CITY OF GROSSE POINTE WOODS
20025 Mack Plaza Drive
Grosse Pointe Woods, Michigan 48236-2397

(313) 343-2440
Fax (313) 343-2785

NOTICE OF MEETING
AND
AGENDA

COMMITTEE-OF-THE-WHOLE

Mayor Robert E. Novitke has called a meeting of the City Council, meeting as a Committee-of-the-Whole, for **Monday, December 17, 2018, at 6:30 p.m.** The meeting will be held in the Conference Room of the Municipal Building, 20025 Mack Plaza, Grosse Pointe Woods, MI 48236 and is accessible through the Municipal Court doors. In accordance with Public Act 267, the meeting is open to the public and the agenda items are as follows:

1. Call to Order
2. Roll Call
3. Acceptance of Agenda
4. Fire Truck
   - A. Letter from City Attorney 12/12/18
   - B. West Shore Purchase Agreement
   - C. Memo from Director of Public Safety 12/13/18
   - D. E-ONE Testing Compliance Standard
5. New Business/Public Comment
6. Adjournment

Bruce Smith
City Administrator

IN ACCORDANCE WITH PUBLIC ACT 267 (OPEN MEETINGS ACT)
POSTED AND COPIES GIVEN TO NEWSPAPERS

The City of Grosse Pointe Woods will provide necessary, reasonable auxiliary aids and services, such as signers for the hearing impaired, or audio tapes of printed materials being considered at the meeting to individuals with disabilities. All such requests must be made at least five days prior to a meeting. Individuals with disabilities requiring auxiliary aids or services should contact the City of Grosse Pointe Woods by writing or call the City Clerk's office, 20025 Mack Plaza, Grosse Pointe Woods, MI 48236 (313) 343-2440, Telecommunications Device for the Deaf (TDD) 313 343-9249, or e-mail the City Clerk at cityclk@gpwmi.us.

cc:

Council – 7	Rec. Secretary	File
Berschback	Email Group	
Smith	Media - Email	
Hathaway	Post -8	

4

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CHARLES T. BERSCHBACK

DON R. BERSCHBACK
OF COUNSEL

December 12, 2018

The Honorable Mayor and City Council
City of Grosse Pointe Woods
20025 Mack Plaza
Grosse Pointe Woods, MI 48236

RE. West Shore Purchase Agreement

Dear Mayor and Council:

Following the Committee of the Whole meeting on December 10, 2018, I emailed Bruce Smith and John Kosanke detailing the changes to the purchase agreement that were discussed at the COW meeting. The additions included clarifying the purchase price, what was included in the purchase price, and that the $5,000.00 component was a contingency fee based on potential price increases. Language was added to make clear that the manufacturer has 395 calendar days after execution of the contract to deliver the apparatus but in any event delivery will be no later than 30 days after the 395 days. The 395 day number was requested by West Shore. I also confirmed delivery to Grosse Pointe Woods City Offices. All requested changes were made by West Shore.

It would be the prerogative of Council to authorize the City Administrator to sign the West Shore Purchase Agreement for the purchase price of $1,076,000.00, broken down as follows: (a) $996,000.00 for the E-One Metro Apparatus, (b) $75,000.00 for equipment listed in the quotation, and (c) contingency fee of $5,000.00 added for potential price increases and shipping on the equipment; and that Administrator Bruce Smith be designated as the representative of the City to receive notices.

Very truly yours,

Charles Berschback

CHARLES T. BERSCHBACK

CTB:gmr
cc: Bruce Smith
John Kosanke
Lisa K. Hathaway

WEST SHORE

Purchase Agreement

This Agreement ("Agreement") is made this day of December 2018, by and between **West Shore Fire, Inc.,** 6620 Lake Michigan Drive, Allendale, Michigan, 49401 (hereinafter "Company") and The City of Grosse Pointe Woods, MI (hereinafter "Buyer").

1. **Purchase:** The Company agrees to sell, and the Buyer agrees to purchase, the fire apparatus manufactured by E-One, Inc of Ocala, FL and related equipment described in the Company's proposal and the specifications attached hereto and hereby incorporated by reference (the "Apparatus"), all in accordance with the terms and conditions of this Agreement. Changes to the specifications attached hereto will only be executed by the Company if documented by a change order signed by both parties. In the event of any conflict between the Company's proposal and the Buyer's specifications, the Company's proposal shall prevail.
2. **Price:** Buyer agrees to pay a purchase price of ***ONE MILLION SEVENTY-SIX THOUSAND AND NO/100 DOLLARS*** $1,076,000.00. The purchase price includes (a) a $6,000.00 trade in of the City's 1985 Seagrave engine, (b) Pre-build trip to E-One, (c) Pre-delivery inspection trip to E-One, (d) Final inspection and training. The purchase price breakdown is as follows: (a) $996,000.00 for the E-One Metro Apparatus, (b) $75,000.00 in equipment listed in the quotation, (c) contingency fee of $5,000.00 added for potential price increases and shipping on the equipment. The $5,000.00 contingency amount will be subject to final calculations prior to delivery and any balance of the $5,000.00 contingency amount not spent will be refunded to the buyer within 60 days of delivery. Unless otherwise specified, this Purchase Price is exclusive of all Federal, State or local taxes of any nature. Any such taxes are the sole responsibility of the Buyer unless specifically added to the purchase price, at which time they will be paid by the Company; provided, however, if the Buyer claims the Order is exempt from any tax, Buyer agrees to complete the applicable exemption certificate furnished by the Company and to hold the Company harmless from any damage which may result from the Company ultimately having any such tax assessed against it.
3. Buyer agrees that the terms of payment shall be cash or cash equivalent due upon delivery to the customer.
4. If more than one Apparatus is included and they are delivered on different dates, the terms of payment shall apply to each delivery and an invoice covering each delivery shall be issued.
5. **Pre-Build:** Upon request (at time of order) by either party, a pre-build conference may be conducted at the manufacturer's facility in Ocala, FL to ascertain and confirm customer requirements with respect to the Apparatus ordered by Buyer. Pre-build meeting will take place based on proposed dates offered by E-One. The customer will be given 15 calendar days notice prior to the conference.
6. **Delivery:** The Apparatus shall be delivered to the customer approximately 395* calendar days after the receipt and execution of the contract by the Company at its offices in Allendale, Michigan. *Final resolution of the pre-construction conference amendments may affect that date.* It is agreed that such delivery is subject to delays caused by war, acts of god, hurricane, labor shortages or strikes, inability to obtain materials, and other causes reasonably beyond the control of the Company and that the Company will not be liable for, and this Agreement may not be terminated on account of, such delays. Buyer will be notified no less than fourteen (14) business days in advance of the delivery date. Although the manufacturer will be delivering the apparatus to West Shore Fire's facility in Allendale, MI this purchase agreement requires West Shore Fire to deliver the apparatus to the City of Grosse Pointe Woods at its city offices. In addition, the apparatus shall be delivered to the customer approximately 395 calendar days after execution of the contract by the company; but in any event delivery will be no later than 30 days after the calendar days mentioned above.

7. **Customer Inspection/Acceptance:** If requested at time of order, Buyer will have up to ten (10) business days from the notified delivery date to conduct Buyer's final inspection and take possession of the Apparatus. Otherwise, delivery will be deemed to occur on the notified delivery date.

8. **Buyer's Cancellation for Convenience.** If Buyer tenders any cancellation hereunder, Buyer shall nevertheless accept delivery of all products which are completed at the time of cancellation. Those products which constitute work-in-process inventory at the time of cancellation shall be paid for by Buyer at a price equal to the completed percentage of the product multiplied by the price specified in Paragraph 2. Buyer also shall pay promptly to Company the costs of settling and paying claims arising out of the termination of work under Company's subcontracts or vendors, plus an additional 15% to defray Company's accounting, legal, and clerical costs arising out of the cancellation.

9. **Title:** The Company is fully financially responsible for delivery of the apparatus to the Buyer. The Company and Buyer agree that title shall remain with the Company until the Company has been paid in full. Provided that the Company has been paid in full, title shall remain with the Company until the Apparatus leaves Company premises in the physical custody of Buyer. Upon delivery to Buyer, Buyer's drive-away service, or Buyer's common carrier, all title, ownership and risk of loss shall pass from Company to Buyer.

