



# MAINTAINER CUSTOM BODIES

## PROPOSAL

M342 FDIC 2019 CRANE RESCUE

DATE: 04/29/2019

### BUILD SPECIFICATIONS

#### NEW ALL-ALUMINUM TWELVE FOOT (12') WALK-AROUND CRANE RESCUE RESPONDER SERIES

**THE APPARATUS BODY SHALL BE MANUFACTURED AS PER THE FOLLOWING SPECIFICATIONS:**

##### **BODY DESIGN:**

The body shall be modular in design, capable of being removed and remounted on a new chassis. Body integrity and strength to be independent of chassis mounting. Body is specifically designed to enable custom layout of interior compartments.

##### **BODY MATERIALS:**

The following shall be the minimum acceptable materials, gauge, and finish used:

Aluminum Sheeting - All exterior panels shall be 5052-H32 aluminum of .125" thickness.

Aluminum Diamond Plate - All diamond plate shall be 3003-H14 aluminum of .125" thickness.

Body Mounting - All body mounting bolts to be minimum Grade 5.

Exterior Fasteners - All exterior nuts, bolts, and screws shall be stainless steel.

##### **CORROSION PROTECTION:**

Electrolysis Corrosion Kontrol (ECK) shall be used to prevent dissimilar metal corrosion. ECK shall be used for door latches, door hinges, trim plates, fenderettes, etc. ECK shall be applied to every external fastener hole prior to component mounting.

##### **BODY SUPER-STRUCTURE:**

The body super-structure shall be constructed of square aluminum tubing and custom extrusions. All framing and supports shall be welded to create a fully enclosed structure. This construction technique provides high strength and durability and enables custom design of interior compartments.

The side wall structure, shall be constructed of 2.0" x 2.0" x .125" 6063-T52 alloy square aluminum tubing, the side wall structure shall be welded and gusseted to the sub structure.

The roof structure shall be constructed of 2.0" x 2.0" x .125" 6063-T52 alloy aluminum tubing in a lateral pattern, maximum 20-inch spacing. The roof structure shall be welded to the side-wall structure.

All side walls shall be surfaced using a .125" aluminum sheet, welded and bonded to body side wall structure. The body roof shall be surfaced using .125" aluminum diamond plate.

A side body impact rail manufactured of 6063-T52 alloy extruded aluminum shall be welded to the apparatus side wall structure. It shall receive the body side sheet by means of a groove, which runs continually fore to aft of the side wall structure.

##### **BODY CORNERS, EXTRUDED:**

The exterior body corners and roof perimeter shall be capped with a radiused (2.44") custom aluminum extrusion and welded to the wall and roof structure. Body corners create additional protection from physical and environmental damage to the super-structure.



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#### **BODY FLOOR CONSTRUCTION:**

The sub structure shall be constructed of 2.0" x 3.0" x .250" 6063-T52 alloy rectangular aluminum tubing, welded and gusseted to the side-wall structure for maximum strength and durability.

Two (2) mounting rails of full-length 3.0" x 5.0" 6061-T6 alloy rectangular aluminum tubing shall be welded to the sub structure, the mounting rails to align with the chassis frame rails for mounting of the body to chassis.

#### **UNDERCOATING:**

The underside of the vehicle including all metal work shall be sprayed with PPG Corashield P8001 automotive undercoating. The Corashield product is designed to prevent chipping, cracking, or marring of painted and unpainted surfaces after exposure to high impact sand, gravel, and other abrasive materials. This undercoating shall aid in preventing corrosion and will provide a sound and vapor barrier to the aluminum body structure.

**BODY FRONT SHEETING:** Fabricated of .125" smooth aluminum and painted job color.

#### **STONE GUARDS:**

The front body corners shall have .125" aluminum diamond plate protective guards. The stone guards shall be bolted to the body and provide coverage at a minimum of 24" high from the base of the body.

#### **BODY REAR SHEETING:**

The rear body sheet shall be fabricated of .125" smooth aluminum sheeting and painted job color. There shall be a kick plate fabricated of .125" aluminum diamond plate, located below the rear opening.

**BODY ROOF SHEETING:** Fabricated of .125" aluminum diamond plate.

#### **APPARATUS BODY PAINT FINISH:**

The final finish of the apparatus shall conform to fire apparatus standards, exhibiting excellent gloss and color retention properties.

Preparation: Since the removal of all contaminants and oxidation is essential to the final effect of a finish system, the apparatus shall be pre-cleaned with wax and grease remover and towel dried to evaporation. A 10-step standard body preparation shall be completed.

Pre-treat ANF Primers: The pre-treat and primer applications shall be made in two (2) independent steps. An application of a combined pre-treat/primer product shall not be allowed as a substrate. The prepared substrate shall be pre-treated with Acid Curing 2 component primer to provide corrosion protection and create an adhesive bond between the substrate and the surface applications. To enhance adhesion and topcoat gloss, a two-component urethane primer shall be applied. All the primed surfaces shall be sanded smooth to remove all texture and surface imperfections and creating a finish base that will meet the rigid requirements of the fire and emergency services.

Top Coats: Paint shall be PPG FBCH. Two (2) coats urethane base coat shall be applied according to paint manufacturer specifications. After the base coats have cured properly, two (2) coats of a high solids urethane clear shall be applied. All surface imperfections shall be removed by buffing and polishing.

#### **REAR BODY CHEVRONS:**

"Diamond Grade" Chevron reflective striping, six inch (6") wide, shall be applied to at least 50% of the entire rear body panel. The chevron style striping shall be applied in an inverted "V" pattern at a 45-degree angle from the tailboard to the upper centerline of the rear panel. The stripes shall alternate red reflective, yellow reflective.



