

PART A

BID SUBMISSION

FORM A: BID
(See B7)

1. Project Title

**SUPPLY & DELIVERY A DEMONSTRATOR 100 FOOT REAR
MOUNT ALUMINIUM
AERIAL LADDER APPARATUS**

2. Bidder

Name of Bidder

Street

City

Province

Postal Code

(Mailing address if different)

Street or P.O. Box

City

Province

Postal Code

The Bidder is:

(Choose one)

a sole proprietor

a partnership

a corporation

carrying on business under the above name.

3. Contact Person

The Bidder hereby authorizes the following contact person to represent the Bidder for purposes of the Bid.

Contact Person

Title

Telephone Number

Facsimile Number

e-mail address

4. Definitions

All capitalized terms used in the Contract shall have the meanings ascribed to them in the General Conditions and D3 unless the context otherwise requires.

5. Offer

The Bidder hereby offers to perform the Work in accordance with the Contract for the price(s), in Canadian funds, set out on Form B: Prices, appended hereto.

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6. Commencement of the Work The Bidder agrees that no Work shall commence until he is in receipt of a Purchase Order authorizing the commencement of the Work.

7. Contract The Bidder agrees that the Bid Opportunity in its entirety shall be deemed to be incorporated in and to form a part of this offer notwithstanding that not all parts thereof are necessarily attached to or accompany this Bid Submission.

8. Addenda The Bidder certifies that the following addenda have been received and agrees that they shall be deemed to form a part of the Contract:

No.		Dated	
_____		_____	
_____		_____	
_____		_____	

9. Time This offer shall be open for acceptance, binding and irrevocable for a period of sixty (60) Calendar Days following the Submission Deadline.

10. Signatures In witness whereof the Bidder or the Bidder's authorized official or officials have signed this
_____ day of _____, 20_____.

Signature of Bidder or
Bidder's Authorized Official or Officials

(Print here name and official capacity of individual whose signature appears above)

(Print here name and official capacity of individual whose signature appears above)

Form B: Prices

(See B8)

**DEMONSTRATOR 100 FOOT REAR MOUNT ALUMINIUM
 AERIAL LADDER APPARATUS**

UNIT PRICES

ITEM NO.	DESCRIPTION	SPEC. REF.	UNIT	APPROX. QUANTITY	UNIT PRICE	AMOUNT
1	Demonstrator 100 ft. Aerial Device Vehicle	06075	Each	(1)	\$ _____	\$ _____
2	Thermal Imager	06075	Each	(1)	\$ _____	\$ _____
3	Parts manuals, CD's preferred	06075	Each	1 Set	\$ _____	\$ _____
4	Technical service manuals, CD's preferred	06075	Each	1 Set	\$ _____	\$ _____
TOTAL BID PRICE (GST and PST extra) (in figures) \$ _____ (in words) _____ _____						

 Name of Bidder

FORM N: DETAILED SPECIFICATIONS 06075

SUPPLY & DELIVERY A DEMONSTRATOR 100 FT. REAR MOUNT ALUMINIUM AERIAL LADDER APPARATUS

(Winnipeg Fire Department)

1.0 INSTRUCTIONS FOR COMPLETION OF SPECIFICATIONS

- 1.1 The **Supply & Delivery of a Demonstrator 100 ft. Rear Mount Aluminium Aerial Ladder Apparatus shall be a 2005 or 2006 model year with less than 500 hours.** The vehicles shall be furnished complete and ready for use by the Contractor. All parts not specifically mentioned but which are required to complete and place the vehicle into successful operation shall be furnished as though specifically mentioned in these specifications.
- 1.2 It will be the responsibility of the Bidder to inform the City of any errors or omissions in these specifications, for under this Contract the Contractor shall be held responsible for the satisfactory operational function of the vehicle.
- 1.3 All items in these specifications must be answered indicating compliance or non-compliance. **Bidders shall state “yes” for compliance or state deviation,** or give a reply where requested to do so. Deviations shall be clearly stated and fully detailed. Alternatives will be considered subject to evaluation.
- 1.4 Each bidder is required to fill in every blank. **Failure to do so may be used as a basis for rejection of bid.**
- 1.5 All applicable SAE standards form an integral part of these specifications and shall have precedence in any conflict concerning minimum acceptable standards.
- 1.6 The completed unit and all its components shall comply with all C.M.V.S.S. Canadian Motor Vehicle Safety Standards, M.H.T.A. Manitoba Highway Traffic Act, S.S.A Safety Standards Act, F.M.V.S.S Federal Motor Vehicle Safety Standards, D.O.T Department of Transportation, regulations and requirements as applicable, including but not limited to, a Manitoba Government Inspection with Safety Sticker on the driver's side window.
- 1.6.1 National Fire Protection Association Standard NFPA 1901 (current edition), with the latest revisions, form an integral part of these specifications and any conflict with the specifications shall be brought to the attention of the person listed in Clause B1:5 General Inquiries, Bidding Instructions, of the tender documents, in accordance with Clause B1:6 of the bidding instructions. The Bidder shall submit within 48 hours of the request of the Contract Administrator, proof of compliance with NFPA 1901 (current edition), including test results, certified by an independent registered Professional Engineer and satisfactory to the Contract Administrator.

2.0 SERVICE FACILITY

- 2.1 For the purpose of warranty repairs, the supplier shall have an authorized service facility located within 10 kilometres of the boundaries of the City of Winnipeg. The facility, or a portion thereof, shall be dedicated to the service and maintenance of the type equipment being offered. Further to B9.1, Bidders shall provide a description of the service facility including, but not limited to, number of qualified service staff, years of service experience, and general service capabilities within three (3) Business Days upon request of the Contract Administrator.

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2.2 If a suitable warranty facility is not available within 10 km of the boundaries of the City of Winnipeg, the Bidder may propose that the City of Winnipeg Repair Facility perform warranty work. Any Work performed by the City of Winnipeg Repair Facility shall be charged to the Contractor at the Facility's shop rate in effect at the time the work is performed (for example, shop rate for 2006: \$98.00/hour and \$ 149.00/hour for overtime and callout).

2.3 **Location of the service facility located within 10 km of the boundaries of the City of Winnipeg.**

The Bidder shall choose and fill in **one** of the Clauses listed below. --- 2.3.1) OR 2.3.2)

2.3.1 Bidder's own facility location. State the location of the service facility below.

2.3.2 Bidder elects to have warranty work be performed by the City of Winnipeg Repair Facility.

3.0 **STATE MAKE AND MODEL BEING BID-**_____

4.0 **INTENT**

4.1 It is the intent of these specifications to describe a telescopic, 100 ft rear mounted aluminium rescue ladder apparatus with a waterway system mounted on a chassis supplied by the manufacturer.

4.2 The NFPA 1901 standard for Automotive Fire Apparatus Chapter 18 sections 18-7 through 18-13 and sections 18-17 through 18-25 shall serve as guidelines for the configuration.

4.3 The ratings specified herein state the minimum values acceptable to the City, not implying that these values are sufficient for the design of the particular unit being bid.

4.4 The telescopic, rescue ladder with waterway, hereinafter referred to as the unit or apparatus, shall be a new or a "Demo Unit" (with no more than five hundred (500) hours of operation) 2006 model as may be modified by these specifications. The apparatus, including all necessary components, shall be furnished complete and ready for use by the Contractor. All parts not specifically mentioned but which are required to complete and place the apparatus into successful operation shall be furnished as though specifically mentioned in these specifications.

4.5 Bidders shall include a written statement within 48 hours upon request of the Contract Administrator, certifying that the apparatus being bid complies with all requirements of the standards referred to in this document. The Bidders shall also include Approval Drawings (general arrangements) depicting the vehicles appearance from the left side, right side, front and rear elevation views. Drawings shall also depict location and arrangement of the pump controls scaled the same as the elevation views.

4.6 The chassis being supplied for the apparatus shall be the same model that has been tested to demonstrate that it meets the requirements of the European Crash Test Standards, **ECE R-29, Addendum 28, Revision 1, Uniform Provisions Concerning the Approval of Vehicles With Regard to the Occupants of the Cab of a Commercial Vehicle.** The Bidder shall submit within 48 hours of the request of the Contract Administrator, proof of compliance with E.C.E. Reg 29, including test results, certified by an independent registered Professional Engineer and satisfactory to the Contract Administrator.

5.0 QUALIFICATIONS OF MANUFACTURER

5.1 The manufacturer of the apparatus shall have a minimum of three (3) years continuous experience manufacturing equipment of the types being offered. The type of apparatus being offered, or one similar in nature, shall have an incident free, manufacturing history. The manufacturer shall have in effect a complete and documented quality control program ensuring compliance with all applicable standards.

Note Bidders shall include a detailed description of the manufacturers experience and qualifications within 48 hours upon the request of the Contract Administrator. A list of at least five (5) references for the type of apparatus being offered shall be included. The list shall include the five departments name, location, contact person, telephone number and the length of time the apparatus has been in service.

The manufacturer of the apparatus shall have successfully demonstrated the operation of the type of apparatus being offered in cold weather climatic conditions.

6.0 CHASSIS

6.1 The apparatus shall be provided with a custom fire service chassis meeting the following requirements.

7.0 TORQUE BOX CHASSIS

7.1 The chassis frame shall utilize an integral torque box type design. The integral torque box shall combine the chassis frame and aerial torque box into a single structure.

7.2 The 19" high x 34" wide torque box shall be fabricated of 50,000-PSI minimum yield, high strength, low alloy steel. The frame and torque box shall be made of 42.7 lbs. per foot structural channel with .500" thick top and bottom plates and .500" integral bulkhead supports. Certified welders shall construct the torque box. The design shall utilize 100% welded joints for a totally sealed box. Skip welding shall not be acceptable. Complete Finite Element Analysis and strain gauge testing shall be employed to verify minimum safety factors for road traveling (5:1) and aerial operation (2.5:1).

7.3 The completed torque box shall have the following attributes:

i) Resistance to bending moment, 14.1 million in.lbs.

ii) Section modulus 282.1 cu. in.

7.3.1 The frame section immediately forward of the torque box shall have the following attributes:

i) Resistance to bonding moment 5.1 million in. lbs.

ii) Section modulus 102.1 cu. in.

7.3.2 The torque box shall incorporate a stainless steel schedule 40 4" water pipe through the torque box for the aerial waterway discharge. In addition, the torque box shall have two- (2) 3" conduits full length to encapsulate the hydraulic, air and electrical lines.

7.3.3 The entire assembly shall be sand blasted and painted black before chassis assembly. A full lifetime warranty against defects in materials or workmanship shall be supplied by the apparatus manufacturer.

8.0 **BUMPER**

8.1 The vehicle shall be equipped with a one-piece 10" high bumper, made from 10-gauge (0.135" nominal) polished stainless steel for corrosion resistance, strength, and long-lasting appearance. It shall be mounted directly to the front frame extensions for maximum strength. The bumper shall incorporate two (2) stiffening ribs and shall extend 12" to 24" forward of the front of the cab per customer specification to provide additional protection against low-speed frontal impacts.

8.2 The space between the bumper and the front of the cab shall be covered on the top and on each side with 1/8" aluminium diamond plate.

9.0 **FUEL SYSTEM**

9.1 One (1) 50-gallon fuel tank shall be provided. The tank shall be of an all-welded,aluminized-steel construction with anti-surge baffles and shall conform to all applicable Federal Highway Administration (FHWA) 393.65 and 393.67 standards. The tank shall be mounted below the frame rails at the rear of the chassis for maximum protection. The tank shall be secured with two (2) wrap-around T-bolt type steel straps. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware.

9.2 The fuel tank shall be equipped with a 2" diameter filler neck. The filler neck shall extend to the rear of the vehicle behind the rear tires and away from the heat of the exhaust system as required by NFPA 1901 Standard for Automotive Fire Apparatus. The open end of the filler neck shall be equipped with a twist-off filler cap with a retaining chain.

9.3 The tank shall be plumbed with top-draw and top-return fuel lines in order to protect the lines from road debris. Bottom-draw and/or bottom-return fuel lines are not acceptable. A vent shall be provided at the top of the tank. The vent shall be connected to the filler neck to prevent splash-back during fueling operations. A ½" NPT drain plug shall be provided at the bottom of the tank.

9.4 The tank shall have a minimum useable capacity of 50 gallons of fuel with a sufficient additional volume to allow for thermal expansion of the fuel without overflowing the vent.

9.5 An auxiliary 12 volt fuel pump shall be included in the fuel system. The electric pump shall permit repriming of the fuel lines and engine. The pump may be manually operated with a switch located on the cab dash. The electric pump shall also automatically operate in conjunction with the mechanical fuel pump as long as engine oil pressure is present. The system shall be plumbed to allow full flow to bypass the pump.

9.6 A shut-off valve shall be supplied to prevent drain back of fuel into the main supply line during filter changes.

10.0 FRONT AXLE / SUSPENSION

- 10.1 The vehicle shall utilize an ArvinMeritor FL-943, 5" drop beam front axle with a rated capacity of 21,000 lbs. It shall have "easy steer" knuckle pin bushings and 68.83" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. _____
- 10.2 The front axle shall be furnished with two (2) heavy-duty, double acting shock absorbers, one (1) on each side. _____
- 10.3 The vehicle shall have a nominal cramp angle of 45 degrees, plus two (+ 2) degrees to minus three (- 3) degrees including front suction applications. _____
- 10.4 The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels. _____
- 10.5 The front axle shall be equipped with 16-1/2" x 6" S-cam brakes with Arvin Meritor automatic slack adjusters. _____
- 10.6 The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum three (3) leaf, progressive rate with bronze bushings and a capacity of 21,000 lbs. at the ground. _____
- 10.7 The vehicle shall be equipped with a Sheppard model M-110 integral power steering gear, used in conjunction with a power assist cylinder. The steering assembly shall be rated to statically steer up to a maximum front axle load of 21,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. _____

11.0 FRONT TIRES

- 11.1 The front tires shall be two (2) Michelin 425/65R 22.5 tubeless type 20 PR radial tires with XTE2 highway tread mounted on 22.5 x 13.00 steel hub-piloted disc wheels. The tires with wheels shall have the following weight capacity and speed rating: 21,000 lbs. @ 65 MPH _____

12.0 REAR AXLE / SUSPENSION

- 12.1 The vehicle shall utilize an ArvinMeritor RT-46-160, 48,000 lb. capacity rear tandem axle with single reduction hypoid gearing, 16-1/2" x 7" Q-Plus S-cam brakes, and ArvinMeritor automatic slack adjusters. _____
- 12.2 The axle shall be equipped with oil-lubricated wheel bearings with Arvin Meritor oil seals. _____
- 12.3 The rear suspension shall be a Hendrickson RT-503 48,000 lb. steel leaf spring suspension, utilizing "bar pin" type beam end connections. The spring hangers shall be used in a four point mounting arrangement. Equalizer beams with bronze center bushings, cross tubes, and torque rods shall be provided to maintain proper alignment. _____

13.0 REAR TIRES

13.1 The rear tires shall be Michelin 12R22.5 tubeless type 16 PR radial tires with mud and snow tread mounted on 22.5 x 8.25 hub-piloted steel disc wheels. The tires with wheels shall have the following weight capacity: 27,000 lbs. (dual) @ 65 MPH

14.0 AIR BRAKE SYSTEM

14.1 The vehicle shall be equipped with air operated brake system. The system shall meet or exceed the design and performance requirements of current FMVSS-121 and test requirements of current NFPA 1901 Standard.

14.2 Each wheel shall have a separate integral brake chamber. A dual treadle valve shall split the braking power between the front and rear systems. Air-lines shall be constructed of color-coded nylon tubing routed in a manner to protect from damage. Brass fittings shall be provided. The chassis air system shall be equipped with a Bendix-Westinghouse AD-9 air dryer.

14.3 The air system shall be provided with a rapid build-up feature, designed to meet current NFPA 1901 requirements. A ¼" brass quick-release air inlet with male connection shall be located inside the driver door on the left side of the cab. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging into the wet tank.

14.4 A pressure protection valve shall be installed to prevent use of air horns or other air- operated devices should the air system pressure drop below 80 PSI.

14.5 Two (2) air pressure needle gauges, for front and rear air pressure, with warning light and buzzer shall be installed at the driver's instrument panel.

15.0 AIR TANK RESERVOIRS

15.1 One (1) reservoir shall serve as the wet tank and a minimum of one (1) tank shall be supplied for each of the front and rear axles. The total system shall carry a sufficient volume of air to comply with FMVSS-121.

15.2 The following tank sizes shall be installed:

Wet 1738 cubic inches.

Front 1738 cubic inches.

Rear 2988 cubic inches.

15.3 A heated automatic drain valve shall be installed on the wet tank. All other tanks shall be equipped with manual drain valves.

16.0 EMERGENCY / PARKING BRAKE

16.1 Spring-actuated emergency/parking shall be installed on the rear axle.

16.2 One (1) Bendix-Westinghouse PP-1 parking brake control shall be supplied on the lower dash panel within easy reach of the driver.

16.3 A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic spring brake application at 40 PSI.

17.0 ANTILOCK BRAKING SYSTEM

17.1 A Wabco ABS system shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to axles and all electrical connections shall be environmentally-sealed, water-, weather-, and vibration-resistant.

18.0 ISOLATION AIR RESERVOIR

18.1 The air system shall have an additional 1738 cu. in. isolated reservoir. The reservoir shall be equipped with a valve that automatically closes when the ignition is turned off. This shall effectively protect the reservoir from any leaks in the air system. It shall be located under the battery tray officer's side if not equipped with front suction. It shall be located underneath front air tank if equipped with front suction.

19.0 ENGINE

19.1 The apparatus shall utilize a Cummins ISM02 electronic engine as described below: (all)

ISM 500HP turbocharged
Charge Air Cooled (CAC) 4-cycle diesel
Six (6) Cylinder
Cummins Celect fuel system
661 cu.in. displacement
500 gross BHP at 1900 RPM and a peak torque of 1550 lb.ft. at 1200 RPM
Engine has a horsepower rating of 475 at governed engine speed of 2100 RPM
Bore and stroke shall be 4.92 x 5.79
Compression ratio shall be 16.1:1
Delco-Remy 39 MD-HD 12 volt starter
18.7 cubic foot per minute air compressor
Exhaust Gas Recirculation
Ember separator compliant with 2003 NFPA 1901 standard

20.0 ENGINE BRAKE

20.1 One (1) Jacobs model 411C engine brake shall be installed as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater.

21.0 TRANSMISSION

21.1 The vehicle shall utilize an Allison EVS4000P, electronic, 5-speed automatic transmission.

21.2 A push button shift module Allison model #29538373 shall be located right side of the steering column, within easy reach of the driver.

