

U. C. Berkeley Police Department

EOD Unit

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CONSTRUCTION PERIOD

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

SVI Trucks will not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor will provide immediate written notice to U. C. Berkeley Police 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 will be approximately 140" (11' - 08") from the ground. This measurement will 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 will be approximately 378" (31' - 06").

OVERALL WIDTH

The overall width (OAW) of the body at drip rails will be 102" (8' - 6"), and body will be 100" (8' - 4").

DELIVERY AND DEMONSTRATION

SVI Trucks will be responsible for the delivery of the completed unit to the U. C. Berkeley Police Department's location. On initial delivery of the apparatus a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the U. C. Berkeley Police Department regarding the operation, care and maintenance of the apparatus and equipment supplied at U. C. Berkeley Police Department location.

The Delivery Engineer will set delivery and instruction schedule with the person appointed by U. C. Berkeley Police Department.

After delivery of the apparatus, the U. C. Berkeley Police Department will be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

CAB CHASSIS

The chassis shall be a Metro Star MFD 20" raised roof model. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2013 model year.

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COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis. Spartan Chassis is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from Spartan Chassis or their OEM needed to be in compliance with those regulations.

APPARATUS TYPE

The apparatus shall be a rescue vehicle designed for emergency service use which shall include the functions of a multipurpose vehicle which primarily provides support services at emergency scenes.

VEHICLE TYPE

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

AXLE CONFIGURATION

The chassis shall feature a 4 x 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

GROSS AXLE WEIGHT RATINGS FRONT

The front gross axle weight rating (GAWR) of the chassis shall be 18,000 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

GROSS AXLE WEIGHT RATINGS REAR

The rear gross axle weight rating (GAWR) of the chassis shall be 22,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

CAB STYLE

The cab shall be a custom, fully enclosed, MFD model with a 20.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to eight (8) seating positions.

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The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner and a rear floor to headliner height of 75.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 49.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 71.00 inches high, from the cab floor to the top of the door opening.

The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.50 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 33.00 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 21.50 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.50 inches.

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CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the "Classic" design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

FRONT GRILLE

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches.

CAB UNDERCOAT

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

CAB SIDE DRIP RAIL

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper, the seams shall be sealed with SEM brand seam sealer and painted with two (2) to four (4) coats of an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene.

The cab shall then be painted with the specific color designated by the customer with a minimum thickness of 2.00 mils of paint, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.

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CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

CAB PAINT PRIMARY/LOWER COLOR

The primary/lower paint color shall be PPG FBCH 2185 White.

CAB PAINT WARRANTY

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

CAB PAINT INTERIOR

The visible interior cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

CAB ENTRY DOORS

The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

CAB ENTRY DOOR TYPE

All cab entry doors shall be full length in design to fully enclose the lower cab steps.

REAR CAB WALL CUTOUT

The rear wall of the cab shall include a cut out which measures 24.00 inches wide X 72.50 inches tall to accommodate a walk through application.

CAB STRUCTURAL WARRANTY

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.

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CAB TEST INFORMATION

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi -Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom.

APPARATUS WIRING PROVISION

An apparatus wiring panel shall be installed in the center dash area behind the rocker switch panel which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp, three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

ACCESSORY POWER

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud.

EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a high visibility protective rubberized coating to prevent corrosion.

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ENGINE

The chassis engine shall be a Cummins ISL9 engine. The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liter) of displacement.

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2010 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

CAB ENGINE TUNNEL

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with a high-idle speed control rocker switch, which shall be pre-set to maintain the engine idle at a pre-determined rate when activated manually. This device shall operate when the master switch is activated and safely interlocked only to function when the transmission is in neutral with the parking brake set.

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

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AUXILIARY ENGINE BRAKE

A compression brake, for the six (6) cylinder engine shall be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.

The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.

AUXILIARY ENGINE BRAKE CONTROL

An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.
- The throttle is at a minimum engine speed position.
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The compression brake shall be controlled through an on/off switch and a low/medium/high selector switch.

ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

FLUID FILLS

The engine oil, coolant, transmission, and power steering fluid fills shall be located under the cab. The windshield washer fill shall be accessible through the front left side mid step.

ENGINE DRAIN PLUG

The engine shall include an original equipment manufacturer installed oil drain plug.

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

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ENGINE FAN DRIVE

The engine cooling system fan shall be direct drive belt driven on the engine.

ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.

ENGINE COOLING SYSTEM PROTECTION

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris.

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

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ELECTRONIC COOLANT LEVEL INDICATOR

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

COOLANT HOSES

The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the right hand side. The dry type filter shall ensure dust and debris safely contained inside the disposable housing, eliminating the chance of contaminating the air intake system during air filter service via a leak-tight seal.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter cone pack, which shall result in pressure differential for improved horsepower and fuel economy. The air intake shall be mounted within easy access via a hinged panel behind the right hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

ENGINE EXHAUST SYSTEM

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction catalyst (SCR) to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.

The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall be mounted below the frame in the inboard position with the SCR canister in line rearward of the DPF.

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DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

ENGINE EXHAUST ACCESSORIES

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

ENGINE EXHAUST WRAP

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

TRANSMISSION

The drive train shall include an Allison Gen IV-E model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The Gen IV-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

The transmission gear ratios shall be:

1st	3.49:1
2nd	1.86:1
3rd	1.41:1
4th	1.00:1
5th	0.75:1
6th	0.65:1 (if applicable)
Rev	5.03:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will select a six (6) speed operation without the need to press the mode button.

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TRANSMISSION FEATURE PROGRAMMING

The EVS group package number 127 shall contain the 199 vocational package in consideration of the duty of this apparatus for rescue. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

An eight (8) pin Delphi connector will be provided next to the steering column connector. This will contain the following input/output circuits to the transmission control module.

Function ID	Description	Wire assignment
C	PTO Request	143
F	Aux. Function Range Inhibit (Special)	101/142
G	PTO Enable Output (See Input Function C)	130
S	Neutral Indicator for PTO	145
	Signal Return	103

TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall provide a prognostic indicator (wrench symbol) on the digital display between the selected and attained indicators. The prognostics monitor various operating parameters to determine and shall alert you when a specific maintenance function is required.

ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

TRANSMISSION COOLING SYSTEM

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

TRANSMISSION DRAIN PLUG

The transmission shall include an original equipment manufacturer installed oil drain plug.

TRANSMISSION WARRANTY

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

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LH PTO

A Spartan supplied ten (10) bolt standard duty clutched drive PTO shall be installed on the transmission. Installation shall include mounting of the PTO and wiring the unit with a control switch.

LH PTO MODEL

A ten (10) bolt Chelsea model 277-XDFJP-B5RA heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides torque ranges from 250 to 335 lb. ft.

PTO LOCATION

The transmission driven power take off (PTO) shall be mounted in the 9:00 o'clock position.

PTO CONTROL

The left hand power take off shall be controlled by the transmission. The power take off shall be activated by a locking on/off rocker switch which contains an integral light which shall illuminate upon a positive engagement of the power take off. This switch shall be located on dash.

Required operating conditions for enabling this function are:

- Throttle position is low
- Engine speed is within customer modifiable constant limits
- Output speed is within customer modifiable constant limits
- Park brake set

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

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ELECTRIC FUEL PRIMER

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

FUEL TANK

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 17.00 inches in height X 29.00 inches in length. The baffled tank shall be made of 14 gauge aluminized steel. The exterior of the tank shall be painted with a PRP CorsoTM black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

FUEL TANK FILL PORT

The fuel tank fill ports shall be provided with two (2) left fill ports located one (1) in the forward position and one (1) in the middle position and the right fill port located in the middle position of the fuel tank.

FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-18. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 18,000 pounds.

FRONT AXLE WARRANTY

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

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FRONT SHOCK ABSORBERS

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and "road sensing" shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or "road sensing" designed shocks shall not be considered.

FRONT SUSPENSION

The front suspension shall include four (4), 54.00 inch long and 4.00 inch wide taper leaf springs with a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 18,000 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 50-degrees to the left and right.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85.

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CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

REAR AXLE

The rear axle shall be a Meritor model RC-22-145 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a rated capacity of 22,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.56 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

REAR AXLE WARRANTY

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 75 MPH +/-2 MPH at governed engine RPM.

REAR SUSPENSION

The single rear axle shall feature a Reyco 102AR air suspension with a single air bag on each side attached to a tapered forged drop leaf spring with one adjustable and one fixed torque rod.

The suspension shall feature dual air height control valves which shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. The suspension shall also include two premium shock absorbers, one each side.

The rear suspension capacity shall be rated at 21,000 to 27,000 pounds to meet the rear axle rating selected.

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REAR SHOCK ABSORBERS

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

FRONT TIRE

The front tires shall be Goodyear 315/80R-22.5 20PR "L" tubeless radial G291 highway tread.

The front tire stamped load capacity shall be 18,180 pounds per axle with a speed rating of 68 miles per hour when properly inflated to 130 pounds per square inch.

The Goodyear Intermittent Service Rating load capacity shall be 18,180 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 130 pounds per square inch. The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

REAR TIRE

The rear tires shall be Goodyear 11R-22.5 16PR "H" tubeless radial G661 HSA regional tread.