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#### **REFLECTIVE STRIPING:**

A six-inch (6") wide white reflective stripe with a one-inch (1") stripe above and below the six-inch (6") stripe, shall be applied in a "Z" pattern to each side of the rescue vehicle.

#### **DRIP RAILS:**

There shall be polished aluminum rain gutters installed on the side and rear of the body, the rain gutters shall be fastened to the body and removable in case of damage. Rain gutters that are an integral part of the roof radius will not be acceptable due to the difficulty in replacing if damaged.

#### **RUB RAILS:**

A two (2) part impact and rub rail system shall be used for body side protection. A polished aluminum rub rail .75" thick x 3" wide shall be bolted to the body "impact" rail to aid in collision protection. The outside vertical edges shall be chamfered for an aesthetic appearance and to reduce the chance of personnel injury.

Black Scotchlite reflective striping to be applied to the recessed center of rub rail to provide additional body side illumination. An additional four (4) reflectors to be installed, two (2) each side of body.

**WHEEL WELL LINERS:** Welded aluminum inner liners shall be provided at both rear wheel wells.

#### **WHEEL WELL SURROUND PANELS PAINTED:**

The body panels that surround the wheel wells shall be painted with no trim overlaid on the body panel.

**FENDERETTES:** Wheel well openings to be trimmed with polished stainless steel fenderettes.

#### **BODY MOUNTING:**

The body shall be mounted to the chassis frame at not less than six (6) locations, three (3) on each side. The mounts shall secure the 3.0" x 5.0" 6061-T6 alloy rectangular aluminum tubing of the floor sub-frame to the chassis frame.

Neoprene pads shall be furnished and installed between the body and the mounts to prevent electrolysis and to minimize noise transfer.

#### **BODY COMPARTMENT CONSTRUCTION:**

The body compartment shall be fully enclosed with .125" aluminum sheet. Each compartment floor shall be covered with .188" aluminum sheet for added weight carrying capability, with all seams fully sealed.

A full width stainless steel door sill shall be installed to protect the lower door opening area. The door sill configuration shall have a raised peak along the rear of the sill to reduce water intrusion under the door when in the closed position.

Wiring channels shall be provided where necessary and shall be screwed in place for ease of access.

#### **DRI-DEK:**

Compartment shelves and trays of the exterior compartments to be covered with Dri-Dek interlocking, rubber tiles. The Dri-Dek shall aid air ventilation around stored equipment, easily removable for cleaning.

**INTERIOR BODY COMPARTMENT COATING:** Fully coated with Zolatone to aid in abrasion resistance.

#### **BODY COMPARTMENT VENTING:**

Each compartment extending below the chassis frame to have a removable louvered vent panel with a replaceable filter.



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#### **ADJUSTABLE SHELF CHANNEL:**

Vertically mounted Uni-Strut channel shall be provided and installed in all exterior compartments where necessary for the installation of infinitely adjustable shelving and trays. The channels shall be of such design to allow square type spring loaded, self-tightening nuts to be attached inside of the channel.

#### **ROLL-UP DOORS:**

The compartments shall be equipped with custom-built Hansen International Inc. roll-up doors. The doors shall be produced by an ISO-9001 certified company and tested to at least 100,000 cycles. Each door shall have a serial number label and shall carry warranty of ten (10) years. To facilitate a 24-hour replacement part service turn around, the doors must be manufactured in the United States.

**Door Construction-Smooth:** The doors shall be constructed of double walled and concave hard anodized aluminum extrusion laths with a smooth exterior surface. The interlocking joint extrusion design shall have an integral synthetic spacer seal to reduce noise and prevent weather or debris intrusion in a closed position. Each door lath shall have inter-locking, nested, and replaceable polymer slide guides. Sides of the door openings shall be of hard anodized aluminum extruded guide channels.

**Operating Components:** The easy opening doors shall be equipped with a 4" counterbalance spring in the roller assembly to assist in lifting and help prevent the accidental closing. A full width lift bar shall secure each door.

**Door Handle and Latching-Handle Bar:** The latch bar shall consist of a full width .750" diameter stainless steel tube handle with centrally located knurled anti-slip sections and 1.25" hand clearance between handle and the door surface. The lift handle bar assembly shall have four (4) roller wheels to reduce friction and ease opening of door.

**Compartment Lighting Switch:** The compartment lights and door-ajar light system shall be activated by an 8-amp rated magnetic switch assembly mounted to the right pennant plate at the top of the door roller area

with a permanently installed magnet installed in the top lath. If the bar is not properly closed, it shall activate the "Door Open" light in the cab.

**Weather Resistance:** The top door drip rail shall be a hard anodized aluminum extrusion and shall contain a full width strip of weather seal to minimize water ingress along the top of the door. The top door seal shall be of a two (2) piece 'non-contacting design' to prevent damage to graphics, logos or reflective striping.

Guide channel seals shall be replaceable and constructed of UV resistant rubber with automotive style flocking material for smoothness of operation. The bottom of the door curtain shall have an additional full width UV resistant rubber seal.

**NOTE: Door Finish-Satin:** The roll-up doors shall be finished anodized Satin.

**NOTE: Key Lock:** Compartment door handles shall be equipped with a keyed cylinder lock assembly.



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#### EXTERIOR COMPARTMENT SPECIFICATIONS:

##### DRIVER'S SIDE:

The front driver's side compartment, L1, shall have a clear opening of 53 5/8" H x 49" W x 22" D (lower) with a roll-up door. The compartment shall be transverse.