21.3 A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

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21.4 The transmission shall have a gross input torque rating of 1675 lb. ft. and a gross input power rating of 580 HP. _____

21.5 The transmission shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the operator. _____

21.6 A transmission oil cooler shall be provided in the lower tank of the radiator. _____

21.7 The automatic transmission shall be equipped with a power lock-up device. The transmission lock-up shall prevent down shifting of transmission when engine speed is decreased during pump operations, thereby maintaining a constant gear ratio. Transmission lock-up shall be automatically activated when placing pump in gear. Transmission lock-up shall be automatically deactivated when disengaging pump for normal road operation. _____

22.0 DRIVELINE

22.1 Drivelines shall have a heavy-duty metal tube and shall be equipped with Spicer 1810HD universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced. _____

23.0 COOLING SYSTEM

23.1 The cooling system shall have a tube-and-fin radiator with a minimum of 1,288 square inches of frontal area. _____

23.2 All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses over 1". _____

23.3 The cooling system shall be filled with a 50/50 mixture of water and antifreeze/coolant conditioner to provide freezing protection to minus 40 (- 40) degrees F for operation in severe winter temperatures. _____

23.4 The system shall include a charge air cooler with a minimum of 888 square inches of frontal area. _____

23.5 Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone. _____

23.6 Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps. _____

23.7 The fan shall be 30" in diameter. _____

24.0 HYDRAULIC SYSTEM

24.1 A hydraulic fixed-displacement pump system shall be provided to power all outrigger and aerial functions with direct control stations provided for each system. The hydraulic system shall be driven off the engine-driven power steering pump with an activation switch located on the cab dash within easy reach of the driver. A system "engaged" indicator light shall be provided on the activation switch. This hydraulic pump system will allow for the aerial system to be activated without having to shut down the water pump or reduce engine RPM's. Engagement

shall be allowed only with the transmission in the neutral or pump gear and the parking brake engaged. This system heats the hydraulic fluid while driving to provide smoother operation to other systems in cold climate conditions, rather than utilizing a separate pump.

25.0 "T" SHIFTER HANDLE

25.1 A T-handle shift module shall be located right side of the steering column, within easy reach of the driver. The shift position indicator shall be indirectly lit for after dark operation. The shift module shall have a "Do Not Shift" light and "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

26.0 CANADIAN CMVSS PACKAGE

26.1 Dashboard gauges shall be calibrated in metric units:

Speedometer – kph
Air pressure – kpa
Oil pressure – kpa
Water pressure - degrees C
Transmission oil temperature - degrees C

27.0 CAB CONSTRUCTION

27.1 The vehicle shall have an all-welded aluminium, fully enclosed tilt cab designed exclusively for the fire service to ensure long life. It shall incorporate a welded substructure of high-strength aluminium alloy extrusions that surrounds and protects the perimeter of the occupant compartment for increased safety.

27.2 The cab shall be constructed from 3/16" (0.188") 3003 H14 aluminium alloy plate roof, floor, and outer skins welded to a high-strength 6063-T6 aluminium alloy extruded sub frame. Wall supports and roof bows are 6061 T6 aluminium alloy.

27.3 The inner structure shall be designed to create an interlocking internal "roll-cage" effect by welding two (2) 3" x 3" x 0.188" wall-thickness 6063-T5 aluminium upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.375" wall-thickness 6063-T6 sub frame structure in the front. An additional two (2) aluminium upright extrusions within the back-of-cab structure shall be welded between the rear roof perimeter extrusion and the sub frame structure in the rear to complete the interlocking framework. The four (4) upright extrusions -- two (2) in the front and two (2) in the rear-- shall be designed to effectively transmit roof loads downward into the sub frame structure to help protect the occupant compartment from crushing in a serious accident. All joints shall be electrically seam welded internally using aluminium alloy welding wire.

27.4 The sub frame structure shall be constructed from high-strength 6061-T6 aluminium extrusions welded together to provide a structural base for the cab. It shall include a side-to-side C-channel extrusion across the front, with ¾" x 2-3/4" (.75" x 2.75") full-width cross member tubes spaced at critical points between the front and rear of the cab.

27.5 The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminium plate welded to the sub frame structure.

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- 27.6 The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminium tread plate supported by a grid of fore-aft and side-to-side aluminium extrusions. _____
- 27.7 The cab roof perimeter shall be constructed from 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminium extrusions with integral drip rails. Cast aluminium corner joints shall be welded to the aluminium roof perimeter extrusions to ensure structural integrity. The roof perimeter shall be continuously welded to the cab roof plate to ensure a leak-free roof structure. _____
- 27.8 The cab rear skin shall be constructed from 3/16" (0.188") 3003 H14 bright aluminium tread plate with the diamonds on the exterior to provide added durability. Structural extrusions shall be used to reinforce the rear wall. _____
- 27.9 The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminium plate. The skins shall be welded to structural aluminium extrusions at the top, bottom, and sides for additional reinforcement. _____
- 27.10 The cab front skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminium plate. The upper portion shall form the windshield mask, and the lower portion shall form the cab front. Each front corner shall have a full 9" outer radius for strength and appearance. The left-hand and right-hand sides of the windshield mask shall be welded to the left-hand and right-hand front door frames, and the upper edge of the windshield mask shall be welded to the cab roof perimeter extrusion for reinforcement. The cab front shall be welded to the sub frame C-channel extrusion below the line of the headlights to provide protection against frontal impact. _____
- 27.11 The exterior of the cab shall be 94" wide x 130" long to allow sufficient room in the occupant compartment for four (4) to six (6) personnel. The cab roof shall be approximately 101" above the ground. The back-of-cab to front axle length shall be a minimum of 58". _____
- 27.12 Front axle fenderette trim shall be brushed aluminium for appearance and corrosion resistance. Bolt-in front wheel well liners shall be constructed of 3/16" (0.188") composite material to provide a maintenance-free, damage-resistant surface. _____
- 27.13 A stainless steel West Coast type mirror shall be mounted on each side of the cab with stainless steel machine bolts and washers for corrosion resistance and long-lasting appearance. Each mirror shall consist of a large 7" x 16" flat mirror section and a 4" x 6" wide-angle convex mirror section, with stainless steel breakaway tube mounts to prevent damage in case of accidental impact. _____
- 27.14 The cab windshield shall be of a two-piece replaceable design for lowered cost of repair. The windshield shall be made from 1/4" (0.25") thick curved, laminated safety glass with a 75% light transmittance automotive tint. A combined minimum viewing area of 2,700-sq. in. shall be provided. Forward visibility to the ground for the average (50th percentile) male sitting in the driver's seat shall be no more than 11 feet 7 inches from the front of the cab to ensure good visibility in congested areas. _____
- 27.15 Cab door assist handrails shall consist of four (4) 1.25" diameter x 18" long 6063-T5 anodized aluminium tubes mounted directly behind the door openings, two (2) each side of the cab. The handrails shall be machine extruded with integral ribbed surfaces to assure a good grip for personnel safety. _____

Handrails shall be installed between chrome end stanchions and shall be positioned at least 2" from the mounting surface to allow a positive grip with a gloved hand.

28.0 CAB MOUNT AND TILT SYSTEM

28.1 The cab shall be independently mounted from the body and chassis to isolate the cab structure from stresses caused by chassis twisting and body movements. Mounting points shall consist of two (2) forward-pivoting points, one (1) on each side; two (2) intermediate rubber load-bearing cushions located midway along the length of the cab, one on each side; and two (2) combination rubber shock mounts and cab latches located at the rear of the cab, one (1) on each side.

28.2 An electric-over-hydraulic cab tilt system shall be provided to provide easy access to the engine. It shall consist of two (2) large-diameter, telescoping, hydraulic lift cylinders, one (1) on each side of the cab, with a frame-mounted electric-over-hydraulic pump for cylinder actuation.

28.3 Safety flow fuses (velocity fuses) shall be provided in the hydraulic lift cylinders to prevent the raised cab from suddenly dropping in case of a burst hydraulic hose or other hydraulic failure. The safety flow fuses shall operate when the cab is in any position, not just the fully raised position.

28.4 The hydraulic pump shall have a manual override system as a backup in the event of an electrical failure. Lift controls shall be located in a compartment to the rear of the cab on the right side of the apparatus. A parking brake interlock shall be provided as a safety feature to prevent the cab from being tilted unless the parking break is set.

28.5 The entire cab shall be tilted through a 40-degree arc to allow for easy maintenance of the engine, transmission and engine components. A positive-engagement safety latch shall be provided to lock the cab in the full tilt position to provide additional safety for personnel working under the raised cab.

28.6 In the lowered position, the cab shall be locked down by two (2) automatic, spring-loaded cab latches at the rear of the cab. A "cab ajar" indicator light shall be provided on the instrument panel to warn the driver when the cab is not completely locked into the lowered position.

29.0 CAB INTERIOR

29.1 The interior of the cab shall be of the open design with an ergonomically designed driver area that provides ready access to all controls as well as a clear view of critical instrumentation.

29.2 The engine cover between the driver and the officer shall be a low-rise contoured design to provide sufficient seating and elbow room for the driver and the officer. The engine cover shall blend in smoothly with the interior dash and flooring of the cab. An all-aluminium sub fame shall be provided for the engine cover for strength. The overall height of the engine enclosure shall not exceed 23" from the floor at each side and 27" in the centre section. The engine cover shall not exceed 41" in width at its widest point.

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- 29.3 The rear portion of the engine cover shall be provided with a lift-up section to provide easy access for checking transmission fluid, power steering fluid, and engine oil without raising the cab. The engine cover insulation shall consist of ¾" dual density fibre glass composite panels with foil backing manufactured to specifically fit the engine cover without modification to eliminate "sagging" as found with foam insulation. The insulation shall meet or exceed DOT standard MVSS 302-1 and V-0 (UI subject 94 Test).
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- 29.4 Externally, the engine cover is a molded 18 lb/cu.ft (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99 and with a minimum skin thickness of 0.0625 inches and shall be provided to reduce the transmission noise and heat from the engine. There shall be molded integral arm rests provided for both the driver and the officer as well as large cup holders.
-
- 29.5 All cab floors shall be covered with a black rubber floor mat that provides an aggressive slip-resistant surface in accordance with current NFPA 1901.
-
- 29.6 A minimum of 57.25" of floor-to-ceiling height shall be provided in the front seating area of the cab and a minimum of 55.25" floor-to-ceiling height shall be provided in the rear seating area. A minimum of 40" of seated headroom shall be provided over each fender well.
-
- 29.7 The floor area in front of the front seat pedestals shall be no less than 20.5" side to side by 25.0" front to rear for the driver and no less than 20.5" side to side by 26.0" front to rear for the officer to provide adequate legroom.
-
- 29.8 Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.
-
- 29.9 All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.
-
- 29.10 The interior of the cab shall be insulated to ensure the sound (dbA) level for the cab interior is within the limits stated in the current edition of NFPA 1901. The insulation shall consist of 2 oz. wadding and ¼" (0.25") foam padding. The padding board shall be backed with ¼" (0.25") thick reflective insulation. The backing shall be spun-woven polyester. Interior cab padding shall consist of a rear cab headliner, a rear wall panel, and side panels between the front and rear cab doors.
-
- 29.11 All surfaces subject to repeated contact and wear -- the dash, overhead console, windshield posts, headliner, door panels, and door post trim -- shall be covered with thermoformed, non-metallic, non-fiber trim pieces or panels to provide excellent scuff and abrasion resistance, as well as chemical stain resistance. The thermoformed material shall comply with Federal Motor Vehicle Safety Standard (FMVSS) 302 for flammability of interior materials.
-
- 29.12 The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18" padded steering wheel with a centre horn button shall be provided.
-
- 29.13 A full-width overhead console shall be mounted to the cab ceiling for placement of siren and radio heads, and for warning light switches. The console shall be made from a thermoformed, non-metallic material and shall have easily removable mounting plates.
-

29.14 Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 20" x 12" x 3.5" high and the officer side compartment shall be approximately 20.25" x 22.75" x 11" high.

29.15 The front cab steps shall be a minimum of 8" deep x 24" wide. The first step shall be 18.0" above the ground with standard tires in the unloaded condition. The rear cab steps shall be a minimum 12" deep x 21" wide. The first step shall be 20.5" above the ground with standard tires in the unloaded condition. The rear steps shall incorporate intermediate steps for easy access to the cab. The steps are to be located inside the doorsill, where they are protected against mud, snow, ice, and weather. The step surfaces shall be aluminium diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminium diamond plate in accordance with current NFPA 1901.

29.16 A black rubber grip handle shall be provided on the interior of each front door below the door window to ensure proper hand holds while entering and exiting the cab. An additional black rubber grip handle shall be provided on the left and right side windshield post for additional handholds.

30.0 CAB DOORS

30.1 There shall be reflective signs on each cab door in compliance with all NFPA requirements.

30.2 Four (4) side-opening cab doors shall be provided. Doors shall be constructed of a 3/16" (0.188") aluminium plate outer material with an aluminium extruded inner framework to provide a structure that is as strong as the side skins.

30.3 Front cab door openings shall be approximately 36" wide x 71.5" high, and the rear cab door openings shall be approximately 33.75" wide x 73" high. The front doors shall open approximately 75 degrees, and the rear doors shall open approximately 80 degrees.

30.4 The inner door panels shall be made from a thermoformed, non-metallic, non-fibre material for increased durability and sound deadening. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.

30.5 The doors shall be securely fastened to the doorframes with full-length, stainless steel piano hinges, with 3/8" (0.375") diameter pins for proper door alignment, long life, and corrosion resistance. Mounting hardware shall be treated with corrosion-resistant material prior to installation. For effective sealing, an extruded rubber gasket shall be provided around the entire perimeter of all doors.

30.6 Stainless steel paddle-style door latches shall be provided on the interiors of the doors. The latches shall be designed and installed to protect against accidental or inadvertent opening as required by NFPA 1901. "L"-type door handles shall be provide on the exteriors of the doors.

30.7 Aluminium bright-finish tread plate scuff panels shall be provided on the lower interior portion of all doors to protect the door panels from wear. The scuff

panels shall extend from the bottom of the door to approximately 4" above the floor line on the front doors and from the bottom of the door to approximately 8.5" above the floor line on the rear doors.

- 30.8 The front door windows shall provide a minimum viewing area of 530 sq. in. each . The rear door windows shall provide a minimum viewing area of 500 sq. in. each. All windows shall have 75% light transmittance automotive safety tint. Full roll-down windows shall be provided for the front cab doors with worm gear drive cable operation for positive operation and long life. Scissors or gear-and-sector drives are not acceptable. Rear cab doors shall be provided with full roll down windows.
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31.0 INTERIOR LIGHTING

- 31.1 Interior cab lighting shall include four (4) individually switched lights in the ceiling, two (2) in the front and two (2) in the rear. Each light shall be white and be 7" in diameter.
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- 31.2 Four (4) step lights, one (1) in each of the four (4) cab doors, shall be installed to provide downward illumination of the steps and the surrounding ground.
-
- 31.3 The cab ceiling lights and the step lights shall be wired through the "door ajar" switch to provide interior lighting when the battery power is on and any cab door is opened.
-
- 31.4 An engine compartment light with a switch shall be installed to illuminate the engine compartment.
-

32.0 CAB INSTRUMENTS AND CONTROLS

- 32.1 Two (2) pantograph-style windshield wipers with two (2) separate electric motors shall be provided for positive operation. Air-operated windshield wipers are not acceptable. The wipers shall be a wet-arm type with a one (1) gallon washer fluid reservoir, an intermittent-wipe function, and an integral wash circuit. Wiper arm length shall be approximately 28", and the blade length approximately 20". Each arm shall have a 70 degree sweep for full coverage of the windshield.
-
- 32.2 An in-dash mounted heater and defroster with a minimum capacity of 42,000 BTU/hr and all necessary controls shall be mounted in the cab. The airflow system shall consist of three (3) levels, defrost, cab, and floor, and shall have fresh air and defogging capabilities.
-
- 32.3 Cab instruments and controls shall be located on the cab instrument panel in the dashboard on the driver's side where they are clearly visible and easily reachable. Gauges and emergency warning light switches shall be installed in removable panels for ease of service. The following gauges and controls shall be provided:

Speedometer/Odometer
Tachometer with integral hour meter

Engine oil pressure gauge with warning light and buzzer
Engine water temperature gauge with warning light and buzzer
Two (2) air pressure gauges with a warning light and buzzer (front air and rear air)
Fuel gauge
Voltmeter
Master battery switch/ignition switch (rocker with integral indicator)
Starter switch/engine stop switch (rocker)
Heater and defroster controls with illumination
Marker light/headlight control switch with dimmer switch
Self-canceling turn signal control with indicators
Windshield wiper switch with intermittent control and washer control
Master warning light switch
Transmission oil temperature gauge
Air filter restriction indicator
Pump shift control with green "pump in gear" and "o.k. to pump" indicator lights
Parking brake controls with red indicator light on dash
Automatic transmission shift console
Electric horn button at centre of steering wheel
Cab ajar warning light on the message centre enunciator
Door ajar warning light on the centre section of the overhead console

32.4 Instrument controls and switches shall be identified as to their function by backlit wording adjacent to each switch, or indirect panel lighting adjacent to the controls.

33.0 FAST IDLE SYSTEM

33.1 A fast idle system shall be provided and controlled by the cab-mounted or pump panel-mounted switch. The system shall increase engine idle speed to a preset RPM for increased alternator output. (The cab dash has a position for the switch by default, if the switch is to be located on the pump panel it must be annotated in "Location".)

34.0 ELECTRICAL SYSTEM

34.1 The cab and chassis system shall have a centrally located electrical distribution area. All electrical components shall be located such that standard operations shall not interfere with or disrupt vehicle operation. An automatic thermal-reset master circuit breaker compatible with the alternator size shall be provided. Automatic-reset circuit breakers shall be used for directional lights, cab heater, battery power, ignition, and other circuits. An access cover shall be provided for maintenance access to the electrical distribution area.

34.2 A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the electrical distribution area. radio suppression shall be sufficient to allow radio equipment operation without interference.

34.3 A 6 place, constantly hot, and 6 place ignition switched fuse panel and ground for customer-installed radios and chargers shall be provided at the

electrical distribution area. radio suppression shall be sufficient to allow radio equipment operation without interference.

34.4 All wiring shall be mounted in the chassis frame and protected from impact, abrasion, water, ice, and heat sources. The wiring shall be color-coded and functionally-labeled every 3" on the outer surface of the insulation for ease of identification and maintenance. The wiring harness shall conform to sae 1127 with gxl temperature properties. Any wiring connections exposed to the outside environment shall be weather-resistant. All harnesses shall be covered in a loom that is rated at 280 degrees f to protect the wiring against heat and abrasion.

