) of the vehicle shall be approximately 152" (12' - 8") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 396" (33' - 0").

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference shall be required, at the contractor's factory for three (3) personnel from the Honolulu Fire Department to finalize all construction details prior to manufacturing.

The contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-construction conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

Prior to finalizing the travel arrangements, the Contractor shall first contact the authorized Honolulu Fire Department personnel to get approval of the flight connections and time frames for the trip. The Contractor shall make all reasonable attempts to book the most direct connection within the shortest period of time for the personnel.

The preconstruction conference shall be for a minimum of five (5) days, two (2) days of travel and three (3) days for the preconstruction conference. The time frame for the preconstruction conference, as well as any transportation, lodging, meals and related expenses as allowed, shall be included in the unit price.

FINAL INSPECTION CONFERENCE

A final inspection conference shall be required, at the contractor's factory for three (3) personnel from the Honolulu Fire Department to inspect the vehicle and construction details prior to shipment of the completed vehicle. This inspection shall take place after any specified striping and lettering is installed.

The contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-construction conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

Prior to finalizing the travel arrangements, the Contractor shall first contact the authorized Honolulu Fire Department personnel to get approval of the flight connections and time frames for the trip. The Contractor shall make all reasonable attempts to book the most direct connection within the shortest period of time for the personnel.

The preconstruction conference shall be for a minimum of five (5) days, two (2) days of travel and three (3) days for the preconstruction conference. The time frame for the preconstruction conference, as well as any transportation, lodging, meals and related expenses as allowed, shall be included in the unit price.

OCEAN DELIVERY

The vehicle shall be delivered to the mainland port by Pasha Hawaii Transport Lines. The vehicle will be cleaned and detailed prior to loading for shipment to Honolulu, HI.

After delivery to port in Honolulu the selling Hawaii motor vehicle dealer will deliver the unit to Honolulu Fire Department with full tank of fuel, completely cleaned, and ready for service.

DELIVERY AND DEMONSTRATION

The contractor shall be responsible for the delivery of the completed unit to the Honolulu Fire Departments location. On initial delivery of the apparatus, the contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the Honolulu Fire Department regarding the operation, care, and maintenance of the apparatus and equipment supplied at Honolulu Fire Department location.

The delivery engineer shall set delivery and instruction schedule with the person appointed by Honolulu Fire Department.

After delivery of the apparatus, the Honolulu Fire Department shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

Honolulu Fire Department
Command Vehicle
Production Specification

CAB/CHASSIS SPECIFICATION

Model Profile
2011 4400 SBA 4X2 (MA035)

APPLICATION:	Emergency
MISSION:	Requested GVWR: 40600. Calc. GVWR: 0 Calc. Start / Grade Ability: 0% / 0% @ 0 MPH Calc. Geared Speed: N/A
FUEL ECONOMY:	N/A
DIMENSION:	Wheelbase: 228.00, CA: 160.90, Axle to Frame: 100.00
ENGINE, DIESEL:	{MaxxForce 9} EPA 10, 330 HP @ 2000 RPM, 950 lb-ft Torque @ 1200 RPM, 2200 RPM Governed Speed
TRANSMISSION, AUTOMATIC:	{Allison 3000EVS_P} 4th Generation Controls; Close Ratio, 5-Speed; With Overdrive, Includes Oil Level Sensor, With Provision for PTO, Less Retarder, Max. GVW N/A
CLUTCH:	Omit Item (Clutch & Control)
AXLE, FRONT NON-DRIVING:	{Meritor MFS-14-143A} Wide Track, I-Beam Type, 14,000-lb Capacity
AXLE, REAR, SINGLE:	{Dana Spicer S23-170} Single Reduction, 23,000-lb Capacity, R Wheel Ends Gear Ratio: 5.57
CAB:	Conventional
TIRE, FRONT:	(2) 12R22.5 XZY-3 (MICHELIN) 483 rev/mile, load range H, 16 ply
TIRE, REAR:	(4) 315/80R22.5 XZY-3 (MICHELIN) 486 rev/mile, load range L, 20 ply
SUSPENSION, RR, SPRING, SINGLE:	Vari-Rate; 31,000-lb Capacity, With 4500 lb Auxiliary Rubber Spring
PAINT:	Cab schematic 100GA Location 1: 9031, White (Prem) Chassis schematic N/A

Description
Base Chassis, Model 4400 SBA 4X2 with 228.00 Wheelbase, 160.90 CA, and 100.00 Axle to Frame.

TOW HOOK, FRONT (2) Inside Rail, Frame Mounted.

FRAME RAILS Heat Treated Alloy Steel (120,000 PSI Yield); 10.250" x 3.610" x 0.375" (260.4mm x 91.7mm x 9.5mm); 456.0" (11582mm) Maximum OAL

BUMPER, FRONT Full Width, Aerodynamic, Chrome Plated Steel; 0.142" Material Thickness

CROSSMEMBER, REAR, AF (01)

WHEELBASE RANGE 199" (505cm) Through and Including 254" (645cm)

AXLE, FRONT NON-DRIVING {Meritor MFS-14-143A} Wide Track, I-Beam Type, 14,000-lb Capacity
SPRINGS, FRONT AUXILIARY Rubber

SUSPENSION, FRONT, SPRING Parabolic, Taper Leaf; 14,000-lb Capacity; With Shock Absorbers
Includes:
SPRING PINS Rubber Bushings, Maintenance-Free

BRAKE SYSTEM, AIR Dual System for Straight Truck Applications
Includes:
BRAKE LINES Color and Size Coded Nylon
DRAIN VALVE Twist-Type
GAUGE, AIR PRESSURE (2) Air 1 and Air 2 Gauges; Located in Instrument Cluster
PARKING BRAKE CONTROL Yellow Knob, Located on Instrument Panel
PARKING BRAKE VALVE For Truck
QUICK RELEASE VALVE Bendix On Rear Axle for Spring Brake Release1 for 4x2, 2 for 6x4
SLACK ADJUSTERS, FRONT Automatic
SLACK ADJUSTERS, REAR Automatic
SPRING BRAKE MODULATOR VALVE R-7 for 4x2, SR-7 with relay valve for 6x4

BRAKES, REAR, AIR CAM
Regardless of Axle/Suspension Ordered.
Rear Axle is Limited to 20,000-lb GAWR with Code 04091 BRAKE SYSTEM, AIR and Code 04NCG

BRAKES, REAR, AIR CAM
Regardless of Axle/Suspension Ordered.
Rear Axle is Limited to 23,000-lb GAWR with Code 04091 BRAKE SYSTEM, AIR and Standard Rear Air

DRAIN VALVE {Berg} Manual; With Pull Chain, for Air Tank
Includes:
DRAIN VALVE Mounted in Wet Tank

AIR BRAKE ABS {Bendix AntiLock Brake System} Full Vehicle Wheel Control System (4-Channel)

AIR DRYER {Bendix AD-IP} With Heater

BRAKE CHAMBERS, FRONT AXLE {Haldex} 20 SqIn

BRAKE CHAMBERS, REAR AXLE {MGM TR3030LP3TSHD} 30/30 Spring Brake
Includes:
BRAKE CHAMBERS, SPRING (2) Rear Parking; WITH TRUCK BRAKESAll 4x2, 4x4; WITH

TRACTOR BRAKESAll 4x2, 4x4; 6x4 & 6x6 with Rear Tandem Axles Less Than 46,000-lb. or GVWR Up To 54,000-lb.

BRAKES, FRONT, AIR CAM S-Cam; 16.5" x 5.0"; Includes: 20 Sq. In. Long Stroke Brake Chambers
Notes
Front Axle with 14,000-lb GAWR is Limited to 13,200-lb GAWR when used in Conjunction with 15" BRAKES, FRONT, AIR CAM.

SLACK ADJUSTERS, FRONT {Haldex} Automatic

SLACK ADJUSTERS, REAR {Haldex} Automatic

BRAKES, REAR, AIR CAM S-Cam; 16.5" x 7.0"; Includes: 30/30 Sq.In. Long Stroke Brake Chamber and Spring Actuated Parking Brake

AIR COMPRESSOR {Bendix Tu-Flo 550} 13.2 CFM Capacity

AIR TANK Polished Aluminum, With Straight Thread O-Ring Ports

STEERING COLUMN Tilting and Telescoping

STEERING WHEEL 2-Spoke, 18" Diam., Black

STEERING GEAR {TRW (Ross) THP45} Power

EXHAUST SYSTEM Single, Horizontal, Aftertreatment Device Frame Mounted Right Side Under Cab; Includes: Vertical Tail Pipe & Bright Guard
Includes:
- EXHAUST HEIGHT 10' Exhaust Height - Based on Empty Chassis with Standard Components (+ or - 1" Height)

ENGINE COMPRESSION BRAKE for MaxxForce I6 Engines; Electronically Activated

TAIL PIPE (1) Straight Type, Bright, for Single Exhaust

SWITCH, FOR EXHAUST 2 Position, Lighted & Latching, ON/OFF Type, Mounted in IP, Inhibits Diesel Particulate Filter Regeneration as Long as Switch is in ON Position

ELECTRICAL SYSTEM 12-Volt, Standard Equipment
Includes:
- BATTERY BOX Steel
- DATA LINK CONNECTOR For Vehicle Programming and Diagnostics In Cab
- FUSES, ELECTRICAL SAE Blade-Type
- HAZARD SWITCH Push On/Push Off, Located on Top of Steering Column Cover
- HEADLIGHT DIMMER SWITCH Integral with Turn Signal Lever
- HORN, ELECTRIC Single
- JUMP START STUD Located on Positive Terminal of Outermost Battery
- PARKING LIGHT Integral with Front Turn Signal and Rear Tail Light
- STARTER SWITCH Electric, Key Operated
- STOP, TURN, TAIL & B/U LIGHTS Dual, Rear, Combination with Reflector
- TURN SIGNAL SWITCH Self-Cancelling for Trucks, Manual Cancelling for Tractors, with Lane Change Feature
- TURN SIGNALS, FRONT Includes: Reflectors and Auxiliary Side Turn Signals, Solid State Flashers; Flush Mounted
- WINDSHIELD WIPER SWITCH 2-Speed with Wash and Intermittent Feature (5 Pre-Set Delays), Integral with Turn Signal Lever
- WINDSHIELD WIPERS Single Motor, Electric, Cowl Mounted
- WIRING, CHASSIS Color Coded and Continuously Numbered

HORN, ELECTRIC (2)

IGNITION SWITCH Keyless

POWER SOURCE Cigar Type Receptacle without Plug and Cord

ALTERNATOR {Leece-Neville 14931PAH} Brush Type, 12 Volt 320 Amp. Capacity, Pad Mounted

BODY BUILDER WIRING Back of Standard Cab at Left Frame or Under Extended or Crew Cab at Left Frame; Includes: Sealed Connectors for Tail/Amber Turn/Marker/ Backup/Accessory Power/Ground and Sealed Connector for Stop/Turn

BATTERY SYSTEM {International} Maintenance-Free (3) 12-Volt 2775CCA Total

RADIO {International} AM/FM Premium Stereo, With CD Player, Weatherband, Clock, Front & Rear Aux Input, USB Port, and Multiple Coaxial Speakers, Includes: iPod Command and Control
Includes:
SPEAKERS IN CAB (2) Coaxial with Deluxe Interior
SPEAKERS IN CAB (4) Coaxial with Premium Interior

BACK-UP ALARM Electric, 102 dBA

DATA RECORDER Includes: Display Mounted in Overhead Console

JUMP START STUD Remote Mounted
Includes:
JUMP START STUD Mounted to Battery Box

ALTERNATOR PULLEY 2.4" Diameter for Increased Alternator Output at Idle; for Fire Truck Application With International Engines, Must Include Fire Truck Identity Code

SWITCH, AIR HORN, PASSENGER Fire Truck Application; Switch Located in Instrument Panel Close to Passenger, Driver Also To Activate Switch at Steering Wheel

HORN, AIR ACCOMMODATION PACKAGE; less Horn.

BATTERY DISCONNECT SWITCH {Joseph Pollak} for Cab Power Disconnect Switch; Lever Operated, Disconnects Power to PDC, Does Not Disconnect Charging Circuits, Cab Mounted

FOG LIGHTS (2) Clear, Oval, With H355W Halogen Bulb

STARTING MOTOR {Delco Remy 38MT Type 300} 12 Volt; less Thermal Over-Crank Protection

INDICATOR, LOW COOLANT LEVEL With Audible Alarm

HEADLIGHTS Halogen; Composite Aero Design for Two Light System

INDICATOR, BATTERY WARNING Green BATTERY ON Indicator, Mounted on Left Side of Instrument Panel, To be Used with Factory Installed or Customer Mounted Battery Disconnect Switch

CIRCUIT BREAKERS Manual-Reset (Main Panel) SAE Type III With Trip Indicators, Replaces All Fuses Except For 5-Amp Fuses

SWITCH, AUXILIARY Switch 40 amp Circuit for Customer Use; Includes: Wiring Connection at PDC and Control in Cab

GRILLE Chrome

INSULATION, UNDER HOOD for Sound Abatement

INSULATION, SPLASH PANELS for Sound Abatement

BUG SCREEN Front End; Mounted Behind Grille

FRONT END Tilting, Fiberglass, With Three Piece Construction

GRILLE EMBER SCREEN Mounted to Grille to Keep Hot Embers out of Engine Air Intake System

PAINT SCHEMATIC, PT-1 Single Color, Design 100
Includes:
PAINT SCHEMATIC ID LETTERS "GA"

PAINT TYPE Base Coat/Clear Coat, 1-2 Tone

PAINT CLASS Premium Color.

KEYS,- ALL ALIKE, ID Z-001

CLUTCH Omit Item (Clutch & Control)

ENGINE, DIESEL {MaxxForce 9} EPA 10, 330 HP @ 2000 RPM, 950 lb-ft Torque @ 1200 RPM, 2200 RPM Governed Speed
Includes:
AIR COMPRESSOR AIR SUPPLY LINE Naturally-Aspirated
COLD STARTING EQUIPMENT Intake Manifold Electric Grid Heater with Engine ECM Control
CRUISE CONTROL Electronic; Controls Integral to Steering Wheel
ENGINE OIL DRAIN PLUG Magnetic
ENGINE SHUTDOWN Electric, Key Operated
FUEL FILTER Included with Fuel/Water Separator
FUEL/WATER SEPARATOR Fuel/Water Separator and Fuel Filter in a Single Assembly; With Water-in-Fuel Sensor; Engine Mounted
GOVERNOR Electronic
OIL FILTER, ENGINE Spin-On Type
WET TYPE CYLINDER SLEEVES

FAN DRIVE {Horton Drivemaster} Direct Drive Type, Two Speed With Residual Torque Device for Disengaged Fan Speed
Includes:
FAN Nylon

RADIATOR Aluminum; 2-Row, Cross Flow, Over Under System, 1045 SqIn Louvered, With 373 SqIn CAC, With 369 SqIn LTR, With In Tank Transmission Oil Cooler
Includes:
ANTI-FREEZE Red Shell Rotella Extended Life Coolant; -40 Degrees F/ -40 Degrees C; for MaxxForce Pre-2010 Engines
DEAERATION SYSTEM with Surge Tank
HOSE CLAMPS, RADIATOR HOSES Gates Shrink Band Type; Thermoplastic Coolant Hose Clamps
RADIATOR HOSES Premium, Rubber

FEDERAL EMISSIONS for 2010; MaxxForce 9 & 10 Engines

AIR CLEANER With Service Protection Element
Includes:
GAUGE, AIR CLEANER RESTRICTION Air Cleaner Mounted

THROTTLE, HAND CONTROL Engine Speed Control; Electronic, Stationary, Variable Speed; Mounted on Steering Wheel

ENGINE CONTROL, REMOTE MOUNTED Provision for; Includes: Wiring for Body Builder Installation of

PTO Controls; With Ignition Switch Control for MaxxForce post 2007 Emissions Electronic Engines

FAN DRIVE SPECIAL EFFECTS Fan Cooling Ring with Fan Shroud Effects, Engine Mounted

ENGINE WATER COOLER {Sen-Dure} Auxiliary, For Use With Fire Trucks

EMISSION COMPLIANCE Federal, Does Not Comply With California Clean Air Regulations

TRANSMISSION, AUTOMATIC {Allison 3000EVS_P} 4th Generation Controls; Close Ratio, 5-Speed; With Overdrive, Includes: Oil Level Sensor, With Provision for PTO, Less Retarder, Max. GVW N/A
Includes:
- OIL FILTER, TRANSMISSION Mounted on Transmission
- TRANSMISSION OIL PAN Magnet in Oil Pan

TRANSMISSION SHIFT CONTROL {Allison} Push-Button Type; for Allison 3000 & 4000 Series Transmission

TRANSMISSION OIL Synthetic; 29 thru 42 Pints

ALLISON SPARE INPUT/OUTPUT for Emergency Vehicle Series (EVS); Fire/Pumper, Tank, Aerial/Ladder

SHIFT CONTROL PARAMETERS Allison Performance Programming in Primary and Allison Economy Programming in Secondary

AXLE, REAR, SINGLE {Dana Spicer S23-170} Single Reduction, 23,000-lb Capacity, R Wheel Ends . Gear Ratio5.57
Includes:
- REAR AXLE DRAIN PLUG (1) Magnetic, For Single Rear Axle

SUSPENSION, RR, SPRING, SINGLE Vari-Rate; 31,000-lb Capacity, With 4500 lb Auxiliary Rubber Spring

AXLE, REAR, LUBE {EmGard 75W-90} Synthetic Oil; 30 thru 39.99 Pints

FUEL TANK (2) Top Draw; D-Style, 19" Tank Depth, Polished Aluminum, 50 U.S. Gal., 190 L, Right Side, 70 U.S. Gal., 265L 120 U.S. Gal., 455L Capacity Total, With Quick Connect Outlet, Mounted Under Cab Right And Left Side

FUEL/WATER SEPARATOR With Thermostatic Fuel Temperature Controlled Electric Heater, and Filter Restriction/Change Indicator, Includes: Standard Equipment Water-in-Fuel Sensor