The compartment over the rear wheels on the driver's side, L2, shall have a clear opening of 30 7/8" H x 41" W with a roll-up door. The compartment shall be transverse.

The driver's side compartment behind the rear wheels, L3, shall have a clear opening of 50 5/8" H x 31" W x 22" D with a roll-up door.

##### OFFICER'S SIDE:

The front officer's side compartment, R1, shall have a clear opening of 53 5/8" H x 49" W x 22" D (lower) with a roll-up door. The compartment shall be transverse.

The compartment over the rear wheels on the officer's side, R2, shall have a clear opening of 30 7/8" H x 41" W with a roll-up door. The compartment shall be transverse.

The officer's side compartment behind the rear wheels, R3, shall have a clear opening of 47 5/8" H x 25" W x 22" D with a roll-up door.

##### REAR:

There shall be a compartment located at the rear of the body, RR1, which shall have a clear opening of 30 3/8" H x 42" W x 35 3/8" D with a roll-up door.

#### COMPARTMENT L1 SHALL CONTAIN:

##### FLOOR EXTENSION:

Floor height at the area over the frame rails to be continued on the same plane to the outer body side-wall. Floor extension shall be fabricated of 3/16" smooth aluminum in the form of an inverted box with a 2" lip to create additional support strength.

##### SLIDE OUT TRAY:

The compartment shall contain a custom-built Hansen International Inc. Lock In Lock Out Drawer System. The drawer system to be a simple, one handed operation. The drawer is to lock open and closed by pressing the red button within the handle. The drawer to lock open and lock closed automatically. The system is to be constructed from aluminum, provide 100% extension minus 1.18", and be maintenance free, washed out with water if needed.

Telescopic slides and side supports are to be finished in anodized aluminum. The tray to be 2.44" deep with mill finish and a protective polythene film and include a black polymer handle. Each drawer system shall have a serial number label and shall carry warranty of five (5) years.

NOTE: Tray to be solid panel

##### TRAY MOUNTED ADJUSTABLE SHELF:

A full depth adjustable shelf shall be fabricated and installed above the lower roll-out tray. The shelf shall be constructed of 3/16" DA finished aluminum, with a 2" lip on all four sides. The shelf shall be vertically adjustable by mounting in four (4) heavy duty C-channel tracks that are attached to corner upright supports affixed to the lower tray corners. Nominal adjustment height is approx. 28".



### BUILD SPECIFICATIONS

#### COMPARTMENT R1 SHALL CONTAIN:

##### FLOOR EXTENSION:

Floor height at the area over the frame rails to be continued on the same plane to the outer body side-wall. Floor extension shall be fabricated of 3/16" smooth aluminum in the form of an inverted box with a 2" lip to create additional support strength.

##### SLIDE OUT TRAY:

The compartment shall contain a custom-built Hansen International Inc. Lock In Lock Out Drawer System. The drawer system to be a simple, one handed operation. The drawer is to lock open and closed by pressing the red button within the handle. The drawer to lock open and lock closed automatically. The system is to be constructed from aluminum, provide 100% extension minus 1.18", and be maintenance free, washed out with water if needed.

Telescopic slides and side supports are to be finished in anodized aluminum. The tray to be 2.44" deep with mill finish and a protective polythene film and include a black polymer handle. Each drawer system shall have a serial number label and shall carry warranty of five (5) years.

NOTE: Tray to be solid panel

##### TRAY MOUNTED ADJUSTABLE SHELF:

A full depth adjustable shelf shall be fabricated and installed above the lower roll-out tray. The shelf shall be constructed of 3/16" DA finished aluminum, with a 2" lip on all four sides. The shelf shall be vertically adjustable by mounting in four (4) heavy duty C-channel tracks that are attached to corner upright supports affixed to the lower tray corners. Nominal adjustment height is approx. 28".

#### COMPARTMENT L2 SHALL CONTAIN:

##### SLIDE OUT TRAY:

The compartment shall contain a custom-built Hansen International Inc. Lock In Lock Out Drawer System. The drawer system to be a simple, one handed operation. The drawer is to lock open and closed by pressing the red button within the handle. The drawer to lock open and lock closed automatically. The system is to be constructed from aluminum, provide 100% extension minus 1.18", and be maintenance free, washed out with water if needed.

Telescopic slides and side supports are to be finished in anodized aluminum. The tray to be 2.44" deep with mill finish and a protective polythene film and include a black polymer handle. Each drawer system shall have a serial number label and shall carry warranty of five (5) years.

NOTE: Tray to be solid panel



### BUILD SPECIFICATIONS

#### COMPARTMENT R2 SHALL CONTAIN:

##### SLIDE OUT TRAY:

The compartment shall contain a custom-built Hansen International Inc. Lock In Lock Out Drawer System. The drawer system to be a simple, one handed operation. The drawer is to lock open and closed by pressing the red button within the handle. The drawer to lock open and lock closed automatically. The system is to be constructed from aluminum, provide 100% extension minus 1.18", and be maintenance free, washed out with water if needed.

Telescopic slides and side supports are to be finished in anodized aluminum. The tray to be 2.44" deep with mill finish and a protective polythene film and include a black polymer handle. Each drawer system shall have a serial number label and shall carry warranty of five (5) years.

NOTE: Tray to be solid panel

#### TRANSVERSE COMPARTMENT L2/R2 SHALL CONTAIN:

##### STOKES AND BACKBOARD STORAGE:

A horizontal storage rack constructed of 1/8" DA finished aluminum shall be installed in the upper portion of the compartment. The storage rack shall allow for storage of one (1) stokes basket storage and three (3) backboards. Strapping shall be provided to contain equipment.