34.5 A vehicle data computer (vdc) shall be supplied within the electrical system to process and distribute engine and transmission electronic control module (ecm) information to chassis system gauges, the message center, and related pump panel gauges. Communication between the vdc and chassis system gauges shall be through a 4 wire multiplexed communication system to ensure accurate engine and transmission data is provided at the cab dash and pump. The vdc shall be protected against corrosion, excessive heat, vibration, and physical damage.

34.6 Two (2) dual rectangular sealed beam halogen headlights shall be installed on the front of the cab, one (1) on each side, mounted in a polished chrome-plated bezel. The low beam headlights shall activate with the release of the parking brake to provide daytime running lights (drl) for additional vehicle conspicuity and safety. The headlight switch shall automatically override the drl for normal low beam/high beam operation.

34.7 Ground area lights shall be provided for each cab door and one (1) on each side under the front bumper area. Lights under the driver and crew area exits shall be activated automatically when the exit doors are opened. Ground area lights shall be switched from the cab dash with the work light switch.

35.0 SUNVISORS

35.1 Padded sunvisors shall be provided for the driver and officer matching the interior trim of the cab and shall be flush mounted into the underside of the overhead console.

36. SEATS

36.1 All seat cushions in the cab will manufactured by 911 Seats Incorporated and will be upholstered with FMVSS/302 flame-retardant, water repellent and wear resistant black and gray tweed, Imperial 1200 fabric.

36.2 One (1) Seats, Inc 911 air suspension seat shall be supplied for the driver's position. Features shall include:

Universal styling
High back seat back
Low profile air suspension assembly with rubber accordion cover
Weight, height and ride adjustment
Built-in back and lumbar adjustment
Built-in back and lumbar adjustment

4" fore and aft adjustment

- 36.3 One (1) Seats, Inc. 911 Universal fixed SCBA seat shall be supplied for the officer's position in front of the cab to the right of the driver's position. Features shall include:

Universal styling.
High back seat back.
Built-in back and lumbar adjustment.
Easy exit, flip up, and split headrest for improved exit with SCBA.

- 36.4 Two (2) Seats, Inc. 911 Universal SCBA seats shall be provided rear facing located in both wheel wells. Features shall include:

Universal styling.
High back seat back.
Easy exit, flip up, and split headrest for improved exit with SCBA.

- 36.5 Two (2) Seats, Inc. 911 Universal SCBA seat backs and a two (2) person bench style seat bottom with a single cushion shall be mounted on the rear wall of the cab. Each side of the seat riser shall be angled, providing sufficient legroom while entering and exiting the cab. Features shall include:

Universal styling
Easy exit, flip up, and split headrest for improved exit with SCBA.
Bench cushion shall be constructed of high-density foam with a heavy-duty wear resistant material.

- 36.5.1 All seat positions shall have a bright red retractable 3-point lap and shoulder harness, providing additional safety and security for personnel. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.
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37.0 INTERIOR COLOUR

- 37.1 Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be grey.
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38.0 SCUFF PLATES

- 38.1 A stainless steel scuff plate shall be installed at each cab door "L" handle for added paint protection.
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39.0 AIR PACK BOTTLE BRACKETS

- 39.1 A Ziamatic bottle bracket model # KD-ULLH consisting of a backplate, short footplate, two non-mar double-coated seats and a "Load & Lock" adjustable strap assembly shall be provided. The backplate and footplate will be black thermo-plastic coated. The clips will be double coated as to not mar cylinders. The bracket shall fit

all U.S. made 30 to 60 minute rated self-contained breathing apparatus.

40.0 HEATED MIRRORS

40.1 Heated rear view mirrors shall be mounted on each side of the cab. A mirror heater control shall be mounted in the dash.

41. MUDFLAPS

41.1 Black linear low density polyethylene (proprietary blend) mudflaps shall be installed on the rear of the cab front wheelwells. The design of the mudflap shall have corrugated ridges to distribute water evenly.

42.0 REAR CAB HEATER

42.1 Dual 25,000 BTU water heaters with diamond plate covers shall be supplied on the rear of the cab wall to heat the rear cab section. A single control switch shall be located on the cab instrument panel.

43.0 AIR CONDITIONING

43.1 A dual in-cab evaporator system with condenser shall be provided. It shall be a three level air control system.

43.2 There shall be five (5) adjustable multidirectional comfort air outlets, four (4) main defrost outlets, and two (2) auxiliary corner defrost outlets. The knob control panel shall actuate the air-distribution system with air cylinders, which are separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed. Airflow is to be approximately 490 cfm on high speed.

43.3 The rear evaporator shall be mounted to the headliner and have a three-speed blower switch. There shall be eight (8) adjustable multidirectional air vents with airflow approximately 325 cfm on high speed.

43.4 The front evaporator shall be mounted overhead and capable of 24,000 BTU's maximum. The rear evaporator shall also be mounted overhead and capable of 38,000 BTU's. The front heater shall produce 40,000 BTU's.

43.5 Both evaporators shall have block type expansion valves and be thermostatically protected to prevent freeze up.

43.6 There shall be two condensers roof mounted when a Cummins ISM or Detroit Series 60 engine is selected and have a maximum capacity of 32,500 BTU's each and have a fan and a built-in receiver/drier with moisture indicator.

43.7 The compressor shall be a ten-cylinder swash-plate type Seltec Model TM-31HD series with a capacity of 19.1 cu. In. per revolution. Compressor speed, dependent on engine drive pulley options, shall be approximately 1:5:1.

44.0 ALTERNATOR

- 44.1 A Niehoff model N1223 290-amp SAE (J56)-rated, 265-amp NFPA 1901-rated brushless-type alternator with rectifier shall be provided. It shall be self-limiting and shall have an adjustable, remote solid-state voltage regulator and AC taps. The alternator shall be installed in accordance with the engine manufacturer's recommendations.
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45.0 BATTERIES

- 45.1 The manufacturer shall supply four (4) WestPenn Deka Model 1131XMF heavy-duty Group 31 12-volt maintenance-free batteries. Each battery shall be installed and positioned so as to allow easy replacement of any single battery. Each battery shall be equipped with carrying handles to facilitate ease of removal and replacement. There shall be two (2) steel frame-mounted battery boxes, one on the left frame rail and one (1) on the right frame rail. Each battery box shall be secured to the frame rail with Grade 8 hardware. Each battery box shall hold (2) batteries. The batteries shall have a minimum combined rating of 4,000 (4 x 1000) cold cranking amps (CCA) @ 0 degrees Fahrenheit and 820 (4 x 205) minutes of reserve capacity for extended operation. The batteries shall have 3/8-16 threaded stud terminals to ensure tight cable connections. The battery stud terminals shall each be treated with concentrated industrial soft-seal after cable installation to promote corrosion prevention. The positive and negative battery stud terminals and the respective cables shall be clearly marked to ensure quick and mistake-proof identification.
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- 45.2 Batteries shall be placed on non-corrosive rubber matting and secured with hold-down brackets to prevent movement, vibration, and road shock. The hold-down bracket J-hooks shall be cut to fit and shall have all sharp edges removed. The batteries shall be placed in plastic trays to provide preliminary containment should there be leakage of hazardous battery fluids. There shall be two (2) plastic trays, each containing (2) batteries. Each battery tray shall be equipped with a rubber vent hose to facilitate drainage. The rubber vent hose shall be routed to drain beneath the battery box. The batteries shall be positioned in well-ventilated areas.
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46.0 FRONT TURN SIGNALS

- 46.1 There shall be a pair of Whelen 600 LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted on the front of the cab, one (1) on each side above the headlights outboard of the front lower level warning lights.
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47.0 DEFOGGER FANS

- 47.1 Two (2) adjustable windshield defogger fans with individual switches shall be mounted in the cab centered below the overhead console. The fans shall be 12 volt and shall each be rated at 250 CFM.
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48.0 FORWARD AERIAL SUPPORT

- 48.1 The aerial ladder support shall be fabricated from A36 steel. It shall be located

behind the rear wall of the cab and shall be bolted to the frame rails.

49.0 ALUMINIUM WHEELS

49.1 The vehicle shall have (8) polished (on outer wheel surfaces only) aluminium disc wheels. They shall be forged from one-piece corrosion resistant aluminium alloy. Wheels are for use with 11R22.5 or 12R22.5 tires on the rear axle.

49.2 The vehicle shall have (2) polished (on outer wheel surfaces only) aluminium disc wheels. They shall be forged from one piece corrosion resistant aluminium alloy. Wheels are for use with 425/65R22.5 tires or 385/65R22.5 tires on the front axle only.

50.0 DRAWINGS

50.1 A general arrangement drawings depicting the vehicle's appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

50.2 Vehicles requiring pump controls shall include a general arrangement view of the pump operator's position, scaled the same as the elevation views.

51.0 FRONT BUMPER COMPARTMENT

51.1 A compartment 14" long x 8" wide x 8" deep constructed of 1/8" aluminium plate shall be recessed into the front bumper extension. The compartment lid shall be fastened with a ¼ turn knob.

52.0 FRONT TOW HOOKS

52.1 Two (2) heavy-duty painted front tow hooks shall be securely bolted to the front chassis frame rail extensions to allow towing (not lifting) of the apparatus without damage. They shall be mounted in the downward position.

53.0 AIR HORNS

53.1 Dual air horns shall be provided, connected to the chassis air system. The horns shall be mounted through the front bumper. The front bumper shall have two (2) holes punched to accommodate the horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

53.2 There shall be a "Y" style lanyard mounted in the centre of the cab that allows the driver and officer to operate the air horns. The lanyard shall activate an electrical air switch.

54.0 REAR MUD FLAPS

54.1 Black linear low density polyethylene (proprietary blend) mud flaps shall be installed on the rear body wheelwells. A reflective logo shall be adhered to the flap itself. The design of the mud flap shall have corrugated ridges to distribute water evenly.

55.0 REAR TOW EYES

55.1 Two (2) heavy-duty tow eyes made of ¾" (0.75") thick steel having 2.5" diameter holes shall be bolted directly to the rear of the frame to allow towing (not lifting)

of the apparatus without damage. The tow eyes shall be protruding into the rear compartment or out the rear of the body. The tow eyes shall be painted chassis black.

56.0 BATTERY CHARGER

56.1 A 20-amp battery charging system shall be installed and connected directly to the shoreline to ensure the batteries remain fully charged while the vehicle is in the fire station or firehouse. The system shall provide a visual signal if battery voltage drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status. Equalization charge shall only occur when necessary, not with every cycle. The system shall fully charge the batteries while allowing up to 8 amps of additional load for onboard systems. The shoreline connection and remote charge indicator panel shall be located outside of the cab at the driver door area.

57.0 AERIAL EQUIPMENT BODY

57.1 The aerial body shall be designed to permit the reloading of fire hose without raising the aerial from the stored position.

57.2 The apparatus body shall be constructed entirely of aluminium extrusions with interlocking aluminium plates.

57.3 The apparatus shall incorporate a rescue style body design to maximize compartment space. The rescue style left and right side body shall combine upper and lower compartments to provide more efficient use of body storage capacity.

57.4 The entire vehicle shall be constructed of aluminium extrusions. Body designs that incorporate steel sub-frames connected to aluminium compartments are not acceptable.

58.0 BODY MAINFRAME

58.1 The body mainframe shall be entirely constructed of aluminium. The complete framework shall be constructed of 6061T6 and 6063T5 aluminium alloy extrusions welded together using 5356 aluminium alloy welding wire.

58.2 The mainframe shall incorporate a series of vertical frame components connected in series. Each vertical frame assembly shall be constructed with 3" x 3" extrusions welded together in a square frame configuration. The open centre shall permit the installation of a tunnel for ground ladder storage. The mainframe shall be held together from front to rear by two (2) solid ½ " x 3" aluminium braces on each side of the vertical frame components. The braces shall also serve as the connection point between the torque box and body frame. The body side compartments shall be connected and supported by the extruded aluminium mainframe assembly.

59.0 BODY SIDE ASSEMBLIES

59.1 The left and right side body assemblies shall be framed with 6063T5 1 ½" x 4" 3/16" wall extrusions. The left side body compartments shall be framed to make full height compartments ahead and behind the wheel well opening. The body side assemblies shall be designed so that the compartment walls are not

required to support the body. The compartments shall be interlocked and welded to the side assembly extrusions.

- 59.2 The top of the body side assemblies shall be supplied with embossed diamond plate covers with polished corners to minimize maintenance and provide service access to electrical components.
-

60.0 WHEEL WELL OPENING

- 60.1 The wheel well frame, constructed from 1-1/2" x 4" 6063T5 aluminium extrusions shall be slotted the full length to permit an internal fit of 1/8" aluminium tread plate above the tandem wheel well openings.
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- 60.2 The wheel well liners shall be a high strength composite material with a black finish. The liners shall be bolted in for easy service and repair.
-

61.0 STABILIZER OPENINGS

- 61.1 The body shall be designed to accommodate a four (4) stabilizer aerial system. One (1) opening shall be supplied behind the rear axle as close to the wheel well opening as possible to maximize rear angle of departure and to prevent the stabilizer pads from contacting the ground during driving. The second set shall be mounted just behind the pump compartment. The openings shall be framed in aluminium extrusions. A stabilizer cover made from tread plate shall be supplied on the extendable stabilizer. The cover shall provide mounting location for a red stabilizer warning light as outlined in NFPA 1901 20.21.4.4.
-

- 61.2 The stabilizer openings shall be supplied with clear lights to illuminate the stabilizers and the ground surrounding the openings. The lights shall illuminate when any stabilizer is moved from the stored position.
-

62.0 BODY MOUNTING SYSTEM

- 62.1 The body shall attach to the integral torquebox with grade 8 bolts connected through steel mounts welded on the side of the torque box. To isolate dissimilar metals a ¼" fibre-reinforced rubber dielectric barrier between the aluminium body and steel torque box shall be supplied. Body designs that weld to the aerial torque box or chassis frame rails shall not be acceptable due to the stress imposed on the vehicle during road travel and aerial operations.
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63.0 REAR BODY DESIGN

- 63.1 The rear body shall be designed to provide ground ladder storage, hose deployment, and service access to aerial components. The centre rear of the body shall be open for ground ladder storage. The area below the ground ladder storage shall be for a waterway inlet, the stabilizer control panel and have access doors to hydraulic components.
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- 63.2 The aerial master control panel that is located on the rear of the body shall consist of a master switch, interlock light, and indicators that illuminate when each stabilizer is deployed. The stabilizer controls shall be divided into two (2) boxes located one (1) each side on the rear body so the operator may observe the stabilizers being deployed on each side of the apparatus as outlined in NFPA 1901.
-

64.0 SIDE AERIAL ACCESS STAIRCASE

64.1 A single access staircase shall be supplied on the driver's side of the apparatus to the aerial turntable. The staircase shall incorporate a pocket-style drop-down step in the body rub rail to reduce ground to staircase step height when the unit is up on jacks. The angled staircase shall be supplied with extruded aluminium handrails on both sides of the staircase frame.

65.0 WATER TANK MOUNTING SYSTEM

65.1 The body design shall allow the booster tank to be completely removable without disturbing or dismounting the apparatus body structure. The water tank shall rest on top of a 3" x 3" frame assembly covered with rubber shock pads and corner braces formed from 3/16" angled plate to support the tank.

65.2 The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain low vehicle centre of gravity, the water tank bottom shall be mounted within 5" of the frame rail top. Designs that store ground ladders under the water tank and raise centre of gravity shall not be acceptable.

66.0 COMPARTMENTS

66.1 All body compartment walls and ceilings shall be constructed from 1/8" formed aluminium 3003 H14 alloy plate. Each compartment shall be modular in design and shall not be part of the body support structure.

66.2 Compartment floors shall be constructed of 1/8" aluminium diamond plate welded in place. Compartment floors that are over 15" deep shall be supported by a minimum 1.5" x 3" x 1/8" walled aluminium extrusions. The compartment seams shall be sealed using a permanent pliable silicone caulk. A series of louvers shall be supplied to facilitate ventilation of each compartment. Each louver shall be 3" wide by 3/4" tall and 1/2" deep.

67.0 HANDRAILS

67.1 Access handrails shall be provided at all step positions, including, but not limited to, the rear corner tailboard and installed to NFPA 1901 15.8. All body handrails shall be constructed of maintenance-free, corrosion-resistant, extruded aluminium. Handrails shall be a minimum of 1.25" OD and shall be installed between chrome end stanchions at least 2" from the mounting surface to allow for access with a gloved hand. The extruded aluminium shall be ribbed to assure a good grip for personnel safety.

67.2 The handrails shall be installed as follows:

Two (2) 48" handrails, one (1) each side, located on the aerial access stair case.

68.0 STEPS, STANDING AND WALKING SURFACES

68.1 The maximum stepping distance shall not exceed 18", with the exception of the

ground to first step. The ground to first step shall not exceed 24". The ground to first step shall be maintained when the stabilizers are deployed by an auxiliary set of steps installed at the aerial access staircase. All steps or ladders shall sustain a minimum static load of 500 lbs. without deformation as outlined in NFPA 15.7.2.

69.0 APPARATUS WARNING LABELS

69.1 A label shall be supplied on the rear body to warn personnel that riding in or on the rear step is prohibited as outlined in NFPA 1901 15.7.4. A label shall be applied to both sides of the apparatus and the rear to warn operators that the aerial is not insulated.

70.0 RUB RAIL

70.1 The body shall have a rub rail along the length of the body on each side and at the rear. The rub rail shall be constructed of minimum 3/16" thick anodized aluminium 6463T6 extrusion. The rub rail shall be a minimum of 2.75" high x 1.25" deep and shall extend beyond the body width to protect compartment doors and the body side.

70.2 The rub rail shall be of a C-channel design to allow marker and warning lights to be recessed inside for protection. The top surface of the rub rail shall have a minimum of five (5) serrations raised .1" high with cross grooves to provide a slip-resistant edge for the rear step and running boards. The rub rail shall be spaced away from the body using 3/16" nylon spacers. The ends of each section shall be provided with a rounded corner piece. The area inside the rub rail C-channel shall be inset with a white reflective material for increased side and rear visibility.

71.0 AERIAL SPECIFICATIONS

71.1 The apparatus shall be designed and built to operate on a continuous duty basis in the climatic conditions common to the City of Winnipeg. The City of Winnipeg has four seasons with ambient temperatures ranging from approximately 95 F (35 C) to -40 F (-40 C), with an average annual snow fall of approximately 42 inches. The apparatus when not in use will be stored in a heated building.

72.0 100 FT AERIAL DEVICE

72.1 A 100' telescopic aerial ladder of the open truss design shall be installed at the rear of the vehicle with the aerial pointed forward when it is in the travel position. The aerial ladder shall meet or exceed the requirements of the current edition of NFPA 1901, (2003 edition) Sections 20.2 through 20.6 and Sections 20.17 through 20.25.