10. **Warranty:** The Company warrants each new Apparatus manufactured against defects in material and workmanship for a period of one year from the in-service date per the Warranty Registration Card. Warranties beyond one year may be applicable to certain components of the Apparatus as described in the Statements of Warranty previously provided to the Buyer. This warranty is in favor of the original user/purchaser, in accordance with the Company's preprinted Statements of Warranty which are either attached to the Agreement or have otherwise been delivered to Buyer. Buyer hereby acknowledges receipt of the Company's preprinted Statements of Warranty.

11. With respect to any Apparatus not manufactured by the Company, such items shall not be warranted by the Company but shall be subject to the warranty provided by the apparatus manufacturer (E-One, Inc) or the manufacturer or manufacturers of individual items.

12. Any used item of Apparatus is sold "As-Is" without any warranty by the Company.

    These warranties are in lieu of all other warranties, whether express or implied, and THE COMPANY EXPRESSLY DISCLAIMS ALL OTHER SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

13. **Notices:** For legal notices, the parties to this Agreement designate Bruce Smith as representative of the Buyer and George Meier as representative of the Company for purposes of communications regarding this Agreement. All notices, requests, demands, waivers, consents, and other communications required or permitted by this agreement shall be in writing and shall be deemed given to a party when (a) delivered by hand or by a nationally recognized overnight courier; (b) sent by facsimile or email with confirmation of transmission by transmitting equipment or (c) received by the addressee by regular U.S. mail, all to the following addresses, facsimiles and emails:

Bruce Smith, City Administrator	George Meier, Apparatus Sales Mgr.
City of Grosse Pointe Woods	West Shore Fire, Inc.
20025 Mack Plaza	6620 Lake Michigan Dr.
Grosse Pointe Woods, MI 48826	Allendale, MI 49401
(313) 343-2450 (phone)	(616) 895-43472
(313) 343-2658 (Fax)	(616) 895-7158
bsmith@gpmi.us	gmeier@westshorefire.com

Notices: For technical issues relating to apparatus construction, contact West Shore Fire Sales Representative, Paul Dowell.

14. **Arbitration:** The parties to this agreement shall agree that any claim, dispute or controversy arising hereunder must be settled in accordance with the then current rules of the American Arbitration Association and judgment on the award rendered by a single person arbitrator may be entered in any court having jurisdiction of the matter. Accordingly, the parties hereby waive any jury or bench trial relating to a claim, dispute or controversy arising out of this agreement.

15. **Choice of Law and Venue:** This agreement shall be governed in all respects by the law of the State of Michigan. In the event that an y matter requires the filing of a lawsuit in a court of law, for example an arbitration award judgment, the parties hereby agree that any suit shall be filed in Wayne County Circuit Court, State of Michigan.

16. **Entire Agreement:** This Agreement, including its attachments and exhibits, constitutes the entire understanding between the parties relating to the subject matter contained herein and supersedes all prior discussions and Agreements. No agent or representative of the Company has authority to make any representations, statements, warranties or Agreements not herein expressed and all modifications or amendments of this Agreement, including its attachments and exhibits, must be in writing signed by an authorized representative of each of the parties hereto.

17. **Acceptance by Company:** This Agreement shall not constitute a valid and binding obligation of the Company until accepted in writing by an officer of the Company at its offices in Allendale, Michigan. When requested by the Company, the Buyer shall furnish a satisfactory written opinion of the Buyer's attorney that the Buyer has the power to make the Agreement, that the individual signing is authorized to sign on behalf of the Buyer, and that this Agreement is a valid, legal and enforceable obligation of the Buyer.

IN WITNESS WHEREOF, The Company and the Buyer have caused this Agreement to be executed by their duly authorized representatives as of the date set forth by each.

For the Buyer:	West Shore Fire, Inc.
Signature: _____	Signature: _____
Printed:	Printed: George D. Meier, Jr.
Title:	Title: Apparatus Sales Manager
Date:	Date:

CITY OF GROSSE POINTE WOODS
DEPARTMENT OF PUBLIC SAFETY

Date: **December 13th, 2018**

To: **Bruce Smith, City Administrator**

From: **John G. Kosanke, Public Safety Director**

Subject: **Purchase Agreement and new Fire Truck Quotation**

The purchase agreement for the new fire truck has been revised to address the questions and concerns of Mayor and Council.

The total price of the E-One Metro 100 is **$1,076,000.00**. The price of the truck is $996,000.00 which includes a $6,000.00 trade-in of the 1985 Seagrave Fire Engine, pre-build trip, pre-delivery trip, final inspection, delivery and training. In addition, the truck will need $75,000.00 in equipment ($5,000.00 contingency added for any price increases and shipping on equipment), for a total of $80,000.00. Any amount of the $5,000.00 contingency which is not needed will be returned to the city.

Questions were raised regarding multiple options for specific areas, such as wheels, axles, engine, and warranties. A 23-page quotation was previously submitted. Attached is a 120-page detailed specification, including diagrams, for the truck which specifically states each and every component as well as the various warranties.

The fire truck will be delivered to the Grosse Pointe Woods city offices approximately 395 days after the execution of the contract.

The Department of Public Safety is requesting permission to move forward with the purchase of the E-One Metro 100 Quint Fire Truck from West Shore Fire, Inc. A completed purchase agreement is submitted with this memo.

Customer: CITY OF GROSSE POINTE WOODS

TESTING COMPLIANCE STANDARD

Hose Bed Capacity

The hose bed shall have the capacity to store the following hose from the driver side to the officer side.

Overall Height Restriction

The apparatus shall have no overall height restrictions.

Overall Length Restriction

The unit has no overall length restrictions.

NFPA Compliance

The E-ONE supplied components of the apparatus shall be compliant with NFPA 1901, 2016 edition.

Equipment Capacity

Equipment allowance on the apparatus shall be 2500 lbs. This allowance is in addition to the weight of the hoses and ground ladders listed in the shop order as applicable.

BUMPERS

Front Bumper Extension

The bumper shall be extended approximately 20" from the face of the cab as required.

Bumper

A heavy duty 12" high steel channel type front bumper shall be provided. The front corners of the bumper shall be angled to reduce swing clearance. The bumper shall be painted job color.

Bumper Gravel Shield

The extended front bumper gravel shield shall be made of 3/16" (.188") aluminum treadplate material. The shield shall fully cover the top flange of the heavy duty front bumper.

FRAME ASSEMBLY

Frame Rail Construction

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. The integral torque box shall provide an optimized design that lowers vehicle center of gravity, eliminates the need to torque aerial frame attachment bolts, and permits underslung outriggers to maximize body compartmentation.

The 20.75" high x 34" wide torque box frame shall be fabricated with 110,000-psi minimum yield, high strength steel. The side rails of the torque box chassis shall be constructed from 20.0" high x .375" thick formed high strength steel C-channel with 7.5" top and bottom flanges. In the jack leg areas the structure shall have .375" thick reinforcing plates spaning the width of the frame above and below the C-channels as well as .500" integral bulkhead supports. Between the front and rear jack areas tubular crossmembers shall be provided.

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).

The torque box shall have the following attributes:

- Resistance to bending moment shall range from 14,440,000 to 22,590,000 in. lbs.
- Section modulus shall range from 131.28 to 205.35 cu. in.

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

- Resistance to bending moment 6,090,000 in. lbs.
- Section modulus 55.41 cu. in.

The torque box shall incorporate a stainless steel schedule 40 4" water pipe through the torque box below the turntable support for the aerial waterway inlet (if applicable). In addition, the torque box shall have two (2) 3" conduits between the forward left and right outriggers and rearward left and right outriggers to encapsulate the hydraulic, air and electrical lines.

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.

The custom chassis frame shall have a WHEEL ALIGNMENT in order to achieve maximum vehicle road performance and to promote long tire life. The alignment shall conform to the manufacturer`s internal specifications. All wheel lug nuts and axle U-bolt retainer nuts shall be tightened to the proper torque at the time of alignment. The wheel alignment documentation shall be made available at delivery upon request.

