



# MAINTAINER CUSTOM BODIES

## PROPOSAL

**M316 Stock 10' Quick Attack**  
**With modifications per Loving County requirements**  
**Honda Gasoline Pump, 300-Gallon Tank**

### BUILD SPECIFICATIONS

#### **NEW ALL-ALUMINUM TEN (10) FOOT RESPONDER BODY QUICK ATTACK**

**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 2.0" x .250" 6063-T52 alloy square aluminum tubing, welded and gusseted to the side-wall structure for maximum strength and durability.

Two (2) mounting rails of full-length 1.0" x 3.0" 6061-T6 alloy solid aluminum flat-bar shall be welded to the sub structure, the mounting rails to align with the chassis frame rails for mounting of the body to the chassis.

The sub structure belly-pan shall be fabricated from .090" aluminum sheeting and welded to the sub structure.

#### **UNDERCOATING:**

The underside of the vehicle including all under-structure metal work shall be sprayed with black automotive undercoating. This undercoating shall aid in preventing corrosion and will provide sound and vapor barriers to the aluminum body structure work.

#### **BODY FRONT SHEETING:**

The front body sheet shall be fabricated of .125" smooth aluminum and painted job color.

#### **STONE GUARDS:**

The front body corners and lower body sheet shall have .125" aluminum diamond plate protective guards. The stone guards shall be screwed 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:**

The body roof sheet shall be 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, thus removing 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.



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#### **REAR BODY CHEVRON:**

"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.

#### **REFLECTIVE STRIPE:**

A four-inch (4") white "Scotchlite" stripe will be provided. Location and application details to be determined at pre-construction meeting.

#### **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.

#### **SCBA WHEEL WELL STORAGE:**

There shall be individual SCBA bottle storage areas provided in the rear wheel well area. The air bottle compartments shall be in the form of a round tube and of adequate depth to accommodate air bottles. Each storage area shall have a rubber liner on the sides and bottom and a drain hole. A strap shall be installed in each cylinder tube to retain the cylinder in the event of a collision. A Cast Products polished aluminum hinged door with a chrome latch shall be provided for each compartment.

NOTE: Storage for three (3) SCBA bottles to be provided; one (1) street side and two (2) curb side of vehicle.

#### **FENDERETTES:**

The wheel well openings shall be trimmed with polished stainless steel fenderettes, screwed into place.

#### **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 1.0" x 3.0" 6061-T6 alloy solid aluminum flat-bar 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.



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#### **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.

#### **BODY COMPARTMENT COATING:**

All body compartments shall be fully coated with Zolatone to aid in abrasion resistance.

#### **EXTERIOR COMPARTMENT VENTING:**

Each compartment that extends below the body sub structure shall have a removable louvered vent panel with a replaceable filter.

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

Vertically mounted Uni-Strut channel shall be provided and installed in all exterior compartments 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.



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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.

### EXTERIOR COMPARTMENT SPECIFICATIONS:

#### DRIVER'S SIDE:

The front driver's side compartment, L1, shall have a clear opening of 56 1/4" H x 24" W x 21" D with a roll-up door.

The compartment over the rear wheels on the driver's side, L2, shall have a clear opening of 29 3/4" H x 41" W x 21" D with a roll-up door.

The driver's side compartment behind the rear wheels, L3, shall have a clear opening of 53 1/4" H x 33" W x 21" D with a roll-up door.

#### OFFICER'S SIDE:

The front officer's side compartment, R1, shall have a clear opening of 56 1/4" H x 24" W x 21" D with a roll-up door.

The compartment over the rear wheels on the officer's side, R2, shall have a clear opening of 29 3/4" H x 41" W x 21" D with a roll-up door.

The officer's side compartment behind the rear wheels, R3, shall have a clear opening of 53 1/4" H x 33" W x 21" 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.

#### ADJUSTABLE SHELF:

One adjustable shelf shall be fabricated and installed. 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 to the Uni-Strut channels provided. Eliminate the inside lip (facing the R1 adjustable shelf).

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#### 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.



### BUILD SPECIFICATIONS

#### **ADJUSTABLE SHELF:**

One adjustable shelf shall be fabricated and installed. 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 to the Uni-Strut channels provided. Eliminate the inside lip (facing the L1 adjustable shelf).