72.2 The aerial ladder shall consist of four (4) telescopic ladder sections capable of operating in conditions described in section 5.1 above at any ladder extension to give a full range of movement. The aerial ladder shall be designed to provide continuous egress for firefighters

- and civilians from an elevated position to the turntable. _____
- 72.3 The aerial ladder shall have a rated vertical height of 100' at full extension and elevation. The measurement of the height shall be consistent with NFPA 1901 section 20.2.2. _____
- 72.4 The aerial ladder shall have a rated horizontal reach of 91.5'. The measurement of the horizontal reach shall be consistent with NFPA 1901 20.2.3. 5.1.5 _____
- 72.5 The ladder shall be able to provide full operating capacities in up to 35 mph wind conditions. _____
- 72.6 To ensure a high strength-to-weight ratio and an inherent corrosion resistance, the aerial ladder shall be completely constructed of high-strength aluminium. **NO EXCEPTIONS.** _____
- 72.6.1 All side rails, rungs, handrails, uprights, and K-braces shall be made of structural 6061-T6 alloy aluminium extrusions. All material shall be tested and certified by the material supplier. All ladder sections shall be semi-automatically welded by inert gas shielded arc welding methods using 5356 aluminium alloy welding wire. Structural rivets or bolts shall not be utilized in the ladder weldment sections. _____
- 72.6.2 Due to the unpredictable nature of fireground operations, a minimum safety factor of 2.5 to 1 is required. This structural safety factor shall apply to all structural aerial components including turntable and torque box stabilizer components. Definition of the structural safety factor shall be as outlined in NFPA 1901 A.20.20.1 **NO EXCEPTIONS.** _____
- 72.6.3 The stability factor, or tip-over safety margin, shall be a minimum of 1.5 to 1 as defined by NFPA 1901 20.21. _____
- 72.6.4 An independent engineering firm shall verify the aerial safety factor. Design verification shall include computer modeling and analysis, and extensive strain gauge testing performed by an independent registered professional engineer. _____
- 72.6.5 Verification shall include written certification from the independent engineering firm made available within 48 hours by the bidder upon request from the Contract Administrator. **NO EXCEPTIONS.** _____
- 72.6.6 All welding of aerial components, including the aerial ladder sections, turntable, torque box and outriggers shall be performed by welders who are certified to American Welding Society Standards D1.1, D1.2 and D1.3 as outlined in NFPA 1901 20.22.3.1. _____
- 68.7.1 72.6.7 The weldment assemblies of each production unit shall be tested visually and mechanically by an ASNT certified level II non-destructive test technician to comply with NFPA 1901 20.22.2. Testing procedures shall conform to the American Welding Society Standard B1.10 Guide for non-destructive testing. Test methods may include dye penetrate, ultrasound, and magnetic particle where applicable. _____

72.6.8 Each ladder section shall consist of two (2) heavy extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals, and two (2) full-length handrails. The rungs on all sections shall be K-braced for maximum lateral stability. This K-bracing shall extend to the center of each rung to minimize ladder side deflection.

72.6.9 The ladder rungs shall be designed to eliminate the need for rubber rung covers. The rungs shall be spaced on 14-inch centers and have integral skid-resistant surfaces as outlined in NFPA 1901 20.2.5 through 20.5.2.3. An oval-shaped rung shall be utilized to provide a larger step surface at low angles and more comfortable grip at elevated positions. The minimum design load shall be 500 pounds per rung distributed over a 3 ½ " (3.5")-wide area as outlined in NFPA 1901 20.2.5.4. **NO EXCEPTIONS.**

72.6.10 The aerial ladder shall comply with NFPA 1901 sections 20.2.6 and governing the minimum ladder section width and handrail height.

72.6.11 The ladder shall have the following minimum dimensions.

Base Section	41.5" wide x 32" high
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Second Section	34.25" wide x 28.13" high
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Third Section	28" wide x 24.75" high
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Fly Section	22.75" wide x 21.94" high
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72.6.12 Both power extension and retraction shall be furnished and meet the requirements of NFPA 1901 section 20.19, 20.20.3, and 20.5.3. Extension shall be by way of two (2) extending cylinders mounted on the side of the base section of the ladder.

72.6.13 The cylinders shall operate through a block-and-tackle cable arrangement to extend and retract the ladder. Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders. The normal operating safety factor shall be 5 to 1, and the stall safety factor shall be 2 to 1 based on the breaking strength of the cables. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used shall be 1 to 12

72.6.14 The ladder assembly shall consist of four (4) separate weldments that shall extend and retract within each other. Nylatron NSM slide pads shall be between each section to minimize friction. Six (6) interlocking load stations shall be utilized -- two (2) at the upper end of the base the 2nd section, and the 3rd section. The interlocking load transfer shall handle load transfer between the ladder sections and encapsulate the slide pads.

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- 72.7 Reflective tape stripes shall be installed on the ladder top handrail of the section to indicate extension in 5-foot increments. Numeric indicators placed at 10-foot intervals. A reflective dot on the base of the 2nd shall provide a visual reference for the operator to estimate aerial elevation. _____
- 72.8 The aerial shall complete the NFPA 1901 20.2.12 time test in 120 seconds. This test involves raising the aerial from the bedded position to full elevation and extension and rotating it 90 degrees to the side. This test is to begin with the stabilizers deployed. _____
- 72.9 The aerial ladder shall have a rated tip capacity of 500 lbs. when the ladder is unsupported at full extension and 0 degrees elevation as defined by the current edition of NFPA 1901. This capacity may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated tip capacity. The rated tip capacity shall be in addition to an allowance of 50 lbs. for equipment mounted at the tip of the ladder. _____
- 72.10 A sign mounted at the base of the aerial ladder shall communicate the aerial ladder capacity ratings for the following configurations when the ladder is in the unsupported, fully extended configuration while maintaining a 2.5 to 1 safety margin. These capacities may take the form of firefighters wearing personal protective gear, people being rescued, equipment, or any combination of loads not to exceed the rated capacities. For purposes of this sign, it shall be assumed that each person weighs 250 lbs. In no case shall the actual combined weights of personnel, equipment, and other loads exceed the rated capacities. The loads for each configuration are in addition to an allowance of 50 lbs. for equipment mounted at the tip of the ladder. _____

Condition #1 - Tip load only, no water flowing

-6 to +39 degrees elevation / 2 people / 500 lbs. NFPA rated capacity

+40 to +76 degrees / 3 people / 750 lbs. NFPA rated capacity

Condition #2 - Distributed loads, no water flowing. (These include two people at the tip)

-6 to +20 degrees elevation / 3 people / 750 lbs. NFPA rated capacity

+21 to +35 degrees / 4 people / 1000 lbs. NFPA rated capacity

+36 to +60 degrees / 6 people / 1500 lbs. NFPA rated capacity

+61 to +76 degrees / 10 people / 2500 lbs. NFPA rated capacity

Condition #3 - Ladder tip load while flowing 1000 GPM with pre-piped waterway

-6 to +76 / 2 people / 500 lbs. NFPA rated capacity

- 72.11 Two (2) folding steps shall be located near the ladder tip to provide a position for a firefighter using the ladder pipe/monitor as outlined in NFPA 1901 20.2.9. The steps shall have a raised surface for traction and cut outs for deployment. _____

73. HYDRAULIC SYSTEM

- 73.1 Hydraulic power for all aerial ladder operations shall be supplied by the positive displacement power steering pump mounted on the vehicle engine to provide consistent pressure and rapid response. The pump shall operate both the vehicle power steering system and the aerial ladder hydraulic

- system. It shall draw hydraulic fluid from a single reservoir, ensuring that the hydraulic fluid is circulated and warmed while the vehicle is responding to an incident, thus protecting the aerial ladder hydraulic system from extreme cold. The pump shall be able to supply thirteen (13) GPM of hydraulic fluid at a maximum pressure of 3,000 PSI. The hydraulic system shall normally operate between 1,000 and 2,500 PSI. It shall have flow controls to protect hydraulic components and it shall incorporate a relief valve set at 2,800 PSI to prevent over-pressurization.
-
- 73.2 The hydraulic fluid reservoir shall consist of a 60 gallon reservoir mounted to the torque box and plumbed to the suction side of the hydraulic pump. The tank shall be supplied with a removable top to allow access to the tank strainer filter. There shall be ports for a return line and a tank drain on the reservoir. The reservoir fill cap shall be marked "Hydraulic Oil Only" according to NFPA 1901 20.19.5.2. Gated valves under the tank shall facilitate filter changes. The hydraulic fluid reservoir shall have sufficient volume and be mounted in such a manner to minimize heat build up and meet the performance requirement in the current edition of NFPA 1901 20.19.6 and 20.19.7.
-
- 73.3 An interlock device shall be provided to prevent activation of the aerial ladder hydraulic pump until either the transmission is placed in neutral and the parking brake is set, or the transmission is placed in drive and the rear driveline is disengaged as outlined in NFPA 20.17.3.
-
- 73.4 All hydraulic components with non-sealing moving parts, whose failure could result in the movement of the aerial, shall have a minimum burst strength of four (4) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901 20.19.1.
-
- 73.5 All hydraulic components with dynamic sealing parts, whose failure could result in the movement of the aerial, shall not begin to extrude or otherwise fail at pressures at or below two (2) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901 20.19.1.1.
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- 73.6 All hydraulic hoses and fittings shall have a minimum burst strength of at least three (3) times the maximum operating pressure to which the component is subjected in order to comply with the current edition of NFPA 1901 20.19.2.
-
- 73.7 All hydraulic tubing shall be made of stainless steel whenever possible. It shall have a minimum burst strength of four(4) times the maximum operating pressure to which it is subjected in order to exceed the requirements of the current edition of NFPA 1901.
-
- 73.8 A hydraulic oil pressure gauge and an aerial hour meter shall be supplied at the aerial ladder control station as required by the current edition of NFPA 1901 20.19.4 and 20.19.7.
-
- 73.9 A hydraulic oil level gauge shall be supplied at the pump panel for easy fluid level verification. The three-light system shall indicate full oil level with a green light, acceptable oil level with yellow light, and low oil level with a red light.
-

73.10 The aerial hydraulic system shall be designed in such a manner that a hydraulic pump failure or line rupture shall not allow the aerial or outriggers to lose position. Hydraulic holding valves shall be mounted directly on cylinders. To ensure reliable performance of holding valves, no hoses shall be permitted between a holding valve and cylinder.

73.11 The hydraulic system shall be designed with an auxiliary power unit meeting the guidelines of NFPA 1901 20.18.7. The auxiliary power unit shall be a 12-volt pump connected to the chassis electrical system. The pump shall provide operation at reduced speeds to store the aerial device and outriggers for road transportation. Self-centering switches shall be provided at the turntable and each stabilizer control station to activate the system. The system shall be designed to provide a minimum of 5 minutes of hydraulic power to operate functions.

73.12 The hydraulic system shall use 5W-20 multi-weight, SAE 32 grade oil and incorporate the following filters to remove contaminant and provide dependable service:

Reservoir Breather	10 micron
Magnetic Reservoir Strainer	125 mesh
Pressure Filter (Torque Box)	3 micron
Return Filter	10 micron

74. TORQUE BOX

74.1 The aerial shall utilize an integral torque box design. The integral torque box design shall serve to carry the chassis, body and aerial device as an integrated system. The system design shall provide a lower center of gravity to enhance road performance, a mounting location for underslung stabilizers, and additional space for body compartments. The strength of the torque box shall be a minimum 14.1 million inch-pounds resistance to bending moment (RBM). The stabilizers and turntable supports shall be welded directly to the torque box.

75. OUTRIGGERS

75.1 The unit shall be equipped with two (2) sets of extendable criss-cross, underslung stabilizers.

75.2 The stabilizers shall have a maximum spread of 12' centerline to centerline stabilizer pads when fully extended. **NO EXCEPTIONS**

75.3 One (1) set of stabilizers shall be mounted in the forward body area and a set close to the rear axle to minimize impact on departure angle. stabilizers shall have an inner and outer tube that slide on a low-friction deployment.

75.4 The stabilizers shall have a tip-over safety margin of 1-1/2 times the rated imposed by the aerial in any position the aerial device can be placed outlined in NFPA 1901 20.21.2. The apparatus stabilization shall be accomplished without the assistance of the chassis suspension or tires in with the ground.

75.5 The aerial shall be able to sustain a 1-1/3 to 1 rated load on a 5 degree slope

downward in the position most likely to cause overturning as outlined in 1901 20.21.3. The maximum ground slope the apparatus can be set 12 percent. On the 12 percent slope, the apparatus can be leveled 6 percent operating range for the apparatus.

75.6 The cylinders shall be supplied with dual pilot-operated check valves on each stabilizer cylinder to hold the cylinder in the retracted (stowed) or extended (working) position should a charged line be severed at any point in the hydraulic system. The stabilizers shall level side-to-side, corner-to-corner, and front-to-rear on uneven terrain. Stabilizers shall contain safety lock valves. This assures there will be no "leak down" of stabilizer legs. Mechanical pins are not required. This feature contributes to efficient set-up and field operation.

75.7 Each stabilizer that can be extended from the body shall be supplied with a red warning light as outlined in NFPA 20.21.4.4. A stabilizer extended warning light shall be supplied in the cab to warn the driver of an extended stabilizer condition as outlined in NFPA 1901 13.11. A floodlight shall be supplied in each stabilizer location to illuminate the stabilizer and ground. The light shall automatically turn on with the deployment of the stabilizer.

75.8 The stabilizer ground contact area for each foot pad shall be 10" x 14" without auxiliary pads and 24" x 24" with auxiliary pads deployed. The ground pressure shall not exceed 75 PSI with auxiliary pads deployed when the apparatus is fully pads deployed. loaded and the aerial device is carrying its rated capacity in every position. This shall be accomplished with the stabilizer pads deployed, as outlined in NFPA 20.21.4.2.

76.0 OUTRIGGER CONTROLS

76.1 Four (4) electric solenoid valves shall control the stabilizers. The control switches shall be located at the rear of the apparatus so the operator may observe the stabilizers during deployment. An audible alarm with a minimum 87 dbA shall also sound while the stabilizers are in motion as required by NFPA 20.21.4.1. Stabilizer deployment shall be completed in less than 60 seconds.

76.2 There shall be an interlock that prevents the operation of the ladder until the stabilizers are down and properly set as outlined in NFPA 20.17.5. Four (4) micro-switches, one (1) on each jackleg, shall sense when all four (4) jack feet are in firm contact with the ground. This condition shall be indicated when all four (4) yellow "jacks down" indicator lights are on and the green "interlock" light is on. When the apparatus has been leveled, a manual transfer switch shall be used to shift hydraulic power to ladder operations. The interlock system shall have a manual override with access through a door on the rear control panel.

76.3 To simplify leveling the apparatus, two (2) color-coded level indicators supplied at the rear of the apparatus. One (1) indicator shall be for rear level and one (1) for side-to-side level.

77.0 TURNTABLE SUPPORT ASSEMBLY

77.1 The aerial ladder turntable assembly shall be mounted at the rear of the apparatus. The turntable support assembly shall be welded to the integral box for efficient transfer of aerial loads to the stabilizers and shall storage of ground ladders in the center rear of the apparatus. complete turntable support assembly shall be multi-pass welded to sides of the combination chassis frame torque box.

77.2 A bearing mounting plate shall be welded to the top of the verticals and sides of the horizontals. The bearing mounting plate shall be 54" x 54" and shall have a 1-1/2" (1.5") thickness. This bearing mounting plate shall be bulkheaded to a 3/4" (0.75") steel plate that is welded to the bottoms of the horizontal tubing. The use of multi-pass welding shall be utilized wherever possible.

78.0 UPPER TURNTABLE ASSEMBLY

78.1 The upper turntable assembly shall attach to the rotation bearing and the base of the ladder.

78.2 The turntable platform shall be a one-piece flanged steel plate that is a minimum of 96" in diameter and 3/8" (0.38") thick. The working platform shall be covered with a non-skid material for operator safety.

78.3 Two (2) railings 42" high shall be provided along the outside of the turntable disc as outlined in NFPA 1901 20.18.1. There shall be a control pedestal on the left side of the turntable.

78.4 Two (2) padded Fire Research brand ManSaver safety bars shall be mounted to the turntable handrails. The bars shall lift up and inward (towards the ladder) permitting easy entrance to the ladder and control console.

78.5 The turntable assembly shall provide a mounting base for the ladder and elevating cylinders. The turntable assembly shall be bolted to the turntable bearing by twenty-two (22) 1" grade 8 plated bolts.

79.0 ELEVATION MECHANISM

79.1 The aerial shall utilize dual 6" diameter elevating cylinders with 35" stroke shall attach to the upper turntable assembly and the base section of the by 2-1/4" (2.25") ID spherical bearings. The elevation system shall designed following NFPA 1901 20.5.1. The elevation hydraulic cylinders incorporate cushions on the upper limit of travel. The hydraulic elevation cylinders shall also serve as a locking device to hold the aerial in stored position for road travel.

80.0 ROTATION MECHANISM

80.1 The aerial shall be supplied with a hydraulically-powered rotation system as in NFPA 1901 20.5.2. The hydraulic rotation motor shall provide continuous rotation under all rated conditions and be supplied with a applied brake to prevent unintentional rotation. The high torque rotation drive shall operate through a dual reduction planetary gearbox that drives a gear mated with the ring gear on the rotation bearing. The rotation gearbox shall be rated at 120,000 in. lbs.

81.0 HYDRAULIC, ELECTRIC AND WATER SWIVEL

81.1 A hydraulic swivel shall be installed to provide hydraulic fluid transfer to the ladder cylinders, electrical power to the aerial ladder, and water delivery to the pre-plumbed waterway while permitting continuous 360-degree rotation. swivel shall provide two (2) hydraulic circuits, twenty four (24) electrical and one (1) 4" passage for water flow. The swivel shall be environmentally-sealed to prevent contamination of the hydraulic fluid.

82.0 TURNTABLE CONTROL STATION

82.1 An aerial ladder operator's position shall be supplied as outlined in NFPA 20.4. The operator's position shall be located on the left side of the turntable. The apparatus shall be supplied with labels to warn of electrocution hazard. The control console shall provide a service access the front and side of the console to access hydraulic and electrical connections. The electrical panel shall be contained in junction box with wires. The console shall be angled, labeled, and supplied with lights night operation.

82.2 A diamond plate contoured hinged cover shall be supplied to protect the console the elements. The cover shall latch in the stored position and swing from the console so as not to interfere with sight of the aerial device.

82.3 The control levers shall be arranged as outlined in NFPA 20.17.7. The first from the left shall be the extension control (forward for extend and back for retract).

The second lever shall be for rotation (forward for clockwise and counter clockwise). The third handle shall control elevation (forward down and back for up). The aerial shall employ direct hydraulic controls precise control and dependable service with minimal electrical functions. around the control console shall be provided to prevent unintentional movement as outlined in NFPA 20.17.6.2.