#### COMPARTMENT L3 SHALL CONTAIN:

##### DUALOCK DRAWER SET:

A custom Dualock drawer unit shall be provided and installed one (1) Roll-Out Tool Drawer Sets: Aluminum rollout drawers to have a 300 lb. mobile capacity and 500 lb. static capacity for each drawer. Each drawer shall have permanent one way & removable dividers the opposite way. Each drawer shall have a single action latch assembly with locking mechanisms on both ends. Drawers latch in the open and in the closed position. All drawer edges shall be hemmed and constructed of .090 inch thick, 3003-H14 grade aluminum.

NOTE: Dualock drawer set to have a 12" drawer, 5" drawer, and 3" drawer

##### ADJUSTABLE SHELVES:

Two (2) adjustable shelves shall be fabricated and installed. The shelves shall be constructed of 3/16" DA finished aluminum, with a 2" lip on all four sides. The shelves shall be vertically adjustable by mounting to the Uni-Strut channels provided.

#### COMPARTMENT R3 SHALL CONTAIN:

##### OUTRIGGER CONTROL:

All components of the electric/hydraulic outrigger system to be housed in storage compartment with close proximity to outriggers. Components include the hydraulic motor, oil reservoir, hydraulic oil manifold and lines. Outriggers to be operated via a tethered control.

##### VERTICAL DIVIDER:

A vertical divider shall be provided and installed. The vertical divider shall be fabricated from 3/16" smooth aluminum and include gussets or other reinforcement for added strength.



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#### **ADJUSTABLE SHELVES:**

Three (3) adjustable shelves shall be fabricated and installed. The shelves shall be constructed of 3/16" DA finished aluminum, with a 2" lip on all four sides. The shelves shall be vertically adjustable by mounting to the Uni-Strut channels provided.

#### **COMPARTMENT RR1 SHALL CONTAIN:**

##### **SLIDE OUT TRAY:**

The compartment shall contain a custom-built Hansen International Inc. Lock In Lock Out Drawer System. The drawer system to be a simple, one handed operation. The drawer is to lock open and closed by pressing the red button within the handle. The drawer to lock open and lock closed automatically. The system is to be constructed from aluminum, provide 100% extension minus 1.18", and be maintenance free, washed out with water if needed.

Telescopic slides and side supports are to be finished in anodized aluminum. The tray to be 2.44" deep with mill finish and a protective polythene film and include a black polymer handle. Each drawer system shall have a serial number label and shall carry warranty of five (5) years.

NOTE: Tray to be solid panel

##### **SLIDE OUT / TILT DOWN TRAY:**

The compartment shall contain a custom-built Hansen International Inc. Slide & Tilt Quick Fit Drawer System. The drawer system to be a simple, one handed operation. The drawer is to lock open and closed by pressing the red button within the handle. The drawer to lock open and lock closed automatically. The system is to be constructed from aluminum, provide 100% extension minus 1.18", and be maintenance free, washed out with water if needed. The tilt of the tray can be adjusted for operational ease.

Telescopic slides and side supports are to be finished in anodized aluminum. The tray to be 2.44" deep with a mill finished with a protective polythene film and include a black polymer handle. Each drawer system shall have a serial number label and shall carry warranty of five (5) years.

NOTE: Tray to be solid panel

### **CRANE COMPONENTS**

#### **CRANE, ELECTRIC OVER HYDRAULIC, 4,500 LB CAPACITY:**

The apparatus builder shall provide and install one (1) Maintainer Corp. of Iowa model EH4520 crane. It shall have a maximum horizontal reach of not less than 20-feet. When in the stored position the crane shall have a maximum horizontal length not to exceed 10-feet. The boom will be hydraulically extendable from minimum to maximum extension. The crane will have a maximum lift capacity of a minimum 4,500-lb, and a minimum 20,000 ft\*lb crane rating. The crane shall have a minimum swing rotation of 580-degrees with an internal stop and shall be powered by a high torque hydraulic motor through a direct, self-locking, worm drive. The crane shall be capable of achieving a 3' lift radius from center of rotation. The boom shall have plus 78-degrees and minus 13-degrees of boom elevation, with visible boom angle indicators on both side of the boom. The overall weight of the crane shall not exceed 1,450 pounds.

All cylinders shall be equipped with load checks and/or counter balance holding valves to prevent cylinder collapse in the event of hydraulic line failure.

The hydraulic winch shall be powered by a high torque hydraulic motor and equipped with 105' of 5/16" wire





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rope, able to achieve 15 ft/min. Operation to include a hoist/winch payout limiter, to prevent spooling out more than the minimum required three (3) wraps on the hoisting drum.

The crane shall be equipped with an internal pressure sensing system. The crane shall be equipped with a two-block damage prevention system, which will disable boom extend, and hoist up.

The crane controls shall incorporate a warning light and an audible overload alarm system. Operation via a wireless remote control for all crane functions; lift, lower, boom in, boom out, hoist up, hoist down, rotate right and rotate left. All crane functions shall incorporate an over-ride feature.

The crane shall have two (2) side mounted LED floodlights, 1,350 effective lumens, attached to the side of the crane to be used as boom tracking lights. The lights shall power on with the crane power but can be turned off with a switch located in the crane control compartment.

The crane shall be equipped with a sensor that is connected to the door open light and shall alert any time the crane is not bedded and status lights to indicate tripped conditions for load capacity limit, anti-two-block, and power pack thermal relief.

#### **ELECTRIC/HYDRAULIC OUTRIGGER SYSTEM:**

The apparatus builder shall provide and install a square leg, electric over hydraulic outrigger system. The system shall have manual out and "power up/down" capabilities, operated via a tethered control. Reflective striping shall be installed on both sides of the extended outrigger to enhance visibility.