#### **TRANSVERSE COMPARTMENT L1/R1 SHALL CONTAIN:**

##### **DUAL DIRECTION SLIDE TRAY:**

A dual direction slide tray shall be mounted in the transverse compartment. The tray shall be fabricated from 3/16" DA finished aluminum and have a 3" lip on all four sides. Tray shall be mounted on 1,000 pound capacity SlideMaster slides. An IMS push/pull red ball latch on the front of the slide shall lock the tray in the "in" or "out" position. On the R1 side of the transverse tray – vertical divider to be provided in the center of the tray section for mounting (4) SCBA air packs. Two (2) air packs to be mounted on each side of the vertical divider. See drawing. Customer to provide height of air packs.

#### **COMPARTMENT L2 SHALL CONTAIN:**

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

One adjustable shelf shall be fabricated and installed. 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 to the Uni-Strut channels provided.

#### **COMPARTMENT R2 SHALL CONTAIN:**

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

One adjustable shelf shall be fabricated and installed. 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 to the Uni-Strut channels provided.

#### **COMPARTMENT L3 SHALL CONTAIN:**

##### **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.

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

A slide out tray shall be fabricated and installed in the compartment. The tray shall be constructed from 3/16" smooth aluminum and have a 3" lip on all four sides. The tray shall have a capacity of 500 pounds and shall be mounted on SlideMaster slides. An IMS push/pull red ball latch on the front of the slide shall lock the tray in the "in" or "out" position.

#### **COMPARTMENT R3 SHALL CONTAIN:**

##### **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.



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#### REAR BODY SKID/TANK AREA:

The body shall be open from the rear body panel to the rear wall of the L1 and R1 compartment(s). This compartment shall measure approximately 86 1/4" long x 46" wide x 45" high. This open body area frame will be reinforced to hold the skid/water load intended. The interior sheet metal for the floor and side walls will be .188" thick for maximum area structural strength.

NOTE: The entire area, floor, front wall, and body side walls shall be coated with PPG paint to match body.

NOTE: The rear skid/tank area floor to be covered in Durabed for additional surface protection at the engine/pump/manifold area. Body and side wall edges to be trimmed with brushed stainless steel.

#### SKID MOUNTED C.E.T. HONDA 20-HP GASOLINE PUMP & 300 GALLON TANK:

**PUMP** - The pump shall be a CET DI-PFP-20hpHND-MR single stage centrifugal pump, bolted directly to the engine, with a 2.5" NPT suction inlet, and a 1.5" NPT discharge outlet. The volute and pump head shall be a lightweight, high strength, seawater resistant, aluminum alloy. The impeller shall be a bronze enclosed type for maximum efficiency, fully machined and balanced. The engine crankshaft shall serve as the pump shaft, with the impeller mounted directly on the crankshaft. The shaft seal shall be self-adjusting, self-lubricating, mechanical type. The pump piping shall be flexible to prevent any breakage caused by vibration. The pump shall be capable of a maximum discharge volume of 290 GPM at 50 PSI, and a maximum discharge pressure of 190 PSI while pumping 100 GPM. In the center of the performance curve, the pump shall be capable of pumping 60 GPM at 175 PSI. Pump to be painted black.

**ENGINE** - The pump shall be driven by a 4-stroke Honda gas powered, 20 horsepower V-twin overhead valve engine. The engine shall be air cooled, 12 volt electric start via quick-disconnect weather-proof style connection.

**PUMP PRIMER** - A manual hand-pump primer to be installed at the pump location.

**FUEL** - Honda engine fuel to be supplied via a three (3) gallon plastic fuel tank at engine/pump location.

**PUMP CONTROLS** - A control panel, constructed of non-glare material, shall be supplied and installed at the engine/pump location. The controls shall consist of a master switch, key start, a 2.5" discharge pressure gauge, a Fire Research TankVision Pro 300 electronic water tank level gauge, and a Fire Research TankVision Pro 300, electronic Class A foam tank level gauge.