Coated Fasteners

The custom chassis frame assembly shall be assembled using GEOMET 720 coated fasteners for corrosion resistance.

AXLE OPTIONS

Shock Absorbers Front

Koni model 90 shock absorbers shall be provided for the front axle. The shocks shall be three way adjustable.

The shocks shall be covered by the manufacturer`s standard warranty.

Front Axle

The vehicle shall utilize a Dana D-2200W drop beam front axle with a rated capacity of 24,000 lbs. It shall have 71" kingpin centers. The axle shall be of I-beam construction and utilize grease-lubricated wheel bearings. The vehicle shall have a nominal cramp angle of 42 degrees including front suction applications.

The front axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels in order to improve wheel centering and extend tire life.

The front springs shall be parabolic tapered, minimum 4" wide x 54" long (flat), minimum four (4) leaf, progressive rate. The springs shall have Berlin style eyes and rubber bushings on each end with an additional standard wrap at the front eye. The capacity shall be 24,000 lbs. at the ground.

Tapered leaf springs provide a 20% ride improvement over standard straight spring systems. Supporting documentation/data shall be provided upon request.

The vehicle shall be equipped with a Sheppard integral model M-110 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 24,000 lbs. Relief stops shall be provided to reduce system pressure upon full wheel cut. The system shall operate mechanically should the hydraulic system fail.

Rear Axle

The vehicle shall utilize an Meritor RS-35-187 single rear axle with single reduction hypoid gearing and a manufacturer`s rated capacity of 35,000 lbs. The axle shall be equipped with oil-lubricated wheel bearings with Meritor oil seals.

The rear axle hubs shall be made from ductile iron and shall be designed for use with 10 hole hub-piloted wheels to improve wheel centering and extend tire use.

SUSPENSIONS

Rear Suspension

The vehicle shall be equipped with a Hendrickson high capacity air suspension. The suspension shall include dual height control valves that allow uneven, side heavy loads to be balanced, Quik-Align for easy axle alignment and two (2) hydraulic shock absorbers. The suspension shall have a maximum capacity of 35,000 lbs.

WHEEL OPTIONS

Front Wheels

The vehicle shall have two (2) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Front Wheel Trim Package

The front wheels shall have stainless steel lug nut covers (for use with aluminum wheels) or chrome plated plastic (for use with steel wheels). The front axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel universal baby moons. All stainless steel baby moons shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) baby moons and twenty (20) lug nut covers.

Rear Wheels

The vehicle shall have four (4) polished (on outer wheel surfaces only) Alcoa aluminum disc wheels. They shall be forged from one-piece corrosion-resistant aluminum alloy and sized appropriately for the tires.

Rear Wheel Trim Package, Single Axle

The rear wheels shall have stainless steel lug nut covers (chrome plated steel lug nut covers not acceptable), or American made chrome plated plastic lug nut covers. The rear axle shall be covered with American made Real Wheels brand mirror finish, 304L grade, non-corrosive stainless steel, spring clip band mount high hats, DOT user friendly. All stainless steel high hats shall carry a lifetime warranty plus a 2 year re-buffing policy. There shall be two (2) high hats and twenty (20) lug nut covers.

Aluminum Wheel Finish [Qty: 6]

A Dura-Brite high performance sealant shall be supplied on the aluminum wheel. The sealant shall not yellow under UV light exposure and shall impede staining and corrosion of the aluminum wheel.

Valve Stem Extensions

Each inside rear wheel on the rear axle shall have valve extensions.

TIRE OPTIONS

Front Tires

The front tires shall be two (2) Michelin 425/65R 22.5 tubeless type 20 PR radial tires with XZY3 Wide Base aggressive tread.

The tires with wheels shall have the following weight capacity and speed rating:

- Max front rating 22,800 @ 65 mph.
- Max front rating with Alco aluminum wheels - 24,400 @ 65 MPH (intermittent fire service rating if GAW is over 22,800)

The wheels and tires shall conform to the Tire and Rim Association requirements.

Rear Tires

The rear tires shall be Michelin 315R22.5 tubeless type radial tires with XDN2 GRIP all weather tread.

The tires with wheels shall have the following weight capacity:

- 33,080 lbs. (dual) @ 75 MPH. (Intermittent fire service max load 35,396 lbs)

The wheels and tires shall conform to the Tire and Rim Association requirements.

Intermittent Tire Service Rating

The front and / or rear tires shall be provided with and intermittent emergency vehicle service rating. Tires rating shall conform to manufacturers` service rating as applicable.

Tire Pressure Indicators

The apparatus shall be provided with Real Wheels AirGuard LED tire pressure indicating valve stem caps. When the tire is under inflated by 5-10 PSI, the LED indicator on the cap shall flash red. The indicator housings shall be shock resistant and constructed from polished stainless steel. The indicators shall be calibrated by attaching to valve stem of a tire at proper air pressure per load ratings and easily re-calibrated by simply removing and re-installing them during service.

Real Wheel Part number RWC1234 was superseded by RWC1235 as of June 2015

BRAKE SYSTEMS

Front Brakes

The front axle shall be equipped with Dana ADB22X 17 inch disc brakes.

A 3 year/unlimited miles parts and 3 year labor brake warranty shall be provided as standard by Dana. The warranty shall include bushings and seals.

Brake System

The vehicle shall be equipped with air-operated brakes and an anti-lock braking system (ABS). The brake system shall meet or exceed the design and performance requirements of the current Federal Motor Vehicle Safety Standard (FMVSS)-121, and the test requirements of the current NFPA 1901 Standard.

A dual-treadle brake valve shall correctly proportion the braking power between the front and rear systems. The air system shall be provided with a rapid pressure build-up feature, designed to meet current NFPA 1901 requirements, to allow the vehicle to begin its emergency response as quickly as possible.

A pressure-protection valve shall be installed to prevent use of the air horns or other air-operated devices should the air system pressure drop below 85 psi. This feature is designed to prevent inadvertent actuation of the emergency/parking brakes while the vehicle is in motion.

Two (2) air pressure needle gauges, one (1) each for front and rear air pressure, with a warning light and buzzer shall be installed at the driver`s instrument panel.

The braking system shall be provided with a minimum of three (3) air tank reservoirs for a total air system capacity of 5,214 cu. in. 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.

Tank Capacities in Cubic Inches:

Wet	Front	Rear	Total
1,738	1,738	1,738	5,214

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

A Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall provide automatic emergency brake application when the air brake system pressure falls below 40 psi in order to safely bring the vehicle to a stop in case of an accidental loss of braking system air pressure.

A four-channel Wabco ABS shall be provided to improve vehicle stability and control by reducing wheel lock-up during braking. This braking system shall be fitted to both front and rear axles. All electrical connections shall be environmentally-sealed for protection against water, weather, and vibration.

The system shall constantly monitor wheel behavior during braking. Sensors on each wheel transmit wheel speed data to an electronic processor, which shall detect approaching wheel lock-up and instantly modulate (or pump) the brake pressure up to five (5) times per second to prevent wheel lock-up. Each wheel shall be individually controlled. To improve field performance, the system shall be equipped with a dual-circuit design configured in a diagonal pattern. Should a malfunction occur in one circuit, that circuit shall revert to normal braking action. A warning light at the driver`s instrument panel shall signal a malfunction.

The system shall also be configured to work in conjunction with all auxiliary engine, exhaust, or driveline brakes to prevent wheel lock-up.

To improve maintenance troubleshooting, provisions in the system for an optional diagnostic tester shall be provided. The system shall test itself each time the vehicle is started, and a dash-mounted light shall go out once the vehicle is moving above 4 MPH.

A 3 year/300,000 mile parts and labor Anti-Locking Braking System (ABS) warranty shall be provided as standard by Meritor Automotive.

Park Brake Release

One (1) Bendix-Westinghouse PP-5 parking brake control valve shall be supplied on the lower dash panel within easy reach of the driver.

Electronic Stability Control

The apparatus shall be equipped with a G4 4S4M Electronic Stability Control (ESC) system that combines the functions of Roll Stability Control (RSC) with the added capability of yaw - or rotational – sensing.