**OUTRIGGER PADS:** Commercially available outrigger pads shall be included to assist in the set up and use of the truck mounted crane.

**PAINTED CRANE:** The crane shall be painted to match the body color using the same preparation and paint steps described within.

#### **INCLINOMETER, CRANE OUTRIGGERS:**

A bubble inclinometer to be installed in close proximity to the right rear outrigger.

#### **LIGHT TOWER, CRANE APPLICATION**

There shall be Will-Burt Night Scan SCOUT LED Spot/Flood light installed on the apparatus crane tip. Light shall operate via 12-volt connection providing 40,000 lumens of light. Control of light shall be by means of a cordless remote control with 400' range, and allow rotation of 355-degrees with a tilt axis of 180-degrees (+/- 90-degrees).

#### **CRANE MOUNTED CAMERA:**

Pro Vision Crane Camera System to be installed. VLI Series system shall include a wireless remote control operation and wireless seven inch (7") monitor. Monitor to be installed with a swivel bracket in the L3 compartment.

#### **ROOF STORAGE, CONSTRUCTION:**

Roof of apparatus to be constructed for transport and protection of special equipment. Apparatus side wall on curb side, street side, and front of body to extend a minimum of twelve inches (12") above the roof surface. Finish of the roof edge to be of rolled aluminum extrusion on the exterior edge and aluminum diamond plate on the interior vertical surface. Roof material to be of aluminum diamond plate.

NOTE: Minimum six (6) stainless steel D-rings to be installed for the securement of equipment



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#### **STORAGE, ROOF EXTENSION:**

The roof structure of apparatus to be extended forward over the chassis cab a minimum 36" for storage of boat and/or other special equipment with lengths in excess of the main body structure. Construction of roof extension to be integral to the main body structure.

#### **BODY ROOF WALKWAY LIGHTS:**

There shall be a six (6) Whelen PELCC LED lights installed to illuminate the roof storage area. These lights to be staggered on each side wall and the front wall to provide adequate illumination of entire surface.

NOTE: Lights to activate automatically with deployment of ladder

#### **ZICO QUIC-LADDER:**

Zico Model 3096 ladder, with a two-rung fold-down section, shall be mounted on the rear of the body to provide access to the roof. The ladder to incorporate 1.25" heavy-walled aluminum handrails, covered in rough grip black powder coat. Ladder rungs, 3" deep non-skid in compliance to NFPA 1901-09 requirements for slip resistance and static load.

#### **BODY HANDRAIL:**

Handrail shall be 1.25" extruded aluminum tubing with deep longitudinal grooves and raised knurled patterned knobs to allow for a non-slip gripping surface. Handrail shall have heavily chrome plated end stanchions with stanchion to body gaskets to prevent dissimilar metal corrosion. Handrail shall be bolted into place for ease of removal or replacement.

NOTE: Handrail to be placed on the interior of the roof storage area wall, above the ladder.

### **ELECTRICAL SYSTEM; LIGHTING, WARNING**

#### **ELECTRICAL SYSTEM - BASE:**

All wiring and electrical equipment shall meet N.F.P.A. 1901 and SAE standards. All lighting and reflectors shall meet Federal Motor Vehicle Standards.

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

The warning system on the apparatus shall be capable of two separate signaling modes during emergency operations. One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right of way. The other mode shall signal that the apparatus is stopped and is blocking the right of way.

Switching shall be provided that senses the position of the park position of an automatic transmission. When the master 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 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 right of way shall be energized. The system shall be permitted to have a method of modifying the two signaling modes.

The warning devices shall be constructed or arranged to avoid the projection of light either directly or through mirrors into any driving or crew compartment(s).

Electromagnetic interference suppression shall be in accordance with SAE J551, performance levels and methods of measurement of electromagnetic radiation from vehicles and devices (30-1000 MHZ).

Wiring grommets shall be provided through all panels for automotive type wiring with coated automotive type



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loom. Insulation shall be in accordance with SAE J1128, low tension primary cable, type SXL or GXL, and wired to SAE J1292, Automobile, Truck, Truck-Tractor, Trailer and Motor Coach wiring for such loading at the potential employed. All wiring installed by the Apparatus Manufacturer shall be stranded copper alloy conductors of a gauge rated to carry 125 percent 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 percent. Wiring shall be color and function coded the entire length with insulated bolted-down type hold-down clamps and mechanically secured connections. Overall covering of conductors shall be 280 degrees F. Minimum flame retardant, moisture resistant loom.

Hydraulic lines, air system tubing, control cables, and electrical lines shall be clipped to the frame or body structure of the apparatus and shall be furnished with metal protective looms or grommets at each point where they pass through body panels or structural members. Where any through-the-frame connector is provided, any such connector and wiring shall also be protected from shear or tear.

Wiring shall be provided with properly rated low voltage over current automatic resetting protective devices. Such devices shall be readily accessible and protected against excessive heat, damage and water spray. Switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. All electrical components shall be protected against corrosion, heat, vibration and moisture.

There shall be a minimum of two (2) spare wires installed in each loom running to the body of the vehicle.

#### **ELECTRICAL MULTIPLEX SYSTEM:**

There shall be a Class-1 fully Programmable Multiplexed Electrical System provided.

The multiplex system shall consist of all solid-state components, nodes. Each node shall consist of input and output. All inputs and outputs shall be configured into a scalable electrical harness utilizing Duetsche connectors. The nodes must be waterproof and not require special mounting requirements.

Data shall be reported in "Real Time" and shall be displayed through several operator interface modules with connection to data reading and recording devices such as computers, lpad, tablets, etc.