The rear tire stamped load capacity shall be 24,020 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating load capacity shall be 25,700 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

REAR AXLE RATIO

The rear axle ratio shall be 5.29:1.

TIRE PRESSURE INDICATOR

There shall be a voucher provided with the chassis for a dial style tire pressure indicator at the front tire valve stem and a pop up style tire pressure indicator at the rear tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the customer.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 9.00 inch polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and a polished finish that lasts.

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REAR WHEEL

The outer rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with LvL One™ bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

BALANCE WHEELS AND TIRES

All of the wheels and tires, including any spare wheels and tire assemblies, shall be dynamically balanced.

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a controlled service brake application during an unlikely event including primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

FRONT BRAKES

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

REAR BRAKES

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type.

PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

In addition to the mechanical rear brake engagement, the front service brakes will also engage via air pressure, providing additional braking capability.

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PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color.

The parking brake actuation valve shall be mounted on the center of the tunnel within easy access of both the driver and officer positions.

REAR BRAKE SLACK ADJUSTERS

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral 100 watt heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right hand frame rail forward of the front wheel behind the right hand cab step.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

REAR BRAKE CHAMBERS

The rear axle shall include TSE 30/30 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 30 brake chamber shall offer a 30.00 square inch effective area.

AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be mounted to the right frame rail.

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MOISTURE EJECTORS

Automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system.

AIR SUPPLY LINES

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

AIR TANK SPACERS

There shall be spacers included with the air tank mounting. The spacers shall move the air tanks 1.50 inches inward towards the center of the chassis. This shall provide clearance between the air tanks and the frame for body U-bolt clearance.

REAR AIR TANK MOUNTING

If a combination of wheel base, air tank quantity, or other requirements necessitate the location of one or more air tanks to be mounted rear of the fuel tank, these tank(s) will be mounted perpendicular to frame.

WHEELBASE

The chassis wheelbase shall be 190.00 inches.

REAR OVERHANG

The chassis rear overhang shall be 88.00 inches.

FRAME

The frame shall consist of single rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, 10.25 inch web X 3.50 inches deep upper and lower flanges X 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each single rail shall be rated by a Resistance Bending Moment (RBM) minimum of 1,830,400 inch pounds and have a minimum section modulus of 16.64 cubic inches calculated by the radius method. The outside dimension frame shall measure 34.25 inches in width.

Proposals calculating the frame strength using the "box method" shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

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A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.

Proposals offering warranties for frames not including cross members shall not be considered.

FRAME WARRANTY

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

FRAME CLEAR AREA

The chassis frame shall be left clear of chassis mounted components inside or outside the frame rails within the first 30.00 inches behind the cab to allow space for OEM installed components. Cross members may be installed in the clear area if required for proper frame or driveline configuration.

FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

FRONT BUMPER

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 6.00 inches ahead of the cab.

FRONT BUMPER EXTENSION FRAME WIDTH

The front bumper extension frame shall feature an overall width of 47.50 inches.

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FRONT BUMPER APRON

The 6.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.

The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.

AIR HORN

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper face, one (1) on the right side of the bumper in the inboard position relative to the right hand frame rail and one (1) on the left side of the bumper in the inboard position relative to the left hand frame rail.

AIR HORN RESERVOIR

One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

ELECTRONIC SIREN SPEAKER

The bumper shall include two (2) Cast Products Inc. model SA4301, 100 watt speakers which shall be recess mounted within the bumper fascia. Each speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. Each speaker shall include a flat mounting flange which shall be polished aluminum.

ELECTRONIC SIREN SPEAKER LOCATION

The two (2) electronic siren speakers shall be located on the front bumper face outboard of the frame rails with one (1) on the right side and one (1) on the left side in the outboard positions.

FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted to match the chassis frame, shall be installed in a rearward position out of the approach angle area, bolted directly to the side of the chassis frame with grade 8 bolts.

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CAB TILT SYSTEM

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

CAB TILT CONTROL RECEPTACLE

The cab tilt control cable shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a six (6) pin Deutsch receptacle with a cap.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

CAB WINDSHIELD

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self locking window rubber.

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GLASS FRONT DOOR

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as "cozy glass" ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

GLASS REAR DOOR RH

The rear right hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS TINT REAR DOOR RIGHT HAND

The window located in the right hand side rear window shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

GLASS REAR DOOR LH

The rear left hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS TINT REAR DOOR LEFT HAND

The window located in the left hand side rear door shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

GLASS UPPER SIDE FRONT

The raised roof on the left and right sides of the cab shall include a triangular shaped window which shall be 12.50 inches wide X 11.00 inches high. These windows shall be fixed within this space. These windows shall be mounted to the cab using black self-locking window rubber.

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GLASS TINT UPPER SIDE FRONT

The windows located in the upper section on the left and right side towards the front of the cab shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

GLASS UPPER SIDE REAR DOOR

Windows shall be provided in the upper portion of each rear door of the raised roof cab. Each window shall measure 27.00 inches wide X 14.00 inches high and be installed above the lower door window. The windows shall be rectangular in shape and fixed within this space. The windows shall be mounted using black self-locking window rubber.

GLASS TINT UPPER SIDE REAR DOOR

The window located in the upper section on the crew doors of the cab shall include a dark gray automotive tint which shall allow forty-five percent (45%) light transmittance. The dark tint shall aid in cab cooling and help protect passengers from radiant solar energy.

CLIMATE CONTROL

The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

The cab shall also include a combination heater air-conditioning unit mounted on the engine tunnel. This unit shall offer eight (8) adjustable louvers, four (4) forward facing and four (4) rearward facing, a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit.

All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

The air conditioner lines shall be a mixture of custom bend zinc coated steel fittings and Aero-quip GH 134 flexible hose with Aero-quip EZ clip fittings.

CLIMATE CONTROL DRAIN

The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

CLIMATE CONTROL ACTIVATION

The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

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A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

CAB INSULATION

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft² PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

INTERIOR TRIM FLOOR

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

INTERIOR TRIM VINYL

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

REAR WALL INTERIOR TRIM

The rear wall of the cab shall be trimmed with vinyl.

HEADER TRIM

The cab interior shall feature header trim above the driver and officer positions constructed of vacuum formed ABS material.

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TRIM CENTER DASH

The main center dash area shall be constructed of durable vacuum formed ABS composite.

TRIM LH DASH

The left hand dash shall be a one (1) piece durable vacuum formed ABS composite housing which shall be custom molded for a perfect fit around the instrument panel. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

TRIM RH DASH

The right hand dash trim shall consist of a vacuum formed ABS composite module, which contains a glove compartment with a hinged locking door and a Mobile Data Terminal (MDT) provision. The glove compartment size shall be 13.50 inches wide X 6.25 inches high X 5.50 inches deep. The MDT provision shall be provided above the glove compartment.

ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

POWER POINT DASH MOUNT

The cab shall include two (2) 12 volt cigarette lighter type receptacles in the center cab dash to provide a power source for 12 volt electrical equipment. The receptacles shall be wired to be live with the battery master switch.

STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 H32 aluminum Grip Strut® grating with angled outer corners. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have an opening on the outer edge to allow debris and water to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed with a Flex-Tred® adhesive grit surface material.

UNDER CAB ACCESS DOOR

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

INTERIOR DOOR TRIM

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish.

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DOOR TRIM CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

CAB DOOR TRIM REFLECTIVE

The interior of each door shall include high visibility reflective tape. A white reflective tape 1.00 inch in width shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes and a Spartan logo. The chevron tape shall measure 6.00 inches in height.

INTERIOR GRAB HANDLE "A" PILLAR

There shall be two (2) rubber covered 11.00 inch grab handles installed inside the cab, one on each "A" post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

INTERIOR GRAB HANDLE REAR DOOR

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

INTERIOR TRIM VINYL COLOR

The cab interior vinyl trim surfaces shall be gray in color.

INTERIOR TRIM SUNVISOR

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

INTERIOR ABS TRIM COLOR

The cab interior vacuum formed ABS composite trim surfaces shall be gray in color.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

CAB PAINT INTERIOR DOOR TRIM

The inner door panel surfaces shall be painted with Zolatone #20-72 silver gray texture finish.

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DASH PANEL GROUP

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

SWITCHES CENTER PANEL

The center dash panel shall include six (6) switch positions in the upper left portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES LEFT PANEL

The left dash panel shall include thirteen (13) switches. There shall be six (6) switches across the top of the panel and seven (7) across the bottom of the panel. Five (5) of the top row of switches shall be rocker type and the left one (1) shall be the headlight switch. Five (5) of the lower row of switches shall be rocker type and the left two (2) shall be the windshield wiper/washer control switch and instrument lamp dimmer switch.

A rocker switch with a blank legend installed directly above shall be provided for any position not designated by a specific option. The non-designated switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES RIGHT PANEL

The right dash panel shall include no rocker switches or legends.

SEAT BELT WARNING

A seat belt warning system shall be installed for each seat within the cab. The system shall activate an indicator light in the instrument panel and audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. Once activated, the indicator light and audible alarm shall remain active until all occupied seats have the seat belts fastened.