RSC focuses on the vehicle's center of gravity and the lateral acceleration limit or rollover threshold. When critical lateral acceleration thresholds are exceeded, RSC intervenes to regulate the vehicle's deceleration functions. The added feature of ESC is to automatically intervene to reduce the risk of the vehicle rotating while in a curve or taking evasive action, prevents drift out through selective braking, and controlling and reducing vehicle speed when lateral acceleration limits are about to be exceeded.

Intervention by the system occurs in three forms - engine, retarder and brake control. The ESC system uses several sensors to monitor the vehicle. These include a steering wheel angle sensor, lateral accelerometer, and yaw position sensor. ESC constantly monitors driving conditions and intervenes if critical lateral acceleration is detected or if the vehicle begins to spin due to low friction surfaces. The system provides control of engine and retarder torque as well as automatically controlling individual wheels to counteract both over steer and under steer.

To further improve vehicle drive characteristics, the unit shall be fitted with Automatic Traction Control (ATC). This system shall control drive wheel slip during acceleration from a resting point. An extra solenoid valve shall be added to the ABS system. The system shall control the engine and brakes to improve acceleration slip resistance. The system shall have a dash mounted light that shall come on when ATC is controlling drive wheel slip.

3 year/300,000 miles parts and labor warranties for ESC, RSC, and ATC shall be provided as standard by Meritor Automotive.

Rear Brakes

The rear axle shall be equipped with ArvinMeritor 16.5" x 8.625" P-Cast S-cam brakes with cast brake shoes. The brakes shall be furnished with Haldex automatic slack adjusters.

A 3 year/unlimited miles parts and 3 year labor rear brake warranty shall be provided as standard by ArvinMeritor Automotive. The warranty shall include bushings, seals, and cams.

AIR SYSTEM OPTIONS

Air Dryer

The chassis air system shall be equipped with a Bendix-Westinghouse AD-9 air dryer to remove moisture from the air in order to help prevent the air lines from freezing in cold weather and prolong the life of the braking system components.

Air Inlet

A 1/4" brass quick-release air inlet with a male connection shall be provided. The inlet shall allow a shoreline air hose to be connected to the vehicle, discharging air directly into the wet tank of the air brake system. It shall be located driver door jamb.

Heated Moisture Ejectors

All air reservoirs shall be equipped with a Bendix DV-2 automatic reservoir drain valve which shall automatically eject moisture and contaminants from the reservoirs. The moisture ejectors shall be heated.

Air Lines

Air brake lines shall be constructed of color coded nylon tubing routed in a manner to protect them from damage. Brass fittings shall be provided.

Air Horns

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 air

horns. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

ENGINES & TRANSMISSIONS

Transmission Selector

A push-button transmission shift module, Allison model 29538373, shall be located to the 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 a "Service" indicator light. The shift module shall have means to enter a diagnostic mode and display diagnostic data including oil life monitor, filter life monitor, transmission health monitor and fluid level. A transmission temperature gauge with warning light and buzzer shall be installed on the cab instrument panel.

Transmission Fluid

The transmission fluid shall be TranSynd, Shell Spirax S6ATF A295, or equivalent synthetic.

Vehicle Speed

Electronic speed limiting set at 60 MPH as required by NFPA 1901.

Engine/Transmission Package

Engine

The vehicle shall utilize a Cummins L9 engine as described below:

- 450 maximum horsepower at 2100 rpm
- 1250 lb-ft peak torque at 1400 rpm
- Six (6) cylinder, charge air cooled, 4-cycle diesel
- 543 cu. in. (8.9 liter) displacement - 4.49 in bore x 5.69 in stroke
- 16.6:1 compression ratio
- Viable Geometry Turbocharged
- Engine shall be equipped with Full-Authority Electronics
- Electronic Timing Control fuel system
- Fuel cooler (when equipped with a fire pump)
- Fleetguard FS1022 fuel filter with integral water separator and water-in-fuel sensor approved by Cummins for use on the ISL engine
- Fleetguard LF9009 Venturi Combo combination full-flow/by-pass oil filter approved by Cummins for use on the ISL engine
- Engine lubrication system, including filter, shall have a minimum capacity of 25 quarts
- Delco-Remy 39 MT-HD 12-volt starter
- Cummins 18.7 cubic foot per minute (cfm) air compressor
- Corrosion inhibitor additive for coolant system

- After treatment system consisting of a oxidation catalyst and diesel particulate filter and selective catalyist reduction system
- Ember separator compliant with current NFPA 1901 standard
- The engine shall be compliant with 2017 EPA Emission standards

The engine air intake shall draw air through the front cab grill. The intake opening shall be located on the officer (right) side behind front cab face with a plenum that directs air to the air filter. The air cleaner intake piping shall be made from aluminized steel tubing with flexible rubber hoses. The intake piping clamps shall be heavy-duty, constant-torque, T-bolt style to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

The air cleaner shall be an 11" diameter K&N for lower restriction and high air flow. The filtration media shall be washable and easily accessed for service. The air filter shall have a 3 year / 300,000 mile warranty.

The engine exhaust piping shall be a minimum of 4" diameter welded stainless steel tubing.
The aftertreatment system shall be mounted horizontally under the right-hand frame rail in back of the cab in order to minimize heat transmission to the cab and its occupants. The exhaust shall be directed away from the vehicle on the right side ahead of the rear wheels in order to keep exhaust fumes as far away as possible from the cab and pump operator position.

A 5-year/100,000-miles parts and labor warranty shall be provided as standard by Cummins.

A copy of the Engine Installation Review stating the engine installation meets Cummins recommendations shall be provided as requested. The engine installation shall not require the operation of any type of "power-down" feature to meet engine installation tests.

Transmission

The vehicle shall utilize an Allison EVS3000P, electronic, 5-speed automatic transmission.

A push button 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 a "Service" indicator light that are clearly visible to the driver. The shift module shall have means to enter a diagnostic mode and display diagnostic data.

A transmission oil temperature gauge with warning light and buzzer shall be installed on the cab instrument panel to warn the driver of high oil temperatures that may damage the transmission.

The transmission shall have a gross input torque rating of 1250 lb.-ft. and a gross input power rating of 450 HP.

The gear ratios shall be as follows:

- 1 - 3.49
- 2 - 1.86
- 3 - 1.41
- 4 - 1.00
- 5 - .75
- R - 5.03

The transmission shall have an oil capacity of 23 quarts and shall be equipped with a fluid level sensor (FLS) system, providing direct feedback of transmission oil level information to the driver.

A water-to-oil transmission oil cooler shall be provided to ensure proper cooling of the transmission when the vehicle is stationary (no air flow). Air-to-oil transmission oil coolers, which require constant air flow, are not acceptable.

The transmission shall be provided with two (2) engine-driven PTO openings located at the 4 o`clock and 8 o`clock positions for flexibility in installing pto-driven equipment.

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

A 5-year/unlimited miles parts and labor warranty shall be provided as standard by Allison Transmission.

Automatic Shift to Neutral

The transmission shall be programmed to comply with NFPA 1901 and automatically shift to neutral upon application of the parking brake.

SECONDARY BRAKING

Jacobs Engine Brake

One (1) Jacobs engine brake shall be installed to assist in slowing and controlling the vehicle as required by NFPA 1901 for vehicles with gross vehicle weight ratings (GVWR) of 36,000 lbs. or greater. An on-off control switch and a high-medium-low selector switch shall be mounted in the cab accessible to the driver.

When activated, the Jacobs engine brake shall cut off the flow of fuel to the cylinders and alter the timing of the exhaust valves. This shall transform the engine into a high-pressure air compressor, driven by the wheels, and the horsepower absorbed by the engine in this mode shall slow the vehicle. The selector switch allows the driver to select the amount of retarding power.

When the on-off switch is in the "on" position, the engine brake shall be automatically applied whenever the accelerator is in the idle position and the automatic transmission is in the lock-up mode. If the accelerator is depressed or if the on-off switch is placed in the "off" position, the engine brake shall immediately release and allow the engine to return to its normal function.