CAB Conventional
Includes:
- ARM REST (2) Molded Plastic; One Each Door
- CLEARANCE/MARKER LIGHTS (5) Flush Mounted
- COAT HOOK, CAB Located on Rear Wall, Centered Above Rear Window
- CUP HOLDERS Two Cup Holders, Located in Lower Center of Instrument Panel
- DOME LIGHT, CAB Rectangular, Door Activated and Push On-Off at Light Lens, Timed Theater Dimming, Integral to Console, Center Mounted
- GLASS, ALL WINDOWS Tinted
- GRAB HANDLE, CAB INTERIOR (1) "A" Pillar Mounted, Passenger Side
- GRAB HANDLE, CAB INTERIOR (2) Front of "B" Pillar Mounted, One Each Side
- INTERIOR SHEET METAL Upper Door (Above Window Ledge) Painted Exterior Color
- STEP (4) Two Steps per Door

HEATER HOSES Silicone

GRAB HANDLE, CAB INTERIOR (2) Safety Yellow

GAUGE CLUSTER English With English Electronic Speedometer
Includes:
- GAUGE CLUSTER (5) Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter
- ODOMETER DISPLAY, Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout
- WARNING SYSTEM Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible)

SEATBELT WARNING PREWIRE Includes: Seat Belt Switches and Seat Sensors for all Belted Positions in the Cab and a Harness Routed to the Center of the Dash for the Aftermarket Installation of the Data Recorder and Seatbelt Indicator Systems, for 1 to 3 Seat Belts

GAUGE, OIL TEMP, ENGINE

GAUGE, OIL TEMP, ALLISON TRAN

GAUGE, AIR CLEANER RESTRICTION {Filter-Minder} With Black Bezel Mounted in Instrument Panel

IP CLUSTER DISPLAY On Board Diagnostics Display of Fault Codes in Gauge Cluster

SEAT, DRIVER {National 2000} NFPA Compliant, Air Suspension, High Back With Integral Headrest, Vinyl, Isolator, 1 Chamber Lumbar, 2 Position Front Cushion Adjust, -3 to +14 Degree Back Angle Adjust
Includes:
- SEAT BELT 3-Point, Lap and Shoulder Belt Type

SEAT, PASSENGER {Gra-Mag} Non Suspension, High Back With Integral Headrest, Vinyl, With Fixed Back, With Under Seat Storage
Includes:
- SEAT BELT 3-Point, Lap and Shoulder Belt Type

MIRROR, CONVEX, LOOK DOWN {Lang Mekra} Right Side; 6" x 10 1/4", With Bright Finish

MIRRORS (2) {Lang Mekra} Styled; Rectangular, 7.09" x 15.75" & Integral Convex Both Sides, 102" Inside Spacing, Breakaway Type, Heated Heads Thermostatically Controlled, Power Both Sides, Clearance Lights LED, Bright Finish Heads & Brackets

GRAB HANDLE Chrome; Towel Bar Type With Anti-Slip Rubber Inserts; for Cab Entry Mounted Left Side Only at "B" Pillar

ACCESS, CAB Driver & Passenger Sides, With Two Temporary Steps on the Passenger side, for Conventional Cab

CAB MOUNTING HEIGHT EFFECTS Mid Cab in Lieu of Low Cab Mounting Height (Approx. 4") for Increased Cooling System Requirements

SEAT BELT All Red; 1 to 3

AIR CONDITIONER {Blend-Air} With Integral Heater & Defroster
Includes:
- CLAMPS, HEATER HOSE Mubea Constant Tension Clamps
- HEATER HOSES Premium
- REFRIGERANT Hydrofluorocarbon HFC-134A

INSTRUMENT PANEL Center Section, Flat Panel

WINDOW, POWER (2) And Power Door Locks, Left and Right Doors, Includes: Express Down Feature

FRESH AIR FILTER for HVAC

CAB INTERIOR TRIM Premium
Includes:
- "A" PILLAR COVER Molded Plastic
- CAB INTERIOR TRIM PANELS Cloth Covered Molded Plastic, Full Height; All Exposed Interior Sheet Metal is Covered Except for the Followingwith a Two-Man Passenger Seat or with a Full Bench Seat the Back Panel is Completely Void of Covering
- CAB SOUND INSULATION Includes: Dash and Engine Cover Insulators
- CONSOLE, OVERHEAD Molded Plastic; With Dual Storage Pockets with Retainer Nets, CB Radio Pocket, Speakers, and Reading Lights
- COURTESY LIGHT (2) Mounted In Front Map Pocket Left and Right Side
- DOOR TRIM PANELS with Cloth Insert on Bolster Driver and Passenger Doors
- FLOOR COVERING Rubber, Black
- GAUGE, TEMPERATURE, AMBIENT Includes: Compass Readout and Wiring and Sensor With Display Unit Mounted in Cluster
- HEADLINER Soft Padded Cloth
- INSTRUMENT PANEL TRIM Molded Plastic with Black Center Section
- STORAGE POCKET, DOOR (2) Molded Plastic (Carpet Texture), Full-Length; Driver and Passenger Doors
- SUN VISOR (3) Padded Vinyl2 Moveable (Front-to-Side) Primary Visors, Driver Side with Vanity Mirror and Toll Ticket Strap, plus 1 Auxiliary Visor (Front Only), Driver Side

CAB REAR SUSPENSION Air Bag Type

WHEELS, FRONT DISC; 22.5" Polished Aluminum, 10-Stud (285.75MM BC) Hub Piloted, Flanged Nut, Metric Mount, 9.00 DC Rims; With Steel Hubs
Includes:
- WHEEL SEALS, FRONT Grease Lubricated, Includes: Wheel Bearings

WHEELS, REAR DUAL DISC; 22.5" Polished Aluminum, 10-Stud (285.75MM BC) Hub Mounted, Flanged Nut, Metric Mount, 9.00 DC Rims; With Steel Hubs
Includes:
- WHEEL SEALS, REAR Oil Lubricated, Includes: Wheel Bearings

WHEEL SEALS, REAR {Stemco Guardian} Oil Lubricated Wheel Bearings

WHEEL SEALS, FRONT {Stemco Guardian} Oil Lubricated Wheel Bearings

WHEEL BEARING, FRONT, LUBE {EmGard 50W} Synthetic Oil

(2) TIRE, FRONT 12R22.5 XZY-3 (MICHELIN) 483 rev/mile, load range H, 16 ply

(4) TIRE, REAR 315/80R22.5 XZY-3 (MICHELIN) 486 rev/mile, load range L, 20 ply

Cab schematic 100GA
Location 1: 9031, White (Prem)
Chassis schematic N/A

Diamond Logic Diagnostic Software

Pre-delivery inspection for 4400

Allison Diagnostic Software

CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

A permanent label in the driving compartment shall specify the quantity and type of the following fluids used in the vehicle and tire information:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid . . (if applicable)
- Pump priming system fluid, if applicable . . (if applicable)
- Drive axle(s) lubrication fluid
- Air conditioning refrigerant . . (if applicable)
- Air conditioning lubrication oil . . (if applicable)
- Power steering fluid
- Cab tilt mechanism fluid . . (if applicable)
- Transfer case fluid . . (if applicable)
- Equipment rack fluid (if applicable)
- CAFS air compressor system lubricant . . (if applicable)
- Generator system lubricant . . (if applicable)
- Front tire cold pressure
- Rear tire cold pressure
- Maximum tire speed ratings

VEHICLE DATA PLATE

A permanent label in the driving compartment which indicates the following:

- Filter part numbers for the;
  - Engine
  - Transmission
  - Air
  - Fuel
- Serial numbers for the;
  - Engine
  - Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Brand and Code(s)
- Sales Order Number

OVERALL HEIGHT, LENGTH DATA PLATE (US)

The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed fire apparatus in feet and inches, the length of the completed fire apparatus in feet and inches, and the GVWR in pounds.

Wording on the label shall indicate that the information shown was current when the apparatus was manufactured and that, if the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate.

ACCIDENT PREVENTION

There shall be a placard in the cab seating area which reads, "ALL OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION".

PERSONNEL CAPACITY

A label that states the number of personnel the vehicle is designed to carry shall be located in an area visible to the driver.

ACCIDENT PREVENTION

If the rear bumper is 8" deep or more, there shall be a placard on the rear face of the body, in clear sight from the ground, which reads, "WARNING - DO NOT RIDE ON STEPS OR DECK AREAS WHILE THE APPARATUS IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT".

WEARING HELMET WARNING

A label stating “DO NOT WEAR HELMET WHILE SEATED” shall be visible from each seating location.

FRONT BUMPER EXTENSION

The front bumper of the chassis shall be extended approximately 18" ahead of the cab using Junior I-beams.

The bumper mounting plate shall be welded to the Junior I-beam for mounting of the chassis bumper. After fabrication of the bumper extension, the panels shall be removed and the unit shall be primed and painted black.

BUMPER GRAVEL SHIELD

The front bumper extension shall have a 3/16" NFPA compliant aluminum tread plate gravel shield. The gravel shield shall cover the full width of the front bumper to the front of the cab and the full height of the bumper on each end.

AIR HORNS

Two (2) Grover 21" Stuttertone chrome plated air horns shall be recess mounted in the front bumper, one (1) on each side inboard of the frame rails. An emergency air shut off valve shall be provided in the cab.

AIR HORN ACTIVATION

The air horn(s) shall be operated by the steering wheel horn button and a foot switch on the cab floor located at the driver position.

FRONT TOW PROVISIONS

The front tow provisions shall be supplied and installed by the cab/chassis manufacturer.

EXHAUST

The exhaust system shall be as provided by cab/chassis manufacturer. No other alternation or modifications are required.

The exhaust piping and discharge outlet shall be located or shielded so as not to expose any portion of the apparatus or equipment to excessive heating.

Exhaust pipe discharge shall be directed away from any operator's position.

Where parts of the exhaust system are exposed so that they are likely to cause injury to operating personnel, protective guards shall be provided.

CHASSIS BATTERIES

The cab/chassis supplied batteries shall be replaced with two (2) group D batteries with 2900 CCA system rating at 0 degrees F, minimum 900 minutes of reserve capacity with SAE posts.

RADIO ANTENNA INSTALLATION

There shall be one (1) radio antenna mounts provided and installed on the roof of the cab/chassis. The end of each radio antenna shall be routed to the center cab console.

Due to multiple configurations of antenna whips, the Body Manufacturer shall provide the antenna base, and Honolulu Fire Department shall provide the whip.

SEAT BELT COLOR

Section 14.1.3.4 of the NFPA 1901 Standards, 2009 edition, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

SEAT BELT WEB LENGTH - COMMERCIAL CAB

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, 2009 edition, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

The chassis seat belt web length as supplied by the commercial chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

Per Honolulu Fire Department specification for a commercial chassis, this emergency vehicle may not have seat belts of this required length. These belts may not provide sufficient length for large firefighters in bunker gear. This specification for an emergency fire apparatus for these seat belts shall be non-compliant to NFPA 1901 standards, effective at the time of the bid opening.

SEAT BELT / VDR SYSTEM - CUSTOM CAB

The seat belt warning and vehicle data recorder systems shall be provided by the cab/chassis manufacturer.

IGNITION KEY

The ignition key will be attached to steering column or dash with vinyl covered steel cable.

SIX (6) - TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with an Accu-Pressure Safety Cap (or equal) visual indicator that indicates proper tire pressure.

HELMET STORAGE

No helmet storage is required in the in the cab driving or crew area.

CAB TESTING CERTIFICATION

As per NFPA 14.3.2, cabs on apparatus with a GVWR greater than 26,000 lb. (11,800 kg) shall meet the requirements of one of the following sets of standards:

9) European Occupant Protection Standard ECE Regulation No. 29.
10) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

A copy of this certification shall be included with the bid.

NOTE: There shall be no exception to any portion of the cab integrity certification requirements. Nonconformance shall lead to immediate rejection of bid.

CAB MIRRORS, DRIVER ADJUSTABLE

Section 14.3.5 of the NFPA 1901 Standards, 2009 edition, requires all primary rear view mirrors used by the driver to be adjustable from the driver's position.

ADD LOWER SECOND COLOR

The cab exterior (door jambs not painted unless specified otherwise) shall be re-painted with a second color over the main cab color from the bottom of the glass down with PPG Delfleet Evolution paint.

Color: Yellow

Paint Number: Match Sikkens FLNA 1229

PAINT DOOR JAMBS JOB COLOR

Two (2) chassis door jambs will be painted to match the exterior color of the chassis.

CHASSIS PAINT WARRANTY

The portion of the cab re-painted shall be provided with a ten (10) year, non-prorated paint warranty to the original owner. The warranty shall be provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

CAB STEP AND FUEL TANK COVER

The chassis fuel tank shall be overlaid with 1/8" aluminum treadplate. The fuel tank shall be labeled "DIESEL FUEL" with a permanent type label. There shall be cab access steps using aluminum diamondback material as the stepping surface.

BATTERY RELOCATION

The chassis batteries shall be located in Compartment C1 on a battery slide-out tray. The batteries shall be mounted in a heavy duty slide-out tray with a heavy duty clamping device. The battery compartment shall be louvered for proper ventilation.

Battery cables shall be shielded from exhaust and muffler components. Large rubber grommets shall be provided where the cables enter the battery compartment.

HUB AND NUT COVERS

Front and rear wheels shall be provided with stainless steel hub caps and wheel nut covers.

BATTERY JUMPER STUDS

Battery jumper studs shall be provided in the driver's step area. The studs allow the vehicle to be jump started in an emergency due to battery failure.

MUDFLAPS

There shall be rubber mudflaps furnished and installed behind each set of tires.

AIR BRAKE SYSTEM QUICK BUILD-UP

The air brake quick build-up system shall be supplied from the specified automatic electric compressor in order to maintain full operating air pressure while the vehicle is not running.

The quick buildup system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time.

AUTOMATIC VEHICLE LEVELING SYSTEM

A Quadra Manufacturing, Inc. "Big Foot" model QE-2 shall be installed on the unit designed for large heavy duty vehicles with a GVWR over 23,000 pounds. The system shall have four (4) mounting brackets bolted to the chassis frame rails, two (2) front and two (2) rear. Each jack shall bolt to the bracket attached to the chassis frame.

Each jack has its own hydraulic reservoir and 12 volt DC motor wired to the chassis electrical system. Jack pads shall have a 100 square inches surface to prevent sinking in soft ground. Jacks shall be rated for lifting 17,000 pounds minimum (each).

The system shall have a drive-off safety feature. If the vehicle ignition switch is on and any legs are not fully retracted, a warning alarm shall sound with the Deluxe-Touch Pad, fully automatic panel with sensor.

The system shall be provided with a 5 year limited warranty from Quadra Manufacturing, Inc.

ROAD EMERGENCY SAFETY KIT

One (1) set of three dual faced triangular warning flares with fold away base complete with storage case per DOT requirements shall be provided with the completed apparatus.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket shall be provided shipped loose with the completed apparatus.

BODY DESIGN

The importance of public safety associated with emergency vehicles requires that the construction of this vehicle meet the following specifications. These specifications are written to establish the minimum level of quality and design. All Bidders shall be required to meet these minimum requirements.

It is the intent of these specifications to fully describe the requirements for a custom built emergency type vehicle. In order to extend the expected service life of this vehicle, the body module shall be removable from the chassis frame and be capable of being installed on a new chassis.

The sheet metal material requirements, including alloy and material thickness, throughout the specifications are considered to be a minimum. Since such materials are available to all Manufacturers, the material specifications shall be strictly adhered to.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Honolulu Fire Department to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Honolulu Fire Department from such repair and shall NOT be used.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.

EXTERIOR ALUMINUM BODY

The fabrication of the body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, will not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded into final position.

Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening. One-way rubber drain valves shall be provided in compartment floors so that a water hose may be used to flush-out compartment area.

All seams in sheet metal below frame, and around the rear wheel well area shall be welded continuous to prevent moisture from entering compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment.

Exterior compartments shall have louvers in lower back wall of compartment for ventilation.

ROOF CONSTRUCTION

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy NFPA nonskid compliant tread plate, fully and continuously welded. The roof shall be reinforced with 2" x 2" x 1/4" aluminum tubing running the full width of the body. A 2" rounded radius shall be provided along the body sides.

BODY SUBFRAME

To assure proper body alignment and clearance, the body subframe shall be constructed directly on the chassis.

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 6" x 1/4" aluminum tubes, the same width as the chassis frame rails, NO EXCEPTION. Welded to this tubing shall be cross members of 2" x 6" x 1/4" aluminum. These cross members shall extend the full width of the body to support the compartments. Cross members shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum cross members shall be located as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of eight (8) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

18" REAR STEP BUMPER

The full width rear bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 18" and provide a rear step with a minimum of 1/2" space at body for water drainage.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below the apparatus body. The tow eyes shall be fabricated from 3/4" thick steel plate and shall have a black powder coat finish.

GROUND LIGHTS

Two (2) OnScene Solutions 9" LED Nightstik ground lights shall be mounted below the bumper.

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 3/16" smooth aluminum panels.

STAINLESS STEEL BODY FENDERS

The body wheel well openings shall be provided with round radius, polished stainless steel fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using a rubber gasket to reduce buildup of moisture and/or debris.

WHEEL WELL LINERS

The wheel wells shall be provided with an easily removable polymer, circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.

ALUMINUM BODY PAINT SPECIFICATIONS

BODY PAINT PREPARATION

After the body and components have been fabricated they shall be disassembled prior to painting so when the vehicle is complete there shall be finish paint beneath the removable components. The body shall be totally removed from chassis during the paint process to insure the entire unit is covered. The body and components shall be metal finished as follows to provide a superior substrate for painting.

The exterior body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion. If the compartment interior is to be painted the interior shall be acid etched as described above then primed with an epoxy primer and all seams caulked.

All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

PAINT PROCESS

The paint process shall follow the strict standards set forth by PPG Industries guidelines. Painters applying PPG products will be PPG Certified Commercial Technicians, and re-certified every two (2) years.

The body shall go through an eight-stage paint process;

11) Clean bare metal using a solvent base wax & grease remover.
12) Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.
13) Re-clean bare metal using a solvent base wax & grease remover.
14) Bare Metal Epoxy Primer Coat - PPG Delfleet® Evolution corrosion resistance epoxy primer to be applied at 1.0-2.0 mills DFT over clean abraded bare metal.
15) Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mils DFT after sanding.
16) Base coat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Base coat. Apply 1.0-3.0 mils DFT of base coat color to achieve full hiding.
17) Clear coat PPG Delfleet® Evolution polyurethane premium quality clear coat with improved mar resistant finish. The clear coat shall be applied to achieve a total dry film thickness of 2.0-3.0 mils.
18) Curing process of the painted body shall go through a force dry/bake cycle process. The painted components shall be baked 180 degrees for 2 hours to achieve a complete coating cure on the finished product.