82.4 A light on the control console shall indicate when the ladder rungs are for climbing.

83.0 AERIAL ALIGNMENT INDICATOR

83.1 A reflective arrow mounted to the body and the turntable shall indicate when aerial is aligned for travel bed.

84.0 LOAD INDICATION SYSTEM

84.1 A lighted elevation/safe load indicator diagram shall be located on the lower of the base section to indicate safe load capacity at any angle of elevation. The safe load indicator shall be 15" x 15" in size and clearly communicate aerial capacity in any one of the following conditions: tipload, with water flowing, and distributed load at full extension. The chart identify capacity using graphic characters to indicate each 250 lb. increment. The chart shall be equipped with lighting and warn of electrocution from power lines and lightning.

85.0 AERIAL WATERWAY

85.1 A 1000 GPM pre-piped waterway shall be supplied as outlined in NFPA 1901 The waterway shall telescope to the end of the fourth section. A waterway of 4" internal diameter shall run through the turntable and a swivel joint to to the tubular aerial waterway. The tubular waterway shall run under aerial ladder. The waterway tubes shall have the following sizes:

Base Section	5" OD
2 nd Section	4.5" OD
3 rd Section	4" OD
Fly Section	3.5" OD

85.2 The tubes shall be constructed of 6063-T6 hard coat anodized aluminum tube 1/8" (0.125") walls and shall be telescopic with the aerial ladder through slip joints. The slip joints shall be designed with grease zerk fittings to facilitate lubrication.

85.3 A 1-1/2" drain valve shall be installed and operated from the rear of the apparatus.

85.4 The water system shall be capable of flowing 1,000 GPM at 100 PSI nozzle pressure at full elevation and extension. The friction loss between the tip and the swivel shall not exceed 100 PSI while flowing 1000 GPM as in NFPA 1901 20.6.1 and 20.6.1.1.

85.5 An automatic relief valve preset at 250 PSI shall be installed in the aerial waterway to prevent over-pressurization of waterway system. The relief shall be mounted in the lower portion of the waterway where it enters aerial torque box frame and dump under the apparatus.

85.6 The aerial ladder shall be equipped with an Akron style 3578 Stream Master electrically controlled monitor. The monitor shall be made from Akron's unique lightweight Pyrolite construction to minimize ladder tip loads. The monitor equipped with an Akron style 5177 Akromatic electrically controlled automatic nozzle capable of discharging 250-1,000 gpm at 80 PSI nozzle pressure. This water flow capability shall be available at any extension, elevation, or position without any restrictions while flowing 1,000 gpm. A

minimum stability factor of 1.5 to 1 shall be maintained in this configuration.

85.7 The monitor shall have fully enclosed motors and gears with built in manual override capability and quick-attach handles.

85.8 A battery, which continuously charges from the vehicle power system shall power for monitor movement.

85.9 Control switches for horizontal movement, vertical movement and pattern selection shall be located at the control panel.

86.0 MONITOR TIP CONTROLS

86.1 In addition to the controls at the operator console, electric monitor directional stream controls shall be installed in close proximity to the monitor on the to allow operation by a firefighter on the ladder.

87.0 ELECTRIC MONITOR TRAVEL RANGE

87.1 The operational range of the electric monitor and nozzle shall be 135 degrees the vertical plane (90 degrees upwards from a line perpendicular to aerial ladder and 45 degrees downward), and 180 degrees through the horizontal plane (90 degrees to either side of the aerial ladder center line). monitor shall be able to move in the horizontal and vertical axis simultaneously.

88.0 WATERWAY PRESSURE GAUGE

88.1 One (1) weatherproof 3-1/2" compound vacuum pressure gauge with a range 600 shall be installed adjacent to the waterway inlet. The function of gauge is to advise the aerial operator of the pressure within the waterway. gauge shall be filled with a liquid solution.

89.0 REAR 4" AERIAL WATERWAY INLET

89.1 One (1) 4" inlet shall be provided at the rear of the apparatus and shall be connected to the vertical pedestal waterway piping to supply water to the waterway from an outside source. All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel piping to help corrosion. A 4" NST chrome-plated male adapter with a long-handle chrome-plated 4" NST cap shall be installed on the inlet.

90.0 FLOWMINDER

90.1 The aerial shall be equipped with one (1) Class 1 brand Flowminder for the waterway to digitally display the actual volume of water being discharged in gallons per minute and the total volume of water that has flowed through waterway. The readout shall be mounted at the turntable control station.

90.2 The Flowminder shall consist of:

i) Weatherproof digital flow display with super-bright digits at least (0.5") high. The display shall read actual flow and shall switch flow when the totalizer button is depressed and held.

ii) Flow transmitter mounted in the aerial waterway pipe above the
The transmitter shall consist of a weather-resistant black-anodized housing with brass wetted parts with a double paddle wheel.

iii) Connecting cables to connect the digital display to the flow transmitter and apparatus power.

iv) Machined mounting hardware to hold the transmitter in position in the discharge line.

90.2.1 The Flowmeter shall be checked and calibrated prior to delivery of the apparatus.

91.0 FILTER ISOLATION SYSTEM

91.1 Three (3) valves shall be provided to minimize fluid loss when changing the hydraulic filter elements during routine maintenance. One (1) 1" ball shall be installed at the inlet side of the return filter. Two (2) 3/4" check shall be installed on the pressure filter, one (1) on the inlet side and on the outlet side.

92.0 LADDER SECTION LIGHTS

92.1 A lighting system to illuminate the climbing area inside each ladder section provided. The lights shall be located above ladder rung level and toward the centerline of the ladder to reduce glare. A minimum of 12 volt lights per section, with polished guards shall be wired and attached so as not to be an obstruction during climbing. The lights shall be controlled with the ladder lights switch at the operators control console.

93 LADDER BASE LIGHTING

93.1 Two (2) Unity model AG-S-H floodlights shall be mounted at the bottom of the base section, one on each side. They shall be controlled from the turntable-operating pedestal.

94.0 QUARTZ LIGHT

94.1 A Kwik-Raze model 36 Magnafire quartz light head with 750-watt 120-volt bulb rated at 19,200 Lumens mounted on a Kwik-Raze model 600 permanent mount non-telescoping base shall be installed at the tip of the device and hardwired to the aerial tip. The light shall be fitted with a resistant switch to control the light when the aerial power circuit activated.

95.0 AERIAL TIP RECEPTACLE

95.1 A 110-volt Twist Lock 15 or 20 amp receptacle outlet shall be installed at the aerial device and wired into an apparatus breaker box with a 30-amp breaker. The breaker shall be fitted with a GFI protection feature. The receptacle box shall be fitted with a weather resistant cover.

96.0 TWO-WAY INTERCOM

96.1 A two way Atkinson Dynamics (Federal Signal) intercom system shall be installed to provide communications between the turntable control station aerial tip. The system shall consist of a 12 volt transistorized amplifier and two (2) waterproof speaker / microphones.

96.2 In addition to the combination speaker / microphone, the turntable shall a volume control and a push to talk button. The speaker / microphone at the tip shall be hands free operation.

97.0 REAR LADDER STORAGE

97.1 A ladder storage tunnel shall be provided beneath the aerial device frame work. ladder tunnel shall have a minimum storage capacity for the 115 feet of ladders as per NFPA 1901, with access to the ladders via an opening at the rear.

97.2 This tunnel shall be lined with .090" aluminum. The ladders will be held captive bottom by aluminum tracks and slide on friction reducing material. ladders shall be removable individually without having to remove any other ladder. A quick release, device shall keep the ladders secured in the area.

98.0 ROLL-UP DOOR AERIAL LADDER COPARTMENT

98.1 The aerial rear ladder compartment shall be provided with a Robinson brand door. The Robinson door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

98.2 The track shall be anodized aluminum with a finishing flange incorporated to a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water dust from entering the compartment.

98.3 The doors shall be counterbalanced for ease in operation. A full width latch shall be operable with one hand, even with heavy gloves. Securing shall be a positive latch device.

98.4 A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

98.5 The door opening shall be reduced by 2" in width and approximately 5" height.

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98.6 A hinged ladder retention plate shall be provided to keep ladders from sliding door when closed.

99.0 REAR PIKE POLE STORAGE

99.1 Pike poles storage shall be provided at the rear of the body for six (6) pike poles. The storage area shall be labeled for two (2) 6' poles, two (2) 8' poles, (2) 12' poles. The pike poles shall be secured by either "J" slotted tubes and/or diamond plate door(s)

100.0 AXE BRACKET

100.1 Axe bracket shall consist of one stainless steel blade bracket and one chrome restrainer mounted directly on the ladder.

101.0 ROOF LADDER BRACKET

101.1 A roof ladder -mounting bracket shall be installed on the outside of the ladder section. The bracket shall be designed to allow for quick removal of ladder.

102.0 THIRD PART FLOW TEST

102.1 A flow test shall be conducted to determine that the water system is capable flowing 1,000 gpm at 100 psi nozzle pressure with the aerial device at full extension and elevation. When the aerial apparatus is equipped with a fire pump the test shall be conducted using the onboard pump. Intake pressure onboard pump shall not exceed 20 psi.

102.2 In addition to the flow test, a hydrostatic test shall be done on the waterway. The permanent water system, piping, and monitor shall be hydrostatically tested at the maximum operating pressure required to flow 1,000 gpm at 100 psi nozzle pressure at maximum elevation and extension.

102.3 These results shall be certified by an independent, third-party testing organization, per NFPA 16.13.1 through 16.13.1.3.

103.0 LADDERS

103.1 The following ladders shall be provided:

i) One (1) Alco-Lite FL-10 10' aluminum folding attic ladder shall be provided. ends shall be equipped with molded rubber feet and the ladder shall have handles for easy carrying. The ladder shall meet or exceed the

requirements of the current edition of NFPA 1931.

ii) One (1) Alco-Lite PRL-14 14' roof ladder shall be provided. Folding steel hooks shall be attached to one end of the ladder with steel spikes on other.

iii) Two (2) Alco-Lite PRL-16 16' aluminum roof ladder shall be provided. of folding 3/4" (0.75") steel roof hooks shall be attached to one end ladder, and a pair of steel spiked feet on the other end. The ladder meet or exceed the requirements of the current edition of NFPA 1931.

iv) One (1) Alco-Lite model AEL-12 two (2) section 12' aluminum extension shall be provided. The ladder shall meet or exceed the requirements current edition of NFPA 1931.

v) One (1) Alco-Lite PEL-24 24' aluminum two-section extension ladder provided. The ladder shall meet or exceed the requirements of the edition of NFPA 1931.

vi) One (1) Alco-Lite PEL3-35 35' aluminum three-section extension ladder provided. The fly section shall be operated by a cable and shall automatically extend as the center section is raised. The ladder shall meet exceed the requirements of the current edition of NFPA 1931.

104.0 PIKE POLES

104.1 The following pike poles shall be provided:

i) One (1) Ziamatic Plasticore model PCM 6 6' hollow fiberglass pike pole, (1.75") outside diameter, with painted steel pike shall be supplied.

ii) One (1) Ziamatic Plasticore model PCM 8 8' hollow fiberglass pike pole, (1.75") outside diameter, with painted steel pike shall be supplied.

iii) One (1) Ziamatic Plasticore model PCM 12 12' hollow fiberglass pike pole, (1.75") outside diameter, with painted steel pike shall be supplied.

105.0 PAINT

105.1 The cab, chassis and apparatus body shall be painted with the highest quality for low maintenance, long life, and attractive appearance. The finish consist of a corrosion-resistant primer, urethane high build primer, and performance durable color coat. The vehicle finish shall be protected with minimum of 2 mils film thickness of UV resistant clear coat.

105.2 The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint. Any vertically or horizontally hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on the body, doorjamb, and door edges.

105.3 The paint process shall feature DuPont Performance Coatings high-solid, VOC products and be performed in the following steps:

i) Corrosion Prevention - all raw materials shall be pre-treated with the MetaLok-CVP system to provide superior corrosion resistance and excellent adhesion of the top coat.

ii) DuPont Uro®Prime 1340S™ polyurethane primer shall be applied to guarantee excellent gloss hold-out, chip resistance, and barrier coat corrosion protection.

iii) DuPont Imron® Elite Express System (Top coat) – a lead free, chromate-free, solids polyurethane color coat shall be applied. A minimum of two coats applied providing excellent coverage and durability.

iv) DuPont High Solids Clear coat TC35000™- a high-solids, low VOC clear shall be applied as the final step. To ensure full gloss, color retention durability a minimum of two coats shall be applied at 2 mils film thickness minimum.

105.4 Any location where the metal is penetrated after painting for the purpose of mounting steps, handrails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting system. The system shall be applied to the sheet metal or extrusions in all locations where the metal has been penetrated. All hardware used in mounting steps, handrails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting system.

105.5 The chassis frame and undercarriage components shall be finished painted urethane chassis black system.

105.6 The vehicle wheels shall be painted to match the exterior color of the vehicle otherwise specified.

105.7 The interior of the cab shall be painted with Zolatone Gray Stone #20-64.

106.0 APPARATUS STRIPE

106.1 A Scotchlite tape "Z" stripe, up to 6" in height, shall run the full length of side of the apparatus. White over red paint, over aluminum roll-up doors.

107.0 AERIAL SIGN PLATES

107.1 Two (2) 10" x 144" x 1/8" (0.125") thick smooth aluminum plates shall be provided. The plates shall have 1" lips top and bottom for rigidity. Each sign plate shall be bolted on either side of the base section, approximately at the midpoint. The plates shall be provided to display the department's name or other information. The plates shall be painted body colour.

108.0 REFLECTIVE TAPE ON JACKS

108.1 The four outriggers that protrude beyond the side of the body shall be with white reflective tape. The tape shall be visible from the front of the unit.

109.0 AERIAL CERTIFICATION

109.1 The manufacturer shall include a statement from a licensed and registered

independent, third-party professional engineer employed by an independent, third-party engineering firm attesting that the aerial ladder on the unit bid is designed and will be provided with a minimum 2.5 to 1 structural safety factor based on the yield strength of the material. This safety factor shall include 2.5 times the dead weight of the aerial, plus 2.5 times the rated load capacity, plus 2 times the water load stress. The safety factor shall be applicable to all components used in the construction of the aerial ladder, including all substructure and stabilizer components.

109.2 The manufacturer shall also include a statement from a licensed and registered independent, third-party professional engineer employed by an independent, third-party engineering firm attesting that the aerial and stabilizer system on the unit bid is designed and will be provided with a minimum of 1.5 to 1 stability factor or tip-over safety factor. This stability factor shall include 1.5 times the rated live load capacity. The stability factor shall apply when the vehicle is on a level surface, as well as when it is on a 5-degree downward side slope with the aerial in the direction most likely to cause overturning.

109.3 All quality control testing shall be performed by an ASNT-certified level II Non-Destructive Test Technician. The aerial ladder shall be tested in compliance with the current editions of NFPA 1901 and NFPA 1914. All sub-assemblies are to be inspected before assembly and body mounting.

109.4 Each aerial section shall be tested prior to the assembly of the complete aerial device. Each section shall be subjected to a visual weld inspection to assure the integrity of the weldment. Die penetrant shall be used as required to qualify suspected weld defect indications. All turntable mounting bolts, cylinder anchor pins, outrigger anchor pins, aerial hinge pins, and other critical mounting components are subjected to ultrasonic testing to detect any flaws.

109.5 A magnetic particle test shall be conducted on the torque box, aerial support structure, outriggers, outrigger support structure and all other structural ferrous aerial components. This test shall be performed to assure the integrity of the weldment.

109.6 After the aerial is assembled and installed on the vehicle, an operational inspection shall be made and the aerial shall be tested to comply with the applicable standards in the current editions of NFPA 1901 and NFPA 1914.

110.0 PUMP COMPARTMENT

110.1 The pump operator's control panel and pump compartment shall be located front of the body. The operator's controls and gauges shall be located left side (street side) of the apparatus. The compartment shall be designed following NFPA 1901 15.6.

110.2 The left and right side pump panels shall be completely removable for easy access to the pump compartment. Each panel shall be split approximately thirds of the way from the bottom by an anodized extrusion, which shall removal of the left side upper panel for easy access to gauges.

110.3 An aluminum diamond plate pump compartment access door shall be provided above the right side pump panel. The access door shall be horizontally-hinged and shall be securely attached with a full-length stainless steel piano hinge and stainless steel D-ring style handle. The access door shall be as wide high as possible.

110.4 A 4" circular single bulb pump compartment light mounted in a shock-resistant housing shall be supplied to inspect plumbing components. The light shall switch on with the pump panel lights.

110.5 A side running board formed from 1/8" aluminum diamond plate shall be provided and shall extend the full length of the pump module on each side of the apparatus. The running board shall be bolted to the pump compartment.

111.0 PUMP OPERATORS PANEL

111.1 The pump compartment side panels shall be constructed of brushed, non-glare 14 gauge stainless steel.

111.2 Pump panel light assemblies shall be provided for each side panel. The pump panel lights shall provide 5 foot-candles light intensity to the pump panel as outlined in NFPA 1901 16.9.2. Light shields shall be anodized aluminum extrusion bolted to the side pump panels.

111.3 The following instruments shall be supplied as a group on the operator's panel as outlined in NFPA 1901 16.12.1 and located as far as practical from hose connections.

Pump master intake
Pump master discharge
Tachometer
Engine coolant temperature indicator
Engine oil pressure
Voltmeter
Pressure controls
Engine throttle
Pump primer
Water tank to pump control
Water tank fill valve
Water tank level

111.4 Test connections for pump gauges shall be supplied on the operator's panel as outlined in NFPA 1901 16.12.5. Two (2) 1/4" standard pipe thread connections shall be supplied with plugs and identified as intake and discharge ports.

111.5 Gauges supplied on the pump operator's panel shall be compliant with NFPA 1901 16.12.2.1.5. There shall be a 1" differential in viewing area between analog master gauges and individual analog outlet gauges. All gauges shall meet ASME B40.1 and be resistant to vibration, pressure pulsation dampened, corrosion-resistant, shock-resistant and condensation-resistant.

111.6 Any discharge outlet 1 1/2" or larger shall have an output indicator and be labeled to identify its control function as outlined in NFPA 1901 16.12.3. The valve control levers shall be chrome push-pull locking "T" handles located at the pump

operator's panel unless the discharge is located on the operator's panel. If the valve is located on the operator's panel, a swing-style valve control shall be used. The control levers shall be located directly adjacent to one another and shall be mounted in line so they are in the same position when shut off. Each valve control lever shall be connected directly to its respective valve by a 7/8" non-corrosive rod to form a direct linkage control system. The specified discharge gauges shall be located directly above the discharge control levers when possible. Each control shall be clearly marked by metal nameplates recessed into the control lever handle.