**FOAM SYSTEM** - A Trident 'Foamate' Model #31.008.0 ATP-1.0 Class A around-the-pump foam system shall be installed. The foam housing shall be of brass construction; due to the high reliability factor, a plastic housing construction shall not be acceptable. The ATP foam system shall be factory calibrated and certified to meet applicable NFPA standards. The unit shall have the ability to turn the foam flow "on and off" without changing the water or foam proportioning settings.

**SUCTION PIPING** - All piping on the suction side shall be made of stainless steel (welded joints) schedule 40. The suction piping, the pump and the discharge shall be tested to 400 PSI. The suction piping shall consist of a 2.5" tank to pump line with a 2.5" flexible rubber hump hose to minimize flex and vibration between the pump and the tank. Between the tank and the pump there shall be a 2.5" Akron fire type grade valve with Trident chrome handle. This valve shall remain open to pump from the tank. There shall be one additional suction valve in place for overboard drafting. The valve shall be a 2.5 Akron fire type valve with a Trident chrome handle and NST male end. This gated suction to include a chrome 30-degree turn-down with female swivels both ends and polished aluminum/chrome plug and chain. All piping to be painted black.



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**WORK LINE SIDE OF MANIFOLD** - On the drivers side of the manifold there will be two (2) 1" NPT and two (2) 1 1/2" NPT discharge outlets, with polished aluminum/chrome caps.

**TANK FILL** - There shall be a one inch (1") tank fill with Akron fire type ball valve on the work line side of the manifold.

**OTHER VALVES** - The other openings will be utilized accordingly when pre-connects, booster reels and other accessories that require pressurized water are specified.

**DISCHARGE PIPING** - All valves larger than 1" shall be ball type valves, with handles for ease of operation and maintenance. Any valve 1" or smaller shall be standard plumbing style valves.

**DISCHARGE MANIFOLD** - A standard discharge manifold will be utilized on the discharge side of the pump to incorporate discharges at the rear of the unit.

The discharge manifold will be 2" x 2" square and be welded on all four (4) sides to prevent leakage. The manifold will be made from industrial stainless steel and painted black.

#### **DISCHARGES TO REAR OF UNIT -**

One (1) 1.0 Akron fire type ball valve with a chrome Trident handle, for builder supplied booster reel.

One (1) 1.5 Akron fire type ball valve with a chrome Trident handle, NST thread to be furnished with polished aluminum/chrome cap and chain.

One (1) 1.5 Akron fire type ball valve with a chrome Trident handle, for builder supplied crosslay.

One (1) 2.5 Akron fire type ball valve with a chrome Trident handle, NST thread to be furnished with polished aluminum/chrome cap and chain.

**POLY WATER TANK CONSTRUCTION** - The water tank shall be constructed of 1/2" thick polypropylene sheet stock. The material shall be of a certified, high quality, non-corrosive, stress relieved thermoplastic, black in color with a textured finish, and UV stabilized for maximum protection. The skid type booster tank shall be of a standard configuration and shall be so designed to have complete modular slide in capability. All joints and seams are to be fully nitrogen welded and electronically tested for maximum strength. The unit shall incorporate transverse partitions manufactured of 3/8" polypropylene which shall interlock with a series of longitudinal partitions constructed of 1/2" polypropylene. All swash partitions shall be so designed to allow for maximum water and air flow between compartments and are fully welded to each other as well as to the inside of the tank. The curb side rear wall of the tank shall have a standard built in sight gauge 2" in width, and 70% transparent.

**FILL TOWER AND TANK COVER** - The tank shall be equipped with a 8" round combination vent/overflow and manual fill tower. The fill tower shall have a molded drop-on type cover that is fastened to the tower to prevent loss. The tower shall be located in the right forward corner of the tank. There shall be a vent / overflow installed inside and to the extreme rear of the tower approximately 2" down from the top. This vent / overflow shall be of a standard schedule 40 polypropylene pipe with minimum ID of 3". The vent / overflow shall be piped internally and exit out the front tank wall with a 1/2" extension past the front tank wall.