Transmission Programming

The transmission shall include the Allison 2nd gear Pre-Select feature. This option will direct the transmission to down shift to second gear when the throttle is released and the Jacobs engine brake (or Telma retarder wired to activate with release of throttle) is engaged. This feature is designed to increase brake life and aid vehicle braking.

EXHAUST OPTIONS

Exhaust Blanket

The exhaust shall be covered with an insulation blanket specifically designed for high temperature usage. The blanket shall have a silicone impregnated fiberglass sewn outer cover with a stainless steel knitted wire mesh inner liner. The cover shall be retained with stainless steel capstan rivets and stainless steel lacing wire. The blanket shall be installed from the engine turbo to the DPF.

Exhaust End Modification

The end of the exhaust tail pipe shall be modified to accommodate a Plymovent in-house exhaust extraction system. The tail pipe will be at 90 degrees and straight out below the side of body. A stop ring shall be provided on the tail pipe to properly position the Plymovent nozzle. The exhaust outlet shall be vented for use with 2013 and newer EPA engines.

COOLING PACKAGE

Engine Cooling Package

Radiator

The cooling system shall include an aluminum tube-and-fin radiator with a minimum of 1,408 total square inches of frontal area to ensure adequate cooling under all operating conditions. There shall be a drain valve in the bottom tank to allow the radiator to be serviced. A sight glass shall be included for quick fluid level assessment. The radiator shall be installed at the prescribed angle in order to achieve the maximum operational effectiveness. This shall be accomplished according to established work instructions and properly calibrated angle measurement equipment.

Silicone Hoses

All radiator and heater hoses shall be silicone. Pressure compensating band clamps shall be used to eliminate hose pinching on all hoses 3/4" diameter and larger. All radiator hoses shall be routed,

loomed, and secured so as to provide maximum protection from chafing, crushing, or contact with other moving parts.

Coolant

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.

Coolant Recovery

There shall be a coolant overflow recovery system provided.

Charge Air Cooler System

The system shall include a charge air cooler to ensure adequate cooling of the turbocharged air for proper engine operation and maximum performance.

Charge Air Cooler Hoses

Charge air cooler hoses shall be made from high-temperature, wire-reinforced silicone to withstand the extremely high temperatures and pressures of the turbocharged air. The hoses shall incorporate a flexible hump section to allow motion and misalignment of the engine relative to the charge air cooler. Charge air cooler hose clamps shall be heavy-duty, constant-torque, T-bolt clamps to ensure proper sealing under all temperatures in order to keep dust and other contaminants out of the engine intake air stream and protect the engine.

Fan/Shroud

The fan shall be 30" in diameter with eleven (11) blades for maximum airflow and dynamic balance. It shall be made of nylon for strength and corrosion resistance. The fan shall be installed with grade 8 hardware which has been treated with thread locker for additional security. A fan shroud attached to the radiator shall be provided to prevent recirculation of engine compartment air around the fan in order to maximize the cooling airflow through the radiator. The fan shroud shall be constructed of fiber-reinforced high temperature plastic. The shroud shall be specifically formed with curved surfaces which improves air flow and cooling.

Transmission Cooler

The cooling system shall include a liquid-to-liquid transmission cooler capable of cooling the heat generated from the transmission. When a transmission retarder is selected, the cooler shall have an increased capacity to handle the additional heat load.

FUEL SYSTEMS

Fuel Shut-Off

A shut-off valve shall be supplied to prevent drain back of fuel into the main supply line during filter changes. The valve(s) shall be located: one (1) inlet side of OEM fuel filter.

Fuel Line

All fuel lines shall be rubber.

Fuel Tanks

Dual side-mounted fuel tanks shall be provided for a total usable capacity of 60 gallons. Each 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 tanks shall be mounted behind the rear axle. Each tank shall be secured by a wrap-around T-bolt type stainless steel strap. Each strap shall be fitted with protective rubber insulation and shall be secured with grade 8 hardware. This design allows for tank removal from below the chassis.

Each tank shall be equipped with a 2" filler neck, two (2) additional 80% draw pick-up/return connections, a vent with overturn leak protection, and a .50" NPT magnetic drain plug. The tanks shall be connected with a 1.0" crossover line for equalization allowing the full fuel capacity to be filled from either side of the vehicle. Fuel shall be drawn from one tank and returned to the other.

A mechanical fuel pump sized to meet the engine requirements shall be provided.

ALTERNATOR

420 Amp Alternator

There shall be a 420 amp Leece Neville alternator installed as specified. The alternator shall be a Leece Neville brushless type with integral rectifier and adjustable voltage regulator with an output of 369 amps per NFPA 1901 rating (420 amps per SAE J56).

BATTERIES

Battery System

The manufacturer shall supply four (4) 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 (1) 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.

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.

One (1) positive and one (1) negative jumper stud shall be provided.

Batteries shall have a warranty of twelve (12) months that shall commence upon the date of delivery of the apparatus.

CHASSIS OPTIONS

Drivelines

Drivelines shall have a heavy duty metal tube and shall be equipped with Spicer 1710HD universal joints to allow full-transmitted torque to the axle(s). Drive shafts shall be axially straight, concentric with axis and dynamically balanced.

Rear Tow Eyes

Two (2) heavy duty tow eyes made of 3/4" (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. 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.

Front Tow Hooks

Two (2) heavy duty stainless steel front tow hooks shall be securely attached to the front chassis frame rails to allow towing (not lifting) of the apparatus without damage. They shall be mounted in the downward position.

Hydraulic Pump System

A fixed-displacement hydraulic pump system shall be provided to operate all outrigger and aerial functions as well as the chassis power steering system. This shared hydraulic system is desired because it heats the hydraulic fluid while driving to provide smoother operation to other systems in cold climate conditions, rather than utilizing a separate pump.

The hydraulic pump system shall allow the aerial system to be activated without having to shut down the water pump or reduce engine RPM`s by a switch located on the cab within easy reach of the driver. A system "engaged" indicator light shall be provided on the activation switch. Engagement of the aerial circuit shall only be allowed with the transmission in the neutral or pump gear and the parking brake engaged.

The system's hydraulic pump shall be engine mounted and 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 (2950 on HP78 models).

Cold Weather Cab Package

Additional insulation shall be provided on the front cab wall. The insulation shall consist of a reflective backing covered air core insulation.

Insulation shall be provided on the rear cab heater hose lines (if equipped).

A thermostatically controlled clutch type cooling fan shall be installed on the chassis engine.

DEF Tank

A diesel exhaust fluid (DEF) tank with a five (5) gallon capacity shall be provided.

The DEF tank shall include a heater fed by hot water directly from the engine block to prevent the DEF from becoming too cool to operate correctly per EPA requirements. The tank shall include a temperature sensor to control the heater control valve that controls the feed of hot water from the engine to the DEF tank heater.

A sender shall be provided in the DEF tank connected to a level gauge on the cab dash.

The tank shall be located left side below rear of cab.

CAB MODEL

Cab Cyclone Medium

The vehicle shall be distinguished by an all-welded aluminum and fully enclosed tilt cab. The cab shall be designed exclusively for fire/rescue service and shall be pre-engineered to ensure long life. It shall incorporate an integral welded substructure of high-strength aluminum alloy extrusions that creates an occupant compartment that is essentially a protective perimeter. The end result is a distinctive structure that is aesthetically appealing, functionally durable, and characterized by increased personnel safety.

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

bows are 6061 T6 aluminum alloy. This combination of a high-strength, welded aluminum inner structure surrounded on all sides by load-bearing, welded aluminum outer skins provides a cab that is strong, lightweight, corrosion-resistant, and durable.

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 aluminum upright extrusions between the 3" x 3" x 0.375" wall-thickness 6061-T6 roof crossbeam and the 2.25" x 3" x 0.435" wall-thickness 6063-T6 sub frame structure in the front. An additional two (2) aluminum 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 aluminum alloy welding wire.

The sub frame structure shall be constructed from high-strength 6061-T6 aluminum extrusions welded together to provide a structural base for the cab. It shall include a side-to-side 3" x 1.5" .375 thick C-channel extrusion across the front, with 3/4" 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.

The cab floor shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate welded to the sub frame structure to give the cab additional strength and to help protect the occupants from penetration by road debris and under-ride collision impacts.