- 111.7 To improve identification of discharges and intakes, color-coded tags, in accordance with current NFPA 1901 A.16.9.1 standards, shall be provided.
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112.0 LEFT SIDE COMPARTMENTS

- 112.1 The body design shall provide 103.54 cubic feet of storage, which exceeds the minimum NFPA 1901 Chapter 8.5 requirement of 40 cubic feet.
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- 112.2 There shall be one (1) compartment (L1) over the forward stabilizer, with a vertically hinged door. The compartment shall be approximately 31" wide x 27" high x 19" deep (upper) and 31" wide x 31" high x 14" deep (lower) and contain approximately 16.99 cubic feet of storage space. The door opening shall be approximately 31" wide x 58" high.
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- 112.3 There shall be one (1) compartment (L2) behind the forward stabilizer, with a vertically hinged door. The compartment shall be approximately 28" wide x 38" high x 19" deep (upper) and 28" wide x 30" high x 25" deep (lower) and contain approximately 23.85 cubic feet of storage space. The door opening shall be approximately 28" wide x 68" high.
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- 112.4 There shall be one (1) compartment (L3) over rear wheels, with a horizontally hinged door. The compartment shall be approximately 50" wide x 22" high x 25" deep and contain approximately 15.91 cubic feet of storage space. The door opening shall be approximately 50" wide x 22" high.
-

- 112.5 There shall be one (1) compartment (L4) over rear wheels, with a horizontally hinged door. The compartment shall be approximately 62" wide x 22" high x 20" deep and contain approximately 15.49 cubic feet of storage space. The door opening shall be approximately 62" wide x 22" high.
-

- 112.6 There shall be one (1) compartment (L5) over the rear stabilizer, with a vertically hinged door. The compartment shall be approximately 31" wide x 14" high x 18" deep (upper) and 31" wide x 31" high x 14" deep (lower) and contain approximately 12.31 Cubic feet of storage space. The door opening shall be approximately 31" wide x 45" high.
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- 112.7 There shall be one (1) compartment (L6) behind the rear stabilizer, with a vertically hinged door. The compartment shall be approximately 28" wide x 15" high x 18" deep (upper) and 28" wide x 41" high x 22" deep (lower) and contain approximately 18.99 cubic feet of storage space. The door opening shall be approximately 28" wide x 56" high.
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113.0 COMPARTMENT DOORS L3 AND L4

113.1 Side compartment doors shall be constructed using a box pan configuration. The outer door pan shall be beveled and shall be constructed from 3/16" aluminum plate. Inner door pans shall be constructed from 1/8" smooth aluminum plate and have nutsert fittings to attach door hold-open hardware. The inner pan shall have a 95-degree bend to form an internal drip rail. Compartment doors shall have a 1" x 9/16" closed cell "P" EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the door.

113.2 A drain hole shall be installed in the lower corner of all inside door pans to assist with drainage.

113.3 Polished stainless steel Hansen D-ring style twist lock door handles with #459 latches shall be provided. The 4 1/2" D-ring handles shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material.

113.4 Compartment doors shall be securely attached to the apparatus body with full-length stainless steel 3/8" knuckle 1/4" rod piano type hinges isolated from the body and compartment door with a dielectric barrier. The doors shall be attached with machine screws threaded into the doorframe. All doors shall have a gas shock style hold open devices connected to the body with a gas spring casting and connected to the inner door.

113.5 An anodized aluminum drip rail shall be mounted over each compartment opening to assist with water runoff.

114.0 RIGHT SIDE COMPARTMENTS

114.1 The body design shall provide 56.31 cubic feet of storage, which exceeds the minimum NFPA 1901 Chapter 8.5 requirement of 40 cubic feet.

114.2 There shall be one (1) compartment (R1) over the forward stabilizers, with a vertically hinged door. The compartment shall be approximately 31" wide x 27" high x 19" deep (upper) and 31" wide x 31" high x 14" deep (lower) and contain approximately 16.99 cubic feet of storage space. The door opening shall be approximately 31" wide x 58" high.

114.3 There shall be one (1) compartment (R2) over the forward stabilizers, with a vertically hinged door. The compartment shall be approximately 28" wide x 38" high x 19" deep (upper) and 28" wide x 30" high x 25" deep (lower) and contain approximately 23.85 cubic feet of storage space. The door opening shall be approximately 28" wide x 68" high.

114.4 There shall be one (1) compartment (R3), over the rear stabilizer, with a vertically hinged door. The compartment shall be approximately 31" wide x 19" high x 14" deep and contain approximately 4.77 Cubic feet of storage space. The door opening shall be approximately 31" wide x 19" high.

114.5 There shall be one (1) compartment (R4), over the rear stabilizer, with a vertically hinged door. The compartment shall be approximately 28" wide x 30"

high x 22" deep and contain approximately 10.69 Cubic feet of storage space.
The door opening shall be approximately 28" wide x 30" high.

115.0 HOSEBED

115.1 The hose bed shall contain 50 cubic feet. The hose bed shall measure 26" H
18" W X 188"L

115.2 The hosebed compartment deck shall be constructed entirely from
maintenance free, extruded aluminum. Extrusions shall have an anodized
ribbed top surface for maintenance free service life. Extruded aluminum slats
shall be 3/4" x 2 3/4 " and shall be riveted into a one-piece grid system to
prevent the accumulation of water and allow ventilation to assist in drying
hose. The hosebed compartment shall be free of sharp edges and
projections to prevent hose damage. The compartment deck design shall
incorporate a track for the installation of adjustable hosebed dividers.

115.3 The hosebed sides shall consist of aluminum plate and diamond plate welded,
from the backside, into a framework of 3" x 3" x 3/16" aluminum slotted
extrusions welded both vertically and horizontally for high rigidity.

116.0 COMPARTMENT DOORS R3 AND R4

116.1 Side compartment doors shall be constructed using a box pan configuration.
outer door pan shall be beveled and shall be constructed from 3/16"
aluminum plate. Inner door pans shall be constructed from 1/8" smooth
aluminum plate and have nutsert fittings to attach door hold-open hardware.
inner pan shall have a 95-degree bend to form an internal drip rail.
Compartment doors shall have a 1" x 9/16" closed cell "P" EPDM sponge
meeting ASTM D-1066 2A4 standards installed around the perimeter
door.

116.2 A drain hole shall be installed in the lower corner of all inside door pans to
with drainage.

116.3 Polished stainless steel Hansen D-ring style twist lock door handles with #459
shall be provided. The 4 1/2" D-ring handles shall be mounted directly
door latching mechanism with screws that do not penetrate the door
material.

116.4 Compartment doors shall be securely attached to the apparatus body with
full-length stainless steel 3/8" knuckle 1/4" rod piano type hinges isolated from
the body and compartment door with a dielectric barrier. The doors shall be
attached with machine screws threaded into the doorframe. All doors shall
gas shock style hold open devices connected to the body with a gas
casting and connected to the inner door.

116.5 An anodized aluminum drip rail shall be mounted over each compartment
to assist with water runoff.

116.6 A bolt on 3/16" aluminum tread plate rear triangular shaped step shall be
supplied and attached to the rear of the body below the hosebed.

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117.0 ROLL-UP DOORS L1, L2, L4, L5, R1, R2 AND B1

117.1 The specified compartment(s) shall be provided with Robinson brand doors.

117.2 The Robinson door slats shall be double wall box frame and manufactured from anodized aluminum. The slats shall have interlocking end shoes on each slat. The slats shall have interlocking joints with a PVC/vinyl inner seal to prevent any metal to metal contact and inhibit moisture and dust penetration.

117.3 The track shall be anodized aluminum with a finishing flange incorporated to provide a finished look around the perimeter of the door without additional trim or caulking. The track shall have a replaceable side seal to prevent water and dust from entering the compartment.

117.4 The doors shall be counterbalanced for ease in operation. A full width latch shall be operable with one hand, even with heavy gloves. Securing method shall be a positive latch device.

117.5 A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.

118.0 WATER TANK

118.1 The booster tank shall be T-shaped in configuration and shall have a useable capacity of 500 gallons (U.S.). The tank sides, top, and bottom shall be constructed of 1/2" (0.50") black UV-stabilized copolymer polypropylene.

118.2 The tank shall have a combination vent and manual fill tower. The tower shall located in the left front corner of the tank. The tank overflow shall be 4" diameter and shall dump behind the rear wheels to permit maximum traction. tower shall have a hinged cover and a 1/4" (0.25") thick polypropylene

118.3 There shall be two (2) standard tank openings; one (1) for the tank-to-pump line with an anti-swirl plate, and one (1) for the tank fill line.

118.4 Baffles, both longitudinal and latitudinal, shall be interlocking and thermo to minimize water surge during travel, enhancing road handling stability. Openings in the baffles shall be positioned to allow water flow to standards during filling or pumping operations.

118.5 The tank shall be supported in an aluminum cradle resting on the frame on reinforced rubber strips to prevent wear and galvanic corrosion caused two dissimilar metals come it contact. The tank shall be completely removable without disturbing or dismounting the apparatus body structure.

119.0 PUMP HEAT PAN

119.1 The pump heat pan shall be constructed of 1/8" smooth aluminum plate and reinforced with 3/4" x 2-3/4" aluminum extrusions. The heat pan shall be

installed under the apparatus pump and securely attached to the underside apparatus body. The heat pan shall be easily removable for fair operation.

120.0 CROSSLAY COVER

120.1 A cover constructed of red (or black) 18 oz. PVC vinyl coated polyester shall be installed on the apparatus crosslay. The base fabric shall be 1000 x 1300 Polyester with a fabric count of 20 x 20 square inch.

120.2 The cover shall be held in place across the top of the body by chrome snaps. sides of the cover shall have integral flaps that extend down to cover the sides of the crosslay. The side flaps shall be secured in place to comply with latest edition of NFPA 1901.

121.0 HOSEBED COVER – ALUMINIUM 2 PIECE

121.1 An aluminum cover shall be provided to protect fire hose stored in the hose bed.

121.2 The hose bed cover shall be constructed of 1/8" aluminum tread brite and two piece in design. Cover shall be hinged with full-length stainless knuckle hinges. For ease of use a pneumatic cylinder (gas shock) shall on each cover. Each cover shall also have a recessed handle.

121.3 Each cover shall have a single water and corrosion resistant switch that will the 2" red flashing door ajar light in the cab to alert the driver that a open.

122.0 REAR HOSEBED COVER

122.1 A cover constructed of red (or black) 18 oz. PVC vinyl coated polyester shall installed at the rear apparatus hosebed. The base fabric shall be 1000 x Denier Polyester with a fabric count of 20 x 20 square inch.

122.2 The top of the cover shall be mechanically attached to the rear hosebed cover extrusion. The lower portion of the cover shall be secured in place with heavy nylon straps to comply with the latest edition of NFPA 1901.

123.0 HOSEBED DIVIDER

123.1 There shall be one (1) hosebed divider provided the full fore-aft length of the hosebed. The hosebed divider shall be constructed of 1/4" (0.25") smooth aluminum plate with an extruded aluminum base welded to the bottom. The end of the divider shall have a 3" radius corner to protect personnel. divider shall be natural finish aluminum for long- lasting appearance and sanded and deburred to prevent damage to the hose. The divider adjustable from side to side in the hosebed to accommodate varying loads.

124.0 LARGE FOLDING STEPS

124.1 A heavy duty folding step that meets NFPA requirements shall be supplied. step shall be located above and below intermediate pump panel step.

- 124.2 Assist handrail(s) shall be provided at each position where steps for climbing located. Handrail(s) shall consist of 1-1/4" OD 6063T5 anodized aluminum mounted between chrome stanchions. Handrail(s) shall be machine extruded with an integral ribbed surface to assure a good grip for personnel
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125.0 INTERMEDIATE PUMP PANEL STEP

- 125.1 An intermediate pump panel step shall be provided on the side of the body at pump panel area, between the upper and lower panels. The step shall be a minimum of 8" deep x the width of the pump panel and shall be tapered on forward end. Step construction shall be formed of minimum 1/8" aluminum diamond plate.
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- 125.2 Assist handrail(s) shall be provided at the step area. Handrail(s) shall consist 1/4" OD 6063T5 anodized aluminum tube mounted between chrome stanchions. Handrail(s) shall be machine extruded with an integral ribbed to assure a good grip for personnel safety.
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- 125.3 A recessed 4" circular single bulb light shall be mounted above the step. The shall be wired to the work light switch on the cab dash. The light shall be in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.
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126.0 STEP SURFACES

- 126.1 All body exterior step surfaces shall be provided with an aggressive resistant surface in accordance with current NFPA requirements.
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- 126.2 Aluminum diamond plate steps shall include a multi-directional, aggressive surface incorporated into the diamond plate. The surface shall vertically from the diamond plate sheet a minimum of 1/8" (0.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and centers not to exceed 4".
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127.0 SLID-OUT PLATFORM

- 127.1 The slide-out platform shall be 21" deep and shall be constructed of 1/8" aluminum tread brite. The platform shall be mounted under the apparatus below the pump panel. The platform shall utilize a maintenance free system incorporating stainless steel shoulder bolts that slide in slotted wall aluminum angles. Notches shall be provided at each end of the hold the platform in both the extended and retracted positions.
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- 127.2 A chrome grab handle shall be provided on the front face of the platform for operation.
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128.0 PUMP COMPARTMENT HEATERS

- 128.1 Two 25,000 BTU heaters shall be installed in the pump compartment and connected to the engine coolant system. The heaters shall be controlled at side pump panel. The heaters shall have a 12V blower.
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129.0 AUXILIARY GROUND PADS

129.1 Auxiliary ground pads shall be 24" x 24" x 1/2" thick aluminum plates. They have a grab handle and shall be mounted in a lift-up, slide-out bracket mounted under the apparatus next to each stabilizer.

130.0 SCBA BOTTLE STORAGE

130.1 Eight (8) 8" diameter air bottle holders shall be provided. The bottle holders located at the wheel well area of the rear axle as specified by the customer. The storage tube shall be constructed of high strength "ABS" to protection for the bottles.

130.2 The bottles shall be held in place by an aluminum-hinged door casting with positive catch latch. Each bottle holder door shall include an inner door increased protection against the elements.

131.0 PUMP SYSTEM

131.1 The pump shall be a midship-mounted Hale QMAX single stage centrifugal. The pump shall be mounted on the chassis frame rails and shall be drive driven.

131.2 The entire pump body and related parts shall be of fine grain alloy cast iron, minimum tensile strength of 30,000 PSI (207 MPa). All metal moving contact with water shall be of high quality bronze or stainless steel. body shall be horizontally split in two sections, for easy removal of assembly including wear rings and bearings from beneath the pump disturbing pump mounting or piping.

131.3 The pump impeller shall be hard, fine grain bronze of the mixed flow design shall be individually ground and hand balanced. Impeller clearance rings bronze, easily renewable without replacing impeller or pump volute and of wrap-around double labyrinth design for maximum efficiency.

131.4 The pump shaft shall be heat-treated, corrosion-resistant stainless steel and rigidly supported by three (3) bearings for minimum deflection. The bearing is to be lubricated by a force fed, automatic oil lubricated pressure-balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and splash-lubricated. Pump shaft must be sealed with double-lip oil keep road dirt and water out of the gearbox.

131.5 Two (2) 6.0" diameter suction ports with 6" NST male threads and removable shall be provided, one each side. The ports shall be mounted one each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

132.0 PUMP PACKING

132.1 The pump shaft shall have only one (1) packing gland located on the inlet the pump. It shall be of split design for ease of repacking. The packing gland shall be of a design to exert uniform pressure on packing and to prevent and uneven packing load when tightened. The packing rings shall be permanently lubricated, graphite composition, and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

133.0 PRESSURE RELIEF VALVE

133.1 The pump shall be equipped with an automatic pressure control device. A bronze variable-pressure-setting relief valve shall be provided and be ample capacity to prevent an undue pressure rise as outlined in N.F.P.A. The relief valve shall be normally closed and shall open against pump pressure. A relief valve control wheel with a control light to signal when open mounted on the pump operator's panel.

134.0 DISCHARGE VALVE

134.1 The pump system shall utilize a stainless steel discharge manifold system allows a direct flow of water to discharge valves. The manifold and fabricated piping systems shall be constructed of a minimum of Schedule 10 stainless steel to reduce corrosion.

135.0 PRIMING SYSTEM

135.1 The electrically-driven priming pump shall be a positive displacement vane type. priming control, located at the pump operator's position, shall open the priming valve and start the priming motor. The primer shall be oil-less type. priming valve shall be electronically interlocked to the "Park Brake" circuit to allow priming of the pump before the pump is placed in gear.

136.0 PUMP SHIFT

136.1 The pump shift shall be pneumatically-controlled using a power shifting cylinder.

136.2 The power shift control valve shall be mounted in the cab and be labeled "SHIFT". The apparatus transmission shift control shall be furnished positive lever, preventing accidental shifting of the chassis transmission.

136.3 A green indicator light shall be located in the cab and be labeled "PUMP ENGAGED". The light shall not activate until the pump shift has completed its full travel into pump engagement position.

136.4 A second green indicator light shall be located in the cab and be labeled "PUMP". This light shall be energized when both the pump shift has completed and the chassis automatic transmission has obtained converter lockup (4th gear lockup).

136.5 One (1) pump panel-mounted "GREEN" indicator light shall be positioned by throttle control on the pump operator's panel. The light shall be energized when the pump shift has been completed, chassis automatic transmission obtained converter lockup (4th gear lockup), and the chassis parking set.

137.0 PUMP SYSTEM

137.1 One (1) 4-1/2" master suction and one (1) 4-1/2" master discharge gauge shall be pump panel-mounted. These compound gauges shall be liquid filled.

137.2 Two (2) test plugs shall be pump panel-mounted for third party testing of and pressures of the pump.

137.3 A master drain valve shall be installed and operated from the pump operator's panel. The master pump drain assembly shall consist of a Class 1 master drain with a rubber disc seal and turning handle.

137.4 The manual Master Drain Valve shall have six (6) individually-sealed ports allow quick and simultaneous draining of multiple intake and discharge shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

137.5 The master drain shall provide independent ports for low point drainage of the pump and auxiliary devices.

138.0 GEARBOX COOLER

138.1 A gearbox cooler shall be provided to maintain safe operating temperatures prolonged pumping operations.

139.0 AUXILIARY ENGINE COOLER

139.1 An engine cooler used to lower engine water temperature during prolonged pumping operations and controlled at the pump operator's panel shall be provided.

139.2 The engine cooler shall be installed in the engine coolant system in such a as to allow cool pump water to circulate around engine water, thus a true heat exchanger action. Cooler inlet and outlet shall be continuous, preventing intermixing of engine coolant and pump water.

140.0 PUMP CERTIFICATION

140.1 The pump, when dry, shall be capable of taking suction and discharging water accordance with current NFPA 1901. The pump shall be tested at the manufacturer's facility by an independent, third-party testing service. The conditions of the pump test shall be as outlined in current NFPA 1901.