The tank cover shall be constructed of 1/2" thick polypropylene, black in color, UV stabilized, and incorporate an exclusive self-locking design. The tank cover shall overlap the tank and be fully welded. Tank shall incorporate transverse partitions manufactured from 3/8" PT2E polypropylene, interlocking with a series of longitudinal partitions. These partitions shall be constructed of 3/8" PT2E polypropylene. All partitions shall be fully welded to each other as well as to the inside of the tank. The street side rear wall of the tank shall have a built-in sight gauge 3.0 inches wide, and 70% transparent.





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**TANK CAPACITY** - The tank shall have a capacity of 300 US gallons of water. The tank shall be covered by a limited Life Time Warranty.

**TANK OUTLETS** - There shall be two standard tank outlets located in the same vertical plane on the driver side rear wall of the tank. One (1) 2 1/2" female NPT tank to pump suction fitting and one (1) 1 1/2" female NPT tank fill fitting with flow deflector.

**TANK MOUNTING BLOCKS** - The top of the tank shall incorporate two (2) parallel mounting blocks that shall accommodate two (2) each sliding nut fasteners for the mounting of a booster reel or other tank accessories. Mounting blocks to be welded to the tank and run from the rear edge of the tank forward.

**SKID BASE** - There shall be a full width skid base manufactured of 3/4" polypropylene welded to the tank. This base shall be designed in an "L" shape. The base shall be 45" wide at the front by 84" long and shall extend 34" past the tank in the rear to allow for pump mounting. The pump mounting area shall be supported by 1/2" polypropylene gussets 15" high by 32" long. The gussets shall be equipped with 2" holes to assist in lifting the unit. The mounts shall allow for the truck to be secured directly to a truck bed without the need for any skid frame work underneath.

**SUMP** - There shall be one (1) sump in the main water tank. The sump shall be integral to the tank floor and will be recessed a minimum 3/4" from the floor. The sump will not be visible and will not protrude from the bottom of the tank.

**FOAM CELL 10 GALLON** - A drop in style foam cell shall be provided in the tank. This foam cell shall be constructed using the same materials and methods as the skid tank. The foam tank shall be incorporated within the water tank and should be of a drop-in type integral to the water tank. The fill tower shall have a round tethered type cover. Foam cell shall have a 10-gallon capacity.

#### **1.5" PRE-CONNECTED DISCHARGE & HOSE TRAY:**

There shall be a pre-connect hose tray fabricated and configured to have one (1) 1 1/2" pre-connected hose line. The compartment shall accommodate 150' of 1 1/2" double jacket fire hose and nozzle. The appropriate plumbing components will be provided to complete the connection to the fire pump discharge manifold. The pre-connected hose shall be supplied from one (1) 1.50" NST Male discharge outlet from the pump manifold and shall be terminated with a 1.50" NST male outlet on a swivel chucksan. It shall be plumbed directly from the discharge manifold with pressure rated hose or stainless steel piping. Tray to extend from the front wall back to, but not over, the stepping surface (next to hose reel).

#### **REAR BODY STEPS:**

Heavy duty folding steps shall be installed on the rear body face. Each step shall have an integral step light.

#### **BODY HANDRAILS:**

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

#### **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



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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 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 SYSTEM:**

There shall be a Class 1 Multiplexed Electrical System installed. The multiplex system shall consist of all solid-state components contained inside aluminum extrusions referred to as nodes. Each node shall consist off twenty-four (24) output channels and twenty-four (24) input channels. All inputs and outputs shall be configured into a scale-able electrical harness utilizing Deutsche connectors. The nodes must be waterproof and not require special mounting requirements.

The system is expandable and shall be capable of performing the following functions: load management sequencing, switch loads and receive digital and analog signals. 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



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associated electronics for controlling various electrical loads and inputs.

The complete multiplex system shall eliminate the need for the following separate components or devices: load manager, load sequencer, warning lamp flasher, headlamp flasher, door open notification system, interlock modules, separate volt meter, ammeter and temperature monitor. Carling rocker type multiplex switches shall be provided and installed on the cab dash to control all vehicle warning and scene lights. Each switch shall have function labels for ease of use.

#### **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 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.



### BUILD SPECIFICATIONS

#### **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.

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

LED modular compartment overhead lighting shall be installed to provide light for the pump and control panel without interference from reels or other equipment. Light(s) shall be activated when vehicle transmission is placed in the park position with marker lights turned on.