SEAT MATERIAL

The seats shall be covered with Turnout Tuff™ rugged material. This material shall be semi-resistant to UV rays and from being saturated or contaminated by fluids.

SEAT COLOR

All seats supplied with the chassis shall be black in color. All seats shall include red seat belts.

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SEAT BACK LOGO

The seat backs shall include the logo for the OEM body manufacturer. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

SEAT DRIVER

The driver's seat shall be a Seats Inc. 911 Universal model seat. The seat shall feature six (6) way electric adjustability. The six (6) adjustments shall include up and down, fore and aft, and front and rear seat rake height. The seat shall feature 6.50 inches of fore and aft travel. The adjustment controls shall be located on a panel installed on the front of the seat below the bottom cushion at the center of the seat.

The seat position shall include a three-point shoulder harness with lap belt and an automatic retractor attached to the cab. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches measured with the seat height adjusted to the lowest position of travel.

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK DRIVER

The driver's seat shall feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also feature a contoured head rest.

SEAT MOUNTING DRIVER

The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

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SEAT OFFICER

The officer's seat shall be a Seats Inc. 911 Battalion series. The seat shall feature a tapered and padded seat, and cushion. The two-way, manually adjustable tracks shall include 7.75 inch fore and aft travel.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK OFFICER

The officer's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

SEAT MOUNTING OFFICER

The officer's seat shall be installed in an ergonomic position in relation to the cab dash.

POWER SEAT WIRING

The power seat or seats installed in the cab shall be wired directly to battery power.

CAB FRONT UNDERSEAT STORAGE ACCESS

The left and right under seat storage areas shall have a solid aluminum hinged door with non-locking latch.

SEAT COMPARTMENT DOOR FINISH

All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture.

WINDSHIELD WIPER SYSTEM

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

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ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of a fiber reinforced plastic composite with a black matt finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

DOOR LOCKS

The doors shall include a Controller Area Network (CAN) based electronic door lock system which shall include two (2) external keypads, one (1) located on the left side next to the front grab handle and one (1) on the right side next to the front grab handle. There shall be one (1) red rocker switch provided on the inside of each front cab entry door to actuate the door locks. The rear cab entry doors shall be provided with a red manual knob on the interior paddle handle to actuate the door lock on the respective door. The electronic door lock system shall include four (4) key fobs for actuation with buttons for cab entry door locks and for compartment door locks.

When the doors are unlocked using the external keypad or the key fobs the interior dome lights shall illuminate and remain on for a period of twenty (20) seconds.

Wiring shall also be provided for up to four (4) exterior cab compartments and up to four (4) body compartments.

POWER DOOR LOCK COMPARTMENT ACTIVATION

The power door lock feature shall include activation for exterior compartment door locks through the key fob and keypads.

GRAB HANDLES

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

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REARVIEW MIRRORS

Retrac Aerodynamic style single vision mirror heads model 613265 shall be provided and installed on the front cab doors.

The mirrors shall be mounted via 1.00 diameter tubular stainless steel arms to provide a rigid mounting to reduce vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an 8.00 inch convex mirrors with a stainless steel back, model 980-4, installed below the flat glass to provide a wider field of vision. The flat mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The convex mirrors shall be manually adjustable.

The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

CAB FENDER

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 12 gauge polished aluminum.

CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) installed on each side of the cab exterior above the wheel well.

CAB EXTERIOR MODEL NAMEPLATE

The cab shall include custom "Metro Star" nameplates on the front driver and officer side doors.

IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the "ON" position.

The starter button shall only operate when both the master battery and ignition switches are in the "ON" position.

BATTERY

The single start electrical system shall include six (6) Harris BCI 31 950 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.

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BATTERY TRAY

The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

BATTERY BOX COVER

Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.

BATTERY JUMPER STUD

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

ALTERNATOR

The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.

STARTER MOTOR

The single start electrical system shall include a Prestolite brand starter motor.

BATTERY CONDITIONER

A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab behind the driver's seat.

BATTERY CONDITIONER DISPLAY

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in front of the left side door just below the windshield.

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ELECTRICAL INLET

A Kussmaul 30 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.

Amp Draw Reference List:

Kussmaul 1000 Charger - 3.5 Amps

Kussmaul 1200 Charger - 10 Amps

Kussmaul 35/10 Charger - 10 Amps

1000W Engine Heater - 8.33 Amps

1500W Engine Heater - 12.5 Amps

120V Air Compressor - 4.2 Amps

ELECTRICAL INLET LOCATION

An electrical inlet shall be installed on the left hand side of cab over the wheel well.

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner.

ELECTRICAL INLET COLOR

The electrical inlet connection shall include a white cover.

AUXILIARY ELECTRICAL INLET

An auxiliary Kussmaul 30 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.

Amp Draw Reference List:

Kussmaul 1000 Charger - 3.5 Amps

Kussmaul 1200 Charger - 10 Amps

Kussmaul 35/10 Charger - 10 Amps

1000W Engine Heater - 8.33 Amps

1500W Engine Heater - 12.5 Amps

120V Air Compressor - 4.2 Amps

AUXILIARY ELECTRICAL INLET LOCATION

An auxiliary electrical inlet shall be installed on the left hand side of cab over the wheel well in the rearward position.

AUXILIARY ELECTRICAL INLET CONNECTION

The auxiliary electrical inlet shall be pre-wired to include 35.00 feet of coiled wire from the starter button for the eject feature.

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AUXILIARY ELECTRICAL INLET COLOR

The auxiliary electrical inlet connection shall include a grey cover.

HEADLIGHTS

The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.

FRONT TURN SIGNALS

The front fascia shall include two (2) Federal Signal Quadra Flare 4.00 inch X 6.00 inch programmable amber LED light heads which shall be installed outboard of the warning lamps above the headlight assemblies to act as turn signals.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly below the front warning lights.

SIDE TURN/MARKER LIGHTS

The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

HEADLIGHT AND MARKER LIGHT ACTIVATION

The headlights and marker lights shall be controlled through a rocker switch within easy reach of the driver. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the battery master switch is in the "On" position and the parking brake is released.

GROUND LIGHTS

Each door shall include an incandescent NFPA compliant ground light mounted to the under side of the cab step below each door. Each light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the respective door as well as rocker switched.

STEP LIGHTS

The middle step located at each door shall include a 4.00 inch round incandescent light which shall activate with the opening of the respective door.

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ENGINE COMPARTMENT LIGHT

There shall be an incandescent NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

SIDE SCENE LIGHTS

The side of the cab shall include two (2) Federal model QL97LEDSCENE scene lights, one (1) each side which shall be recess mounted. The Federal lights shall offer 12 volts LED light heads 9" x 7" with a chrome flange.

SIDE SCENE LIGHT LOCATION

The scene lighting located on the left and right sides of the cab shall be mounted in the upper mid forward portion of the 10.00 inch raised roof of the cab between the front and rear crew doors.

SIDE SCENE ACTIVATION

The scene lights shall be activated by two (2) rocker switches located in the switch panel, one (1) for each light.

INTERIOR OVERHEAD LIGHTS

The cab shall include a two-section, red and clear Weldon incandescent dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 9.50 inches in length X 5.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and both the red and clear portions can be activated by individual switches on each lamp.

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a flashing red light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high and shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

MASTER WARNING SWITCH

A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled "Master" for identification. The switch shall feature control over all devices wired through it. Any warning device switch left in the "ON" position shall automatically power up when the master switch is activated.

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INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Federal Signal Quadra Flare LED front warning lights in the left and right inboard positions. The lights shall feature advanced Solaris technology and include a built in flasher capable of multiple flash patterns. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

INBOARD FRONT WARNING LIGHTS COLOR

The warning lights mounted on the cab front fascia in the inboard positions shall be red on the left and blue on the right side.

FRONT WARNING SWITCH

The front warning lights shall be controlled via rocker switch on the panel. This switch shall be clearly labeled for identification.

INTERSECTION WARNING LIGHTS

The chassis shall include two (2) Federal Signal Quadra Flare LED intersection warning lights, one (1) each side. The lights shall feature advanced Solaris technology and a built in flasher with multiple flash patterns including steady burn.

INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red/blue with a clear lens.

INTERSECTION WARNING LIGHTS LOCATION

The intersection lights shall be mounted on the side of the bumper.

SIDE AND INTERSECTOR WARNING SWITCH

The side and intersector warning lights shall be controlled by a rocker switch on the switch panel. This switch shall be clearly labeled for identification.

SIREN CONTROL HEAD

A Federal PA4000 electronic siren control head shall be provided and flush mounted in the in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, wail, radio broadcast, public address, yelp, priority tones and a noise cancelling microphone.

HORN BUTTON SELECTOR SWITCH

A rocker switch shall be installed in the switch panel between the driver and officer to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

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AIR HORN ACTIVATION

The air horn activation shall be accomplished by the steering wheel horn button for the driver and a black momentary push button on the switch panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

BACK-UP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring.