140.2 The tests shall include, at a minimum, the pump test, the pumping engine overload test, the pressure control system test, the priming device tests, the test, and the water tank to pump flow test as outlined in current 1901.

140.3 A piping hydrostatic test shall be performed as outlined in current 1901.

140.4 The pump shall deliver the percentage of rated capacities at pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure
 - 100% of rated capacity at 165 psi net pump pressure
 - 70% of rated capacity at 200 psi net pump pressure
 - 50% of rated capacity at 250 psi net pump pressure
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140.5 A test plate, installed at the pump panel, shall provide the rated discharges pressures together with the speed of the engine as determined by the

certification test, and the no-load governed speed of the engine.

- 140.6 A Certificate of Inspection certifying performance of the pump and all related components shall be provided at time of delivery. Additional certification documents shall include, but not limited to, Certificate of Hydrostatic Test, Electrical System Performance Test, Manufacturer's Record of Pumper Construction, and Certificate of Pump Performance from the pump manufacturer.
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141.0 SUCTION SIDE RELIEF VALVE

- 141.1 The pump shall be equipped with an Akron style 59 cast brass, variable-pressure-setting relief valve on the pump suction side. It shall be designed operate at a maximum inlet pressure of 250 psi. The relief valve shall be normally closed and shall be set to begin opening at 125 psi in order to intake pressures in the pumping system. When the relief valve opens, overflow water shall be directed through a plumbed outlet to discharge the apparatus body in an area visible to the pump operator. The overflow outlet shall terminate with a male 2-1/2" NST threaded fitting to the overflow water to be directed away from the vehicle with a short (supplied by the fire department) during freezing weather or under conditions where an accumulation of water around the apparatus be hazardous.
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142.0 THERMAL RELIEF VALVE

- 142.1 A Hale thermal relief valve that protects the pump from overheating shall be provided. The valve shall automatically dump a controlled amount of water to ground when the pump water exceeds the pre-set temperature of the valve.
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143.0 MECHANICAL SPEED COUNTER

- 143.1 The test connection shall be installed on the pump operator's panel to manually verify the vehicle engine speed displayed on the electronic tachometer.
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144.0 GOVERNOR

- 144.1 The apparatus shall be equipped with a Class 1 engine/pump pressure governor/throttle system connected directly to the Electronic Control Module mounted on the engine. The governor shall control and monitor the master discharge pressure, eliminating any need for a relief valve on discharge side of the pump. A special preset feature shall permit a predetermined pressure or RPM to be set and hold it against varying flow independent discharge lines by modulating engine rotation speed. of the engine speed shall be dictated by preprogrammed software electronic control module. The preset shall be easily adjustable by operator.
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- 144.2 The Class 1 system shall be installed in place of the discharge relief valve pump panel mounted hand throttle.
-
- 144.3 A display/control until shall be mounted on the pump operator's panel. The unit shall be a self-contained, weatherproof module, approximately 6"H. The display unit shall provide alpha-numeric display.
-

145.0 WATER TANK LEVEL GAUGE

145.1 One (1) Innovative Controls brand water tank level gauge shall be located at pump operator's panel to provide a high-visibility display of the water tank water level. Fourteen (14) high-intensity light emitting diodes (LED's) on the module shall form an inverted "V" pattern allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance.

145.2 The display module shall be protected from vibration and contamination with components being encased in an encapsulated plastic housing. The long extreme durability of LED indicators eliminates light bulb replacement and maintenance. Color-coded cover plates shall complete the assembly of display module to the pump panel. System calibration shall be accomplished via five (5) small adjustment screws, one for each level, located face of the display module. Each display level shall be set independently for maximum reliability.

145.3 The display shall provide a steady indication of fluid level despite sloshing of the tank when the vehicle is in motion.

146.0 PUMP COOLER

146.1 The pump shall have a 3/8" line installed from the pump discharge to the tank to allow a small amount of water to circulate through the pump in order to cool the pump during sustained periods of pump operation water is not being discharged. The pump cooler line shall be controlled the pump operator's panel by a 3/8" snubber valve.

147.0 ENGINE SYSTEMS MONITOR

147.1 The apparatus shall be equipped with a Class 1 Enfo III electronic system engine operating information display/warning system mounted on the operator's panel. The gauge shall be a self-contained, weatherproof approximately 4.5"W x 6" H.

Features:

- i) Engine RPM - engine RPM shall be displayed in numeric in 5 RPM increments.
 - ii) System voltage display and alarm - System voltage below 11.8 volts for more seconds shall cause the display to flash actual system voltage while simultaneously sounding an audible alarm.
 - iii) Engine temperature display and alarm - a display shall be provided to indicate temperature and an audible alarm warning of high engine temperature. The display shall flash with an audible alarm to warn the operator.
 - iv) Engine oil pressure display and alarm - a display shall be provided to indicate pressure and an audible alarm warning of low oil pressure. The display shall flash with an audible alarm to warn the operator.
-

147.2 The connection to the apparatus shall be achieved by the use of a Deutsche position socket connector.

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148.0 FRONT BUMPER 1 1/2" DISCHARGE

148.1 One (1) 1-1/2" preconnect outlet with a manually operated Akron valve shall supplied to the extended front bumper. The preconnect shall consist of a 2" duty hose coming from the pump discharge manifold to a 2" FNPT x MNST mechanical swivel hose connection to permit the use of the from either side of the apparatus.

148.2 The valve shall be an Akron 8800HD series with a 316 stainless steel ball dual polymer seatsfor ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic lock design to balance the stainless steel ball when in a throttle and water is flowing through it.

148.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

148.4 The discharge shall include a Class 1 2.5" diameter liquid-filled (-30-0-600 psi) pressure gauge mounted at the pump panel adjacent to the discharge control. logical gauge and valve alignment is to ensure proper control execution ease of field operation. The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

148.5 An air blowout valve shall be installed between the chassis air reservoir and the front jump line. The control shall be installed on the pump operator's panel.

148.6 The valve control shall be located at the pump operator panel and shall indicate the position of the valve at all times.

148.7 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

149.0 PUMP TO TANK FILL

149.1 One (1) manually operated 1-1/2" Akron valve shall be installed between the discharge, and the booster tank in order to fill the tank. The valve shall be located at the pump operator's panel, and shall visually the position of the valve at all times.

149.2 The valve shall be an Akron 8800HD series with a 316 stainless steel ball and polymer seats for ease of operation and increased abrasion resistance. valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water flowing through it.

149.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

149.4 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

150.0 DOUBLE CROSSLAY HOSEBED

- 150.1 Two (2) crosslay hosebeds shall be provided at the front area of the body. the two crosslay sections shall have a capacity for 200' of 1-3/4" jacket fire hose preconnected to the pump discharge. The crosslay shall be constructed entirely of maintenance-free 3/4" x 2-3/4" 2.75") hollow aluminum extrusions.
-
- 150.2 Each crosslay section shall include one (1) 2" brass swivel with a 1-1/2" NST hose connection to permit the use of the hose from either side of the apparatus.
-
- 150.3 Stainless steel rollers with nylon guides set in aluminum extrusions shall be installed horizontally and vertically on each end of the crosslay to allow easy deployment of the hose and help protect the body paint.
-
- 150.4 The crosslay piping shall consist of two (2) 2" heavy-duty hoses from the discharge manifold to the 2" swivels. Each crosslay discharge shall a manually operated 2" Akron style valve. The valve control shall be at the pump operator's panel, and shall visually indicate the position valve at all times.
-
- 150.5 The valve shall be an Akron 8800HD series with a 316 stainless steel ball dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.
-
- 150.6 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.
-
- 150.7 All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel piping for superior corrosion resistance and decreased loss.
-
- 150.8 Each crosslay discharge shall include a Class 1 2.5" diameter liquid-filled 600 psi) pressure gauge mounted at the pump panel adjacent to the valve control. The discharge shall be supplied with a 3/4" bleeder assembly to drain water from the gauge pressure line to prevent of the line. The bleeder valve shall be controlled with a quarter-turn on the pump panel.
-

151.0 2.5" CROSSLAY HOSEBED

- 151.1 One (1) single crosslay shall be provided at the front area of the body. The crosslay shall have a capacity of 150' of 2-1/2" double-jacket fire hose. The crosslay decking shall be constructed entirely of maintenance-free 3/4" x 2-3/4" 2.75") hollow aluminum extrusions.
-
- 151.2 The crosslay shall have one (1) 2-1/2" mechanical swivel hose connection to the use of the hose from either side of the apparatus.
-
- 151.3 Stainless steel rollers with nylon guides set in aluminum extrusions shall be

installed horizontally and vertically on each end of the crosslay, to allow easy deployment of the hose and to help protect the body paint.

151.4 The crosslay hosebed shall consist of a 2.5" heavy duty hose coming from pump discharge manifold to the 2.5" swivel. The hose shall be connected to a manually operated 2.5" Akron valve. The valve shall be an Akron 8800HD with a 316 stainless steel ball and dual polymer seats for ease of operation and increased abrasion resistance.

151.5 The valve shall have a self locking ball feature using an automatic friction design to balance the stainless steel ball when in a throttle position and flowing through it.

151.6 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

151.7 The discharge shall include a Class 1 2.5" diameter liquid-filled (-30-0-600 psi) pressure gauge mounted at the pump panel adjacent to the discharge control. logical gauge and valve alignment is to ensure proper control execution ease of field operation. The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

151.8 The valve control shall be located at the pump operator's panel and shall indicate the position of the valve at all times.

151.9 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

152.0 LEFT SIDE 2-1/2" DISCHARGE

152.1 One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall provided at the left side pump panel.

152.2 The valve shall be an Akron 8800HD series with a 316 stainless steel ball dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic lock design to balance the stainless steel ball when in a throttle and water is flowing through it.

152.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

152.4 The discharge shall include a Class 1 2.5" diameter liquid-filled (-30-0-600 psi) pressure gauge mounted at the pump panel adjacent to the discharge control. logical gauge and valve alignment is to ensure proper control execution ease of field operation. The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

152.5 The valve control shall be located at the pump operator panel and shall visually the position of the valve at all times.

152.6 All fabricated piping shall be a minimum of Schedule 10 stainless steel for

superior corrosion resistance and decreased friction loss.

153.0 RIGHT SIDE 2-1/2" DISCHARGE

153.1 One (1) 2-1/2" discharge outlet with a manually operated Akron valve shall provided at the right side pump panel.

153.2 The valve shall be an Akron 8800HD series with a 316 stainless steel ball dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic lock design to balance the stainless steel ball when in a throttle and water is flowing through it.

153.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

153.4 The discharge shall include a Class 1 2.5" diameter liquid-filled (-30-0-600 psi) pressure gauge mounted at the pump panel adjacent to the discharge control. logical gauge and valve alignment is to ensure proper control execution ease of field operation. The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

153.5 The valve control shall be located at the pump operator panel and shall visually the position of the valve at all times.

153.6 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

154.0 2-1/2" DISCHARGE ELBOWS

154.1 2.5" discharge valves shall extend out from the apparatus at a 30 degree with chrome plated 2-1/2" NST threads. The 30 degree droop shall be integral part of the discharge valve.

155.0 2-1/2" THREADS

155.1 All 2.5" threads shall be Winnipeg Fire and Paramedic threads.

156.0 AERIAL WATERWAY 4" DISCHARGE

156.1 One (1) 4" diameter discharge outlet with an electrically operated Akron valve connected from the pump to the aerial waterway.

156.2 The valve shall be an Akron 8840E HD series with a bronze flat ball design for operation and increased abrasion resistance. The valve shall have a locking ball feature using an automatic friction lock design to balance the ball when in a throttle position and water is flowing through it.

156.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

156.4 The 8840E series valve shall have the following features:

- i) 12 volt DC motor

- ii) A toggle switch and indicator lamp assembly mounted on the pump operator's panel
 - iii) Red, yellow and green valve position indicator lights
 - iv) Valve open and close "Auto Travel"
 - v) Manual override valve actuation
-

156.5 The discharge shall include a Class 1 2.5" diameter liquid-filled (-30-0-600 psi) pressure gauge mounted at the pump panel adjacent to the discharge control. logical gauge and valve alignment is to ensure proper control execution ease of field operation. The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

156.6 The valve controls and indicators shall be located at the pump operator panel.

156.7 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

157.0 RIGHT SIDE 4" DISCHARGE

157.1 One (1) 4" diameter discharge outlet with an electrically operated Akron valve provided at the right side pump panel.

157.2 The valve shall be an Akron 8840E HD series with a bronze flat ball design for operation and increased abrasion resistance. The valve shall have a locking ball feature using an automatic friction lock design to balance the ball when in a throttle position and water is flowing through it.

157.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

157.4 The 8840E series valve shall have the following features:

- i) 12 volt DC motor
 - ii) A toggle switch and indicator lamp assembly mounted on the pump operator's panel
 - iii) Red, yellow and green valve position indicator lights
 - iv) Valve open and close "Auto Travel"
 - v) Manual override valve actuation
-

157.5 The discharge shall include a Class 1 2.5" diameter liquid-filled (-30-0-600 psi) pressure gauge mounted at the pump panel adjacent to the discharge control. logical gauge and valve alignment is to ensure proper control execution ease of field operation. The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

157.6 The valve controls and indicators shall be located at the pump operator panel.

157.7 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

157.8 This discharge shall be provided with a 5" Storz fitting.

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158.0 TANK TO PUMP 3" SUCTION

158.1 One (1) manually operated 3" Akron valve shall be installed between the pump and the booster tank in order to pump water from the tank. The valve shall be located at the pump operator's panel, and shall visually indicate the position of the valve at all times.

158.2 The valve shall be an Akron 8800HD series with a 316 stainless steel ball and polymer seats for ease of operation and increased abrasion resistance. valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

158.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

158.4 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance, and decreased friction loss.

159.0 LEFT SIDE 2-1/2" SUCTION

159.1 One (1) 2 1/2" suction inlet with a manually operated 2 1/2" Akron valve shall provided on the left side of the apparatus at the pump panel.

159.2 The valve shall be an Akron 8800HD series with a 316 stainless steel ball dual polymer seats for ease of operation and increased abrasion resistance. The valve shall have a self locking ball feature using an automatic friction lock design to balance the stainless steel ball when in a throttle position and water is flowing through it.

159.3 The valve shall be of the unique Akron Swing-out design to allow the valve be removed for servicing without disassembling the plumbing.

159.4 The outlet of the valve shall be connected to the suction side of the pump with valve body located behind the pump panel. The valve shall come equipped with a brass inlet strainer, 2 1/2" NST female chrome inlet swivel and shall be equipped with a chrome-plated, rocker-lug plug with a retainer device.

159.5 The valve controls and indicators shall be located at the pump operator panel.

159.5.1 All fabricated piping shall be a minimum of Schedule 10 stainless steel for superior corrosion resistance and decreased friction loss.

160.0 FORWARD CAB LIGHTS

160.1 A Federal Model FV2251 six (6) pod ViewPoint light system shall be mounted forward part of the cab roof. The system shall include two (2) individual three (3) pod units. Each pod unit shall have two (2) 95FPM rotators and one oscillating light. The lens configuration shall be R/C/R/C/R/R. The two (2) oscillating lights shall be switched off in the blocking right of way mode. & 5 may be wired through the load manager).

161.0 SIDE FACING CAB LIGHT BARS

161.1 A Federal Model FV2232 six (6) pod ViewPoint light system shall be provided. system shall include two (2) individual three (3) pod units. Pods 1,3,4 & 6

shall have 175FPM rotators. Pods 2 & 5 shall have 95 FPM rotators. The lens configuration shall be R/C/R R/C/R. The two (2) clear lights shall be switched the blocking right of way mode. (Pods 1 & 6 may be used to supplement upper rear warning lights, Pods 3 & 4 may be wired through the load manager). lightbars shall be located above the rear doors.

162.0 SIREN SPEAKER

162.1 One (1) Federal model MS100 Dynamax 100 watt speaker shall be flush mounted as far forward and as low as possible on the front of the unit. The shall meet NFPA requirements for sound output producing a minimum 120 dB of sound at 10 feet. A polished Model MSFMT-EF "Electric F" grille shall be provided on the outside of the speaker to prevent debris from entering the speaker.

162.2 Speaker dimensions shall be: 5.8 in. high x 5.8 in. wide x 2.6 in. deep.
= 5.5 lbs.

163.0 BODY WIRING

163.1 All body electrical equipment installed by the apparatus manufacturer shall conform to current automotive electrical system standards, the latest Federal standards, and the requirements of the applicable NFPA Apparatus Standard. Twisted-pair shielded wire shall be provided within the electrical for noise reduction.

163.2 The wiring harness shall conform to SAE J-1128 with GXL temperature properties. All exposed wiring shall be run in a loom with a minimum 289 Fahrenheit rating. All wiring looms shall be properly supported and attached to body members along the entire run. All wiring shall be mounted provide protection from water and heat. All connections shall be type with heat shrink tubing with insulated shanks to resist moisture foreign debris such as grease and road grime. Weather-resistant connectors shall be provided throughout to ensure the integrity of the electrical system. All wiring looms shall be properly supported and attached the entire run. At any point where wire or looms must pass through holes, rubber grommets shall be installed in the holes to protect the from abrasion.

163.3 Wiring shall be individually and permanently function-labeled and color-coded three (3) inches on the insulation to allow for easy identification.

163.4 The main low voltage chassis to body interface point and distribution panel provided at the front of the body in a location providing easy service The distribution panel shall be labeled and shall contain body electrical relays and wire connection bar. The distribution panel shall be located so as reduce useable compartment space.

163.5 All electrical equipment switches shall be mounted on a switch panel mounted cab convenient to the operator. Emergency warning light switches shall be of the rocker type. For easy nighttime operation, an integral indicator light provided to indicate when the circuit is energized. All switches shall be appropriately identified as to their function.

164.0 MAIN CONTROL SYSTEM

164.1 The apparatus shall have an in-vehicle electrical networking system, also as multiplexing, to provide real-time or current-state diagnostic capability and reduce troubleshooting or down time when compared to a standard point to-point wiring system. Due to the unique features and capabilities of a multiplexed electrical system, no exception will be allowed specification.

164.2 The system shall have the capability of delivering multiple signals via a CAN utilizing specifications set forth by SAE J1939.

164.3 For superior system integrity, the networked system shall meet the following minimum requirements:

i) Universal System Manager (USM) containing the main processor and manager.

ii) Integrated load management functions such as load shedding

iii) Self-contained LED diagnostic indicators:
-PWR for input power status (red)
-BUS for output power status (yellow)
-COM for communication status (green)

iv) Power Distribution Module - input/output modules

- Switch input capability
 - Solid-state circuitry
 - Responsible for lighting device activation
 - Diagnostic display for warning message indication
 - Vocation Module to allow for failsafe pumping operations in the event of a
 - fault occurrence within the multiplex system.
-

164.4 The electrical system shall be pre-wired for computer modem accessibility service personnel to easily plug in a modem and phone line to allow diagnostics, troubleshooting, or program additions.