#### **"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, **200 watt**, wired to the siren head.

#### **FRONT LIGHT BAR / ARRAY:**

Seven (7) M9 series lights across top front body. (5) red and (2) blue/white split. See drawing, blue/white split to be 2<sup>nd</sup> light in from each side.

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

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

Two (2) warning lights shall be mounted in the grille.

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

#### **SIDE UPPER WARNING/SCENE LIGHTS:**

There shall be Whelen M9RCZ Combination Warning/Scene Super LED lights with chrome bezels installed.

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.

Warning lights shall be red LED's with clear lenses.



### BUILD SPECIFICATIONS

#### **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.

Two (2) lights installed, one (1) at each side of bumper tail.

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

#### **REAR UPPER WARNING/SCENE LIGHTS:**

There shall be Whelen M9RCZ Combination Warning/Scene Super LED rear upper warning lights with chrome bezels installed on the vehicle.

Two (2) lights shall be mounted, one (1) in each upper rear corner.

Warning lights shall be red LED's with clear lenses.

#### **REVERSE ACTIVATED REAR SCENE LIGHTS:**

The rear scene lights shall be automatically activated whenever the apparatus transmission is in the reverse mode.

#### **REAR TRAFFIC DIRECTING LIGHT MODULES:**

Two (2) groups of four (4) rear directing light modules utilizing Whelen MICRON series Amber Super-LED lights shall be installed on the rear of the unit. This split-module design to provide the RDL function when the apparatus body has a center open rear area. The modules will be mounted at the top of the left and right side rear compartment wall. A Whelen TACTL5 control shall be mounted in the cab console.

#### **REAR D.O.T. QUAD CLUSTER W/WARNING LIGHT:**

A four (4) light cluster shall be mounted on the rear of the body, one (1) each side.

The cluster will utilize Whelen M6 series LED lights:

A Whelen Model #M6BTT LED red combination stop/tail light.

A Whelen Model #M6T LED amber turn signal.

A Whelen Model #M6BUW LED white back-up light.

A Whelen Model #M6RC LED red warning 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.

#### **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.

#### **TELESCOPING LED LIGHTS:**

There shall be Fire Research Spectra MS LED Scene Light Model# SPA530-R14-SW-SR side mount push up telescopic light installed. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The outer pole shall be a grooved aluminum extrusion and qualify as an NFPA compliant handrail. The extension pole shall rotate 360-degrees, installation to



### BUILD SPECIFICATIONS

include a mirrored stainless steel panel at roof edge to protect body from damage when light is stowed.

The lamphead shall have 36 ultra-bright white LED's, 30 for flood lighting and 6 to provide a spot light beam pattern. Lamp to operate at 12-volts DC, draw 10.8 amps, and generate 14,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be 6 1/2" high by 8 3/4" wide by 3 1/4" deep and have a heat resistant handle.

NOTE: TO BE MOUNTED ON FRONT OF THE BODY ONE (1) EACH SIDE.

#### 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. Storage for binders and maps to be provided based on available space, to be determined.

The console shall be coated with Zolatone to aid in abrasion resistance.

#### MINI CAB MOUNTED WATER TANK LEVEL GAUGE:

A Fire Research Tank Vision (Model #WLA205-A00) miniature tank level indicator shall be mounted on the cab console. The indicator will show the volume of water in the tank on five (5) easy to see super LED's. The wide view lens over the LED's shall provide 180 degrees of viewing angle. The indicator case shall be manufactured of Polycarbonate material with an integrated lens and have a distinctive blue label.

#### MINI CAB MOUNTED FOAM A TANK LEVEL GAUGE:

A Fire Research Tank Vision (Model #WLA265-A00) miniature tank level indicator shall be mounted on the cab console. The indicator will show the volume of Class A Foam in the tank on five (5) easy to see super LED's. The wide view lens over the LED's shall provide 180 degrees of viewing angle. The indicator case shall be manufactured of Polycarbonate material with an integrated lens and have a distinctive green label.

#### PRE-WIRED ANTENNA CABLES:

There shall be two (2) RG58U coax cables pre-wired by the body builder from the module 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.