MACHINE POLISHED

After the force dry/bake cycle and ample cool down time, the coated surface shall be sanded using 1,000, 1,500, and or 3,000 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed then polished to an extra high gloss smooth finish. Total dry film thickness of paint will average between 8.0-12.0 mils.

PAINT - ENVIRONMENTAL IMPACT

The contractor shall meet or exceed all current State (his) regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. PPG Delfleet® Evolution paint shall be free of all heavy metal (lead & chromate) components. Paint emissions from sanding and painting shall be filtered and collected. All paint wastes shall be disposed of in an environmentally safe manner. Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse.

PAINT FINISH - TWO COLOR

The body shall be painted with a two-tone color of PPG Delfleet® Evolution paint per approved customer sprayout.

Prior to the assembly and reinstallation of exterior components; i.e. warning and DOT lights, handrails, steps, door hardware, and miscellaneous items, an isolation tape, or gasket shall be used to prevent damage to the finish painted surfaces. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nutserts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

Touch-up paint shall be provided with completed vehicle.

- Paint Color, Upper: White Paint Number, Upper: FBCH 90288
- Paint Color, Lower: Yellow Paint Number, Lower: FBCH 913798

BODY UNDERCOATING

The entire underside of body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas underside of body and wheel well area to help prevent corrosion under the vehicle.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT WARRANTY

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

COMPARTMENT INTERIOR FINISH

The compartment interiors shall be treated with phosphoric acid and then sprayed with an epoxy primer applied 1.0 mil thick. All body seams will be caulked with urethane seam sealer and painted with two (2) coats of textured Zolatone paint. Zolatone catalysts will be added to the Zolatone to help in resisting moisture and provide a more durable finish. Paint color shall be gray.

REFLECTIVE STRIPE

All retroreflective materials shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

REFLECTIVE STRIPE - CAB FRONT

A reflective stripe shall be affixed to the front of cab. The stripe or combination of stripes shall be a minimum of 2 in. (50 mm) in total width.

A retroreflective stripe(s) shall be affixed to at least 25 percent of the width of the front of the apparatus.

- The stripe material shall be 3M Scotchcal 680.
- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - CAB DOOR INTERIOR

Any door of the apparatus designed to allow persons to enter or exit the apparatus shall have at least 96 in.2 (62,000 mm2) of retroreflective material affixed to the inside of the door.

The stripe material shall be 3M Scotchlite 680.

- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - BODY SIDES

A 6" minimum reflective stripe shall be affixed to the sides of the body.

- The stripe material shall be 3M Scotchcal 680.

This reflective stripe shall be white in color with 1/4" black outline.

The stripe shall extend from the chassis to the body where it will angle up and then extend straight back to the rear of the body.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width.

The rear side panels only of the body shall have a Chevron style reflective stripe layout, and cover as much of the rear side panels as possible. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

- The stripe material shall be 3M Diamond Grade.

All retroreflective materials required shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

- This reflective chevron stripe shall alternate red and yellow in color.

LETTERING

The following lettering shall be furnished and installed on the completed unit:

SIDE CAB DOOR LETTERING

There shall be thirty (30) 4" high 22K Gold letters furnished and installed on the front cab doors. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

"HONOLULU" - Arched above door emblem
"FIRE DEPT." - Arched below door emblem

UPPER BODY SIDE LETTERING

There shall be forty eight (48) 4" high reflective letters furnished and installed on the vehicle. The lettering shall state:

“Pride – Service – Dedication”

- This reflective lettering color shall be determined at the preconstruction conference.

There shall be twenty eight (28) 5-1/4" high 22K Gold letters with black shadow furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

The lettering shall state:

"COMMUNICATIONS”

There shall be forty four (44) 6-1/2" high 22K Gold letters with black shadow furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

The lettering shall state:

"HONOLULU FIRE DEPARTMENT”

FRONT OF CAB LETTERING

There shall be fourteen (14) 6" high 22K Gold letters with black shadow furnished and installed on the vehicle. Lettering shall have a clear 3M UV Protective Over Laminate applied before installation.

The lettering shall state:

"COMMUNICATIONS”

CUSTOM DECAL EMBLEM - 12"

Two (2) custom designed 12", 22K gold emblem(s) shall be provided on the completed vehicle, located on cab doors.. The emblems shall exactly match existing Honolulu Fire Department vehicles.

CUSTOM DECAL LOGO

Two (2) custom designed Scotchcal type retroreflective logo(s) shall be provided on the completed vehicle. The logo(s) shall be located on the lower body side(s) and shall state:

“911
Don’t Stall
Call”

EXTERIOR COMPARTMENT DOORS

HINGED DOOR CONSTRUCTION

The exterior compartment doors shall be custom manufactured and built for each compartment. The compartment doors must be able to withstand years of rugged service and wear. For this reason, the compartment door design, metal thickness, and attachments must be strictly adhered to.

The compartment doors shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation.

The doors shall be flush mounted so that the outer surface is in line with the side body surface. Lap or bevel type constructed doors, doors framed with extrusions, or doors requiring rubber bumpers to prevent unnecessary contact are NOT ACCEPTABLE.

Compartment door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. In addition, rubber molding shall be provided along hinge to prevent moisture entry. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Hinged compartment doors shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

Drip rails shall be installed above all compartment door openings. Drip rails shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" Hansen offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

All vertically hinged compartment doors shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE. All horizontally hinged compartment door shall have a door check as specified with each door.

BODY HEIGHT MEASUREMENTS

The vertical body dimensions shall be as follows:

AHEAD OF REAR AXLE

	Description	Dimension
A	Bottom of Subframe to Top of Body	89.0"
B	Bottom of Subframe to Bottom of Body	25.0"
C	Vertical Door Opening - (Short Compartment) -with hinged door	20.0"

BEHIND REAR AXLE

	Description	Dimension
D	Bottom of Subframe to Bottom of Body	22.5"
E	Vertical Door Opening - (Short Compartment) -with hinged door	17.5"

GENERAL

	Description	Dimension
G	Bottom of Drip Rail to Top of Body	38.5"
H	Walk-in Interior Height	78.0" (min)

(Dimensions are generic and subject to change during the actual design process)

BODY WIDTH DIMENSIONS

The body shall be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be:

Area Description	Dimension
Transverse Area:	95.5"
- Above Top of Subframe	
Compartment Depth:	24.5"
- Below Top of Subframe	
- Ahead of Rear Axle	
Compartment Depth:	23.5"
- Below Top of Subframe	(Eng. Note)
- Behind the Rear Axle	

(Dimensions are generic and subject to change during the actual design process)

STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment width shall be approximately 60.0" wide.

The compartment door opening shall be approximately 55.0" wide.

This compartment shall have vertically hinged box pan style doors fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.

- The diesel engine driven generator location.

PASS-THRU DOOR

One (1) pass-thru compartment door shall be provided above the generator compartment into the front IT work area. The door shall be a Cast Products rectangular brushed aluminum door assembly with cold lock bristles located in the upper 4.00 inch portion of the opening, a component patch panel in the lower portion of the opening, and locking positive catch latch installed on the exterior.

STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 50.0" wide.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- Location for air conditioning condenser system.
- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.
- There shall be one (1) Cast Products hinged door located on the compartment floor, adjacent to the shore power receptacle. The door shall have a spring-loaded hinged door and a brush-type weather seal. The door shall allow for use of the shore power receptacle with the exterior compartment door closed.
- A 100 ampere, 240 VAC, single phase shore power receptacle shall be located in this compartment.
- One (1) OnScene Solutions 9" LED Nightstik ground light shall be provided below the body.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

STREETSIDE COMPARTMENT - REAR (S3)

The interior useable compartment space shall be approximately 56.0" wide.

The compartment door opening shall be approximately 50.0" wide.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as necessary to hold the specified inverter batteries. The tray top shall be fabricated from 12 gauge stainless steel with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions. The tray shall include hold down provisions to secure the specified batteries.

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.

- Location for specified inverter and deep cycle batteries. The batteries shall be mounted in the specified stainless steel slide-out tray with hold down provisions for mobile application.

- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

TECH ROOM SIDE ENTRY DOOR

Access to the interior body compartment shall be provided through a side entry door. The door opening shall be approximately 23" wide x 74" high.

Construction of the side entry door shall be with 1/8" aluminum exterior smooth plate, the interior door pan being constructed from 1/8" aluminum tread plate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. The hinge shall be slotted horizontally and vertically for ease of adjustment. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

The latch mechanism shall include a paddle handle on inside and a locking Hansen offset bent "D"-ring handle on exterior. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame.

ENTRY HANDRAILS

There shall be two (2) handrails provided at entry door, one (1) vertical on exterior of body on door handle side, and one (1) on inside of door. The interior handrail shall be angled for optimum use when entering or exiting the walk-in portion of the body.

Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

EXTERIOR COMPARTMENT PULL-OUT ENTRY STEPS

Located below the entry door shall be a compartment for storage of pull-out entry steps for ingress/egress into interior body.

Entry steps shall be enclosed behind a drop-down hinged compartment door. The compartment door must be able to withstand years of rugged service and wear. For this reason the compartment door design, metal thickness, and attachments must be strictly adhered to.

DOOR CONSTRUCTION DETAIL

The flush mounted compartment door shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation. The door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Compartment door shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

A drip rail shall be installed above compartment door opening and shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" Hansen offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

A pair of pneumatic cylinder door checks shall hold door in the open and closed position and capable of being closed without unlatching. Door checks shall be bolted to body and box pan of door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE.

STEP CONSTRUCTION DETAIL

There shall be two (2) fixed steps with 10" minimum tread depth. Steps shall be fabricated from 1/8" thickness 3003H-14 alloy aluminum with NFPA compliant step surface and adequately reinforced to withstand a 350 lb. person standing on step.

There shall be one (1) fold-down step located on the bottom tread surface to reduce the distance from the ground to the first step. This lower step shall manually fold up onto other steps for travel.

The step shall be mounted on an On Scene Solutions slide-out tray frame constructed of anodized aluminum extrusions. The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum distributed load of 1,000 lbs. and a 500 lb. end load.

The drop-down door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 39.0" wide.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as necessary to hold the specified chassis batteries. The tray top shall be fabricated from 12 gauge stainless steel with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions. The tray shall include hold down provisions to secure the specified batteries.

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.

- Location for chassis batteries. The batteries shall be mounted in the specified stainless steel slide-out tray with hold down provisions for mobile application.

- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

Access to the interior body compartment shall be provided through a side entry door. The door opening shall be approximately 31" wide x 74" high.

Construction of the side entry door shall be with 1/8" aluminum exterior smooth plate, the interior door pan being constructed from 1/8" aluminum tread plate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. The hinge shall be slotted horizontally and vertically for ease of adjustment. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

The latch mechanism shall include a paddle handle on inside and a locking Hansen offset bent "D"-ring handle on exterior. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame.

ENTRY HANDRAILS

There shall be two (2) handrails provided at entry door, one (1) vertical on exterior of body on door handle side, and one (1) on inside of door. The interior handrail shall be angled for optimum use when entering or exiting the walk-in portion of the body.

Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

WINDOW(S)

There shall be one (1) 18" wide x 22" vertical sliding window(s) installed in the entrance door. Each window shall have Solar Cool Reflective one-way privacy glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

EXTERIOR COMPARTMENT PULL-OUT ENTRY STEPS

Located below the entry door shall be a compartment for storage of pull-out entry steps for ingress/egress into interior body.

Entry steps shall be enclosed behind a drop-down hinged compartment door. The compartment door must be able to withstand years of rugged service and wear. For this reason the compartment door design, metal thickness, and attachments must be strictly adhered to.

DOOR CONSTRUCTION DETAIL

The flush mounted compartment door shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation. The door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Compartment door shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

A drip rail shall be installed above compartment door opening and shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" Hansen offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

A pair of pneumatic cylinder door checks shall hold door in the open and closed position and capable of being closed without unlatching. Door checks shall be bolted to body and box pan of door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE.

STEP CONSTRUCTION DETAIL

There shall be two (2) fixed steps with 10" minimum tread depth. Steps shall be fabricated from 1/8" thickness 3003H-14 alloy aluminum with NFPA compliant step surface and adequately reinforced to withstand a 350 lb. person standing on step.

There shall be one (1) fold-down step located on the bottom tread surface to reduce the distance from the ground to the first step. This lower step shall manually fold up onto other steps for travel.

The step shall be mounted on an On Scene Solutions slide-out tray frame constructed of anodized aluminum extrusions. The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum distributed load of 1,000 lbs. and a 500 lb. end load.

The drop-down door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

CURBSIDE COMPARTMENT - REAR (C3)

The interior useable compartment width shall be approximately 31.0" wide.

The compartment door opening shall be approximately 29.0" wide.

This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

The hinged door(s) shall have a stainless steel 6" Hansen offset bent D-ring locking handle. A gasket shall be placed between stainless steel handle and door. Door latches shall be a two-point (top and bottom) rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

COMPARTMENT LAYOUT

- One (1) horizontally mounted OnScene Solutions LED Nightstik mounted at the top of the compartment toward the compartment door opening.

- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

COMMAND ROOM SIDE ENTRY DOOR

Access to the interior body compartment shall be provided through a side entry door. The door opening shall be approximately 31" wide x 74" high.

Construction of the side entry door shall be with 1/8" aluminum exterior smooth plate, the interior door pan being constructed from 1/8" aluminum tread plate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. The hinge shall be slotted horizontally and vertically for ease of adjustment. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

The latch mechanism shall include a paddle handle on inside and a locking Hansen offset bent "D"-ring handle on exterior. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame.

ENTRY HANDRAILS

There shall be two (2) handrails provided at entry door, one (1) vertical on exterior of body on door handle side, and one (1) on inside of door. The interior handrail shall be angled for optimum use when entering or exiting the walk-in portion of the body.

Handrails shall be NFPA compliant 1-1/4" extruded aluminum tubing with chrome plated end stanchions.

WINDOW(S)

There shall be one (1) 18" wide x 22" vertical sliding window(s) installed in the entrance door. Each window shall have Solar Cool Reflective one-way privacy glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

EXTERIOR COMPARTMENT PULL-OUT ENTRY STEPS

Located below the entry door shall be a compartment for storage of pull-out entry steps for ingress/egress into interior body.

Entry steps shall be enclosed behind a drop-down hinged compartment door. The compartment door must be able to withstand years of rugged service and wear. For this reason the compartment door design, metal thickness, and attachments must be strictly adhered to.

DOOR CONSTRUCTION DETAIL

The flush mounted compartment door shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation. The door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Compartment door shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

A drip rail shall be installed above compartment door opening and shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" Hansen offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

A pair of pneumatic cylinder door checks shall hold door in the open and closed position and capable of being closed without unlatching. Door checks shall be bolted to body and box pan of door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE.

STEP CONSTRUCTION DETAIL

There shall be two (2) fixed steps with 10" minimum tread depth. Steps shall be fabricated from 1/8" thickness 3003H-14 alloy aluminum with NFPA compliant step surface and adequately reinforced to withstand a 350 lb. person standing on step.

There shall be one (1) fold-down step located on the bottom tread surface to reduce the distance from the ground to the first step. This lower step shall manually fold up onto other steps for travel.

The step shall be mounted on an On Scene Solutions slide-out tray frame constructed of anodized aluminum extrusions. The frame shall be assembled using stainless steel fasteners (no welds). Each slide shall use a three extrusion rail design utilizing twelve to sixteen (12 - 16) urethane rollers. Each roller shall contain two (2) precision roller bearings mounted in an aluminum hub with a molded on urethane cover. The rollers shall not lose contact with the rail extrusion during operation of the slide unit. Each slide shall have a cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release). The slide shall lock in the closed and full extension positions. The slide shall be rated for a maximum distributed load of 1,000 lbs. and a 500 lb. end load.

The drop-down door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

SIDE BODY PROTECTION - RUB RAIL

There shall be side rub rails provided below the compartment door openings on both the streetside and curbside. The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body. The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

3M™ Diamond Grade™ Conspicuity striping shall be provided in the rub rail. The striping shall be white in color.

FRONT GRAVEL GUARDS

Gravel guards shall be fabricated of brushed stainless steel. Gravel guards shall be installed on the front lower body corners and shall wrap around the corners to the front compartment door hinge on each side.

ACCESS LADDER

The ladder shall be weld constructed of vertical aluminum extrusion tubing and aluminum grip surface ladder rungs with slip resistant tread grip pattern. It shall be set off from body 8 inches and mounted to body with chrome plated end stanchions bolted to the body with stainless steel bolts. The ladder shall extend above the body roof to assist in accessing the roof area. The location shall be in the center area of the rear apparatus body, slightly offset to the curbside.

COMPARTMENT COMPONENTS DESCRIPTIONS

All interior compartment components shall be fabricated as follows:

COMPARTMENT LIGHTING

Each enclosed equipment compartment greater than 4 ft3 (0.1 m3) in volume and having an opening greater than 144 in.2 (92,900 mm2) shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any shelves, dividers, or equipment in the compartment.

Compartments such as ladder tunnels, pike pole storage tubes, or underbody compartments designed around the volumetric requirements of specific equipment that can be removed without the use of article illumination shall not be required to have compartment lighting.

All compartments shall be equipped with OnScene Nightstik LED lights with the following minimum light requirements;

- Full Height Compartments, 63” Section (42 LED's)
- Wheel well Compartments, 36” Section (24 LED's)
- Rear Rescue Compartment, 63” Section (42 LED's)
- Low Compartments, 18" Section (12 LED's), Vertical
- Low Compartments, 36" Section (24 LED's), Horizontal

The OnScene Nightstik lights shall be rated at 100,000 hours of service and shall be provided with a 5 year free replacement warranty.

STEP / GROUND LIGHTS

Step and ground lights shall be OnScene Solutions 9" LED Nightstik and be placed at any entry door and step where personnel climb on or descend from the apparatus to ground level. OnScene LED lights shall have 6 LED lights per 9” light, and shall be rated at 100,000 hours of service. On Scene Solutions LED lights shall be have a 5 year free replacement warranty.

All of the required step and ground lights shall be activated when the parking brake is set.

WALK-IN INTERIOR FINISH DETAILS

INTERIOR SPECIFICATIONS

INTERIOR INSULATION

Following the sheet metal fabrication the roof area, upper exterior walls and the entry door of the apparatus body shall be insulated with 1-1/2" rigid polyurethane foam insulation. This insulation shall be the type that will not absorb moisture, move once in place or deteriorate. Mat type fiberglass or spray in foam insulation are not acceptable.