The cab roof shall be constructed from 3/16" (0.188") 3003 H14 aluminum treadplate supported by a grid of fore-aft and side-to-side aluminum extrusions to help protect the occupants from penetration by falling debris and downward-projecting objects. Molded fiberglass or other molded fiber-reinforced plastic roof materials are not acceptable.

The cab roof perimeter shall be constructed from 4" x 6-5/8" (4" x 6.625") 6063-T5 aluminum extrusions with integral drip rails. Cast aluminum corner joints shall be welded to the aluminum 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.

The cab rear skin shall be constructed from 3/16" (0.188") 3003 H14 aluminum plate. Structural extrusions shall be used to reinforce the rear wall.

The left-hand and right-hand cab side skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum plate. The skins shall be welded to structural aluminum extrusions at the top, bottom, and sides for additional reinforcement.

The cab front skins shall be constructed from 3/16" (0.188") 3003 H14 smooth aluminum 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.

Cab Exterior

The exterior of the cab shall be 94" wide x 130" long to allow sufficient room in the occupant compartment for up to eight (8) fire fighters. The cab roof shall be approximately 101" above the ground with the flat roof option. The back-of-cab to front axle length shall be a minimum of 58".

Front axle fenderette trim shall be brushed aluminum 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 that helps protect the underside of the cab structure and components from stones and road debris.

A large stainless steel cooling air intake grille with an open area of no less than 81% shall be at the front of the cab.

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.

Cab Mounts and Cab Tilt System

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 (1) 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.

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.

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.

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 brake is set.

The entire cab shall be tilted through a 42-45 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.

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.

Cab Interior

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.

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-aluminum sub frame 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 center section. The engine cover shall not exceed 41" in width at its widest point.

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 3/4" dual density fiberglass 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 (Ul subject 94 Test).

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.

The rear engine cover area shall be covered with molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black with a pebble grain finish for slip resistance.

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 36" of seated headroom at the "H" point shall be provided over each fenderwell.

The interior side to side dimensions shall be 87" from wall padding to wall padding and 89.5" from door to door.

The floor area in front of the front seat pedestals shall be no less than 24" side to side by up to 25" front to rear for the driver and no less than 24" side to side by up to 27" front to rear for the officer to provide adequate legroom.

Battery jumper studs shall be provided to allow jump-starting of the apparatus without having to tilt the cab.

All exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

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 1/4" (0.25") foam padding. The padding board shall be backed with 1/4" (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.

The vehicle shall use a seven-position tilt and telescopic steering column to accommodate various size operators. An 18" padded steering wheel with a center horn button shall be provided.

Storage areas, with hinged access doors, shall be provided below the driver and officer seats. The driver side compartment shall be approximately 20" deep x 12" wide x 3.5" high and the officer side compartment shall be approximately 14" deep x 12" wide x 11" high (height will be reduced with air or electric seat). Note: With RollTek option the compartments may be occupied by air bag system components.

The front cab steps shall be a minimum of 8" deep x 24" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. The rear cab steps shall be a minimum 12" deep x 21" wide. The first step shall be no more than 24.0" above the ground with standard tires in the unloaded condition per NFPA 1901 standards. 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 aluminum diamond plate with a multi-directional, aggressive gripping surface incorporated into the aluminum diamond plate in accordance with current NFPA 1901.

A black 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 grip handle shall be provided on the left and right side windshield post for additional handholds.

Cab Doors

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

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

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.

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.

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.

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.

Cab Instruments and Controls

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 because of their tendency to accumulate moisture, which can lead to corrosion or to freezing in cold weather. 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.

Cab 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. Emergency warning light switches shall be installed in removable panels for ease of service. The following gauges and/or controls shall be provided:

- 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 center of steering wheel
- Cab ajar warning light on the message center enunciator

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.

Fast Idle System

A fast idle system shall be provided and controlled by the cab-mounted switch. The system shall increase engine idle speed to a preset RPM for increased alternator output.

Electrical System

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.

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.

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.

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.

Two (2) dual rectangular chrome plated headlight bezels shall be installed on the front of the cab. 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.

Cab Crashworthiness Requirement

The apparatus cab shall meet and/or exceed relevant NFPA 1901 load and impact tests required for compliance certification with the following:

Side Impact Dynamic Pre-Load per SAE J2422 (Section 5).

Testing shall meet and/or exceed defined test using 13,000 ft-lbs of force as a requirement. The cab shall be subject to a side impact representing the force seen in a roll-over. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 13,776 ft-lbs of force **exceeding** testing requirements.

Quasi-static Roof Strength (proof loads) per SAE J2422 (Section 6) / ECE R29, Annex 3, paragraph 5.

Testing shall meet and/or exceed defined test using 22,046 lbs of mass as a requirement. Testing shall be completed using platen(s) distributed uniformly over all bearing members of the cab roof structure.

Cab testing shall be completed using 23,561 lbs of mass **exceeding** testing requirements. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and doors shall remain closed.

Additional cab testing shall be conducted using 117,336 lbs of mass **exceeding** testing requirements by **over five (5) times**. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space and the doors shall remain closed.

Frontal Impact per SAE J2420.

Testing shall meet and/or exceed defined test using 32,549 ft-lbs of force as a requirement. The cab shall be subject to a frontal impact as defined by the standard. The cab shall exhibit minimal to no intrusion into the cab's occupant survival space, doors shall remain closed and cab shall remain attached to frame.

Cab testing shall be completed using 34,844 ft-lbs of force **exceeding** testing requirements.

Additional cab testing shall be conducted using 65,891 ft-lbs of force **exceeding** testing requirements by **over two (2) times**.

The cab shall meet all requirements to the above cab crash worthiness; **NO EXCEPTIONS**.

A copy of a certificate or letter verifying compliance to the above performance by an independent, licensed, professional engineer shall be provided upon request.

For any or all of the above tests, the cab manufacturer shall provide either photographs or video footage of the procedure upon request.

Seat Mounting Strength

The cab seat mounting surfaces shall be third party tested and in compliance with FMVSS 571.207.

Seat Belt Anchor Strength

The cab seat belt mounting points shall be third party tested and in compliance with FMVSS 571.210.

ISO Compliance

The manufacturer shall ensure that the construction of the apparatus cab shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions,

Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus cab that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

CAB ROOF TYPE

Raised Rear Cab Roof (Split)

The outboard roof of the rear crew area shall be raised 12" allowing the rear cab doors to be extended up providing improved egress. The forward end of the raised roof shall be tapered for a streamlined appearance. The interior of the raised cab roof areas shall be provided with padded headliner material to match the center cab ceiling.

The center of the cab roof shall include a 1.5" deep waterway clearance notch from front to rear minimizing overall travel height of the vehicle. The center cab roof notch shall not affect the interior cab ceiling or cab structure.

CAB BADGE PACKAGE

Logo Package

The apparatus shall have manufacturer logos provided on the cab and body as applicable.

CAB DOOR OPTIONS

Rear Cab Door Position

The cab rear doors shall be moved to the rear of the wheel opening. This door placement facilitates easier entry and egress by reducing the rear facing seat protrusion into the door opening.

Rear door position to the 58” or (medium cab).

Cab Door Locks

Each cab door shall have a manual operated door lock actuated from the interior of each respective door. Exterior of each cab door shall be provided with a barrel style keyed lock below the cab door handle.

Cab Door Locks

The cab shall have 1250 keyed door locks provided on exterior doors to secure the apparatus.

Cab Door Front Windows

Driver and Officer door windows. Includes electric roll-down actuation. Each door to have individual control at door position and the driver door is to have master control for all power window locations.

Cab Door Rear Windows

Rear crew cab door windows. Includes electric roll-down actuation. Each door to have individual control. Not available with paddle style door latching.

Cab Door Panels

The inner door panels shall be made from 14 gauge brushed finish stainless steel for increased durability. The cab door panels shall incorporate an easily removable panel for access to the latching mechanism for maintenance or service.

Cab Door Exterior Latches

All cab doors shall have “L” style exterior door latches.