The instrument panel shall contain the following gauges:

One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter, and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of useable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm. The instrument panel shall include a light bar that will contain the following LED indicator lights:

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RED LAMPS

Low Primary Air Pressure (located in gauge)
Low Secondary Air Pressure (located in gauge)
Stop Engine-indicates critical engine fault
Air Filter Restricted-indicates excessive engine air intake restriction
Park Brake-indicates parking brake is set
Seat Belt Indicator-indicates when a seat is occupied and corresponding seat belt remains unfastened
Volts-indicates high or low system voltage (located in gauge)
Low Oil Pressure-indicates low engine oil pressure (located in gauge)
High Coolant Temperature-indicates excessive engine coolant temperature (located in gauge)
DEF Level Bar-DEF level is at critically low level (located in gauge)

AMBER LAMPS

MIL-indicates an engine emission control system fault
Check Engine-indicates engine fault
Check Trans-indicates transmission fault
High Transmission Temperature-indicates excessive transmission oil temperature
ABS-indicates anti-lock brake system fault
Wait to Start-indicates active engine air preheat cycle
HEST-indicates a high exhaust system temperature
Water in Fuel-indicates presence of water in fuel filter
DPF-indicates a restriction of the diesel particulate filter
Regen Inhibit-indicates regeneration has been postponed due to user interaction
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
SRS-indicates a problem in the RollTek supplemental restraint system
Low Fuel-indicates low fuel, (located in gauge)
DEF-indicates a low level of DEF fluid (located in gauge)
DEF Level Bar-DEF level is at a low level (located in gauge)

GREEN LAMPS

Left and Right turn signal indicators
ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system
High Idle-indicates engine high idle is active.
Cruise Control-indicates cruise control is active
OK to Pump-indicates the pump engage conditions have been met
Pump Engaged-indicates the pump is currently in use
Auxiliary Brake-indicates secondary braking device is active
DEF Level Bar-indicates useable levels of DEF: 25%, 50%, 75%, 100% (located in gauge)

BLUE LAMPS

High Beam Indicator

CONSTANT AUDIBLE ALARMS FROM GAUGE PACKAGE

High Trans Temp
High or Low Voltage
Seatbelt
Check Engine
Check Transmission
Stop Engine

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Low Air Pressure
Fuel Low
Water in Fuel
ESC
High Coolant Temperature
Low Engine Oil Pressure
Low Coolant Level
Low DEF Level

OSCILLATING AUDIBLE ALARMS FROM GAUGE PACKAGE

Air Filter
Extended Left and Right Turn remaining on
Cab Ajar
Door Ajar
Low Oil Level

BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

FIRE EXTINGUISHER

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

ROAD SAFETY KIT

The cab and chassis shall include one (1) emergency road safety triangle kit.

DOOR KEYS

The cab and chassis shall include a total of six (6) door keys for the manual door locks.

WARRANTY

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the end user. The warranty shall include conditional items listed in the detailed warranty document which shall be provided upon request.

OPERATION MANUAL

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

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ENGINE AND TRANSMISSION OPERATION MANUALS

There shall be two (2) digital copies of the engine operation manual and two (2) digital copies of the transmission operation manual specific to the model ordered included with the chassis in the ship loose items.

AS BUILT WIRING DIAGRAMS

The cab and chassis shall include two (2) digital copies of wiring schematics and option wiring diagrams.

CAB TO AXLE DIMESION

Cab to axle will be 134".

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

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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.

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FRONT BUMPER

The front bumper will be as provided by the cab/chassis manufacturer. No other alteration or modifications are required.

BUMPER GRAVELSHIELD

The bumper extension gravel shield will be provided by the cab/chassis manufacturer.

AIR HORN(S)

The air horn(s) shall be supplied and installed by the cab/chassis manufacturer.

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. The tailpipe may require some modifications for proper ground clearances and fit with body.

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

Exhaust pipe discharge shall be directed away from any operator's position or entry doors on body.

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

RADIO/ANTENNA INSTALLATION

There will be one (1) U. C. Berkeley Police Department supplied radio with antenna installed in the cab within easy reach of driver. The location of radio will be determined by the U. C. Berkeley Police Department at the pre-construction meeting.

Radio will be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.

FIVE (5) POSITION ANTENNA RAIL

One (1) radio antenna rail(s) will be provided and installed on roof of vehicle. Each rail be constructed of aluminum, forming a two piece box design. The top section will be removable for easy access to the individual antenna wiring. Five (5) antenna bases will be provided and installed in each rail. Each antenna base will include enough cable to reach radio location plus a service loop of at least 3' of LMR195 flexible communications cable. The antenna wiring will enter the vehicle roof at a single point under the end of the rail. The end of each radio antenna will be routed to radio mounting locations, or as determined by the U. C. Berkeley Police Department.

Due to the various configurations of antenna whips, the contractor will provide the antenna base only, and U. C. Berkeley Police Department will provide the antenna whip.

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CAB CRASH TEST CERTIFICATION

A cab crash test certification from the fire apparatus manufacturer shall be provided with the equipment. 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.

The certification shall state that the cab does meet or exceed the requirements below:

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

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.

HUB AND NUT COVERS

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

MUDFLAPS

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

REAR CAB CABINET/DESK LAYOUT

REAR CAB DESK - "L" SHAPED

The rear portion of cab will be provided with an "L" shaped desk extending from the curbside to streetside directly behind the driver and officer and extending to the rear wall of the cab on the streetside.

The section directly behind the driver and officer will be approximately 26" deep and located 30" from the floor. The streetside extension will be approximately 18" deep and located 30" from the floor. The front edge of desk will be reinforced with 2" x 2" tubing in order to support a person sitting on the edge of the desk. No Exception

The desk top surface will be fabricated of 3/16" smooth finish aluminum with a 2" vertical downward edge along the front to cover the 2" x 2" reinforcement. There will be 2-1/2" diameter holes with plastic edge grommets provided at each rear corner for wiring of future equipment located on the desk top. The desk top will be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface. No Exception

Desk fabricated from wood or laminates will not be acceptable due to long term durability issues.

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CAB INTERIOR CABINET - OVERHEAD

There will be two (2) overhead cabinets provided on interior. The cabinets will be constructed of 1/8" smooth finish aluminum, and painted with a dark gray hammer tone powder coat paint finish for a hard durable surface. Each cabinet will be approximately 14" high x 14" deep x 40" wide. No Exception

Cabinets manufactured from wood, laminates or thinner material will not be acceptable.

The above cabinet(s) will have sliding clear Lexan door(s).

OVERHEAD RADIO MOUNTING CONSOLE

There will be two (2) overhead radio mounting console provided in the cab command interior. The radio cabinet will provide mounting area for the radios specified and shall be approximately 14" deep by 4" high. The surface will be painted dark gray with a hammer tone powder coat paint finish for a hard and durable surface.

The radio cabinet will be constructed of 1/8" smooth finish aluminum and front of the cabinet will have standard bolt-on 8-1/2" x 4" black radio trim mounting plates. A hinged 3/16" aluminum drop down access cover will be provided on the bottom to access equipment mounting and wiring with 1/4 turn knobs to secure cover closed. One (1) 12 volt cooling fan and 12 volt power and ground provisions will be provided for proper installation and ventilation of radio equipment.

There shall be four (4) radio(s) mounted in the front face of the component console

INTERIOR UNDER CABINET LED LIGHTS

Two (2) OnScene Solution model #70152, 10" x 6" x 7/8", 10-30 VDC, surface mount dual red and white LED light(s) with clear lens will be provided under cabinet. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a 5 second delay after switching off.

FILING CABINET, 2-DRAWER

One (1) Hon 2-drawer Efficiency Pedestal cabinet(s) with "K" type pull handles will be provided under specified desk areas. Cabinet(s) will have a keyed lock and will be painted charcoal. Each filing cabinet will be approximately 15" wide x 27" high x 20" deep. Both drawers of the cabinet will be capable of storing 8-1/2" x 11" file folders.

OFFICE CHAIR, ROLL-AROUND

There will be two (2) office type chair(s) with dual wheel casters for easy movement provided for specified desk areas. Seat(s) will have provisions to be fully secured under the desk when vehicle is in motion. Seat(s) will NOT be as a riding position and will only be used while vehicle is parked.

MAGNETIC WHITEBOARD

There shall be two (2) magnetic whiteboard(s), approximately 30" wide x 36" tall located on wall, location per U. C. Berkeley Police Department.

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INTERIOR CAB COMMAND CURTAIN

An interior curtain will be provided between the command center and the front of the cab.

The curtain will be of Cover Lite Select, 22 oz material. The curtain will be rolled up in a trough when not in use.

FUEL FILL

There will be one (1) Cast Products fuel fill door located in the streetside exterior wheel well panel, behind the rear axle. The fill door will have a spring-loaded hinged door and a permanent label with the text "DIESEL FUEL ONLY".

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 will 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 will 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 will be strictly adhered to. NO EXCEPTIONS

The fabrication of the body will be formed sheet metal. Formed components will allow the U. C. Berkeley Police 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 U. C. Berkeley Police Department from such repair and will NOT be used. NO EXCEPTIONS

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body will be built directly on the subframe. The joining of the subframe and body will be of a welded integral construction. NO EXCEPTIONS

The sheet metal fabrication of the body will be performed using inert gas continuous feed welders only. The entire body will 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 will 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. NO EXCEPTIONS

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EXTERIOR ALUMINUM BODY

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

The body compartment floors and exterior panels will be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls will 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, No Exceptions.