164.5 There shall be a diagnostic display provided in the cab. The diagnostic display allow for fault and condition messages to be displayed. This will provide the operator with detailed messages, such as which compartment door is ajar. display shall allow for complete diagnostic capability without the use of additional hardware or software.

165.0 NON-WARNING LIGHTING

165.1 Clearance lights and reflectors shall be installed in conformance to the latest DOT standards. Clearance lights and reflectors shall include two (2) clearance lights, four (4) red rectangular reflectors, two (2) amber rectangular reflectors, and three (3) red marker lights centered at the rear recessed in the rubrail for protection.

165.2 There shall be a rectangular-shaped marker light with an amber-colored lens installed

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on either side of the apparatus body at the front of the body and just forward of the rear axle. The marker light shall be wired to the turn indicator. lights at the front of the body shall be mounted in the rubrails of the for protection.

165.3 There shall be a rectangular-shaped marker light with a red-colored lens installed at the trailing edge on either side of the apparatus body. The lights shall be recessed in the rubrails for protection.

165.4 One (1) 7" red and one (1) 7" clear Weldon model 1010 light shall be installed on each side of the vehicle rear. Light functions shall include running lights, lights, turn signal lights, and back-up lights.

165.5 There shall be a license plate light installed at the rear of the vehicle.

165.6 Three (3) Weldon #2030 lights shall be mounted under a light shield directly each pump panel if equipped with a pump. The work light switch in shall activate the lights when the park brake is set.

166.0 COMPARTMENT LIGHTING

166.1 There shall be a minimum of one (1) 4" circular single light bulb mounted body compartment. Compartment lights shall be wired to a master rocker switch on the cab instrument panel. Each light shall be in a shock shock-absorbent mount for improved bulb life.

166.2 The wiring connection for the compartment lights shall be made with a weather-resistant plug in style connector. A single water- and corrosion-resistant switch with a polycarbonate actuator and sealed contacts shall control each compartment light. The switch shall allow the light to illuminate if the compartment door is open.

166.3 The compartment light switch shall also be wired to activate a 2" red flashing located in the cab to alert the driver that a body door is open. The door warning light shall be interlocked through the parking brake to prevent the light from flashing when the vehicle is being serviced or the master/ignition is in the on position.

166.4 There shall be a compartment light with a switch installed to illuminate the area for service.

167.0 STEP LIGHTS

167.1 There shall be a minimum of four (4) recessed 4" lights with clear lenses provided to illuminate the rear step area. Step lights shall be activated with work lights switch in cab after the park brake is set.

167.2 The apparatus shall have sufficient lights to properly illuminate the work areas, walkways, and ground areas around the apparatus in accordance with current NFPA requirements. Areas under the driver and crew area exits shall activated automatically when the exit doors are opened. Ground area lights shall be switched from the cab dash with the work light switch.

168.0 BACK-UP ALARM

168.1 There shall be an electronic back-up alarm supplied at the rear of the

apparatus. The 97 dB(A) alarm shall be wired into the chassis back-up signal when the vehicle is in reverse.

169.0 ELECTRICAL SYSTEM LOAD MANAGER

169.1 The vehicle's electrical system shall be equipped with an integrated load management device. The load manager shall be a one-touch device designed so that it shall be protected against reverse voltage and electrostatic damage.

169.2 Integrated load management functions shall be as follows:

- i) Eight (8) electrical load priorities, # 0 through # 7
 - ii) The sequence of load shedding from # 7 shall start with # 7 and proceed to # 1 and with # 0 never shedding. Sequencing of loads shall be 1/20.5 second intervals.
-

169.3 Electrical load shedding shall be tied through the parking brake. Electrical shall shed only during stationary operations. Only devices not required stationary operation, in accordance with current NFPA requirements, available for load shedding. Electrical loads shed during stationary operation will be reactivated when the park break is released.

169.4 Automatic fast idle activation shall occur before load shedding. The fast idle automatically activate whenever the parking brake is set and the system voltage drops below 12.8 volts for at least one 1 minute. The fast idle is to on for a minimum of 10 minutes and until a minimum of 13.0 volts is achieved. The fast idle function is to be automatically canceled if the park released, there is loss of neutral safety, pump is shifted into gear, service brake is depressed.

169.5 The load manager system shall include the following features:

- i) Main battery monitoring
 - ii) Visual and audible low voltage alarm control
 - iii) Digital display for diagnostics and status information
 - iv) Test button to cycle all loads and the ability to verify load shedding sequences draining the battery
 - v) Override switch shall be provided, with label, to override operation of the management system, per NFPA requirements.
-

169.6 The apparatus low voltage electrical system shall be tested in accordance current NFPA requirements. A third-party testing service shall perform and certification.

170.0 MULTIPLEX MODEM KIT

170.1 A kit shall be supplied to include modem, adapter for laptop computer interface and adapter harness. The diagnostic hookup shall be located under officer's side dash.

171.0 MULTIPLEX DATA LOGGER

- 171.1 The data logger shall record historical faults within the multiplex system and accessible through the diagnostic software as well as the information
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172.0 ELECTRONIC SIREN

- 172.1 One (1) Federal Signal PA300 siren model 690010 solid state electronic with attached noise-canceling microphone shall be installed. The unit capable of driving high-power speakers up to 200 watts to achieve a output level that meets Class "A" requirements. Operating modes include hi-lo, yelp, wail, P.A., air horn, and radio re-broadcast. It shall a Tap II feature.
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173.0 FOOT SWITCH

- 173.1 A heavy-duty metal floor-mounted foot switch shall be installed to operate the warning device. The fire department shall specify the location, driver officer side, and the warning device for operation.
-

174.0 LICENCE PLATE BRACKET

- 174.1 There shall be bracket fabricated from aluminum diamond plate, secured to the body to accommodate a license plate.
-

175.0 REAR UPPER LEVEL WARNING LIGHTS

- 175.1 One (1) red and one (1) amber Federal Signal Sentry model SY12FS rotating with a polycarbonate base, a single 55-watt halogen lamp, and a twist-on lexan dome shall be mounted at the upper rear of the vehicle to comply with 1901. Each light shall produce 175 flashes per minute. The warning the left side of the apparatus shall have a red dome, and the warning the right side shall have an amber dome.
-

176.0 WHELEN 500 SERIES RED LED (PR)

- 176.1 Two (2) Whelen 500 Series LED (Light Emitting Diode) light heads with red shall be provided. The rectangular lights shall be wired with weatherproof connectors and shall be surface mounted where specified.

- Side facing on each side of cab between front and rear doors.

177.0 WHELEN 700 SERIES 8-32 DEGREE SCENE LIGHTS

- 177.1 Two (2) Whelen 700 Series scene lights with clear lenses shall be provided. volt 35 watt halogen light heads shall have internal light deflecting that will redirect the light between 8 and 32 degrees of angle. Lights switched separately or together from a specified location. The rectangular lights shall be wired with weatherproof connectors and shall be mounted where specified.
-

178.0 LED LIGHT PACKAGE

- 178.1 Ten (10) Whelen 600 series LED (Light Emitting Diode) light heads with red shall be provided.

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178.2 The rectangular lights shall be wired with weatherproof connectors and shall mounted as close to the corner points of the apparatus as is practical as follows:

- i) Two lights on the front of the apparatus facing forward (in headlight bezel)
- ii) Two lights on the rear of the apparatus facing rearward
- iii) Two lights each side of the apparatus, one intersection each side at the forward most point (as is practical), and side warning one each side at the rearward most point (as is practical).
- iv) One light each side of the apparatus centrally located in the wheel well area to provide mid ship warning light.

178.3 All warning devices shall be surface mounted in compliance with NFPA standards.

179.0 SCENE LIGHTS

179.1 Two (2) Federal GHSCENE lights with clear lenses shall be provided. Each shall include (2) 20 watt halogen fixtures within the light housing. Both within the each housing, shall be adjustable horizontally and vertically provide desired coverage. All electrical connectors are to be enclosed housing providing protection against the elements.

179.2 The light shall be 12VDC, 40 watts, and provide 1050 candelas.

179.3 Located each side of cab between front door and side window.

180.0 HOSE BED LIGHTS

180.1 One (1) 6" chrome plated 12-volt floodlight shall be installed at the front area hose bed to provide hose bed lighting per current NFPA 1901. The bed light shall be manually operated by the worklight on/off switch in the cab. An on/off switch shall also be provided on the light.

180.2 One (1) Federal Signal GHSCENE flush-mounted scene light with a clear lens installed at the front area of the hosebed to provide hosebed lighting current NFPA 1901. The light shall include (2) 20-watt halogen light fixtures within the light housing. The hosebed light shall be switched with worklight in the cab. An on-off switch shall also be provided at the light.

180.3 The two light fixtures shall be adjustable horizontally and vertically to provide desired coverage. All electrical connectors are to be enclosed in the providing protection against the elements.

181.0 CROSSLAY LIGHTS

181.1 Two (2) Weldon model 2030 lights with Cast Products model LH23501 housings shall be provided at the driver's and officer's side rear of the crosslay. The lights shall be mounted approximately 16" away from the on top of the body. The lights provide NFPA required crosslay lighting

181.2 The light shall be operated by the work light switch in the cab.

182.0 DECK LIGHT WIRED TO BACK-UP

182.1 The rear deck lights shall be activated when the chassis is placed in reverse provide additional lighting, in addition to the back-up lights, when backing vehicle.

183.0 CAB SCENE LIGHTS SWITCHING

183.1 The cab scene lights shall be wired to activate through the appropriate side door ajar switch. This application allows the cab scene lights to be used additional lumination of the ground area for personnel entering or exiting vehicle. The switching for this application is in addition to the standard scene light switching.

184.0 TAIL LIGHTS

184.1 Two (2) Whelen model 600 series incandescent lights with one (1) Whelen series halogen light shall be installed in a Cast 3 housing in a vertical each side at rear, in place of standard and wired with weatherproof connectors.

184.2 Light functions shall be as follows:

- i) Incandescent red running light with red brake light in upper position.
 - ii) Incandescent amber arrow turn signal in middle position.
 - iii) Halogen 27 watt clear backup light in lower position.
-

184.3 A one-piece polished aluminum trim casting shall be mounted around the (3) individual lights in a vertical position.

185.0 12V POWER POINT

185.1 A plug-in type receptacle for hand held spotlights, cell phones, chargers, etc... installed as specified.

186.0 CAB DOME LIGHTS

186.1 A dome light assembly consisting of a 3-position assembly mounted rocker (31) candlepower incandescent 4" stainless steel white dome light (31) candlepower incandescent 4" stainless steel red dome light and housing shall be installed as specified.

186.2 The white lights activates with appropriate cab door and light assembly mounted rocker switch, the red light activates with assembly mounted rocker only.

187.0 HAND HELD SPOT LIGHT

187.1 A specialty #2150 hand held spotlight, with holder, shall be provided.

188.0 HYDRAULIC GENERATOR

188.1 Smart Power, model #ER110, modular style generator 10,000 watt hydraulic generator shall be provided and installed as per the customer specified, ventilated, location.

188.2 The unit shall come equipped with: modular generator unit (which includes the hydraulic motor and filter, generator, hydraulic reservoir and cooler),

- axial piston hydraulic pump and a gauge panel. _____
- 188.3 The gauge panel shall display voltage, hourmeter, frequency, and amperage. _____
- 188.4 The hydraulic motor, generator, blower, cooler, and necessary hydraulic components shall be mounted in a rugged steel case. _____
- 188.5 The modular generator unit shall be 33.5" long x 15.75" wide x 13.75" high weigh approximately 130 pounds. _____
- 188.6 The hydraulic pump shall be driven by a chassis transmission mounted power (PTO). _____
- 188.7 A PTO engage switch shall be mounted on the cab instrument panel to the PTO and start the generator. _____
- 188.8 *Ratings and Capacity*
- i) 10,000 watts instantaneous / 10,000 watts continuous
 - ii) 120/240 volts
 - iii) Single phase / 4 wire
 - iv) 60 Hz
 - v) 83 amps @ 120 volts / 42 amps @ 240 volts
 - vi) Engine engagement speed below 1000 RPM
 - vii) RPM operation range of 850 to 3240 RPM
- _____
- 188.9 The generator shall be tested in accordance with current N.F.P.A. 1901 standards. _____
- 189.0 TWIST LOCK RECEPTICLE**
- 189.1 A 20 amp, 110 volt (NEMA #L5-20) twist lock receptacle with a weatherproof plate shall be installed as specified by the department. _____
- 190.0 TELESCOPIC QUARTZ LIGHTS**
- 190.1 Two (2) Kwik-Raze model 36 Magnafire quartz light heads with 750-watt, halogen bulb rated at 19,200 Lumens mounted on a Kwik-Raze 500 bottom raising aluminum telescopic pole with up indicator switch. _____
- 190.2 The light assembly shall be externally mounted, One (1) each side at rear _____
- 190.3 The pole shall allow for 360-degree rotation of the light. A locking knob shall pole at the desired height. _____
- 191.0 FORWARD FACING QUARTZ LIGHTS**
- 191.1 Two (2) Kwik-Raze model 36 Magnafire quartz light heads with 750-watt, halogen bulb rated at 19,200 Lumens mounted on a Kwik-Raze KR1536 E-One custom cab permanent mount housing. Forward facing brow. _____
- 192.0 BREAKER PANEL**

192.1 A ten (10) place breaker box with up to ten (10) appropriately sized fault interrupter circuit breakers shall be supplied. The breaker box include a master breaker sized according to the generator output. The box will be located in the specified compartment, not to exceed 12' wire.

192.2 Dimensions: 17.92" high x 14.25" wide x 3.75" deep.

193.0 ELECTRIC CORD REEL

193.1 A permanently mounted Hannay model ECR 1616-17-18 electric rewind electric cord reel with 200' of black 10 gauge 3 conductor type SOWA cord 20 amps @ 110 volts shall be installed as specified. The cord shall be terminated at the end. A rewind button shall be mounted as specified.

194.0 CORD REEL ROLLERS

194.1 Stainless steel rollers shall be installed for the electric rewind cord reel to facilitate smooth removal of the electrical cord.

195.0 COR CONNECTOR

195.1 A Daniel Woodhead 20 amp, 110 volt (NEMA #L5-20) twistlock female cord connector model #27W47 shall be installed as specified.

196.0 LOW VOLTAGE SWITCHES

196.1 Relays shall be provided to allow operation of the specified 120\240 volt from remote locations other than the breaker box. The relays shall mounted in a weather resistant enclosure mounted near the breaker box. switches shall be mounted as specified.

197.0 GENERATOR TESTING

197.1 The generator shall be tested at the manufacturer's facility by an independent, third-party testing service. The conditions and testing of the generator shall be as outlined in current NFPA 1901.

197.2 The test shall include operating the generator for two hours at 100% of the load. Power source voltage, amps, frequency shall be monitored. The mover's oil pressure, water temperature, transmission temperature applicable) and power source hydraulic fluid temperature (if applicable) monitored during testing.

197.3 The results of the test shall be recorded and provided with delivery documentation.

198.0 MANUALS & DIAGNOSTIC SOFTWARE:

198.1 The Contractor shall supply the following manuals (in English) upon delivery of the vehicles:

198.1.1 Operator's manual – one (1) per vehicle.

198.1.2 Parts and Service manuals- one (1) set.

198.2 Data Collections Sheets- Data collections sheets to be completely fill out.
See clause D.6 (PMDCS)

199.0 WARRANTY:

199.1 The Contractor shall warrant the vehicle and all parts thereof, against any defects of workmanship, construction and materials, and agrees to repair or replace without cost to the City any article that has become defective and not proven to have been caused by negligence on the part of the user for a period of:

Bumper to Bumper	1 Year
Engine	5 Years
Transmission	5 Years
Structural Components	10 Years
Paint	10 Years
Aerial Structure	20 Years
Frame Structure	Lifetime

199.2 In the event of a failure on the part of the Contractor to repair or replace any article during the warranty period within five (5) business days from the date of notification, the City may have the work performed by others and offset the cost against any money due, or that may become due to the Contractor, or if there is money due, the Contractor agrees to pay the City such cost.

199.2 The responsibility for the design of the complete equipment, its performance and reliability shall rest upon the Contractor.

199.3 The term "repeated failures" as determined by the Contract Administrator, as used herein is defined to mean that the same component, subassembly, or assembly develops repeated defects, breakdowns and/or malfunctions rendering the apparatus inoperative, or requiring repeated shop correction, service and/or replacement during the warranty period applicable for said component, subassembly, or assembly. Minor items or ordinary service adjustments are not included, or considered under the scope of "repeated failures", as well as other factors, such as operational damage due to accidents, misuse or lack of proper maintenance, service and lubrication attention by not following the manufacturer's preventative maintenance schedule.

199.4 Where the vehicle develops "repeated failures" in service, the Contractor shall make any necessary engineering changes, repairs, alterations or modifications in order to guarantee reliability of performance, at no cost to the City, including all incidental costs, with a reapplied, full warranty as described in clause 46.4.

200.0 TRAINING:

The Contractor shall be required to provide training (at the Contractor's expense) for the City of Winnipeg maintenance and operating personnel.

The training shall be divided into two separate sessions, one for maintenance personnel and one for operating personnel. The training shall be conducted in separate or combined sessions for each group of personnel.

The duration of the sessions shall be as long as required for adequate familiarization and orientation of the equipment to the satisfaction of the Contract Administrator.

The training shall be conducted within two (2) calendar weeks from the date of delivery and shall be coordinated through the Contract Administrator.

The training shall be conducted in Winnipeg at a time and location designated by the Contract Administrator.

Pricing should be based on two (2) business days for maintenance personnel and two (2) business days for operating personnel.

Note: The first payment of the contract on the equipment will not be issued until successful completion of training has been conducted to the satisfaction of the Contract Administrator.

200.1 Training Aides

200.2 Training aids to be included.

200.3 On the type of equipment being offered, state if VHS video tape or CD Rom training aides are available.

200.4 State if other training aides are available and state type

201.0 DELIVERY:

201.1 The equipment shall be serviced, ready for operation and delivered F.O.B. with the freight prepaid to the City of Winnipeg, Fleet Management Agency, 185 Tecumseh Street, Winnipeg, Manitoba within **Four (4) calendar weeks** from the date of official notification of award of Contract. The Contractor shall contact the Contract Administrator prior to delivery of the equipment.

201.1.1 The Contractor shall fax all vehicle serial numbers, hours/mileage to the Contract Administrator one (1) calendar week prior to delivery.

201.1.2 A pre-delivery inspection shall be performed by the Contractor on all equipment.