Cab Door Area Lighting

There shall be four (4) clear LED lights provided to illuminate the cab step well area. Each light shall be located on each cab door in the inboard position. Each light shall be activated by the cab door ajar circuit.

Door Mounted Flashing Lights

There shall be four (4) door mounted red LED flashing lights, one (1) per door.

The lights shall be located on each cab door in the outboard position.

Each light shall be activated by the cab door ajar circuit.

Cab Door Reflective Material

Reflective Red/Fluorescent Yellow Green 3M Diamond Grade material striping shall be supplied on each of the cab doors. The stripes shall run from the lower outer corner to the upper inside corner of the panel, forming an "A" shape when viewed from the rear. The material shall meet NFPA 1901 requirements for size (96 square inches) and reflectivity.

Cab Front Door Windows

Driver and officer door windows shall be full width.

CAB STEP OPTIONS

Cab Step

An auxiliary step below the cab door shall be provided. The step shall be constructed of .188" aluminum tread brite. The step surface shall be provided with an aggressive skid-resistant surface and have an open back. The step shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate. The surface shall extend 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 on centers not to exceed 4".

The step shall be located driver's front door, officer's front door, driver side rear door, officer side rear door.

Steps under front cab doors shall not interfere with approach angle.

MIRRORS

Mirrors, Heated

Driver and officer cab mirrors to be heated. Includes all surfaces (flat and convex, as applicable).

Cab Mirrors

Two (2) Ramco model 6001FFR remote controlled aluminum mirrors shall be installed. The mirrors shall incorporate a full face main section with a convex mirror with housing model CAS750, mounted to the top. The adjustment of main sections shall be through dash mounted switches. Location: mounted on front corners of cab.

MISC EXTERIOR CAB OPTIONS

Cab Canopy Window

There shall be a fixed window provided between the front and rear doors on the driver`s side of the cab.

Window dimensions shall be as follows:

- 26.69"W x 24.5"H

Cab Canopy Window

There shall be a fixed window provided between the front and rear doors on the officer`s side of the cab.

Window dimensions shall be as follows:

- 26.69"W x 24.5"H

Front Mud Flaps

Black linear low density polyethylene (proprietary blend) mud flaps shall be installed on the rear of the cab front wheel wells. The design of the mud flaps shall have corrugated ridges to distribute water evenly.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 18" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer door openings one 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.

Handrails

Cab door assist handrails shall consist of two (2) 1.25" diameter x 36" long 6063-T5 anodized aluminum tubes mounted directly behind the driver and officer rear door openings one 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.

Rear Cab Wall Construction

The rear cab wall shall be constructed with the use of 3/16" aluminum diamond plate interlocking in aluminum extrusions.

Cab Wheel Well

The cab wheel well shall be increased in size to provide additional clearance for larger tires. The fender trim shall be adjustable in and out to better accommodate various wheel / tire offsets.

Receptacle Mounting Plate

A mounting plate shall be provided for the battery charger receptacle, battery charger indicator and if applicable the air inlet, etc. The plate shall be constructed of 14 gauge brushed finish stainless steel and be removable for service access to the receptacle(s) and indicator.

HVAC

Air Conditioning

An overhead air-conditioner / heater system with a single radiator mounted condenser shall be supplied.

The unit shall be mounted to the cab interior headliner in a mid-cab position, away from all seating positions. The unit shall provide ten (10) comfort discharge louvers, four (4) to the back area of the cab and six (6) to the front. These louvers will be used for AC and heat air delivery. Two (2) additional large front louvers shall be damper controlled to provide defogging and defrosting capabilities to the front windshield as necessary.

The unit shall consist of a high output evaporator coil and heater core with one (1) high output dual blower for front air delivery, and two (2) high performance single wheel blowers for rear air delivery.

The control panel shall actuate the air-distribution system with air cylinders, which are to be separated from the brake system by an 85-90 psi pressure protection valve. A three-speed blower switch shall control air speed.

The condenser shall be radiator mounted and have a minimum capacity of 65,000 BTU`s and shall include a receiver drier.

Performance Data: (Unit only, no ducting or louvers)

- AC BTU: 55,000
- Heat BTU: 65,000
- CFM: 1300 @ 13.8V (All blowers)

The compressor shall be a ten-cylinder swash plate type Seltec model TM-31HD with a capacity of 19.1 cu. in. per revolution.

The system shall be capable of cooling the interior of the cab from 100 degrees ambient to 75 degrees or less with 50% relative humidity in 30 minutes or less.

Heat, Supplemental

A single 40,000 BTU water heater shall be supplied in the front area of the cab. The unit shall heat the lower section of the driver`s and officer`s footwell.

Dual 23,000 BTU water heaters with diamond plate covers shall be supplied in the rear of the cab to heat the rear cab lower section.

Dual climate control will be achieved via dual switches installed on a front instrument panel. On units with optional multiplex display climate control, the floor heaters shall be controlled through the HVAC screen in the display.

SEATS

Seating

All seats shall be Seats, Inc. 911 brand.

Seat, Driver

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
- 4" fore and aft adjustment

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.

Seat, Officer

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.

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.

Seat, Rear Facing

One (1) Seats, Inc. 911 Universal SCBA seat shall be provided in the rear facing position over the driver side wheel well.

Features shall include:

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

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.

Seat, Rear Facing

One (1) Seats, Inc. 911 Universal SCBA seat shall be provided in the rear facing position over the officer side wheel well.

Features shall include:

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

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.

Seat Fabric Color

All seats shall be gray in color.

Seating Capacity Tag

A tag that is in view of the driver stating seating capacity of four (4) personnel shall be provided.

SCBA Bracket SmartDock

A IMMI SmartDock Gen2 SCBA storage bracket shall be provided. The SmartDock is a strap-free docking station that offers single-motion SCBA insertion and hands-free release when the firefighter stands up to exit the seat. SmartDock has undergone extensive testing to ensure that it meets or exceeds industry standards. When evaluated to the NFPA 1901 Standard for Automotive Fire Apparatus, SmartDock met requirements for retaining both the cylinder and the pack in dynamic testing.

Location: officer's seat, rear facing driver's side, outboard driver's side rear wall, inboard driver's side rear wall, inboard officer's side rear wall, outboard officer's side rear wall, rear facing officer's side.

Seat Cover Material

All seats shall have Turnout Tuff seat cover material.

Seat Belt Extender

ReadyReach seat belt extenders shall be provided. The extender shall include an arm that places the shoulder belt D-loop in a closer, easier to reach location.

The extenders shall be provided for the driver's seat, officer's seat, rear facing driver's side, rear facing officer's side seat.

MAP BOXES

Map Box

An aluminum map/storage box shall be installed in the cab. The map box shall be constructed of 1/8" (.125) inch smooth aluminum. Hinged drop-down doors with push button latches, shall be installed on the front of the box for the access to the driver and officer side storage areas. Each storage area shall have two (2) fixed shelves for storage of ring binders, map books, etc. Each latch shall have a 25 lb. rating.

The map box shall be mounted on the vertical uprights in the center of the cab between the driver and officer seating positions. The map box shall be secured and tested to meet with current NFPA requirements.

Approximate overall dimension: 34" W x 9.50" H x 12" D.

Map Box Finish

The map box(es) shall have Zolatone gray #20-64 finish.

MISC INTERIOR CAB OPTIONS

Cab Interior Color

Cab instrument panel, overhead console, trim panels, headliner, and door panels shall be gray.

Sun Visors

Lexan sun visors 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.

Interior Grab Handles

There shall be one (1) rubber covered grab handle provided at the interior of each front cab door opening. The handles shall be located at the rear of the door openings.

Mounting Plate on Engine Cover

An equipment mounting plate shall be provided between the driver and officer on the chassis engine cover. The plate shall be mounted to the engine access door spaced approximately 1/2" up to provide clearance for equipment mounting hardware. The plate shall be constructed of 3/16" aluminum plate and have a swirl finish.

Engine Cover

The engine cover shall blend in smoothly with the interior dash and flooring of the cab. The upper left and right sides shall have a sloped transition surface running front to rear providing increased space for the driver and officer.