INTERIOR WALL FINISH - CARPET

The interior walls shall be covered with a durable gray carpet to lower the interior noise level. Material will be non-flammable and trimmed along top edge. The lower walls will have black rubber base molding installed for a maintenance free finish.

INTERIOR WALKWAY FLOOR

There shall be Lonseal, Loncoin-II Flecks installed on the floor substrate. Loncoin II Flecks is a heterogeneous resilient sheet vinyl with a decorative raised coin texture, breathtaking color, and intriguing style. The fleck coloration provides camouflage for simpler maintenance while the raised coin embossing provides enhanced traction. Excellent for interior, retail, commercial, or institutional use where design parameters call for a high performance, sophisticated flooring solution.

Loncoin II Flecks is composed of polyvinyl chloride (PVC) resin, plasticizers, fillers, and pigments. The co-calendared wear layer is formulated to provide maximum resistance to foot traffic and most commercial and healthcare chemicals.

The middle layer provides dimensional stability, sound-absorbing properties, and resiliency under foot. The backing layer provides strength and stability of the flooring and enhances the bonding strength of the adhesive.

The material shall be black in color (Loncoin-II Flecks - Onyx).

Lonseal, Inc. warrants that Lonseal flooring products shall be free from manufacturing defects for a period of one (1) year from the date of purchase and that, when properly installed and maintained, shall not wear through as a result of normal foot traffic for a period of 7 years from the date of installation.

INTERIOR SUB-FLOOR

Above the body subframe shall be an isolation sheet that shall prevent outside elements from permeating the full length sound and thermal barrier of 3/4" thick grade plywood. The sheet shall be fabricated from the same type of material as is used in the subframe. The isolation sheet shall be flanged on both sides with a 1" high vertical break.

TWO ROOM AIR CONDITIONER - HEATER SYSTEM

The vehicle body shall be supplied with an “off roof” Dometic Cruisair air conditioning/heater system for up to two (2) rooms. The individual cooling/heat units shall be connected to one (1) undercarriage mounted model ACH14BC, 230 VAC, 36/9 Amp start/full-load, 14,000 BTU each condensing units. (Size: 26" L x 22" D (inc. hoses) x 14" H, Weight: 97 lbs.) Condensing unit features refrigerant condenser, compressor and associated electrical and mechanical components in an aluminum enclosure. Refrigerant connections are located on the front of unit. Blower type unit pull air in through the coil in back and discharge in back through the bottom or front of unit.

Condensing unit shall supply two (2) Dometic Cruisair model CRU-715010702-REU7C 230 VAC, 1.8/1.0 Amp start/full-load, 7,000 BTU, 233 CFM, each evaporator units. (Size: 14" L x 10" D x 12" H, Weight: 14 lbs.) These evaporators will be inside wall or cabinet mounted and ducted to supply air flow for cooling and heating of two separate areas inside the body. Each cooling unit is a compact ductable unit with a rotatable variable speed blower, insulated condensate drip pan with anti-slosh, antifungal foam lining, with an air filter. Interior air temperature will be controlled by a wall mounted SMX Series computerized control.

The system will be completely tested prior to delivery for cooling capabilities and refrigerant line leaks. The entire system shall be designed and installed per Dometic Cruisair installation requirements for air flow, refrigerant line length and sizing, and condenser cooling and air flow.

STREETSIDE INTERIOR AREA (IS1)

The forward 28.00 inches of body shall be an IT personnel work area to provide access to back side of all 19.00 inch data racks in the communications area. This work area shall be air conditioned for proper cooling of electrical components and have a side entry door.

Air conditioning system components will be located on curbside interior wall.

STREETSIDE INTERIOR AREA (IS2) - COMMUNICATIONS AREA

The mid 88.00 inches of body shall be a communications area for three (3) operators with a side entry door.

COMMUNICATION ROOM, OFFICE CHAIRS

There shall be three (3) Office Star model 6216, or equal roll-around type office chairs provided at the front communications desk area. The seats shall have provisions to fully secure the seat under the desk when not in use and the apparatus is in motion.

INTERIOR DESK, FULL WIDTH

The interior of vehicle shall be provided with a full width desk. The desk frame work shall be approx. 42" deep, while the desk finished surface will be approx. 18" deep, and approx. 30" from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk.

The rear wall under desk shall be closed off from the front IT area and covered with carpet with vinyl base trim. Vents shall be provided under desk at each seat position for cross ventilation to/from IT area.

The desk top surface shall be fabricated of 3/16" smooth finish aluminum. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner of desk for wiring of future equipment located on the desk top. The desk top shall be painted either with a gray hammer tone powder coat paint finish for a hard and durable surface.

The rear frame work of desk will hold the specified Mid Atlantic 19" data racks. Data racks will be securely mounted to desk frame work and extend up to finished interior ceiling height.

COMPONENT CONSOLE

There shall be two (2) component consoles provided, one (1) between each data racks for optional component mounting. The console shall be fabricated from 1/8" aluminum approximately 12" wide x 48" high (desk to ceiling). The console shall be painted with a black powder coat paint finish to match the specified data racks.

The console shall be built to match the layout as shown in the approved sales drawing.

Access to the component console equipment for servicing shall be from the IT personnel work area. The following components shall be located in each console;

There shall be one (1) phones mounted in the front face of the component console

There shall be six (6) locations for radio(s) installed in the front face of each face of component console. Proper 12VDC power and ground shall be provided at each location. Radios to be installed by the Honolulu Fire Department after delivery. Exact makes and models of radios shall be provided by the Honolulu Fire Department prior to construction of the apparatus.

There shall be two (2) data port(s) provided in the front face of the component console.

There shall be one (1) two-gang 12 VDC outlet(s) provided in the front face of the component console.

There shall be one (1) 120 VAC, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the front face of the component console.

DATA RACKS

Three (3) Mid Atlantic, model MRK-2426 data racks shall be provided and installed on top of desk frame work. Data racks shall be on top rear of desk frame work with approx. 12" between them and securely fastened to desk frame work. The Back Haul and Video racks shall include a UPS with vertical 120 VAC outlets. Each rack shall be 22" wide x 48.125" high x 26.40" deep.

Data racks systems shall be laid out as follows;

19. Streetside Data Rack - Back Haul

- Microwave communications system to be installed after delivery by Honolulu Fire Department
-

2. Center Data Rack – Video Systems

- All components supplied by Incident Communications Systems
- Bosch Recorder System
-

3. Curbside Data Rack - Inter/Op and RF

- JPS model ACU 1000 to be installed after delivery by Honolulu Fire Department
- Twelve (12) radios to be installed after delivery by Honolulu Fire Department

STREETSIDE INTERIOR AREA (IS3) - FORWARD COMMAND

The rear 131" of body shall be a command area divided into a forward and rear section.

ACCESSORY MOUNTING PANEL

There shall be one (1) accessory mounting panel located on the rear face of the stub wall, directly above the specified counter height cabinet. The panel shall be approximately 28.00 inches tall by 30.00 inches wide constructed out of 3/16” smooth plate aluminum and powder coated with a gray hammer tone finish to match the interior cabinet finish. The panel shall be easily removable from the wall to allow for surface mounting of equipment (gang chargers, etc.) by the Honolulu Fire Department after delivery of the apparatus.

INTERIOR CORNER CABINET

There shall be one (1) interior cabinet provided on front streetside interior corner. Cabinet shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Cabinet shall be approximately 18" W x 18" D x 36" H.

A cooling unit for the specified air conditioning system shall be located in base of this cabinet.

- The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.
- The above cabinet(s) shall have a vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.
- There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

There shall be two (2) 120 volt outlet(s) located on the stub wall of the interior area, adjacent to the accessory mounting panel.

- The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).
  - Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.

19" VIDEO MONITOR

One (1) Samsung 19" LCD HDTV, LN-19B360 (or equal) flat panel monitors with built-in TV tuner shall be provided and located on upper rear area of the stub wall.

Monitors shall be installed on pivoting wall mount brackets with horizontal/vertical adjustment.

System shall be complete and fully operational, including all miscellaneous coax cable, 120 volt AC wiring, and cable connections. One (1) CATV inlet/outlet shall be provided at each monitor location.

STREETSIDE INTERIOR AREA (IS4) - REAR COMMAND AREA

INTERIOR CABINET - OVERHEAD

There shall be two (2) 48" wide overhead cabinets provided on interior. Cabinets shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

- The above cabinet(s) shall have sliding Clear Lexan doors.

CONFERENCE TABLE

The interior of vehicle shall be provided with a 36.00 inch wide conference table extending from the rear wall 94.00 inches deep and located approximately 30.00 inches from floor. The front edge of the desk top shall be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk. Interior corners of desk will have radiused corners.

The conference table surface shall be fabricated of 3/16" smooth finish aluminum. It shall have a 2" vertical downward edge along front to cover the 2" x 2" reinforcement. There shall be 2-1/2" diameter holes with plastic edge grommet provided at each rear corner along wall for access to outlet strip on underside of table, and for wiring of future equipment located on the conference table. The desk top shall be painted with a gray hammer tone powder coat paint finish for a hard and durable surface.

DESKTOP COMPONENT CONSOLE

There shall be a console at top rear of the desk for optional component mounting. The console shall be fabricated from 1/8" aluminum approximately 6" high x 9" deep with a 6" sloping component mounting face. The console shall be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

The sloped component mounting surface shall be a one-piece hinged cover to allow access to optional components, and wiring and held closed with knurled thumb type latch in each corner.

There shall be two (2) phones mounted in the front face of the component console

There shall be four (4) data port(s) provided in the side face of the component console, one (1) per side.

There shall be two (2) two-gang 12 VDC outlet(s) provided in the front face of the component console.

There shall be four (4) 120 VAC, 20 amp, duplex straight-blade receptacle (NEMA 5-20R) outlet(s) provided in the front face of the component console.

CONFERENCE TABLE, OFFICE CHAIRS

There shall be three (3) Office Star model 6216, or equal roll-around type office chairs provided at the conference table. The seats shall have provisions to fully secure the seat under the desk when not in use and the apparatus is in motion.

OUTLET STRIP

There shall be one (1) 120 volt outlet strip(s) approximately 4' long with straight blade household type outlets located on underside of conference table with 15 ampere circuit breaker protection.

BENCH SEAT

The streetside rear wall of body shall be provided with a bench seat extending up to corner cabinet. The bench seat base shall be fabricated of 1/8" aluminum to form a under seat storage compartment. A hinged door with single point "D"-ring handle and latch shall be provided on the front face of the seat compartment, under the specified conference table. The bench seat base shall be covered with carpet material, same as walls with vinyl base trim.

The seat shall be fabricated of 3/4" exterior grade plywood with 3" thick foam and Duraware heavy duty fabric covering. The seat backrest shall be approximately 12" high x 2" thick and constructed the same as the seat.

CURBSIDE INTERIOR AREA (IC1)

The forward 28.00 inches of body shall be an IT personnel work area to provide access to back side of all 19.00 inch data racks.

There shall be a side entry door located in this area.

CURBSIDE INTERIOR AREA (IC2) - COMMUNICATIONS AREA

There shall be a side entry door located in this area.

CURBSIDE INTERIOR AREA (IC3)

INTERIOR CORNER CABINET

There shall be one (1) interior cabinet provided on front curbside interior corner. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Cabinet shall be approximately 18" W x 36" H x 18" D.

The specified fax machine will be mounted to cabinet top.

One (1) 120 VAC, 20 amp duplex, straight-blade receptacle (NEMA 5-20R).

- The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.
- The above cabinet(s) shall have a vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.
- There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

19" VIDEO MONITOR

One (1) Samsung 19" LCD HDTV, LN-19B360 (or equal) flat panel monitors with built-in TV tuner shall be provided and located on streetside rear wall.

Monitors shall be installed on pivoting wall mount brackets with horizontal/vertical adjustment.

System shall be complete and fully operational, including all miscellaneous coax cable, 120 volt AC wiring, and cable connections. One (1) CATV inlet/outlet shall be provided at each monitor location.

CURBSIDE INTERIOR AREA (IC4)

There shall be a side entry door located in this area.

CONFERENCE MONITOR AND SMART BOARD

A Samsung 400 FPN 40" LCD flat screen monitor shall be provided and wall mounted on rear wall of command area.

A SMART Board PX340 interactive whiteboard overlay shall be provided over the flat screen monitor above. The protective overlay adds interactive whiteboard functionality to the liquid crystal display (LCD) panel. You simply touch the display to control any computer application or write in digital ink and then save all your work to print, e-mail or post online. Compatible with a broad range of flat-panel display sizes and brands, SMART Board for Flat-Panel Displays interactive whiteboards use DViT (Digital Vision Touch) technology to ensure touch precision without compromising image quality.

The server located in the data rack shall control the SMART Board. The server shall be accessed by one (1) wireless keyboard and one (1) wireless mouse.

Unit will be connected to matrix switcher and installed to view signals from all on-board audio/video equipment.

Provision will be made for connection of the unit and SMART Board overlay to be connected to the computer network system.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

Any low voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Electrical connections shall be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body shall be run in full length electrical wiring raceway down each side of body.

Wiring

All electrical circuit feeder wiring supplied and installed by the fire apparatus manufacturer shall meet the requirements of NFPA Chapter 13.

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125 % of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10 %. The use of star washers for circuit ground connections shall not be permitted.

All circuits shall otherwise be wired in conformance with SAE J1292, *Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring.*

Wiring and Wire Harness Construction

All insulated wire and cable shall conform to SAE J1127, *Low Voltage Battery Cable,* or SAE J1128, *Low Voltage Primary Cable,* type SXL, GXL, or TXL.

All conductors shall be constructed in accordance with SAE J1127 or SAE J1128, except where good engineering practice dictates special strand construction. Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application. Physical and dimensional values of conductor insulation shall be in conformance with the requirements of SAE J1127 or SAE J1128, except where good engineering practice dictates special conductor insulation. The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturer's instructions. All ungrounded electrical terminals shall have protective covers or be in enclosures. Wire nut, insulation displacement, and insulation piercing connections shall not be used.

Wiring shall be restrained to prevent damage caused by chafing or ice buildup and protected against heat, liquid contaminants, or other environmental factors.

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram.

Circuits shall be provided with properly rated low voltage overcurrent protective devices. Such devices shall be readily accessible and protected against heat in excess of the overcurrent device's design range, mechanical damage, and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

If a mechanical-type device is used, it shall conform to one of the following SAE standards:
4) SAE J156, *Fusible Links*
5) SAE J553, *Circuit Breakers*
6) SAE J554, *Electric Fuses (Cartridge Type)*
7) SAE J1888, *High Current Time Lag Electric Fuses*
8) SAE J2077, *Miniature Blade Type Electrical Fuses*

Switches, relays, terminals, and connectors shall have a direct current (dc) rating of 125 % of maximum current for which the circuit is protected.

Power Supply

A 12 V or greater electrical alternator shall be provided. The alternator shall have a minimum output at idle to meet the minimum continuous electrical load of the vehicle, at 200°F (93°C) ambient temperature within the engine compartment, and shall be provided with full automatic regulation.

Minimum Continuous Electrical Load

The minimum continuous electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode during emergency operations:

1) The propulsion engine and transmission
2) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
3) The radio(s) at a duty cycle of 10 percent transmit and 90 % receive (for calculation and testing purposes, a default value of 5 A continuous)
4) The lighting necessary to produce 2 fc (20 lx) of illumination on all walking surfaces on the apparatus and on the ground at all egress points onto and off the apparatus, 5 fc (50 lx) of illumination on all control and instrument panels, and 50 percent of the total compartment lighting loads
5) The minimum optical warning system, where the apparatus is blocking the right-of way
6) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
7) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

If the apparatus is equipped to tow a trailer, an additional 45 A shall be added to the minimum continuous electrical load to provide electrical power for the federally required clearance and marker lighting and the optical warning devices mounted on the trailer.

The condition of the low voltage electrical system shall be monitored by a warning system that provides both an audible and a visual signal to persons on, in, or near the apparatus of an impending electrical system failure caused by the excessive discharge of the battery set.

The charge status of the battery shall be determined either by direct measurement of the battery charge or indirectly by monitoring the electrical system voltage.

If electrical system voltage is monitored, the alarm shall sound if the system voltage at the battery or at the master load disconnect switch drops below 11.8 V for 12 V nominal systems, 23.6 V for 24 V nominal systems, or 35.4 V for 42 V nominal systems for more than 120 seconds.

A voltmeter shall be mounted on the driver's instrument panel to allow direct observation of the system voltage.

Electromagnetic Interference

Electromagnetic interference suppression shall be provided, as required, to satisfy the radiation limits specified in SAE J551/1, *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*.

Wiring Diagram

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

Low Voltage Electrical System Performance Test

A low voltage electrical system test certification shall be provided with delivered apparatus.

12 VOLT MULTIPLEX CONTROL CENTER

The apparatus shall have a multiplexed 12 volt electrical system that will provide complete diagnostic capability. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.

MULTIPLEX SYSTEM VISTA III V-MUX COLOR DISPLAY

One (1) Weldon V-MUX Vista III shall be provided. The Vista III shall have seven switches with custom legends and a wide temperature operating range. The four wires shall control all lighting and HVAC. The Vista III shall have color changes for button status. The display shall be pre-programmable (OEM Level) and be colored. The auto climate control shall display temperature set point and outside temperatures. The Vista III shall be ready for back-up camera, thermal cameras and DVDs. Virtual switches, GPS, on-board diagnostics, 6" and 9" Pana Vise options and large font size shall also be included.

The Vista III allows for peer to peer networking. The Vista III shall have the ability to automatically change screens based on a predetermined state or condition for warning message or status.

The V-Mux display shall be located in the cab center console for control of all master and emergency lights.

CAB CONSOLE

A center cab console shall be provided between the Driver's and Officer's seats. Console shall be designe similar to Edmonton #726 and be fabricated of 1/8" smooth aluminum. A textured powder coat paint finish shall shall be provided for durability and finished appearance.

The rear portion of the console shall be provided with open top storage for notebooks or maps. Two (2) adjustable dividers shall be provided in the storage area. The forward portion of console shall be slanted for easy viewing of the V-Mux display screen, and any siren or radio equipment. The area shall be within easy access to both Driver and Officer.