The front and rear corners of body will be formed as part of the front or rear body panels. This provides a stronger body corner and finished appearance. The use of extruded corners, or caps will not be acceptable, No Exceptions.

The door side frame openings will be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments will be provided. This raceway will 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 will 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 will be single one-piece sections. Compartment floors will be preformed, then positioned in body and welded into final position.

Compartment floors will 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 will be provided in compartment floors so that a water hose may be used to flush-out compartment area.

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

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

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

DRIP RAILS

The body will have drip rails over the side full height compartments. The drip rails will be formed into the upper body panels providing a ridged lower panel and a flat upper body panel surface. The use of mechanically fastened, taped or glued on drip rails will not be acceptable, No Exceptions.

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ROOF CONSTRUCTION

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

BODY SUBFRAME

The chassis frame rails will 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 will be constructed from 6061T6 aluminum alloy tubing. Subframe will 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 will be cross members of 2" x 6" x 1/4" aluminum. These cross members will extend the full width of the body to support the compartments. Cross members will 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 will be located on 16" centers, or as necessary to support walkway or heavy equipment.

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

BODY MOUNTING

The body subframe will be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount will be configured using a two-piece encapsulated slide bracket. The two (2) brackets will be fabricated of heavy duty 1/4" thick steel and will have a powder coat finish to prevent any corrosion. Each mounting assembly will utilize two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design will 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 will eliminate any stress from being transferred into the body. The spring loaded body mounts will 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 will be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper will 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 will be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below the apparatus body. The tow eyes will be fabricated from 3/4" thick steel plate and will have a black powder coat finish.

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GROUND LIGHTS

There will be two (2) OnScene 9" Premium LED light(s) installed below bumper 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 will be switchable but activated automatically when the vehicle park brake is set.

WHEEL WELL EXTERIOR PANEL

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

DIEFORMED BEADED EDGE BODY FENDERS

A die formed beaded edge will be provided along the radius of the wheel well opening for a finished appearance.

WHEEL WELL LINERS

The wheel wells will be provided with an easily removable polymer, circular inner fender liner. The inner liner will 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.

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;

1. Clean bare metal using a solvent base wax & grease remover.
2. Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.

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3. Re-clean bare metal using a solvent base wax & grease remover.
4. 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.
5. Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mills DFT after sanding.
6. Base coat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Base coat. Apply 1.0-3.0 mills DFT of base coat color to achieve full hiding.
7. 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 mills.
8. 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 - SINGLE COLOR

The body shall be painted with a single 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: Match cab/chassis supplied paint color.

PAINT WARRANTY

The vehicle will 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 will be provided with the delivered vehicle. **Pro-rated warranties will not be acceptable.**

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COMPARTMENT INTERIOR FINISH

The interior of all exterior body compartments will be a "Maintenance Free" smooth unpainted finish. All body seams will be finished with a caulk sealant for both appearance and moisture protection.

REFLECTIVE STRIPE REQUIREMENTS

Material

All retroreflective materials will 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, will 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 will conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

GRAPHICS PROOF

A color graphics proof of the reflective striping layout will be provided for approval by U. C. Berkeley Police Department prior to installation. The graphics proof will be submitted to U. C. Berkeley Police Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet will be provided showing all details.

REFLECTIVE STRIPE - CAB SIDE

The reflective stripe material will be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe will be white in color.

REFLECTIVE STRIPE - CAB FRONT

The reflective stripe material will be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe will be white in color.

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REFLECTIVE STRIPE - CAB DOOR INTERIOR

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

The stripe material will be 3M Scotchlite 680.

- This reflective stripe will be white in color.

REFLECTIVE STRIPE - BODY SIDES

The reflective stripe material will be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe will be white in color.

The stripe shall extend straight back from the chassis and then, ahead of the rear wheels, it shall form a "Z" and then extend straight back to the rear of the body.

LETTERING

GRAPHICS PROOF

A color graphics proof of the lettering layout will be provided for approval by U. C. Berkeley Police Department prior to installation. The graphics proof will be submitted to U. C. Berkeley Police Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet will be provided showing all details.

The following lettering will be provided and installed on the completed unit as follows;

SIDE CAB DOOR LETTERING

There shall be sixty (60) 3" high reflective letters furnished and installed on the vehicle.

- This reflective lettering will be white in color.

UPPER BODY SIDE LETTERING

There shall be eighty (80) 10" high reflective letters furnished and installed on the vehicle.

- This reflective lettering will be white in color.

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EXTERIOR COMPARTMENT DOORS

HINGED DOOR CONSTRUCTION

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

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

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

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

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

All vertically hinged compartment doors will have a pneumatic cylinder to hold door in the open and closed positions. Each door will be capable of being closed without unlatching. Door checks will 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 will have a door check as specified with each door.

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ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)

The apparatus will be equipped with Robinson ROM Series III roll-up exterior compartment doors. Robinson roll-up doors will be complete with the following features;

- Doors shall be front roll with drum positioned at upper front portion of compartment to afford maximum clearances and head room for mounting equipment to ceiling of compartment
- There shall be a non-abrasive side brush seals
- Every slat must have interlocking end shoes to prevent slat from moving side-to-side and binding the door
- Between each slat must be a co-extruded PVC inner seal to prevent metal-to-metal contact and to repel moisture. This inner seal is not visible to detract from appearance of door
- Slat are to have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects
- Slat to be double-wall extrusion 1.366" high by .315" thick. Exterior surface to be flat and interior surface to be concave to prevent loose equipment from interfering with door operation
- Latch system to be a full width one piece lift bar operable by one (1) hand
- A 2" wide finger pull integrated into the bottom rail extrusion for easy one (1) hand opening and closing
- Clip system that connects the curtain slats to the operator drum which allows for easy tension adjustment without tools
- Each roll-up door shall have a 4" diameter counterbalance operator drum to assist in lifting the door.
- Track shall be one-piece aluminum that has an attaching flange and finishing flange incorporated into its design
- Drip rail will have specially designed seal that prevents the seal from scratching the door
- Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door
- Bottom rail to have "V" shaped double seal to prevent water and debris from entering the compartment
- Standard replacement parts to be shipped from the United States and available in as little as 48 hours
- Will be free from manufacturing defects for a period of up to 7 years from date of purchase provided that the Product is used under conditions of normal use, that regular periodic maintenance and service is performed and that the product was installed in accordance with R•O•M's instructions.

Each shutter door will decrease the compartment door frame opening approximately 2.00" in width and approximately 4.50" in height for the bottom section of door assembly.

The specified retroreflective stripe material will be applied on the roll-up compartment doors. The stripe will be precision machine cut for each door slat of the roll-up doors. Under no circumstance will the stripe material be cut on roll-up door surface. NO EXCEPTIONS

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BODY HEIGHT MEASUREMENTS

The vertical body dimensions will be as follows:

AHEAD OF REAR AXLE

	<u>Description</u>	<u>Dimension</u>
A	Bottom of Subframe to Top of Body	89.0"
B	Bottom of Subframe to Bottom of Body	25.0"
C	Vertical Door Opening - (Full Height Compartment)	
	-with roll-up door	67.5"
	-with hinged door	71.5"
	Vertical Door Opening - (Short Compartment)	
	-with hinged door	20.0"

ABOVE REAR AXLE

	<u>Description</u>	<u>Dimension</u>
D	Vertical Door Opening - Above Rear Wheel	
	-with roll-up door	34.0"
	-with hinged door	37.0"

BEHIND REAR AXLE

	<u>Description</u>	<u>Dimension</u>
E	Bottom of Subframe to Bottom of Body	22.5"
F	Vertical Door Opening - (Full Height Compartment)	
	-with roll-up door	62.0"
	-with hinged door	66.0"
	Vertical Door Opening - (Short Compartment)	
	-with hinged door	17.5"

GENERAL

	<u>Description</u>	<u>Dimension</u>
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 will be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions will be approximately:

<u>Area Description</u>	<u>Dimension</u>
Transverse Area above Subframe	95.0"
Compartment Depth below Subframe	24.5"

COMPARTMENT LOCKS

All compartments will be keyed alike. The locks will be keyed to match this unit only, no industry standard keys code (1250) will be acceptable.

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STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment will have a ROM roll-up door.

- The roll-up door will have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door will be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock will be provided in the bottom portion of the roll-up door.

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

COMPARTMENT LAYOUT

- There will be vertically mounted aluminum shelf-trac for specified component installation.
- There will be two (2) adjustable shelf/shelves approximately 24" deep. Each shelf will be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges
- There will be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. Each tray will be vertically adjustable. Each tray top will be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks will extend 100% of the slide length. The tray assembly will utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
- The floor of the compartment above the frame rails will cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- The 12 volt electrical distribution panel will be located in the streetside front lower compartment.

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STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment will have a ROM roll-up door.

- The roll-up door will have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door will be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock will be provided in the bottom portion of the roll-up door.