The placement of nodes throughout the apparatus enables a reduction in wire harness bundles, elimination of redundant harnesses and separate circuit boards, relay and circuit breakers, electrical hardware, separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.

The complete multiplex system shall eliminate the need for the following separate components or devices but are not limited to: load manager, load sequencer, warning lamp flasher, headlamp flasher, door open notification system, seat belt notification, interlock modules, and any other vehicular systems requiring control or monitoring.

Systems activation shall be controlled by touchpad on a Ultra-View display screen designed to interface with the Multiplex system control nodes. Ultra-View display shall be located in the cab and easily accessible to the driver.

#### **POWER DISTRIBUTION QUARTERS:**

The vehicle shall be equipped with a sealed Power Distribution Quarters (PDQ) to provide a protected environment for the electrical systems interface to the apparatus body. The PDQ shall have a service access door that is removable via two (2) recessed positive type door latches. 12v lighting shall automatically activate with the removal of the access door. The compartment and access door shall be



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fabricated from 5052-H32 aluminum alloy, finished to match with interior compartments, and include venting for heat dissipation.

The design shall provide a standardized platform for reliable and repeatable hard-wired or multiplexed electrical systems that can be documented and easily serviced and maintained. The electrical distribution panel shall incorporate wiring harnesses that meet or exceed NFPA standards while providing a central location for body wiring harnesses, as well as a centralized point for chassis harness interface.

All harnesses entering and exiting the distribution panel shall pass through a protected wiring channel directly into the PDQ to eliminate connectivity issues common with bulkhead connectors. Internal wiring

terminals shall be machine or torque-tool crimped to the wire ends and splices shall be protected with heat shrink material.

The distribution panel, including all circuits, shall be documented and made part of the records available at time of delivery.

#### **BATTERY CONTROL SYSTEM, IGNITION SWITCH:**

Battery master control shall be through the chassis ignition switch. The chassis ignition key shall activate a heavy-duty relay to provide 12-volt battery power to the vehicle. Battery switch shall consist of a minimum 200-ampere, constant duty solenoid to feed from positive side of battery.

#### **BATTERY CHARGER:**

A Kussmaul Auto Charge Low Profile LPC 20 Series Model #091-207-12 shall be installed for a single battery system. The charger shall include a Model #091-194-IND "Status Center" exterior digital display. Charger to be built in an aluminum enclosure and include an auxiliary 15-amp output circuit with power source selector for operating accessory loads, and front panel connections for a remote display. Charger output shall pose no interference with other electronic systems on the vehicle.

The charger shall have the following operational specifications: 120-volts AC input at 7-amperes, 12-volts DC output at 20-amperes, dimensions of: 3.3" high x 6.8" wide x 13.25" deep and weighs 7 lbs.

#### **KUSSMAUL 120-VOLT SUPER AUTO EJECT:**

Kussmaul Super Auto Eject, model 091-55-20-120, 20-amp, automatic shoreline disconnect will be provided for the on board, 120-volt battery charging system. The disconnect will be equipped with a NEMA 5-20P male receptacle, which will automatically eject the shoreline when the vehicle starter is energized. The connection will be equipped with a weatherproof cover. A label will be provided indicating voltage and amperage ratings.

#### **COMPARTMENT STRIP LIGHTING:**

Hansen International "Brilliant White" LED modular compartment lighting shall be installed all compartments to provide even, full height lighting for the compartment without interference from shelves or equipment. Protected strip to be installed on both sides of the opening and shall run the full height of the compartment. Lights shall be activated by a magnet switch when opening the compartment door.

This lighting system to employ 12V D.C. solid state operation with 24" connective pigtail, 120 lumens per foot, rated at 50,000 hours, waterproof to IP66 rating, and be shock and vibration resistant. Lighting shall

snap-in for easy installation and service if necessary, be manufactured in the USA, exceed NFPA 1901 current edition, and be white in color.



### BUILD SPECIFICATIONS

#### **"DOOR OPEN" WARNING LIGHT:**

A red LED warning light, Weldon 1500 Series, shall be installed on the cab console and shall flash when any compartment door is open.

#### **ELECTRONIC SIREN:**

A Whelen Siren Amplifier model # 295SLSA1 shall be provided and installed in the cab console. The siren amplifier shall incorporate a 12V/200W siren installed on an aluminum alloy chassis covered by a black polycarbonate powder coated housing for maximum protection. The 295SLSA1 shall have the ability for either 100 or 200-watt output. The front overlay shall be made of velvet Lexan™ with a matte finish. The lettering and artwork on the overlay shall be illuminated with adjustable backlighting of soft LED non-glaring green. The operating controls will consist of a power switch, manual button, PA volume switch, horn button, and rotary switch. The 295SLSA1 PC board shall have input polarity protection, output short circuit protection. The siren amplifier shall include a 20A/32V fuse. The solid-state siren speaker amplifier shall be vibration resistant. The microphone shall be hardwired to the 295SLSA1.

#### **SPEAKER SYSTEM:**

There shall be one (1) Cast Products 3800 Series siren speaker recessed into the front bumper. Speaker to be polished aluminum, 100-watt, wired to the siren head.

#### **FRONT UPPER LIGHT ARRAY:**

A horizontal light module array consisting of seven (7) Whelen C9 Series SurfaceMaxx LED lights will be provided and installed. The lights will be mounted "side-by-side" in a single horizontal pattern at the top of the front apparatus body face. The light will be mounted in individual chrome flanges. There shall be a configuration of five (5) red and two (2) white lamps with clear lenses. The array will be controlled from the operators display on the cab console.