BATTERY SYSTEM

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. Where required, the cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

Batteries shall be of the high-cycle type. With the engine off, the battery system shall be able to provide the minimum continuous electrical load for 10 minutes without discharging more than 50 percent of the reserve capacity and then to restart the engine. The battery system cold cranking amps (CCA) rating shall meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries shall be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries shall be readily accessible for examination, testing, and maintenance.

A means shall be provided for jump-starting the engine if the batteries are not accessible without lifting the cab of a tilt-cab apparatus.

Where an enclosed battery compartment is provided, it shall be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries shall be protected against vibration and temperatures that exceed the battery manufacturer’s recommendation.

A master load disconnect switch shall be provided between the starter solenoid(s) and the remainder of the electrical loads on the apparatus. The starter solenoids shall be connected directly to the batteries.

Electronic control systems and similar devices shall be permitted to be otherwise connected if so specified by their manufacturer.

The alternator shall be wired directly to the batteries through the ammeter shunt(s), if one is provided, and not through the master load disconnect switch.

A green “battery on” pilot light that is visible from the driver’s position shall be provided.

A sequential switching device shall be permitted to energize the optical warning devices and other high current devices required in minimum continuous electrical load, provided the switching device shall first energize the electrical devices required in minimum continuous electrical load within 5 seconds.

BATTERY SWITCH

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver’s position shall be provided. The switch and pilot light shall be supplied by the cab/chassis manufacturer.

The switch shall be located in a custom enclosure in the area adjacent to the drivers' seat. The enclosure shall be constructed out of smooth plate aluminum powder coated with a gray hammer tone finish and shall be designed to hold the specified cab/chassis supplied battery disconnect switch and battery charge indicator.

BATTERY SOLENOID

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

BATTERY CONDITIONER

One (1) Xantrex model XC5012 battery conditioner, with 120 VAC input, and 50 amp 12 VDC output shall be provided on the back wall of compartment C1, adjacent to the chassis batteries.

This system shall have a multiplex charging mode which employs the 3-stage charging algorithm: Bulk, Absorption, and Float. During the Bulk stage the battery is accepting high current. In the Absorption stage the battery voltage is held constant and the current declines. Finally, in the Float stage, the charger continues to provide voltage at a lower level to maintain the battery in a fully charged state. If there is no load on the battery, it will typically draw very little current. The charger, however, is able to provide current to its full rating to power DC loads on the battery. In float, if batteries are very new or a battery is on the low end of the size range and if it is fully charged to the point where it will not accept any more current, then the charger will enter an adaptive float/no float behavior where it shall alternate between float charging (flo) and resting the battery (rdy).

The charger shall have a EMC FCC Class B Approval, **NO EXCEPTIONS**.

CHASSIS AIR SHORE PUMP

One (1) Kussmaul Auto-Pump 12 volt, 80 psi air compressor shall be provided and installed to maintain air pressure in chassis air brake system. The compressor shall be located in compartment C1, adjacent to the chassis batteries.

BATTERY CHARGE INDICATOR

A Kussmaul 091-94-12 charge indicator display shall be provided and located in an enclosure (with the battery disconnect switch) inside the drivers' door area, adjacent to the drivers' seat. This single battery system indicator is a suppressed zero bar graph voltage display which may be installed in any 12 volt system.

SHORE POWER INLET

One (1) Kussmaul 120 VAC, 30 amp Super Auto-Eject shore power inlet(s) shall be provided. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged.

The protective ground from the shoreline inlet shall be bonded to the vehicle frame.

- The outlet cover shall be red.
- The shore power plug shall be located near the generator door area.

ENGINE COMPARTMENT LIGHT

There shall be one (1) light(s) mounted in the engine compartment with integral switch with a light output of at least 20 candlepower (250 lumens). The engine compartment light(s) shall operate only when the master battery switch is turned "On".

CAB HAZARD WARNING LIGHT

A red flashing or rotating light, located in the driving compartment, shall be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

- Any passenger or equipment compartment door is not closed.
- Any ladder or equipment rack is not in the stowed position.
- Stabilizer system is not in its stowed position.
- Powered light tower is not stowed.
- Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

Compartments and equipment meeting all of the following conditions shall be permitted to be exempt from being wired to the hazard light:

- The volume is less than or equal to 4 ft3 (0.1 m3).
- The compartment has an opening less than or equal to 144 in.2 (92,900 mm2).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

The hazard light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

An audible alarm shall be provided for the door ajar light.

BACK-UP ALARM

The body manufacturer shall furnish and install one (1) 107 dB(A) electronic back-up alarm. Back-up alarm to actuate automatically when the transmission gear selector is placed in reverse.

REAR VIEW CAMERA

There shall be one (1) Voyager rear observation camera system provided and installed on the apparatus. The system shall include one (1) color camera installed on the rear the body. The image shall be displayed on a 7" color flat panel display located within the Driver's range of view.

INTERIOR LED LIGHTS

Ten (10) OnScene Solution model #70071, 10-30 VDC, recessed dual red and white LED light(s) with clear lens shall be provided throughout the vehicle with a switch at the entry door(s). Each light shall have a hi/lo intensity setting switchable at the entry door. In addition light is capable of a 5 second delay after switching light off.

TAIL LIGHTS

Rear body tail lights shall be vertically mounted per Federal Motor Vehicle Safety Standards. The following lights shall be furnished:

- Two (2) Whelen amber LED 600 Series 60A00TAR turn signal lights
- Two (2) Whelen red LED 600 Series 60R00XRR stop/tail lights
- Two (2) Whelen halogen 600 Series 60J000CR back-up lights with clear lens
- Two (2) Whelen warning lights as detailed in the warning light section

Two (2) Whelen CAST-4V, 4-light polished aluminum bezels shall be provided, one (1) each side vertically mounted on the rear of the apparatus body for the above tail lights.

MIDSHIP MARKER/TURN SIGNAL

Two (2) Whelen LED midship body clearance marker/turn signal lights (T0A00MAR) shall be installed. There shall be one (1) light on each side of the body, in the wheel well, ahead of the rear axle. Both lights shall have an amber lens and operate with the chassis clearance marker and turn signals.

MARKER LIGHTS

The apparatus body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) regulations. All body clearance lights shall be LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

CAB STEP LIGHTS / GROUND LIGHTS

There shall be two (2) OnScene Solutions 9" LED Nightstik light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE LIGHT

One (1) Arrow #437 chrome plated LED license plate light shall be installed on the rear of the body. License plate light shall be wired to the headlight circuit of chassis. A fastener system shall be provided for license plate installation.

ELECTRONIC SIREN

One (1) Whelen model 295SLSA1 electronic siren control with standard hard wired microphone and user programmable siren tones shall be provided in cab. Siren to be installed in cab within easy access of Driver.

A switch shall be provided at the 12 volt control panel so that the steering wheel horn ring can be used to activate electronic siren.

SIREN SPEAKER

Two (2) Cast Products Inc. model SAP/D-4307 100 watt siren speaker shall be provided recessed in the front bumper, one (1) on the streetside and one (1) on the curbside.

SIDE SCENE LIGHTS

There shall be four (4) Whelen 900 series (9" x 7") recess mounted Opti-Scene halogen lights (90E000ZR) provided on the upper body. Light quantity shall be divided equally per side. Each light will have an 8-32 degree gradient lens and chrome flange.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

The lights shall be switched at the 12 volt control panel in the cab.

REAR SCENE LIGHTS

Two (2) Whelen 900 series (9" x 7") recess mounted Opti-Scene halogen lights (90E000ZR) shall be provided on the upper rear body to light the work area immediately behind the vehicle to a level of at least 3 fc (30 lx) within a 10 ft × 10 ft (3 m × 3 m) square. Each light will have a 8-32 degree gradient lens and chrome flange.

The lights shall be switched at the 12 volt control panel in the cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

WARNING LIGHT PACKAGE

Each apparatus shall have a system of optical warning devices that meets or exceeds the requirements of this section.

The optical warning system shall consist of an upper and a lower warning level. The requirements for each level shall be met by the warning devices in that particular level without consideration of the warning devices in the other level.

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. The four zones shall be designated A, B, C, and D in a clockwise direction, with zone A to the front of the apparatus.

Each optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

A master optical warning system switch that energizes all the optical warning devices shall be provided.

The optical warning system on the fire apparatus shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s). The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.

UPPER LEVEL OPTICAL WARNING DEVICES

The upper-level optical warning devices shall be mounted as high and as close to the corner points of the apparatus as is practical to define the clearance lines of the apparatus. The upper-level optical warning devices shall not be mounted above the maximum height, specified by the device manufacturer.

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Edge FN72QLED LED 72" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

SECTION	INTERNAL COMPONENTS	LENS COLOR
1	Red Linear LED - Side Facing	Clear
2	Red Corner LED	Clear
3	Blank	Clear
4	Clear Linear LED	Clear
5	Blank	Clear
6	Red Linear LED	Clear
7	Blank	Clear
8	Blank	Clear
9	Red Linear LED	Clear
10	Blank	Clear
11	Clear Linear LED	Clear
12	Blank	Clear
13	Red Corner LED	Clear
14	Red Linear LED - Side Facing	Clear

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lightbar shall be separately switched at the 12 volt control panel in the cab.

GTT OPTICOM

One (1) GTT Opticom emitter light shall be provided inside specified light bar. The Opticom shall be activated with light bar and de-activated when the park brake is set and the vehicle is in blocking mode.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Red Linear Super-LED lights (90RR5FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

UPPER FORWARD CORNER WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Red Linear Super-LED lights (90RR5FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen 900 series (9" x 7") Red Linear Super-LED lights (90RR5FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

LOWER LEVEL OPTICAL WARNING DEVICES

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1220 mm) above level ground for small apparatus.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY WHEELWELL AREA)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") red Linear Super-LED lights (60R02FRR) provided, one (1) each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

LINE VOLTAGE ELECTRICAL SYSTEM

DIESEL GENERATOR

An Onan model 12HDKCD, diesel driven generator shall be installed on the vehicle. The generator shall be installed so that fumes, vapors, heat, and vibrations do not enter the driving or crew compartment. The generator shall be rated at 12,000 watts at 120/240 VAC, 100/50 amps, single phase. Current frequency shall be stable at 60 hertz.

Generator features shall include:

- 3-cylinder diesel engine
- Brush type AC alternator
- Integral enclosed muffler
- USDA approved spark arrestor
- Internal radiator
- Sound attenuated housing
- Intake silencer
- Heavy-duty air cleaner
- Maintenance-free electronic governor
- Digital voltage regulation
- Regulated-voltage 15 A battery charging
- Hourmeter
- Waterproof connector for remote operation
- Electric fuel pump
- Fuel filter
- Full flow oil filter
- Automatic timed glow plugs for quick easy start
- Overvoltage, low oil pressure, overtemp, overspeed, overload, and AC alternator overtemp safeties

Overall size of generator shall be 41" L x 24" W x 27" H and weigh 816 lbs.

Generator shall be equipped with a high temperature automatic shutdown system and a low oil (pressure or level) automatic shutdown system. The generator shall be installed in accordance with the generator manufacturer's requirements for ventilation and service accessibility.

Permanently installed generators shall have readily accessible engine oil drain provisions or piping to a remote location for oil changing.

If the generator is located in a position on the vehicle where the operator cannot see the instrumentation and operate the controls while standing at ground level or positioned at a specifically designated operator station, an operating panel with the required instrumentation, start and stop controls, and other controls necessary for safe operation shall be provided at a remote operator's panel.

The remote starting controls for the generator shall be located inside the walk-in body of the apparatus, adjacent to the Paneltronics circuit breaker box.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the CMQD Quiet Diesel Series Generators shall be free from defects in material and workmanship for a period of two (2) years or two thousand (2,000) hours, whichever comes first, from the date of delivery to the first purchaser.

GENERATOR MOUNTING

The generator shall be mounted in a lower exterior compartment on rubber vibration isolators. The compartment shall be reinforced where necessary to hold weight of generator. A valve shall be provided on the generator oil drain outlet and piped to underside of generator compartment with flexible hose and plug. The drain shall be located where easily accessible for generator service.

FUEL SYSTEM

The generator fuel system shall be plumbed to the chassis main fuel tank. A separate fuel line shall be installed directly from the tank, not connected to the truck engine fuel line system. The generator fuel line shall be properly protected and secured inside of chassis frame. A shut-off valve shall be provided between the generator and fuel line as it enters the compartment.

Fuel lines shall be protected from chafing at all wear points. If the fuel source is shared with the apparatus engine, a separate fuel pickup system shall be provided that is arranged to ensure that the generator cannot utilize more than 75 percent of the fuel tank capacity.

STARTING SYSTEM

The generator starting system shall be powered by chassis battery system with heavy duty stranded copper cables. The starter line shall by-pass the chassis master switch to permit generator operation when the apparatus engine is not running. This starter line shall be of sufficient size for the generator, adequately protected and supported inside the chassis frame area.

EXHAUST SYSTEM

The generator exhaust system shall be equipped with a residential type muffler for maximum quieting, and black iron rigid pipe to link the generator to the muffler. The exhaust pipe shall be securely supported and shall be shielded or insulated to prevent excessive heating of the compartment. Exhaust shall discharge vertically to roof of vehicle and shall include a flapper type rain guard.

MANUALS AND SCHEMATICS

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

GENERATOR COMPARTMENT INSULATION

The generator compartment shall be provided with heavy duty sound insulation applied to walls and ceiling. Insulation shall have a high temperatures rating with a foil facing and attached to walls with a positive type fasteners, glue type adhesive shall not be acceptable.

CIRCUIT BREAKER BOX

There shall be a Paneltronics™ 120/240 VAC distribution/breaker panel provided on the forward surface of the stub wall in the interior of compartment IS2. All circuit breakers shall be rated to the wire size and load demand.

There shall be color coded LED indicator lights provided to indicate the status of each branch breaker.

Each individual switch and all meters shall be back lit for identification in low light situations.

The panel shall have four (4) meters:

- One (1) to monitor frequency
- One (1) to monitor line voltage
- One (1) to monitor load current (amps)
- One (1) hour meter to register genset run time

Each circuit breaker shall be hydraulic/magnetic trip free style with a manual reset.

The Paneltronics™ panel shall also control the manual switch over from shore to generator power.

The entire panel shall be mounted via a piano style hinge that allows the front panel to open for access to the breakers.

SHORE POWER INLET - BATTERY CHARGER

The above mentioned shore power inlet, and battery conditioner shall be specified in the 12 volt section.

SHORE POWER INLET - INVERTER

One (1) Kussmaul 30 amp "Super Auto-Eject" shore power inlet shall be furnished and installed. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged. The shore power inlet shall provide an external power source for apparatus electrical circuits. A matching 30 ampere plug shall be shipped with the apparatus for Honolulu Fire Department supplied external power source wiring.

A transfer switch shall be required to isolate one power source from the other where a circuit(s) is intended to be supplied from more than one power source. To protect both the generator and external power source from back feed, two (2) 120 volt, 30 ampere, 4PST auxiliary contact with safety interlock relay shall be installed. Relay shall cut-off the connection between the generator supply circuit and device circuits when shore power is connected.

Transfer equipment, including transfer switches, shall operate such that all ungrounded conductors of one power source are disconnected before any ungrounded conductors of the second power source are connected. The neutral conductor shall be switched through the transfer switch. The apparatus shall have a label permanently affixed at the power inlet that indicates the line voltage, and amperage.

- The outlet cover shall be white.

- The shore power plug shall be located near the generator door area.

Shore power shall be wired to the specified 120 volt inverter.

SHORE POWER INLET - SPECIFIED CIRCUITS

One (1) Kussmaul 30 amp Super Auto-Eject shore power inlet shall be provided and wired to specified circuits below. The shore power connection shall automatically disengage from vehicle when chassis ignition is engaged. The shore power inlet shall provide an external power source for apparatus electrical circuits. A matching 30 ampere plug shall be shipped with the apparatus for Honolulu Fire Department supplied external power source wiring.

A transfer switch shall be required to isolate one power source from the other where a circuit(s) is intended to be supplied from more than one power source. To protect both the generator and external power source from back feed, two (2) 120 volt, 30 ampere, 4PST auxiliary contact with safety interlock relay shall be installed. Relay shall cut-off the connection between the generator supply circuit and device circuits when shore power is connected.

Transfer equipment, including transfer switches, shall operate such that all ungrounded conductors of one power source are disconnected before any ungrounded conductors of the second power source are connected. The neutral conductor shall be switched through the transfer switch. The apparatus shall have a label permanently affixed at the power inlet that indicates the line voltage, and amperage.

- The outlet cover shall be blue.

- The shore power plug shall be located near the generator door area.

Shore power inlet shall be wired to the following specified 120 VAC circuits;

Shore power shall be wired to all primary 120 VAC, 20 ampere electrical outlets on apparatus (maximum of two (2) circuits). Circuits shall be provided with circuit breaker protection with either generator or shore power providing power.

SHORE POWER INLET - 100 AMP

A 100 ampere, 240 VAC, single phase shore power inlet shall be provided on the apparatus to provide an external power source for apparatus electrical circuits. A matching 100 ampere plug shall be shipped with the apparatus for Honolulu Fire Department supplied external power source wiring.

Shore power shall be wired to apparatus main circuit breaker in the circuit breaker distribution panel and feed all 120/240 electrical circuits on apparatus.

To protect both the generator and external power source from back feed, a manual switch shall be installed at the generator control panel, to cut off the connection between the apparatus circuits and the generator when the external power source plug is in use.

OUTLETS AND CIRCUITS

The generator and or shore power shall supply the 120/240 volt electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

Two (2) 120 volt exterior outlets, one (1) each side near rear wheel well area.

- The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).

INVERTER

The apparatus shall be equipped with a Xantrex model 3000SW inverter that provides 3,000 watt inverter, 50 A surge capability, 120 VAC, 60 cycle output from 12 VDC.

The alternator and/or battery system shall be adequate to provide power for continuous operation for a minimum of 2 hours at full output.

3000SW

- Power factor corrected multistage charger
- True sine wave output (crystal controlled)
- Built-in 30 A transfer switch automatically transfers between inverter power and incoming AC power
- Equalization mode conditions batteries for longer life
- Power sharing prevents tripping of shore power breaker
- Compact, lightweight, and easy to install
- Includes remote panel and battery temperature sensor
- Two year warranty

Protection Features

- Over voltage and under voltage protection
- Over temperature protection and automatic overload protection
- Short circuit AC backfeed protection

3000SW (ACS) Remote Panel (Included)

- Independent inverter and charger on/off controls
- Push button control of power sharing, equalizing, battery set-up
- Easy to read backlit digital display
- Single at-a -glance display of AC and DC system information
- Text message fault diagnostics

INVERTER BATTERY SUPPLY

There shall be three (3) Odessy model PC2150 Group 31 deep cycle batteries provided as the 12volt power source for the onboard inverter. The batteries shall incorporate Absorbent Glass Mat (AGM) technology for efficient gas recombination of up to 99% and freedom from electrolyte maintenance. The batteries shall be mounted in a stainless steel pan with hold down provisions for mobile application.