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

COMPARTMENT LAYOUT

- There will be vertically mounted aluminum shelf-trac for specified component installation.
- There will be three (3) adjustable shelf/shelves approximately 24" deep. Each shelf will be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges
- There will be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top will be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks will extend 100% of the slide length. The tray assembly will utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
- The floor of the compartment above the frame rails will cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents will be provided in the lower compartment.

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STREETSIDE COMPARTMENT - REAR (S4)

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

The compartment door opening shall be approximately 49.0" wide.

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

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

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

COMPARTMENT LAYOUT

- There will be vertically mounted aluminum shelf-trac for specified component installation.
- There will be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top will be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks will extend 100% of the slide length. The tray assembly will utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents will be provided in the lower compartment.

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CURBSIDE COMPARTMENT - FRONT (C1)

SIDE ENTRY DOOR

Access to the interior body compartment will be provided through a side entry door. The door opening will be approximately 29" wide x 94" high.

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

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

The latch mechanism will include a paddle handle on inside and a locking offset bent "D"-ring handle on exterior. A polyester barrier film gasket will be placed between the stainless steel handles and the aluminum door panels. The door latch will 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.

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

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" knurled 304 stainless steel with welded end stanchions.

WINDOW(S)

There will be one (1) 18" wide x 22" high, double-paned insulated, non-sliding window(s) installed in the entrance door. Each window will have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame will have a black anodized finish.

WINDOW(S)

There will be one (1) 18" wide x 22" high, double-paned insulated, vertical sliding window(s) installed in the entrance door. Each window will have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame will have a black anodized finish.

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CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)

The interior useable compartment width shall be approximately 59.0" wide.

The compartment door opening shall be approximately 52.0" wide.

This compartment will have a ROM roll-up door.

- The roll-up door will have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door will be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock will be provided in the bottom portion of the roll-up door.

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

COMPARTMENT LAYOUT

- There will be vertically mounted aluminum shelf-trac for specified component installation.
- There will be three (3) adjustable shelf/shelves approximately 24" deep. Each shelf will be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges
- There will be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top will be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks will extend 100% of the slide length. The tray assembly will utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
- The floor of the compartment above the frame rails will cover the area directly above the frame rails ONLY (non-extended floor).
- Two (2) OnScene 64" Access LED compartment lights, vertically mounted.
- The cab tilt control pendant.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents will be provided in the lower compartment.

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CURBSIDE COMPARTMENT - REAR (C3)

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

The compartment door opening shall be approximately 49.0" wide.

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

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

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

COMPARTMENT LAYOUT

- There will be vertically mounted aluminum shelf-trac for specified component installation.
- There will be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top will be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks will extend 100% of the slide length. The tray assembly will utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents will be provided in the lower compartment.

REAR ENTRY DOOR

Access to the interior body compartment shall be through a double rear door. The door shall be the full height of the interior walkway and approximately 36" wide.

Construction of the rear entry doors shall be with 1/8" aluminum exterior smooth plate, the interior door pans shall be constructed from 1/8" aluminum treadplate.

The doors shall be hung on full height 14 gauge stainless steel hinges with 1/4" stainless steel pins. The hinge shall be bolted to the doors and body with stainless steel machine screws at 5" offset 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 the aluminum doors.

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 the door frame.

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The active latching door shall overlap the non-latching door. The latch mechanism shall include a stainless steel paddle handle on the inside.

There will be a single dropdown door located below the two entry doors to allow for the ramp to be deployed and the upper doors closed.

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

ENTRY HANDRAILS

There shall be four (4) handrails provided at entry door, two (2) vertical on exterior of body, and two (2) on inside of door. The interior handrails 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" knurled 304 stainless steel with welded end stanchions.

BI-FOLD RAMP

There shall be a Link Manufacturing model LB-20 bi-fold ramp installed in the passenger side rear compartment door opening. The ramp shall have the following features:

- Flat surface mount
- Stores vertically inside the vehicle
- Reduces dangerous lifting
- Increases efficiency
- Reduces equipment damage
- High strength aluminum extrusion
- Takes seconds to position for use

ELECTRIC STEP

One (1) heavy duty, Ziamatic Quik-Step, 12 volt electric folding step shall be located under the side area access door. The step shall be 24" wide and fold up under body to reduce ground clearance. The step shall fold out and down to reduce the ground to step distance.

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WALK-IN INTERIOR FINISH DETAILS

DESK, CABINET, CONSOLE FINISH

All specified interior desks, cabinets, overhead cabinets, or consoles will be fabricated from formed 1/8" 3003 H14 alloy smooth aluminum. After fabrication is completed they will be painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

The use of wood materials or laminated surfaces in the construction of desks, cabinets, overhead cabinets, or consoles will not be allowed. There will be **No Exceptions** allowed on specified ruggedized finish.

CAB/BODY WALK-THROUGH CONNECTION

The front center of the rescue body will be interconnected with the rear crew area of custom cab through a weather tight walk-through opening. The opening will be designed to allow the custom cab to tilt forward without disconnecting an attached type seal between the cab and body. The opening will be approximately 24" wide x 70" high (sized to match the cutout in the rear wall of the cab).

The front of the body will be cut out to match the cab opening. Additional reinforcements with metal angle or tubing will be provided to back of cab or front of body, if necessary so that the walk-through opening weakens neither the cab nor body integrity.

The connection will be weather resistant, yet provide the cab and body to move independent of each other. A flexible 3" rubber weather strip will be attached to a stainless steel sheet metal frame around the perimeter of the opening in the back wall of the cab. A drip rail will be provided on front of body above the opening to channel water to both sides of opening. Stainless steel scuff panels will be provided on back of cab where the rubber seal on body comes in contact with cab.

A formed metal frame will be bolted to the front of the body. The body-mounted frame will be provided where the rubber seal comes into contact with the body. The framework will be painted to match the body color.

The base of the opening will be covered with a 3/16" aluminum tread plate full width panel, which will overlap from the cab to body so that the rubber seal can not be damaged.

Full width padded foam cushion head bumpers will be provided on both sides of opening. Head bumpers will be covered with matching interior vinyl and bolted to each side of walk-through.

CUT OUT IN REAR CAB WALL

The rear wall of the custom cab shall be cut out 24" wide for walk-thru application. The height of the cutout shall be determined by the cab structure in the rear wall and the roof. The opening shall be completed by the custom cab/chassis manufacturer to assure proper cab structural integrity and completed final interior finish.

SLIDING POCKET DOOR

There shall be one (1) sliding pocket door(s) provided on interior of walk-in body area. Pocket door shall be fabricated from 1/8" smooth aluminum and be approximately 1-1/2" thick and hang on adjustable pocket door hardware. The door shall be painted to match the interior wall color. A stainless steel handle shall be provided on each side of door. The door shall be equipped with a pneumatic cylinder which will "over-center" to hold the door in open and closed positions.

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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 is not acceptable.

INTERIOR FINISH

The interior of the apparatus body shall have a fully maintenance free and durable finish. The interior finish shall be installed on the ceiling, front wall, and interior side walls from top of exterior compartments to ceiling height.

The interior panels shall be installed with sheet metal screws with gray plastic plugs covering the screws. The seams between FRP panels, interior corners, and exterior corners shall be trimmed with gray plastic molding.

The interior finish shall be pearl gray pebble grain FRP.

INTERIOR WALKWAY FLOOR

There will 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 will be black in color (Loncoin-II Flecks - Onyx).

Lonseal, Inc. warrants that Lonseal flooring products will be free from manufacturing defects for a period of one (1) year from the date of purchase and that, when properly installed and maintained, will 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 will be an isolation sheet that will prevent outside elements from permeating the full length sound and thermal barrier of 3/4" thick grade plywood. The sheet will be fabricated from the same type of material as is used in the subframe. The isolation sheet will be flanged on both sides with a 1" high vertical break.

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AIR CONDITIONER - HEATER

Two (2) Dometic Penguin, model 641835 low profile, 120 VAC, 60 cycle, single phase air conditioner(s) will be provided and installed on the body roof. The unit will be a roof top contemporary contoured integral evaporator/condenser type with built-in heating elements.

Each unit will be rated at minimum of 13,500 BTU cooling capacity with a heating element rated at 5,600 BTU.

A three-speed fan will supply a maximum/minimum of 335/250 cfm air flow capacity.

The roof mounted air conditioner will be approximately 9.5" high x 29" wide x 40" long and weigh approximately 96 pounds.

STREETSIDE INTERIOR AREA (IS1)

INTERIOR CABINET – ABOVE DECK

There shall be one (1) cabinet(s) provided on interior above the interior deck surface formed by exterior compartment ceilings. Cabinet(s) shall be framed in from the top of the interior deck surface to the ceiling of the walk-in area. Each cabinet shall be approximately (insert actual dimensions).

- There will be vertically mounted aluminum shelf-trac for specified component installation.
 - The above cabinet(s) shall have an open front face (no door).
 - There shall be two (2) vertically adjustable shelves in each of the above cabinets.

STREETSIDE INTERIOR AREA (IS2)

INTERIOR CABINET – ABOVE DECK

There shall be one (1) cabinet(s) provided on interior above the interior deck surface formed by exterior compartment ceilings. Cabinet(s) shall be framed in from the top of the interior deck surface to the ceiling of the walk-in area. Each cabinet shall be approximately (insert actual dimensions).