NOTE: Configuration R-R-W-R-W-R-R

#### **FRONT LOWER WARNING LIGHTS:**

There shall be Whelen M2RC series Super LED lights with chrome bezels installed.

Four (4) warning lights shall be mounted in the grille.

The warning lights shall be red LED's with clear lenses.

#### **SIDE UPPER WARNING LIGHTS:**

There shall be Whelen C9 SurfaceMax series Super LED upper warning lights with chrome bezels installed. LED and lens color to be determined at pre-construction.

Two (2) warning lights shall be mounted on the left upper body panel.

Two (2) warning lights shall be mounted on the right upper body panel.

#### **SIDE LOWER WARNING LIGHTS:**

There shall be Whelen M2RC series Super LED lower warning lights with chrome bezels installed on the vehicle.

Two (2) lights installed, one (1) on each front fender of the chassis.

Two (2) lights installed, one (1) above each rear wheel well.

The warning lights shall be red LED's with clear lenses.

#### **SIDE LOWER WARNING LIGHTS:**

Whelen Micron Series Super-LED model MCRNSCR shall be provided. The low-profile warning light shall incorporate six red Super-LEDs with a clear optic hard-coated polycarbonate lens and utilize a TIR reflector for maximum output.

Two (2) lights installed, one (1) on each side of rear bumper tail



### BUILD SPECIFICATIONS

#### **REAR UPPER WARNING LIGHTS:**

There shall be Whelen C9 SurfaceMax series Super LED upper warning lights with chrome bezels installed. LED and lens color to be determined at pre-construction.  
Two (2) warning lights shall be mounted, one (1) each upper rear corner.

#### **REAR LOWER WARNING LIGHTS:**

There shall be Whelen C6 SurfaceMax series Super LED rear lower warning lights with chrome bezels installed.

Two (2) lights shall be mounted, one (1) on each side of the lower rear body.

#### **UPPER SIDE, PIONEER DUAL PANEL FLOOD/SPOT SURFACE MOUNT SCENE LIGHT:**

Whelen Pioneer Plus™ Model # PCPSM2C shall be provided. The 154 watt +12v DC dual Pioneer lighthouse shall incorporate Super-LED® combination flood/spot light installed in ABS Cycholac™ resin surface mount housing. The surface mount housing will be chrome plated. The PCPSM2C configuration shall consist of 24 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 48 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. The Pioneer flood/spot light shall have 16,000 usable lumens. The PCPSM2C new combination optic design projects light directly down at 5° and producing illumination to the side of the vehicle arching upward to a 90° pattern of light.

NOTE: Located upper body side, One (1) centered each side of vehicle between warning lights

#### **UPPER REAR, PIONEER SINGLE PANEL FLOOD/SPOT SURFACE MOUNT SCENE LIGHT:**

Whelen Pioneer Plus™ Model # PCPSM1C shall be provided. The 76 watt +12v DC single Pioneer lighthouse shall incorporate Super-LED® combination flood/spot light installed in ABS Cycholac™ resin surface mount housing. The surface mount housing will be chrome plated. The PCPSM1C configuration shall consist of 12 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 24 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. The Pioneer flood/spot light shall have 7,800 usable lumens. The PCPSM1C new combination optic design projects light directly down at 5° and producing illumination to the side of the vehicle arching upward to a 90° pattern of light.

NOTE: Located rear body, One (1) each upper corner

#### **TRAFFIC ADVISOR LIGHT BAR:**

A Whelen Traffic Advisor light bar, model TAL65, to be installed on the rear of the unit. Low profile, six-lamp LED traffic director to be 36" long. A TACTL5 control head shall be mounted in the cab center console.

#### **REAR TURN SIGNAL, BACK-UP AND BRAKE LIGHTS:**

The rear turn signal, backup and stop/tail lights shall be a Whelen C6 series LED lights.  
The top light shall be a Whelen C6 series LED red combination stop/tail light.  
The rear turn signal shall be a Whelen C6 series LED amber light.  
The backup light shall be a Whelen C6 series LED white light.

#### **LED CLEARANCE LIGHTS:**

Nine (9) Weldon 1500 Series LED Low Amp Draw Marker Lamps seven (7) Red (Model #9186-1500-10) and two (2) Amber (Model #9186-1500-20), with stainless steel brush guard (Model #0J10-1200-00) shall be installed to meet ICC, FMVSS and other applicable regulations.



### BUILD SPECIFICATIONS

#### **LED UNDERBODY LIGHTS:**

There shall be eight (8) TecNiq Series E10-WS00-1 LED under body lights mounted on Stainless Steel brackets.

Two (2) under the cab entry doors, one (1) each side.

Two (2) under the front body compartments, one (1) each side.

Two (2) under the rear body compartments, one (1) each side.

Two (2) under the rear bumper, one (1) each side.

The lights shall be activated when the transmission is placed in Park and the Headlights are on.

#### **LICENSE PLATE BRACKET WITH LIGHT:**

There shall be a license plate bracket with light supplied and mounted at the rear of the apparatus

#### **CHASSIS RELATED ACCESSORIES**

##### **CAB CONTROL CONSOLE:**

There shall be one (1) cab control console installed in the chassis between the cab bucket seats. This console shall be fabricated from .125" aluminum and shall be as large as possible and bolted into place. This console shall have a removable top cover plate, which shall be retained by stainless steel counter-sunk fasteners.

The console shall accommodate all required electrical connections, sirens, light controls, switch banks, multiplex control heads, and any other electrical equipment as specified. The console shall be coated with Zolatone to aid in abrasion resistance. Storage for binders and maps to be provided based on available space, to be determined.