INVERTER BATTERY SUPPLY - VSR

There shall be one (1) Voltage Sensitive Relay (VSR) provided with the deep cycle batteries. The VSR allows two batteries to be charged at the same time. When the engine is started and the start battery reaches 13.7 volts, the VSR engages, allowing two battery banks (start and inverter supply) to be charged simultaneously. When the voltage drops below 12.8 volts (e.g. the engine is stopped), the VSR disengages, separating the batteries. This system eliminates the possibility of draining the wrong battery and protects sensitive electronic equipment powered from the house battery from harmful engine start up spikes.

LINE VOLTAGE ELECTRICAL SYSTEM

GENERAL REQUIREMENTS

Stability

Any fixed line voltage power source producing alternating current (ac) shall produce electric power at 60 Hz, ±3 Hz when producing power at all levels between no load and full rated power. Any fixed line voltage power source shall produce electric power at the rated voltage ±10 percent when producing power at all levels between no load and full rated power.

The maximum voltage supplied to portable equipment shall not exceed 275 volts to ground. Higher voltage shall be permitted only when used to operate fixed wired, permanently mounted equipment on the apparatus.

Conformance with National Electrical Code

All components, equipment, and installation procedures shall conform to *NFPA 70*, *National Electrical Code*, except where superseded by the requirements of this chapter. Where the requirements of this chapter differ from those in *NFPA 70*, the requirements in this chapter shall apply.

Where available, line voltage electrical system equipment and materials included on the apparatus shall be listed and used only in the manner for which they have been listed. All equipment and materials shall be installed in accordance with the manufacturer's instructions.

Location Ratings

Any equipment used in a dry location shall be listed for dry locations. Any equipment used in a wet location shall be listed for wet locations.

Any equipment, except a PTO-driven generator, used in an underbody or under chassis location that is subject to road spray shall be either listed as Type 4 or mounted in an enclosure that is listed as Type 4.

If a PTO-driven generator is located in an underbody or under chassis location, the installation shall include a shield to prevent road spray from splashing directly on the generator.

Grounding

Grounding shall be in accordance with 250.34(A) and 250.34(B) of *NFPA 70*. Ungrounded systems shall not be used.

Only stranded or braided copper conductors shall be used for grounding and bonding.

The grounded current-carrying conductor (neutral) shall be insulated from the equipment-grounding conductors and from the equipment enclosures and other grounded parts.

The neutral conductor shall be colored white or gray in accordance with 200.6, "Means of Identifying Grounded Conductors," of *NFPA 70*.

Any bonding screws, straps, or buses in the distribution panel board or in other system components between the neutral and equipment-grounding conductor shall be removed and discarded.

Bonding

The neutral conductor of the power source shall be bonded to the vehicle frame. The neutral bonding connection shall occur only at the power source. In addition to the bonding required for the low voltage return current, each body and each driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor.

The conductor shall have a minimum amperage rating, as defined in 310.15, “Ampacities for Conductors Rated 0–2000 Volts,” of *NFPA 70*, of 115 percent of the rated amperage on the power source specification label.

A single conductor that is sized to meet the low voltage and line voltage requirements shall be permitted to be used.

Ground Fault Circuit Interrupters

In special service vehicles incorporating a lavatory, sink, toilet, shower, or tub, 120 V, 15 or 20 A receptacles within 6 ft (1.8 m) of these fixtures shall have ground fault circuit interrupter (GFCI) protection. GFCIs integrated into outlets or circuit breakers or as stand-alone devices shall be permitted to be used in situations.

Power Source General Requirements

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

The power source shall be shielded from contamination that would prevent the power source from operating within its design specifications.

Power Source Rating

For power sources of 8 kW or larger, the power source manufacturer shall declare the continuous duty rating that the power source can provide when installed on fire apparatus according to the manufacturer’s instructions and run at 120°F (49°C) air intake temperature at 2000 ft (600 m) above sea level.

The rating on the power source specification label shall not exceed the declared rating from the power source manufacturer.

Access shall be provided to permit both routine maintenance and removal of the power source for major servicing. The power source shall be located such that neither it nor its mounting brackets interfere with the routine maintenance of the fire apparatus.

Instrumentation

If the power source is rated at less than 3 kW, a “Power On” indicator shall be provided. If the power source is rated at 3 kW or more but less than 8 kW, a voltmeter shall be provided.

If the power source is rated at 8 kW or more, the following instrumentation shall be provided at an operator’s panel:

8) Voltmeter
9) Current meters for each ungrounded leg
10) Frequency (Hz) meter
11) Power source hour meter

The instrumentation shall be permanently mounted at an operator’s panel. The instruments shall be located in a plane facing the operator. Gauges, switches, or other instruments on this panel shall each have a label to indicate their function.

The instruments and other line voltage equipment and controls shall be protected from mechanical damage and not obstructed by tool mounting or equipment storage.

An instruction plate(s) that provides the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Operation

Provisions shall be made for placing the generator drive system in operation using controls and switches that are identified and within convenient reach of the operator.

Where the generator is driven by the chassis engine and engine compression brakes or engine exhaust brakes are furnished, they shall be automatically disengaged for generator operations.

Any control device used in the generator system power train between the engine and the generator shall be equipped with a means to prevent unintentional movement of the control device from its set position in the power generation mode.

If there is permanent wiring on the apparatus that is designed to be connected to the power source, a power source specification label that is permanently attached to the apparatus at the operator’s control station shall provide the operator with the information required.

The power source, at any load, shall not produce a noise level that exceeds 90 dBA in any driving compartment, crew compartment, or onboard command area with windows and doors closed or at any operator’s station on the apparatus.

Power Supply Assembly

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 12 ft (4 m) in length.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source.

If the power supply assembly connects to the vibrating part of a generator (not a connection on the base), the conductors shall be flexible cord or other fine-stranded conductors enclosed in metallic or nonmetallic liquid tight flexible conduit rated for wet locations and temperatures not less than 194°F (90°C).

Overcurrent Protection

Manually resettable over current devices shall be installed to protect the line voltage electrical system components.

Power Source Protection

A main over current protection device shall be provided that is either incorporated in the power source or connected to the power source by a power supply assembly.

The size of the main over current protection device shall not exceed 100 percent of the rated amperage stated on the power source specification label or the rating of the next larger available size over current protection device, where so recommended by the power source manufacturer.

If the main over current protection device is subject to road spray, the unit shall be housed in a Type 4–rated enclosure.

Branch Circuit Overcurrent Protection

Over current protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with 240.4, “Protection of Conductors,” of *NFPA 70*.

Any panel board shall have a main breaker where the panel has six or more individual branch circuits or the power source is rated 8 kW or larger.

Each over current protection device shall be marked with a label to identify the function of the circuit it protects.

Dedicated circuits shall be provided for any large appliance or device (air conditioning units, large motors, etc.) that requires 60 percent or more of the rated capacity of the circuit to which it is connected, and that circuit shall serve no other purpose.

Panelboards

All fixed power sources shall be hardwired to a permanently mounted panel board unless one of the following conditions exists:

1) All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated over current devices.
2) Only one circuit is hardwired to the power source, which is protected by an integrated over current device.

The panel shall be visible and located so that there is unimpeded access to the panel board controls. All panel boards shall be designed for use in their intended location. The panel(s) shall be protected from mechanical damage, tool mounting, and equipment storage.

Where the power source is 120/240 V and 120 V loads are connected, the apparatus manufacturer or line voltage system installer shall consider load balancing to the extent that it is possible.

Wiring Methods

Fixed wiring systems shall be limited to the following:

1) Metallic or nonmetallic liquid tight flexible conduit rated at temperatures not less than 194°F (90°C) with stranded copper wire rated for wet locations and temperatures not less than 194°F (90°C)
2) Type SOW, SOOW, SEOW, or SEOOW flexible cord rated at 600 V and at temperatures not less than 194°F (90°C)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring and shall be arranged as follows:

1) Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
2) Separated from fuel lines by a minimum distance of 6 in. (150 mm)

A means shall be provided to allow “flexing” between the driving and crew compartment, the body, and other areas or equipment whose movement would stress the wiring.

Electrical cord or conduit shall be supported within 6 in. (150 mm) of any junction box and at a minimum of every 24 in. (600 mm) of run.

Supports shall be made of nonmetallic materials or of corrosion-resistant or corrosion-protected metal. All supports shall be of a design that does not cut or abrade the conduit or cord and shall be mechanically fastened to the apparatus.

Only fittings and components listed for the type of cord or conduit being installed shall be used.

Splices shall be made only in a listed junction box.

Additional Requirements for Flexible Cord Installations

Where flexible cord is used in any location where it could be damaged, it shall be protected by installation in conduit, enclosures, or guards.

Where flexible cord penetrates a metal surface, rubber or plastic grommets or bushings shall be installed.

Wiring Identification

Each line voltage circuit originating from the main panel board shall be identified.

The wire or circuit identification either shall reference a wiring diagram or wire list or shall indicate the final termination point of the circuit.

Where prewiring for future power sources or devices exists, the un-terminated ends shall be marked with a label showing their wire size and intended function.

Wiring System Components

Only stranded copper conductors with an insulation rated for temperatures of at least 194°F (90°C) and wet locations shall be used. Conductors in flexible cord shall be sized in accordance with Table 400.5(A) of *NFPA 70*. Conductors used in conduit shall be sized in accordance with 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*. Aluminum or copper-clad aluminum conductors shall not be used.

All boxes shall conform to and be mounted in accordance with Article 314, "Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes," of *NFPA 70*. All boxes shall be accessible using ordinary hand tools. Boxes shall not be permitted behind welded or pop-riveted panels.

The maximum number of conductors permitted in any box shall be in accordance with 314.16, "Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies," of *NFPA 70*.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer's instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

Each switch shall indicate the position of its contact points (i.e., open or closed) and shall be rated for the continuous operation of the load being controlled. All switches shall be marked with a label indicating the function of the switch. Circuit breakers used as switches shall be "switch rated" (SWD) or better. Switches shall simultaneously open all associated line voltage conductors. Switching of the neutral conductor alone shall not be permitted.

Line voltage circuits controlled by low voltage circuits shall be wired through properly rated relays in listed enclosures that control all non-grounded current-carrying conductors.

Receptacles and Inlet Devices

Wet and Dry Locations

All wet location receptacle outlets and inlet devices, including those on hardwired, remote power distribution boxes, shall be of the grounding type, provided with a wet location cover, and installed in accordance with Section 406.8, "Receptacles in Damp or Wet Locations," of *NFPA 70*.

All receptacles located in a wet location shall be not less than 24 in. (600 mm) from the ground. Receptacles on off road fire apparatus shall be a minimum of 30 in. (750 mm) from the ground. All receptacles located in a dry location shall be of the grounding type and shall be at least 12 in. (300 mm) above the interior floor height. No receptacle shall be installed in a face-up position.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical.

Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

Wiring Schematics

An "As-Built" Wiring diagrams for line voltage systems shall be provided to include the following information;

(a) Pictorial representations of circuit logic for all electrical components and wiring
(b) Circuit identification
(c) Connector pin identification
(d) Zone location of electrical components
(e) Safety interlocks
(f) Alternator–battery power distribution circuits
(g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems

SEVEN (7) ANTENNAS - RAIL MOUNTED CAB ROOF

There shall be four (4), radio antenna rail(s) provided and installed on the roof of the cab/chassis. The rails shall be constructed of aluminum, forming a two piece box design. The top section shall be removable for easy access to the individual antenna wiring. **Total of seven (7), antenna bases shall be provided and installed on each side of the apparatus, per the approved sales drawing (every other antenna only will be populated)**. The bases shall include a minimum of 20' of LMR195 cable. The antenna wiring shall enter the cab roof at a single point under the end of the rail. The end of each radio antenna shall be routed to a location determined by the Honolulu Fire Department.

Due to multiple configurations of antenna whips, the Manufacturer shall provide the antenna base, and Honolulu Fire Department shall provide the whip.

ADVANCED COMMUNICATIONS SOLUTION - MAJOR COMPONENT LIST

All bidders must maintain and provide documented proof of all of the following certifications to ensure proper installation and configuration of the advanced communication solution;

- Cisco Premier level certification
- Cisco Unified Communications Express Certification
- ATP Cisco IPICS Communication Solution

Bids submitted without the above certifications will be automatically rejected.

Product	**Description**	**Qty**
Router		
CISCO2811-AC-IP	Fully Configured Cisco 2811 AC IP Router with required components - 2811 w/ AC+POE,2FE,4HWICs,2PVDMs,1NME,2AIMS,IP BASE,64F/256D	1
Switch		
WS-C3560-24PS-S	Catalyst 3560 24 10/100 PoE + 2 SFP + IPB Image	1
Outrigger		
ICS-OUTR-001	ICS Outrigger System with 16 10/100 Data Ports, 4 FXO, 4FXS and Fiber Optic Interface	1
ICS-MXRR-4-3M-LC	3 Meter MX Tactical Interconnect with LC Connections (For internal Vehicle Harness - CUSTOM)	1
ICS-CAMD-10T4M-MX	1000 FT T4M tactical fiber cable on Reel with MX Tactical Connectors	1
Phones		
CP-7961G	Cisco IP Phone 7961	6
CP-7921G-A-K9	Cisco 7921G FCC; CCM/CCME UL Reqd; Battery/PS Not Included	2
Video Systems		
AXIS 241QA	AXIS 241QA Four Channel Video Server (Encoder)	1
Tandberg Edge 95 MXP	Tandberg Edge 95 MXP HD VTC system with camera	1
ICS-AGM-SK1	Agile Mesh Starter Kit: 2 single camera tripod solutions, 1 wearable unit, 1 base dual video node, 1 network bridge, 2 field accessory kits, public safety frequency upgrades and 1 day training	1

AUDIO VIDEO ROUTING AND CONTROL SYSTEM

One (1) AMX NI-3000 control station with RS323 control shall be used to operate and control the video system equipment.

Three (3) AMX NXD-500i, 5" color touch-panel interface units shall be provided and located;

- Two (2), located in the lower area of the center data rack in front communications area as shown in the approved sales drawing
- One (1) in the rear conference area

The interface units shall communicate with the NI-3000 control station which shall in turn IR and RS-232 compatible components. The control shall be programmed with custom code to offer each interface unit with an interactive menu. The menus shall include screens to operate the Pelco camera system from either interface unit with the ability to assign one (1) as the master and take control at any time.

The control code shall also include signal instructions to allow the operators to interact with the broadcast TV receiver, Satellite TV receivers, and display screens.

System shall be capable of routing all audio/video inputs (including Satellite TV, DiBos outputs, Pelco camera system, and Broadcast TV). Any input source can be displayed at any of the specified monitors.

PHONE SYSTEM

A total of six (6) interior phone jacks, and one (1) fax machine jack shall be provided and be compatible with Cisco phone system specified. Phone jacks shall be located as follows;

- One (1) on wall in front IT personnel area.
- Two (2) in consoles in communications area
- One (1) for fax machine located front streetside corner of command area
- Two (2) at rear conference table console of command area
- One (1) on streetside wall of command area

The phone system shall include the additional following hardware;

- Three (3) Telular Phonecell SX5e's configured for the Sprint wireless system; two (2) interfaced to the phone system and one (1) interfaced to the fax machine.

The phone system shall interface with both the Telular (cellular), and VOIP (satellite) systems installed. All telephone lines and cellular antenna cables shall be installed in ENT conduit.

VEHICLE SATELLITE COMMUNICATIONS SYSTEM

An AVL Technologies/Agiosat model 1278-09, 8 Watt Ku-Band Auto-Deploy Mobile VSAT Antenna system shall be installed on vehicle to include:

- 4.50 Mbps maximum uplink from field location to hub
- 1.2 Meter Prime Focus Offset Reflector
- Reflector rear cover
- 2 port Feedhorn Assembly with Transmit Reject Filter plus Norsat PLL LNB
- RF Interface - 8 Watt Ku-band Amplifier
- Waveguide WR 75 Flex from Feed Assembly
- Coax RG59 run from feed to base plus 15 ft.
- Pallet Mount for Permanent Vehicle Integration
- Electrical Interface - 30 ft. Cable with Connectors for Controller L-Band Satellite Modem
- Certified for Auto-commissioning on Agiosat North American Networks L-Band Satellite Modem
- TracStar One-button Full Function Rackmount Auto-deploy Controller
- Peaking, and Cross-Pol Adjustment using GPS, Compass and Level Sensor Inputs
- Certified for Auto-commissioning on Agiosat North American Networks
- CDM570L L-Band Satellite Modem
- Data rate: 2.4 kbps-5 Mbps BPSK, QPSK, OQPSK, 8PSK, Turbo Product Code, QOS Header & Payload Compression, IP Module, licenses, 24/48VDC BUC power supply
- DVB Satellite Receiver - DVB-S and DVB-S2 capable
- High-speed Receive Link for the Agiosat Network platform

Requires at least a Cisco Router for DHCP and Inbound QOS with Integrated 8 Port Ether Switch Network Module with AES Chipset, QOS & Header Compression (Router by ICS)

Completed unit will include a two (2) year “Hawaii” package of 22 days of 1.5 MB broad band network service plan by Agiosat. Documentation of service activation shall be provided with the completed apparatus.

TV SATELLITE SYSTEM

One (1) Moto Sat Executive series 24" satellite receiver shall be provided on roof of apparatus body. This satellite receiver is designed exclusively for mobile users (RV's, boats, buses). The Moto Sat Executive is 10" H x 25" wide x 38" long, and weighs 35 pounds. The satellite receiver is equipped with a Nomad 2 controller so that the antenna automatically aims at the satellite and automatically stows.

The satellite shall be located so that it does not interfere with operation of other roof mounted equipment.

Satellite dish shall be provided with dual LNB capability and wired so that multiple receiver(s) can be used with system.

There will be two (2) Dish model 311 receivers located in the 19" data rack.

A 2 year Dish Network Business Essentials including Honolulu local service plan shall be the included in total price. Documentation of service activation shall be provided with the completed apparatus.