- There will be vertically mounted aluminum shelf-trac for specified component installation.
 - The above cabinet(s) shall have an open front face (no door).
 - There shall be two (2) vertically adjustable shelves in each of the above cabinets.

STREETSIDE INTERIOR AREA (IS3)

- There will be a hanger bar across the top of the cabinet that will support the weight of two (2) bomb suits. The suits weigh 200 lbs each. The suits measure 14" wide x 37" deep (shoulder to shoulder) and 64" tall. SVI shall purchase or fabricate metal hangers.

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STREETSIDE INTERIOR AREA (IS4)

- There will be a hanger bar across the top of the cabinet that will support the weight of two (2) bomb suits. The suits weigh 200 lbs each. The suits measure 14" wide x 37" deep (shoulder to shoulder) and 64" tall. SVI shall purchase or fabricate metal hangers.

CURBSIDE INTERIOR AREA (IC1)

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

CURBSIDE INTERIOR AREA (IC2)

INTERIOR CABINET – ABOVE DECK

There shall be one (1) cabinet(s) provided on interior above the interior deck surface formed by exterior compartment ceilings. Cabinet(s) shall be framed in from the top of the interior deck surface to the ceiling of the walk-in area. Each cabinet shall be approximately (insert actual dimensions).

- There will be vertically mounted aluminum shelf-trac for specified component installation.
 - The above cabinet(s) shall have an open front face (no door).
 - There shall be two (2) vertically adjustable shelves in each of the above cabinets.

There shall be one (1) 120 volt outlet(s) located in the walk-in area of the body.

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

There shall be one (1) 120 volt outlet strip(s) approximately 2' long with straight blade household type outlets provided with this outlet. Exact mounting location shall be specified by the U. C. Berkeley Police Department at the pre-construction meeting.

- Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.

CURBSIDE INTERIOR AREA (IC3)

- One (1) 12 volt terminal block(s) installed to provide 12 VDC power for equipment supplied by the U. C. Berkeley Police Department. Exact location shall be determined at the pre-construction meeting.

There shall be one (1) 120 volt outlet(s) located in the walk-in area of the body.

- The outlet receptacle(s) will 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.

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CLIMATE CONTROL CURTAIN

A climate control curtain will be provided in the walk-in area of the body separating the forward portion of the body from the rear, robot and Segway vehicle storage area. The design of the curtain will be determined at the pre-construction meeting.

ROBOT MOUNTING SYSTEM

There shall be recessed tie downs provided in the floor for securing the department supplied robot. Tie down straps shall be utilized to secure the robot in place for transportation. There will be provisions made for the charging system. AC or DC power will be provided to an area adjacent to the robot storage location.

CURBSIDE INTERIOR AREA (IC4)

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 will be used to protect wire and wire looms. Electrical connections will be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body will 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*.

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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:

- 3) SAE J156, *Fusible Links*
- 4) SAE J553, *Circuit Breakers*
- 5) SAE J554, *Electric Fuses (Cartridge Type)*
- 6) SAE J1888, *High Current Time Lag Electric Fuses*
- 7) 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.

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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 will be provided with finished apparatus. Similar or generic type electrical schematics will NOT BE ACCEPTABLE.

Low Voltage Electrical System Performance Test

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

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12 VOLT DIAGNOSTIC RELAY CONTROL CENTER

The 12 volt power distribution will be conveniently located with easy access for service. All relays and circuit breakers will be plug-in type allowing for removal for repairs without necessitating soldering or tools. The sockets mounts for both the relays and circuit breakers will be of a design that permits the use of standard automotive type components.

The 12 volt distribution panel will utilize printed circuit boards mounted in high strength enclosure. Each printed circuit board will be provided with twelve (12) heavy duty independent switching relays. Each relay will have the ability to be configured either normally open or normally closed and be protected by a 20 amp automatic reset breaker. Each circuit will be provided with a LED for visual diagnostic.

Power distribution panel will be located in apparatus body within a protected enclosure with removable or hinged cover.

ROCKER SWITCH PANEL

The 12 volt control switch panel shall be supplied and installed by the cab/chassis manufacturer.

ELECTRICAL SYSTEM MANAGER

The chassis shall contain an electrical system manager for:

- Monitoring chassis battery voltage
- Shedding pre-determined electrical circuits
- Sequencing pre-determined electrical circuits
- Automatically controlling chassis engine fast-idle
- Monitor master switch and parking brake applications
- Automatically control warning light modes ("Calling-For" and "Blocking Right of Way")
- Provide low voltage alarm
- Programmable control circuits
- Remote system status indicator panel

System manager shall perform all electrical functions required by current NFPA 1901 Standards.

The electrical system manager shall be supplied and installed by the cab/chassis manufacturer.

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BATTERY SYSTEM

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

Batteries will be of the high-cycle type. With the engine off, the battery system will 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 will meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries will be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries will be readily accessible for examination, testing, and maintenance.

A means will 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 will be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries will be protected against vibration and temperatures that exceed the battery manufacturer's recommendation.

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

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

The alternator will 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 will be provided.

A sequential switching device will 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 five (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 will be provided. The switch and pilot light shall be supplied and installed by the cab/chassis manufacturer.

BATTERY SOLENOID

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

BATTERY CONDITIONER

The battery conditioner shall be supplied and installed by the cab chassis manufacturer.

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ENGINE COMPARTMENT LIGHT

Engine compartment light(s) shall be supplied and installed by the cab chassis manufacturer.

CAB HAZARD WARNING LIGHT

A red "HAZARD" warning light shall be supplied and installed by the cab/chassis manufacturer. Light shall illuminate automatically to warn the Driver of the following when the apparatus parking brake is not fully engaged:

- Any passenger or compartment door is open
- Equipment rack is not in stowed position
- Light tower is extended

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

BACK-UP ALARM

The body manufacturer will furnish and install an automatic sound sensing electronic back-up alarm. The back-up alarm will actuate automatically when the transmission gear selector is placed in reverse. The alarm automatically adjusts its sound output, maintaining a minimum of ten dB(A) above noise level, up to maximum rated output of 112 dB(A).

INTERIOR LED LIGHTS

Five (5) OnScene Solution model #70156, 10" x 10" x 7/8", 10-30 VDC, surface mount dual red and white LED light(s) with clear lens will be provided throughout the vehicle. Each light shall be individually switched with a high/low intensity setting switchable at the entry door(s). In addition light(s) will be capable of a five (5) second delay after switching 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) Federal amber LED QL64Z-ARROW turn signal lights
- Two (2) Federal red LED QL64Z-BTT stop/tail lights
- Two (2) Federal white LED QL64Z-BACKUP back-up lights

Each of the lights above shall be mounted in a QL64MC, chrome finish bezel.

MIDSHIP MARKER/TURN SIGNAL

Two (2) Whelen LED midship body clearance marker/turn signal lights (TOA00MAR) 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.

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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 Truck-Lite Model 18 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

The step lights and/or ground lights will be supplied and installed by the cab/chassis manufacturer. Light(s) will be 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 will be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE MOUNTING BRACKET

There shall be one (1) Cast Products aluminum license plate mounting with chrome shielded license plate light mounted on the rear of the body.

ELECTRONIC SIREN

The siren control head shall be supplied and installed by the cab/chassis manufacturer.

SIREN SPEAKER

The siren speaker(s) shall be supplied and installed by the cab/chassis manufacturer.

SIDE SCENE LIGHTS

There shall be four (4) Federal QL97LEDSCENE, 9" x 7" recess mounted LED scene lights provided on the upper body. Light quantity shall be divided equally per side. Each light will have a clear lens and chrome bezel.

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

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

REAR SCENE LIGHTS

There shall be two (2) Federal QL97LEDSCENE, 9" x 7" recess mounted LED scene lights provided on the upper rear body. Each light will have a clear lens and chrome bezel.

The lights will 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.

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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 (4) 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 (4) 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 (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) 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 (2) 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.

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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 will be one (1) Federal Signal Corporation ADX7205 AeroDync Solaris LED lightbar permanently mounted to the cab roof. The lightbar shall include (12) nine-LED Solaris LED reflectors - red, and (2) traffic clearing lights - white.

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

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

ZONE B & D - SIDE WARNING LIGHTS

There will be four (4) Federal Signal QuadraFlare (9" x 7") LED lights (QL97SF-RR) provided, two (2) on each side of the apparatus in the upper corners. Each light will have a red lens and chrome flange.

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

ZONE C - REAR WARNING LIGHTS

There will be two (2) Federal Signal QuadraFlare (9" x 7") LED lights (QL97SF-RR) provided, one (1) on each side of the apparatus in the upper corners. Each light will have a red lens and chrome flange.

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

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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

The front lower warning lights will be supplied and installed by the cab/chassis manufacturer. They will be Federal lights to complete an NFPA compliant lower level warning light system.

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

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

The front lower warning lights will be supplied and installed by the cab/chassis manufacturer. They will be Federal lights to complete an NFPA compliant lower level warning light system.

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

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

There will be two (2) Federal Signal QuadraFlare (6" x 4") LED lights (QL64XF-R) provided, one (1) on each side. Each light will have a red lens and chrome flange.