### BUILD SPECIFICATIONS

#### **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 approximately 11" 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 shall be installed.

#### **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 OS 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.

#### **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:**

There shall be an Federal Signal Evacuator (Model #210331SSG) electronic back-up alarm with momentary cut off switch installed, activated when the chassis is shifted into reverse.

#### **COMBINATION FUEL/DEF FILL DOOR:**

A flush mounted fuel filler/DEF guard with a hinged door shall be installed over the fuel and DEF fill ports. The door shall be a Cast Products Incorporated FG2208 or similar. The door shall have a label for FUEL/DEF FILL. The labels shall be a product of Innovative Concepts Inc. Additionally, DIESEL FUEL ONLY and DEF engraved plates shall be installed inside the door on a permanently attached label above or near each fill site.

#### **TOW EYES - REAR:**

There shall be two (2) tow eyes mounted directly to the chassis rear bumper framework.

#### **STAINLESS STEEL WHEEL COVERS:**

One (1) complete set of stainless steel wheel covers will be provided on the front and rear exterior wheels. Each simulator will have a top hat, wheel cover, lug nut covers, and valve covers.

#### **SUSPENSION SPACER - REAR:**

There shall be a 0.75" spacer block inserted below the rear leaf spring pack to maintain the correct ride height at the rear of the vehicle. Spacer to be used in compensation for the additional weight of the water-filled tank and pump equipment.



### BUILD SPECIFICATIONS

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

Each tire shall be equipped with an LED tire alert pressure management system (Vecsafe equal.) A chrome plated brass sensor shall be provided on the valve stem of each tire and calibrate to the tire pressure when installed on the valve stem for pressures between 20 and 120 psi. The sensor shall activate an integral battery operated LED when the pressure of that tire drops 8 psi.

Tire monitors to be shipped loosed and installed for calibration after vehicle is loaded with equipment.

#### **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 such as pump discharge controls, electrical connections, fuel/DEF fill and exterior switches, etc. Labels to be manufactured by Innovative Controls.

#### **MAXIMUM SEATING CAPACITY:**

There shall be a label located in the driver's view specifying the maximum number of personnel the vehicle is designed to carry per NFPA standards.

#### **REMAIN SEATED:**

There shall be a label located in the driver's view stating "Occupants Must Remain Seated While Vehicle is in Motion".

#### **OVERALL HEIGHT:**

There shall be a label located in the driver's view that states the overall height (in feet and inches) of the vehicle from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

#### **OVERALL LENGTH:**

There shall be a label located in the driver's view stating the overall maximum length of the apparatus in feet and inches.

#### **OVERALL WIDTH:**

There shall be a label located in the driver's view stating the overall maximum width of the apparatus in feet and inches.

#### **FASTEN SEATBELT:**

There shall be a label located in the cab stating "Occupants Must Fasten Seat Belts Before Vehicle is in Motion."

#### **DO NOT RIDE:**

There shall be 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".

#### **ADD OPTIONAL EQUIPMENT**

- Ranch Hand, winch ready, HORIZON bumper/grille guard
- Warn 12k winch w/synthetic rope
- Go Light on cab roof, joystick control in cab console
- Buell twin air horns, recess mounted, Air horn switch in cab console





### 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.

#### CONSTRUCTION PROVISIONS:

The proposed vehicle shall conform to all applicable NFPA Standards 1901, 2016 Edition, provisions and requirements. Additionally, the vehicle shall conform to all FMVSS, DOT, SAE, TRA, ULI, TBEA, and State Motor Vehicle regulations.

#### CHASSIS SPECIFICATION

##### CHASSIS:

2017 Ford F550 4x4 Crew Cab, 179" Wheelbase  
6.7L Power Stroke Turbo V8 Diesel  
TorqShift 6-Speed Automatic Transmission  
4x4 Electronic Shift on the Fly  
GVWR: 19,500lbs  
Tires: 225/70Rx19.5G BSW AS  
Dual Heavy-Duty Alternators, 377-amp Total  
Dual Batteries  
Fire/Rescue Prep Package  
Power Windows  
Driver and Passenger Power Remote Heated Folding Mirrors  
Race Red