ELECTRONIC PATCH PANEL

An electronic patch panel shall be provided on forward curbside of body inside a Cast Products phone box with locking door with cold lock bristles for audio, video, etc. input/outputs as follows; The enclosure shall be deigned with a pass through area as specified in the compartment section of the specification. The pass through area will be located on the rear panel of the Cast Product box and will be a minimum of 4.00 inches tall and as wide as possible. Brush type material will be installed to provide a weather seal to the inside of the apparatus.

3. Four (4) composite video inputs
4. Four (4) composite video outputs
5. Two (2) pair RCA audio inputs
6. Two (2) pair RCA audio outputs
7. Two (2) CAT 5 inputs
8. Two (2) CAT 5 outputs
9. Two (2) standard 2 pair phone jack inputs
10. Two (2) standard 2 pair phone jack outputs

All wiring shall terminate inside the video data cabinet.

OFFICE EQUIPMENT

One (1) HP Officejet 6310, or equal, color all-in-one color inkjet printer with scanner/copier/fax shall be provided on front curbside corner cabinet of rear command area.

BOSCH DiBOS VIDEO RECORDER / ROUTER

There shall be one (1) Bosch DiBos 8 video component provided and installed in the video data rack. The DiBos component shall have inputs for the video resources in the truck and route them to the computer network. The video feeds shall be accessed by typical users though the use of a internet browser. Users that require more advanced control will require the license software. One (1) license will be provided with the DiBos unit.

The DiBos component shall include a 1TB hard drive array for recording video sources. The recording media shall exist on the DiBos device in an encrypted format. Transportation of the media can be done through the DiBos by burning it to CD or DVD media through the onboard DVD writer or by using the licensed software. The burned media can be in ASF (Windows Media Format) or the encrypted DiBos format. If the media is left in the DiBos format, a DiBos compatible player will be automatically downloaded to the DVD media.

Features of the DiBos 8 include:

- Supports both analog and IP video inputs
- MPEG-4 compression
- 4CIF recording and viewing
- Web browser remote access and viewing
- Control cameras and AutoDomes with Biphase or Bilinx
- Connects to Bosch alarm panels

RACK MOUNTED COMPUTER

Supply and install the following rack mounted computer: Dell Poweredge, or equal, server, 2.8GHz/2MB Cache, Xeon, 800MHz Front Side Bus for PESC1425, 4GB DDR2 400MHz (4X1GB) Dual Ranked DIMMs, BCC, 160GB 7.2K RPM SATA HDD Poweredge SC, Windows Server 2008 R2 Standard Edition, Includes 5 Cals, INTEL 1000MT DUAL PORT GB,NIC, CDRW/DVD, 4G, 24X, Internal SAMSUNG, 20GB OS Partition Override for Microsoft OS Options, 160GB 7.2K SATA, Additional HDD Poweredge SC, Motherboard SATA controller, 2 Hard Drives, No RAID, Rack Chassis w/Versarail Round Hole-Universal for 3rd-party racks, PEXX.

COMMAND CAMERA SYSTEM

There shall be one (1) Bosch MIC3000 camera system(s) complete with pan & tilt drive system, enclosure with shield wiper, high quality camera and lens. The camera system shall be a high resolution unit with Lowlight color technology.

The camera control system shall contain one (1) keyboard with joystick.

TELESCOPING PNEUMATIC MAST

The vehicle shall be equipped with one (1) Will-Burt 7-42 heavy duty pneumatic powered telescoping mast(s). The mast shall utilize air from the chassis brake system. Air to operate the telescoping mast must be drawn from a drier system and be regulated to 20 psig and shall have a back pressure protection valve.

A red flashing warning light will be visible to the driver to warn when a light tower is out of roof nested position.

A pneumatic kit to raise and lower the mast shall include air control valve, 0-160 psig air valve, regulator, 0-30 psig air gauge.

A 70' Nycoil conduit measuring 1" ID x 16-1/2" OD coil shall be provided for the 7-42 telescopic mast. The Nycoil cable conduit will contain the following:

- Camera feed and controls
- Two (2) each RF transmission coaxial cables (LMR300). Cables are to terminate in the IT compartment rack with 10.00 feet of excess cable on the interior end, and 2.00 feet of excess cable on the mast end. The mast end shall be located in a sealed junction box located adjacent to the camera. N style male connectors shall be provided on both ends of the cabling.

The mast shall be of a free standing design (non-guyed) and use high strength, heat treated aluminum alloy tubes and collars. Each mast section (tube) shall have two full length external keys and nominal .095" wall thickness collars with matching keyways to maintain directional azimuth.

Each mast section and collar shall be of the low friction synthetic bearings for smooth operation and longer life. Bumpers shall be supplied to reduce shock on extension and retraction. All exterior aluminum surfaces shall be anodized and sealed. Fasteners and fittings shall be plated steel or stainless steel for corrosion resistance.

One (1) maintenance and instruction manual will be provided for the towers on delivery. Wiring schematic, air piping schematic and installation diagrams shall be provided with the manual. Manufacturer's blueprint of tower, complete parts list and bill of materials for towers provided with manuals.

MODEL 7-42 SPECIFICATIONS

Nested height tower only:	7'-1"
Extended height tower only:	41'-2"
Normal payload capacity:	150 lbs.
Number of sections:	9
Mast Diameter:	9" - 3"
Mast Volume:	7.2 cu. ft.
Collar type:	Non-locking
Maximum operating pressure:	35 psi

The operational envelope of the mast shall be automatically illuminated by a lookup light whenever the mast assembly is being raised as required by NFPA.

MAST MOUNTING - EXTERNAL

The above telescoping mast shall be mounted using an external mounting kit. The mast shall be located on the rear of the body mounted to the rear bumper.

MAST COVER

There shall be a custom designed, 1/8" smooth aluminum cover (painted body color) provided to store control cables, air hoses, and to protect the mast from the elements. The cover shall be easily removed to allow access to mast for maintenance.

BODY PROTECTION PANEL

There shall be a custom designed, brushed stainless steel protection panel provided on the rear of the body, between the specified air mast and the apparatus. The cover shall be designed to protect the painted surface of the body from damage from the Nycoil wiring contacting the body during raising and lowering of the mast.

TELESCOPING PNEUMATIC MAST - MICROWAVE COMMUNICATIONS SYSTEM

The vehicle shall be equipped with one (1) Will-Burt 7-30 heavy duty pneumatic powered telescoping mast for the future install of a microwave communications system by Honolulu Fire Department. The mast shall utilize air from the chassis brake system. Air to operate the telescoping mast must be drawn from a drier system and be regulated to 20 psig and shall have a back pressure protection valve.

A red flashing warning light will be visible to the driver to warn when a light tower is out of roof nested position.

A pneumatic kit to raise and lower the mast shall include air control valve, 0-160 psig air valve, regulator, 0-30 psig air gauge.

A 60' Nycoil conduit measuring 1" ID x 16-1/2" OD coil shall be provided for the 7-30 telescopic mast.

The mast shall be of a free standing design (non-guyed) and use high strength, heat treated aluminum alloy tubes and collars. Each mast section (tube) shall have two full length external keys and nominal .095" wall thickness collars with matching keyways to maintain directional azimuth.

Each mast section and collar shall be of the low friction synthetic bearings for smooth operation and longer life. Bumpers shall be supplied to reduce shock on extension and retraction. All exterior aluminum surfaces shall be anodized and sealed. Fasteners and fittings shall be plated steel or stainless steel for corrosion resistance.

One (1) maintenance and instruction manual will be provided for the towers on delivery. Wiring schematic, air piping schematic and installation diagrams shall be provided with the manual. Manufacturer's blueprint of tower, complete parts list and bill of materials for towers provided with manuals.

MODEL 7-30 SPECIFICATIONS

Nested height tower only:	6'-8"
Extended height tower only:	29'-1"
Normal payload capacity:	150 lbs.
Number of sections:	6
Tube Diameter	6-3/4" - 3"
Mast Volume:	3.2 cu. ft.
Collar type:	Non-locking
Maximum operating pressure:	35 psi

The operational envelope of the mast shall be automatically illuminated by a lookup light whenever the mast assembly is being raised as required by NFPA.

CABLING/WIRING FOR FUTURE SYSTEMS

All cabling and wiring shall be provided for the future microwave communications system from mounting point on top of mast to the back haul data rack located in front of vehicle.

All cabling and wiring shall be provided for the future pan/tilt con troll system for microwave communications system from mounting point on top of mast to the back haul data rack located in front of vehicle.

The cabling provided shall be as follows:

- Two (2) each microwave RF transmission coaxial cable (LMR400). The cables shall be installed in the Nycoil conduit and terminated in the IT compartment rack area with 10.00 feet of excess cable on the interior end, and 2.00 feet of excess cable on the mast end. There shall be no termination of the transmission lines.

- Two (2) each multi-conductor control wires with six (6) 18-20 AWG color coded conductors in each bundle for the microwave antenna motor control. 15.00 feet excess cable will be provided at the IT rack area and 3.00 feet excess cable will be provided on the mast end. There will be no termination of the control cabling.

- The specified cabling will be mounted at the top of the mast in a sealed aluminum junction box designed for mounting a future microwave system.

MAST MOUNTING - EXTERNAL

The above telescoping mast shall be mounted using an external mounting kit. The mast shall be located on the rear of the body mounted to the rear bumper.

MAST COVER

There shall be a custom designed, 1/8" smooth aluminum cover (painted body color) provided to store control cables, air hoses, and to protect the mast from the elements. The cover shall be easily removed to allow access to mast for maintenance.

BODY PROTECTION PANEL

There shall be a custom designed, brushed stainless steel protection panel provided on the rear of the body, between the specified air mast and the apparatus. The cover shall be designed to protect the painted surface of the body from damage from the Nycoil wiring contacting the body during raising and lowering of the mast.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1901 standards, the special service vehicle shall be designed for an equipment loading allowance of 4,000 lbs. of Honolulu Fire Department provided loose equipment based on a 30,001 - 40,000 pound gross vehicle weight rating.

EQUIPMENT

The following equipment shall be furnished with the completed special service vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.

- There shall be two (2) NFPA approved folding aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20 % grade, with the transmission in neutral, and the parking brake released.

  - The wheel chock(s) shall be mounted behind rear wheels, below body on streetside.

- Two (2) Streamlight LiteBox Vehicle Mounting Systems shall be provided. Each flashlight shall be orange in color. Each flashlight shall have a 12 volt DC charger and vehicle mount kit. Each flashlight shall have a 20 watt spotlight style bulb and reflector. The flashlights shall be wired to battery direct unless otherwise specified by the customer.

  - The flashlight(s) shall be mounted one (1) on the forward face of the cab console justified to the officer side, and one (1) located on the streetside interior wall of area IS2, adjacent to the Paneltronics circuit breaker panel, mounted at eye level.

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

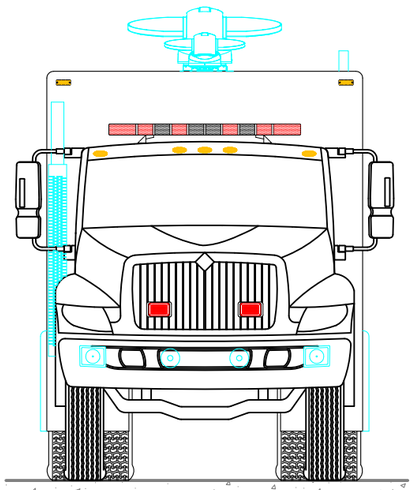
All other minor equipment not specified above, but required by NFPA 1901 before the unit is placed in service shall be supplied and mounted by Honolulu Fire Department.

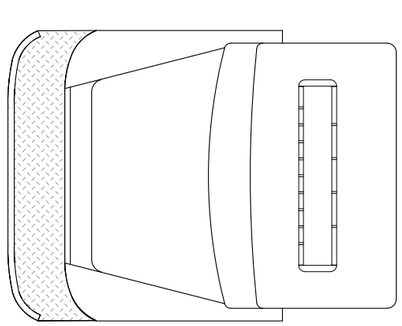
BID DRAWING

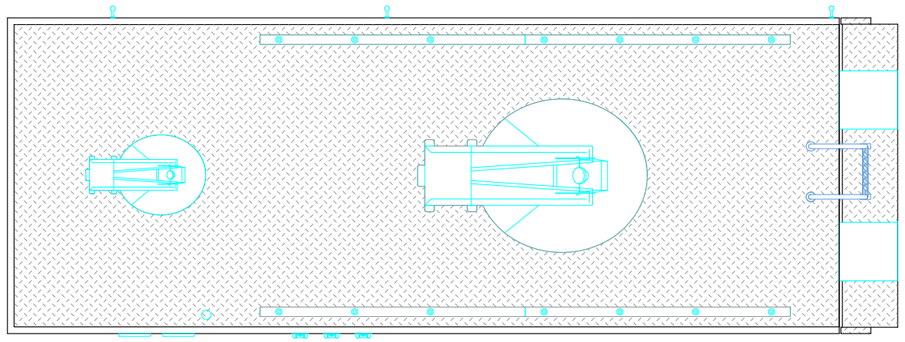
REVISIONS			
REV	DESCRIPTION	DATE	BY

NOTE 1: Do not scale drawing. This drawing is for general truck configuration only. All items and dimensions shown are approximate and may vary with final production. The drawing may not provide illustration for all items in the specification. In all situations where the drawing may contradict the specifications, the specifications shall prevail. This drawing and all data herein are provided as confidential materials and shall not be reproduced without written consent of the manufacturer.

NOTE 2: Chassis frame height will change due to axle characteristics, loading and tire dimensions which will effect the overall height dimension shown. Any overall height restrictions should take this into consideration and allow approximately 2-3 inches of tolerance.

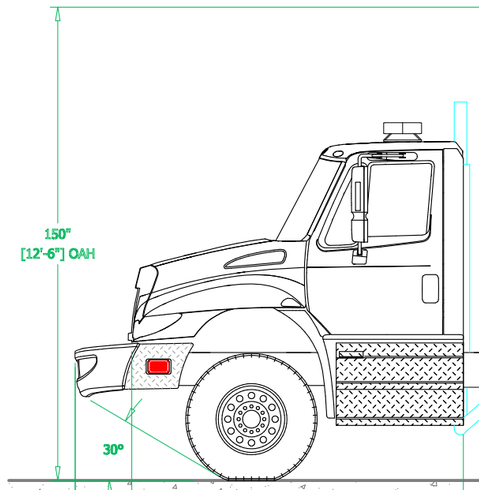


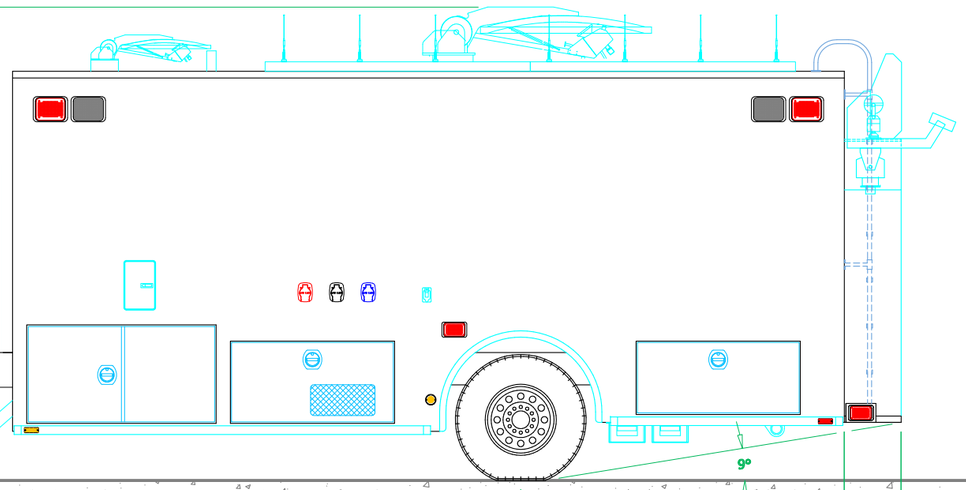




263 1/2"
[21'-11 1/2"]20 ' BODY

150"
[12'-6"] OAH





30°

9°

18"

167 1/2" CA

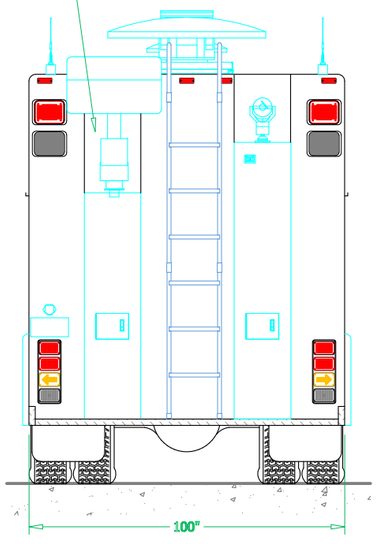
234 1/2" WB

102 1/2" (100 1/2" AF)

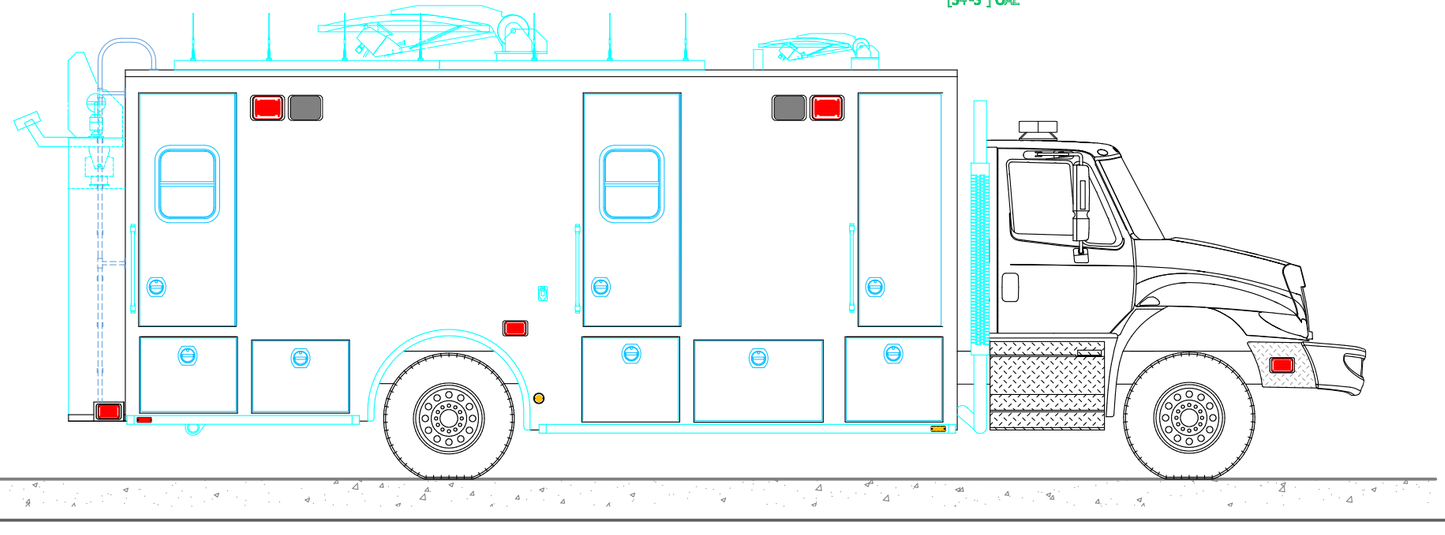
18"