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

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

There will be two (2) Federal Signal QuadraFlare (6" x 4") LED lights (QL64XF-R) provided, one (1) on each side. Each light will have a red lens and chrome flange.

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

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There will be two (2) Federal Signal QuadraFlare (6" x 4") LED lights (QL64XF-R) provided, one (1) on each side. Each light will have a red lens and chrome flange.

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LINE VOLTAGE ELECTRICAL SYSTEM

ONAN PTO GENERATOR

The vehicle shall be equipped with an Onan Protec PTO generator system with a capacity of 25,000 watts at 120/240 VAC, 208/104 amps, single phase. Current frequency shall be stable at 60 hertz.

The transmission's PTO port and PTO, or the split shaft PTO, and all associated drive shaft components shall be rated to support the continuous duty torque requirements of the generator's continuous duty rating as stated on the power source nameplate.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO, the driving compartment speedometer shall register when the generator drive system is engaged.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO and a chassis transmission retarder is furnished, it shall be automatically disengaged for generator operations.

The direct drive generator shall be mounted so that it does not change the ramp break over angle, angle of departure, or angle of approach as defined by other components, and it shall not extend into the ground clearance area.

The direct drive generator shall be mounted away from exhaust and muffler areas or provided with a heat shield to reduce operating temperatures in the generator area.

GENERATOR ENGAGEMENT

A "Generator Engaged" indicator shall be provided in the driving compartment to indicate that the generator shift has been successfully completed.

An "OK to Operate Generator" indicator shall be provided in the driving compartment to indicate that the generator is engaged (if not always engaged), the transmission is in the proper gear (if required, automatic transmissions only), and the parking brake is engaged (if applicable).

An interlock system shall be provided to prevent advancement of the engine speed in the driving compartment or at any operator's panel unless the parking brake is engaged, and the transmission is in neutral or the output of the transmission is correctly connected to a pump or generator instead of the drive wheels.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the Protec YDCR series PTO generators shall be free from defects in material and workmanship for a period of five (5) years or one thousand (1,000) hours, whichever comes first, from the date of delivery to the first purchaser.

GENERATOR SPLASH GUARD

A powder coat painted splash cover shall be installed to reduce the amount of road spray on the frame mounted PTO generator. A V-ring seal shall also be installed in the cover to provide additional protection against contaminants reaching the generator front seals.

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GENERATOR MOUNTING

The generator shall be mounted between the chassis frame rails. The generator mounting brackets shall be fabricated using heavy duty steel tubing, or structural channel. The generator mounting shall be bolted and removable so that the generator can be lowered from under apparatus for service, if necessary. The generator case shall not extend below the bottom edge of the apparatus body.

MANUALS AND SCHEMATICS

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

POWER-TAKE-OFF GENERATOR DRIVE

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO by the cab chassis manufacturer. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.

ENGINE SPEED CONTROL

An engine speed auxiliary control device (high idle switch or throttle) shall be installed to maintain a stable cycle output from generator when the apparatus is parked.

An interlock shall prevent the operation of the engine speed auxiliary control device unless the parking brake is engaged and the transmission is in neutral or park, or the parking brake is engaged and the engine is disengaged from the drive wheels.

The engine shall be prevented from regulating its own engine speed during times when engine rpm control is critical for consistent apparatus functions such as generator, water pump, or aerial operation.

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CIRCUIT BREAKER BOX

There will be a Newmar 120/240 VAC distribution/breaker panel provided on completed vehicle. All circuit breakers will be rated to the wire size and load demand.

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

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

The panel will 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 will be hydraulic/magnetic trip free style with a manual reset.

The Newmar panel will also control the manual switch over from shore to generator power.

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

OUTLETS AND CIRCUITS

The generator and or shore power will 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) will be 20 amp, straight-blade (NEMA 5-20R).

There shall be two (2) 120 volt outlet strip(s) approximately 2' long with straight blade household type outlets provided with this outlet. Exact mounting location shall be specified by the U. C. Berkeley Police Department at the pre-construction meeting.

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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.

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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.

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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:

- Voltmeter
- Current meters for each ungrounded leg
- Frequency (Hz) meter
- 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.

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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 ampere rating and shall be sized to carry not less than 115 percent of the ampere 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 ampere 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.

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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.

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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 pre-wiring 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

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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

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120/240 VAC SCENE LIGHTING

COMMAND LIGHT - KNIGHT TOWER w/ BACKLIGHT

The apparatus shall be equipped with one (1) all-electric floodlight tower(s). The unit shall not require tapping into vehicle braking system to be operated, eliminating the chance for vehicle brake problems. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the all-electric light tower specified. NO EXCEPTIONS.

The light tower shall have six (6) weatherproof, 500 watt, 120 volt quartz halogen lights. Light heads shall be mounted in three (3) pairs, giving two (2) vertical lines of three (3) when the lights are in the upright position. The light tower shall have slip-rings for a full 360 degree rotation and capable of rotating either direction from a stowed position, NO EXCEPTIONS.

The lower pair of light heads shall be capable of being rotated about a horizontal axis to provide light down on the vehicle or to the opposite side of the vehicle.

The light tower shall be capable of overhanging the side or back of the vehicle (depending on mounting location) to provide maximum illumination and a warming area adjacent to the vehicle, NO EXCEPTIONS.

Positioning of the light bank shall be accomplished with maintenance free, heavy duty 12 volt linear actuators.

The light tower shall be all aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

Light tower shall be controlled with a hand-held umbilical line remote control. The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature.

Command Light controls shall include:

- Three (3) switches, one (1) for each light bank.
- One (1) light bank rotation switch.
- One (1) switch for elevating lower stage.
- One (1) switch for elevating upper stage.
- One (1) light to indicate when light bank is out of roof nest position.
- One (1) light to indicate when light bank is rotated to proper nest position.
- One (1) back light rotation switch
- One (1) "On/Off" switch for the top mounted strobe (optional)

The controls shall be located per the itemized compartment list.

The light tower shall have a full extension over 7' from mounted position and extend from nest position to full upright in 15 seconds. The overall size of nested light tower shall be approximately 23" wide x 47" long x 11 3/4" high, and weight approximately 120 lbs.

A flashing warning light shall be provided in cab, indicating when a light tower is not in nested position as required by NFPA 1901. The operational envelope of the mast shall be automatically illuminated whenever the mast assembly is being raised, lowered, or rotated as required by NFPA 1901.

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The Command Light shall be covered by a five (5) year limited warranty from defects in materials and workmanship. An operation, maintenance, and parts manual shall be provided with the delivered apparatus.

The light tower will be mounted to roof of the custom cab which shall be reinforced as necessary to support weight of the light tower.

INFORMATION TECHNOLOGY (IT) SYSTEMS

All information technology systems specified below shall be supplied, installed, and supported by the contractor including, but not limited to the design, inter-connecting wiring, and integration of all specified systems. Under no circumstances will the installation of these systems be subcontracted

The following information technology systems shall be provided and installed on completed unit as follows;

COMMAND CAMERA SYSTEM

There will be one (1) Pelco ES31C22-5N 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 and a 176X zoom lens (22X optical, 8X electronic).

The camera control system will contain one (1) KBD300A keyboard with joystick, and one (1) KDBKIT keyboard kit.

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.

Mast will be wired to a red flashing warning light in cab visible to the driver to warn when the mast is out of the nested position.

A pneumatic kit to raise and lower the mast will 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 will be provided for the 7-42 telescopic mast.

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

Each mast section and collar will be of the low friction synthetic bearings for smooth operation and longer life. Bumpers will be supplied to reduce shock on extension and retraction. All exterior aluminum surfaces shall be anodized and sealed. Fasteners and fittings will 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 will be provided with the manual. Manufacturer's blueprint of tower, complete parts list and bill of materials for towers provided with manuals.

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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 will 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 will be mounted using an external mounting kit attached to the rear body panel. The mast will be enclosed with a removable 3/16" smooth aluminum enclosure located on the rear of the body extending from bumper level upward to enclose mast. 2" x 2" x 1/4" angles will be welded to rear body panel for attachment of enclosure to body. The mast enclosure will be provided to protect the control cables, air hoses, and the mast from the elements. The specified camera system will extend above the enclosure, but still be lower than body height.

Controls for the mast will be recessed into mast enclosure in a Cast Products aluminum box with hinged door. A removable panel will be provided on side for access to lower section of mast for maintenance purposes.

A stainless steel scuff plate will be provided on upper section of rear body panel to prevent scuffing of Nycoil cable on body surface.

MAST COVER

The mast enclosure will be painted same as body color(s).

32" LCD MONITOR

One (1) Commercial grade, 32" multiple input, flat panel LCD monitor shall be provided in the main body area on the curbside wall.

System shall be complete and fully operational, including all miscellaneous coax cable, 120 volt AC wiring, and cable connections.

- Ram Mount monitor mounting system consists of a heavy duty universal assembly that will attach a flat surface to another flat surface. Includes a universal base piece to mount heavy devices to a flat surface and a 4.75" x 4.75" face plate recommended for mounting heavy devices such as monitors and flat screen electronics. Features a hole pattern for 100mm and 75mm VESA standards.