NOTE: Two (2) sealed (non-leaking) cupholders to be provided

##### **PRE-WIRED ANTENNA CABLES:**

There shall be two (2) RG58U coax cables pre-wired by the body builder from the chassis roof to the cab center console. Cables to be clearly labeled and secured within the console. Antenna bases to be protected by removable covers.

##### **USB PORT, DUAL, KUSSMAUL:**

A Kussmaul Dual USB charging port Model #091-219-4 shall be provided in the center console area allowing for quick and easy way to recharge electronic devices in the apparatus. A 4.2 Amps max output allows charging of both a smart phone and a tablet at the same time or two tablets at the same time. Built-In LED Indicator indicates device is powered.

##### **REAR STEP AND BUMPER:**

The rear bumper and step assembly shall extend full width of the body.

The bumper structure shall be attached to the chassis frame rails using a minimum of 3" structural channel. The bumper and step assembly shall extend beyond the rear of the modular body a minimum 9.0" to protect the body from damage.

The rear step shall be constructed of an open aluminum grip strut material.

**TRAILER HITCH:** Class III trailer hitch shall be installed on the rear of the rescue vehicle.

**TRAILER LIGHT CONNECTOR:** A combination 7-pin/4-pin trailer plug connector wired to the tail lights.



### BUILD SPECIFICATIONS

#### **RUNNING BOARDS:**

Running boards shall be installed beneath the cab and crew area doors on both sides of the chassis. They shall be fabricated from aluminum diamond plate and be structurally reinforced for maximum strength.

#### **CAB STEP LIGHTS:**

There shall be four (4) Whelen 0S Series (Model #0AC0EDCR) LED step lights provided.

There shall be one (1) light installed at each cab entry door.

The lights shall be activated when marker lights are activated and the transmission is in the Park position.

#### **TIRE PRESSURE MONITORING DEVICES:**

The apparatus shall be equipped with an AirGuard LED tire alert pressure management system. When tire is properly inflated, the indicator inside the cap shall be clear. The sensor shall activate an integral battery operated LED when the pressure of that tire drops by 8 psi or more. Valve stem extensions shall be included on outer rear wheels. Sensors to be shipped loose for installation by customer.

#### **BACK-UP CAMERA:**

One (1) Nagy 7" color back up camera system, 8212-IR Camera Kit, shall be installed on the apparatus. The camera shall display the real time view of the area directly behind the apparatus. Monitor shall attach to the windshield in replacement of the chassis rear view mirror.

#### **BACK-UP ALARM:**

A Federal Evacuator Plus, model 210331SSG, dual function back-up alarm shall be provided. 97 dB(A)

**TOW EYES - REAR:** Two (2) tow eyes mounted directly to the chassis rear bumper framework.

**MUD FLAPS - REAR:** There shall be black rubber mud flaps installed for the rear wheels.

#### **WARNING LABELS AND INFORMATION PLATES:**

All operator controls and switches shall have the appropriate label and corresponding bezel. Labels to be manufactured by Innovative Controls.

**MAXIMUM SEATING CAPACITY:** Label located in the driver's view specifying the maximum number of personnel the vehicle is designed to carry per NFPA standards.

**REMAIN SEATED:** Label located in the driver's view stating "Occupants Must Remain Seated While Vehicle is in Motion".

**OVERALL HEIGHT, LENGTH, WIDTH:** Label located in the driver's view that states the dimensions of the vehicle.

**FASTEN SEATBELT:** Label located in the cab stating "Occupants Must Fasten Seat Belts Before Vehicle is in Motion."

**DO NOT RIDE:** Two (2) labels located on the rear of the apparatus, one on each side, stating "Danger: Do Not Ride on Rear Step While Vehicle is in Motion - Death or Serious Injury May Result".





### BUILD SPECIFICATIONS

#### DELIVERY REQUIREMENTS:

#### VEHICLE ROAD AND SYSTEMS INTEGRITY TESTING:

A complete and thorough road test and systems integrity test shall be conducted at the time of vehicle completion, and prior to delivery. The road test portion shall encompass differing types of road conditions and terrain, including but not limited to – hills, curves, rough roads, rural high-speed environments, urban stop and go environments, and other conditions to verify vehicle manufacturing and delivery integrity.

A systems integrity test shall be performed on the completed vehicle. In this test, the completed vehicle shall have all systems checked for proper operation and conformity to manufacturing specs. This test shall include but not be limited to - a full 12-volt electrical test, a full 120-volt electrical test, all doors shall be checked for proper closure, all doors, hatches, bellows, etc. shall have a water test performed to check for leaks, all roll out trays, tool boards, drawers, etc. shall be checked for proper opening and closing, tire chains (if included) shall be operated, and any system having a mechanical function shall be tested.

#### MANUALS:

All manuals related to sub-system components for included optional equipment to be provided at the time of customer acceptance.

#### CHASSIS:

2019 Ford F550 4x4 Crew Cab, 203" Wheelbase  
6.7L Power Stroke Turbo V8 Diesel  
TorqShift 6-Speed Automatic Transmission  
4x4 Electronic Shift on the Fly  
PTO Provision  
GVWR: 19,500lbs  
Tires: 225/70Rx19.5G BSW AS  
Dual Heavy-Duty Alternators, 377-Amp Total  
Dual Batteries  
Upfitter Interface Module  
Fire/Rescue Prep Package  
XL Package w/Chrome Grille  
Polished Aluminum Wheels  
Power Windows, Locks  
Remote Keyless Entry  
Driver and Passenger Power Remote Heated Folding Mirrors  
Vermillion Red  
Medium Earth Gray Interior