411"
[34'-3"] OAL

(2) STAINLESS STEEL
RUB GUARDS



100"



SVI
LOVELAND COLORADO

SVI FIRE & RESCUE TRUCKS
1511 E. 11th STREET, LOVELAND, CO 80537 PHONE 970-667-5146, FAX 970-667-3343

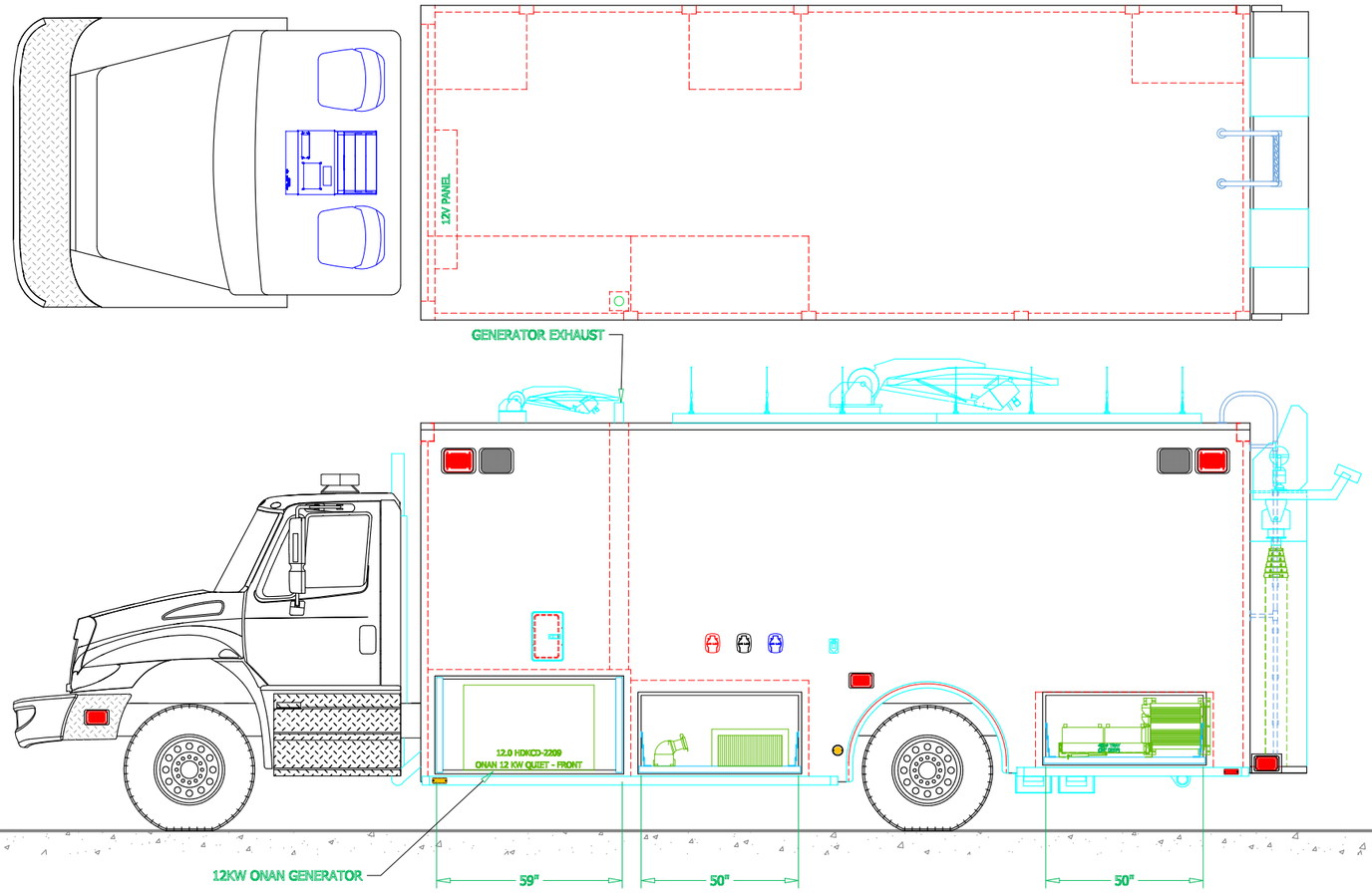
HONOLULU
FIRE DEPARTMENT

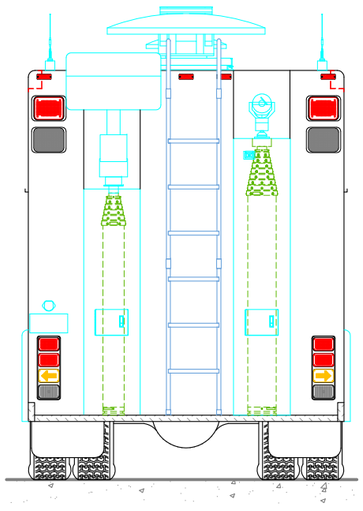
BODY SIZE: 22' BODY	UNIT TYPE: COMMUNICATION SUPPORT
BODY MATERIAL: 3/16" ALUMINUM	TRUCK NO: SVI #xxx
CHASSIS TYPE: INTERNATIONAL	WHEELBASE: SEE DWG
4400	CAB TO AXLE: SEE DWG
STANDARD	OVERALL LENGTH (OAL): SEE DWG
	OVERALL WIDTH (OAW): SEE DWG
TWO DOOR	OVERALL HEIGHT (OAH): SEE DWG
DRAWN BY: HJR	DATE: October 7, 2010 SCALE: 1/4" = 1'-0"
DRAWING NO: Honolulu_HI_CM_22_PreCon1	SHEET 1 OF 3

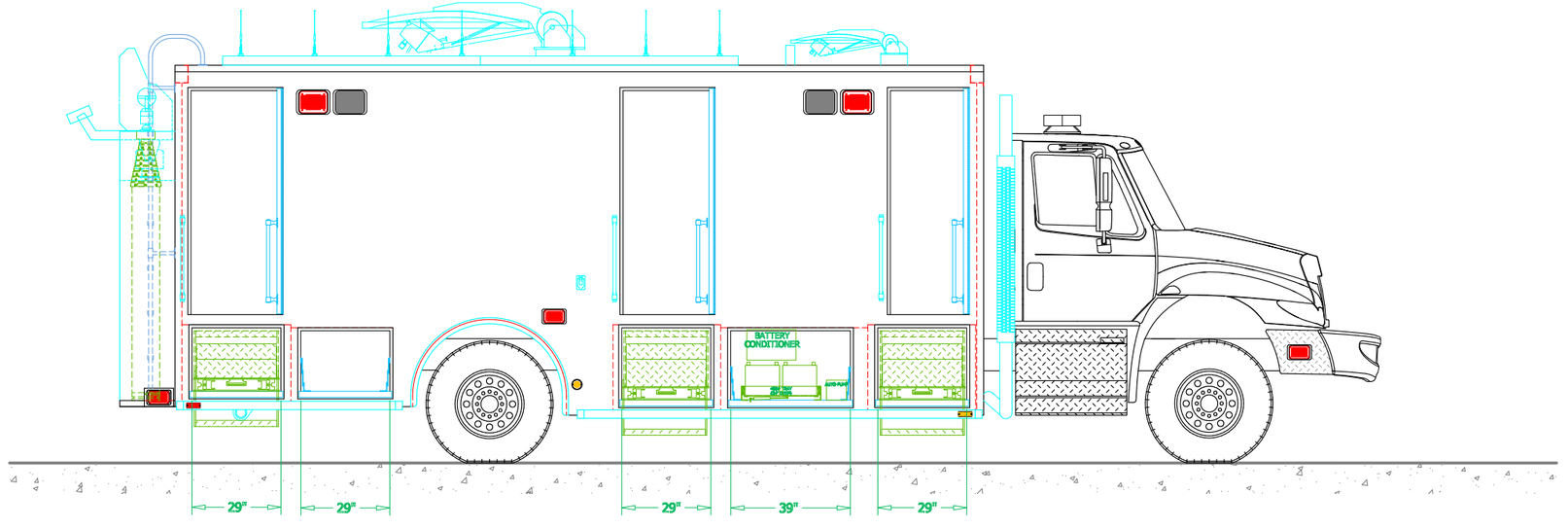
BID DRAWING

REVISIONS			
REV	DESCRIPTION	DATE	BY

NOTE 1: Do not scale drawing. This drawing is for general truck configuration only. All items and dimensions shown are approximate and may vary with final production. The drawing may not provide illustration for all items in the specification. In all situations where the drawing may contradict the specifications, the specifications shall prevail. This drawing and all data herein are provided as confidential materials and shall not be reproduced without written consent of the manufacturer.







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HONOLULU FIRE DEPARTMENT

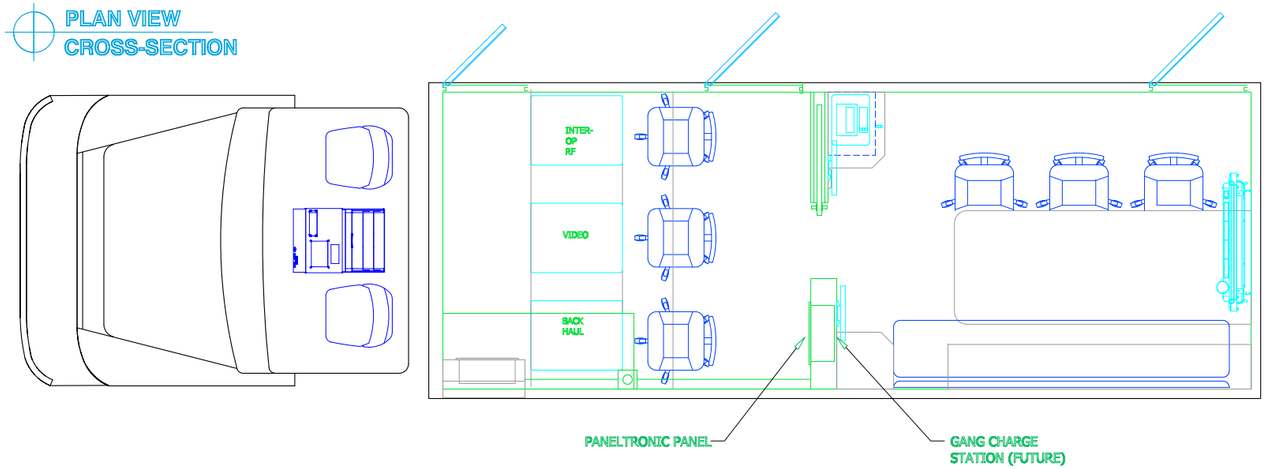
DRAWN BY: HJR	DATE: October 7, 2010	SCALE: 1/4" = 1'-0"
DRAWING NO: Honolulu_HI_CM_22_PreCon1		SHEET 2 OF 3

BID DRAWING

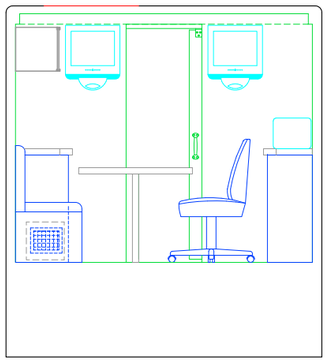
REVISIONS			
REV	DESCRIPTION	DATE	BY

NOTE 1: Do not scale drawing. This drawing is for general truck configuration only. All items and dimensions shown are approximate and may vary with final production. The drawing may not provide illustration for all items in the specification. In all situations where the drawing may contradict the specifications, the specifications shall prevail. This drawing and all data herein are provided as confidential materials and shall not be reproduced without written consent of the manufacturer.

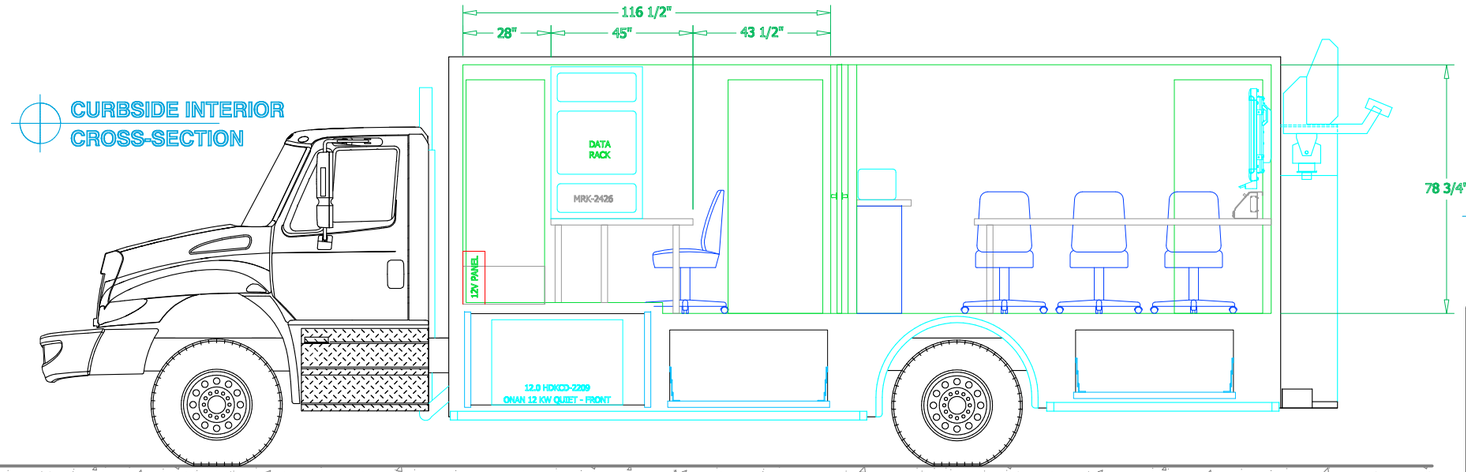
PLAN VIEW CROSS-SECTION



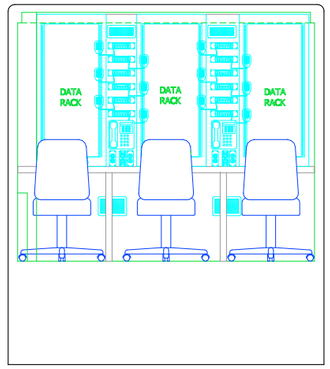
FRONT VIEW CROSS-SECTION



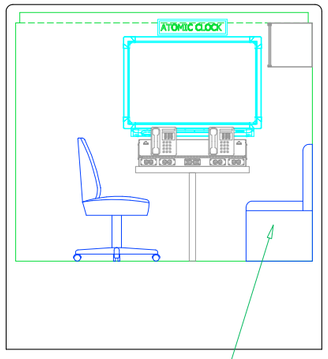
CURBSIDE INTERIOR CROSS-SECTION



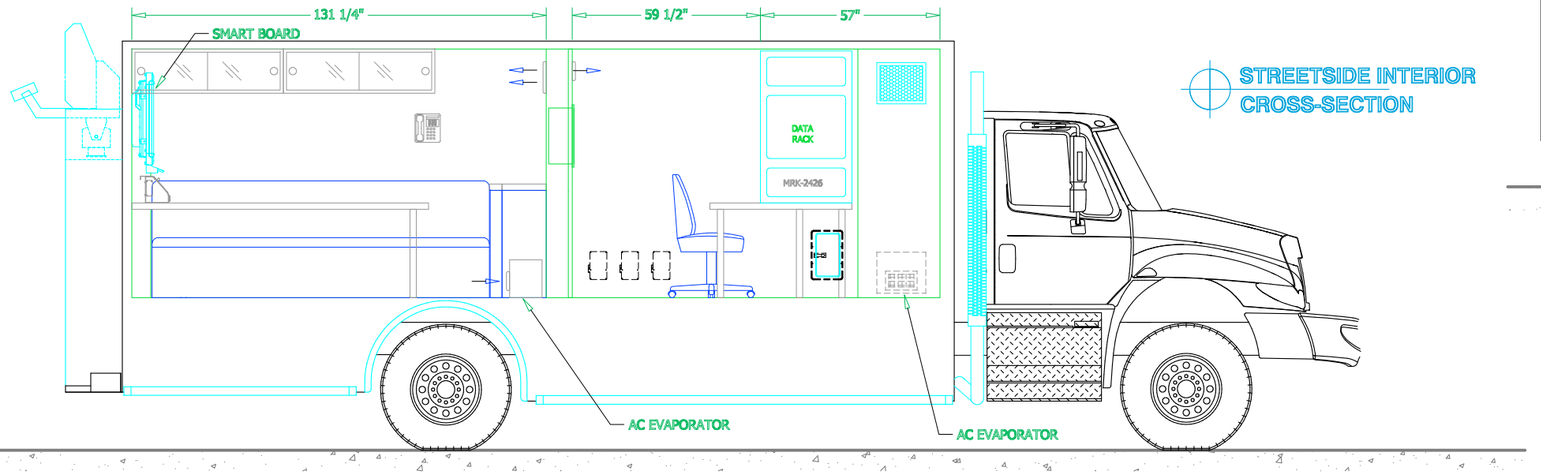
REAR VIEW CROSS-SECTION



REAR VIEW CROSS-SECTION



STREETSIDE INTERIOR CROSS-SECTION



LOVELAND SVI COLORADO

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HONOLULU FIRE DEPARTMENT

DRAWN BY: HJR	DATE: October 7, 2010	SCALE: 1/4" = 1'-0"
DRAWING NO: Honolulu_HI_CM_22_PreCon1		SHEET 3 OF 3