The engine cover and engine service access door cover shall be molded 18 lb/cu. ft. (+/-0.5) flexible integral skinned polyurethane foam at a Durometer of 60 (+/- 5.0) per ASTM F1957-99. The cover shall be approximately .5" thick with a minimum skin thickness of 0.0625 inches. The cover shall be provided to reduce the transmission of noise and heat from the engine. The cover shall be black and feature a pebble grain finish for slip resistance.

Cup Holder / Storage Tray

A cup holder and tray assembly shall be provided on the cab engine cover between the driver and officer. The tray shall be approximately 14" wide x 10" long x 1.5" tall and constructed from .125" aluminum plate. The top edge of the tray sides shall have a .5" lip and the front corners of the tray shall be tapered for dash access. The two (2) cup holders shall be constructed from 3.5" diameter pipe approximately 2.5" tall and be located one each side at the rear corners of the tray. The assembly shall be painted to match the cab interior color.

Cab Dash - Low Profile Severe Duty

The center and officer side dash shall be constructed from .125" smooth aluminum plate painted to match the cab interior. The center and officer side dash panel shall be lowered to provide increased visibility. A hinged access panel shall be provided on top of the center dash to provide easy access to components within.

The lower kick panels below the dash to be constructed from .125 aluminum plate painted to match the cab interior. The panels shall be removable to allow for servicing components that may be located behind the panels.

Rear Facing Storage

Recessed storage areas shall be provided in the rear face of the cab wheel well risers. Each area shall provide 900 cubic inches of storage space.

Overhead Console

A full-width front overhead console shall be mounted to the cab ceiling for placement of siren/radio heads (non-LTH cabs only) and for warning light switches. The console shall be made from a thermoformed, non-metallic material and shall have easily removable mounting plates.

The overhead HVAC shall be covered with thermoformed, non-metallic, non-fiber trim pieces 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.

Rear Engine Cover

The rear engine cover shall be provided with a reduced profile for increased legroom on the forward facing rear inboard seats.

CAB ELECTRICAL OPTIONS

Cab Dome Lights

Four (4) ceiling mounted dome light assemblies shall be provided.

Each light shall consist of a three-position assembly mounted rocker switch, LED (light emitting diode) 4" grommet mount white dome light, LED (light emitting diode) 4" grommet mount red dome light, and a plastic housing.

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

Two (2) lights shall be located in both the front and rear of the cab.

Push-Button Switch

A heavy duty metal push-button switch shall be installed on the officer`s side dash to operate the Q2B siren.

Push-Button Switch

A heavy duty metal push-button switch shall be installed on the officer`s side dash to operate the Q2B siren brake.

Auto-Eject Battery Charger Receptacle

The battery charger receptacle shall be a Kussmaul 20 amp NEMA 5-20 Super Auto-Eject #091-55-20-120 with a cover. The Super Auto-Eject receptacle shall be completely sealed and have an automatic power line disconnect.

The receptacle shall be located outside driver's door next to handrail and the cover color shall be Yellow.

Horn Button Switch

A two (2) position rocker switch shall be installed in the cab accessible to the driver and properly labeled to enable operator to activate the OEM traffic horn or air horn from the steering wheel horn button.

Push-Button Switch

A heavy duty metal push-button switch shall be installed on the officer`s side dash to operate the air horns.

English Dominant Gauge Cluster

The cab operational instruments shall be located in the dashboard on the driver side of the cab and shall be clearly visible. The gauges in this panel shall be English dominant and shall be the following:

- 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
- Transmission oil temperature gauge

This panel shall be backlit for increased visibility during day and night time operations.

Headlights

The front of the cab shall have four (4) headlights. The headlights shall be mounted on the front of the cab in the lower position. The headlights shall be day time operational.

Air Compressor

A Kussmaul model 091-9B-1, 120V air compressor shall be installed.

The air compressor shall be powered by a 120 volt inlet receptacle and has an output of .76 cfm at 100 psi. A pressure switch senses the system pressure and operates the compressor whenever the pressure in the air brake system drops below a pre-determined level.

12 Volt (or 24 Volt) Outlet

A plug-in type receptacle for hand held spotlights, cell phones, chargers, etc. shall be installed officer side dash. The receptacle shall be wired battery hot.

Antenna Base

There shall be a Tessco P/N 90942 universal antenna base mounted on the cab roof with a weatherproof connector. The antenna base shall be NMO Motorola Style (equivalent to a MATM style) with RG58U coax cable. The antenna shall be located officer side forward with coaxial cable terminating at the center of the dash board.

Battery Charger Location

The battery charger shall be located behind driver's seat.

Air Compressor Location

The air compressor shall be located behind officer's seat.

Officer Speedometer

A speedometer shall be provided in the officer side multiplex display in the cab.

Battery Charger

An E-ONE LPC 20 battery charger with remote mounted LED display shall be installed.

A fully automatic charging system shall be installed on the apparatus. The system shall have a 120 volt, 60 hertz, 7 amp AC input with an output of 20 amps 12 volts DC. The battery charging system shall be 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 include a remote charging status indicator panel. The panel shall consist of two (2) LED lights to provide a visual signal if battery voltage is good or drops below 11.5 volts. The microprocessor shall be continuously powered from the battery to provide the charge status.

Programming Instructions

Auxiliary switch 1 on the steering wheel switch pod shall be programmed to operate the Q2B.

Programming Instructions

Auxiliary switch 2 on the steering wheel switch pod shall be programmed to operate the Q2B Brake.

Programming Instructions

Auxiliary switch 3 on the steering wheel switch pod shall be programmed to operate the Front brow light(s). (Requires relay option if lights are not 12v).

Cab USB Charging Port

A dual USB charging port for cell phones, chargers, etc. shall be installed In cab driver side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush), In cab officer side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush), officer side dash. The receptacles shall be wired battery hot.

DPF Regeneration Override

A momentary override switch shall be provided for the Diesel Particulate Filter (DPF) regeneration. The switch will inhibit the regeneration process until the switch is reset or the engine is shut down and restarted. The switch shall be located within reach of the driver.

Steering Wheel Switches

The steering wheel shall be supplied with two (2) switch pods. Each switch pod shall include five (5) switches. The pods shall include switching for wipers, master warning, air horns and auxiliary engine brake (on/off). In addition there shall be three (3) auxiliary switches that can be programmed to meet department specified functions.

The wiper switches shall include high / low speed, intermittent, wipe / wash and off. The wiper motors shall shall be synchronized so as to wipe each windshield simultaneously.

Cab Headlights

FireTech model FT-4x6-4KIT LED headlights shall be provided. Headlights shall include low beam, high beam, elliptical beam and an integrated halo ring park lamp.

Cab Turn Signals

There shall be a pair of Federal Signal FireRay model FR6-ARROW LED (Light Emitting Diode) turn signal light heads with populated arrow pattern and amber lens mounted upper headlight bezel and wired with weatherproof connectors.

BODY SPEC

Aerial Equipment Body

Performance

The aerial body shall be designed to permit the reloading of fire hose without raising the aerial from the stored position. This requirement is essential to the effective operation of the apparatus when pumper operations are required. **NO EXCEPTIONS**.

The apparatus body shall be constructed entirely of aluminum extrusions with interlocking aluminum plates. An extruded modular aluminum body is required due to the high strength-to-weight ratio of aluminum, corrosion-resistant body structure, easy damage repair, and lighter overall body weight to allow for increased equipment carrying capacity.

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.

The entire vehicle shall be constructed of aluminum extrusions. Body designs that incorporate steel sub-frames connected to aluminum compartments are not as corrosion-resistant and not acceptable.

Body Mainframe

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

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 center 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 1/2" x 3" aluminum 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 aluminum mainframe assembly.

Body Side Assemblies

The left and right side body assemblies shall be framed with 6063T5 1 1/2" 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.

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.

Stabilizer Openings

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 aluminum extrusions. A stabilizer cover made from treadplate shall be supplied on the extendable stabilizer. The cover shall provide a pleasing appearance and mounting location for a red stabilizer warning light as outlined in NFPA 1901.

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.

Body Mounting System

The body shall attach to the integral torque box with grade 8 bolts connected through steel mounts welded on the side of the torque box. To isolate dissimilar metals a 1/4" fiber- reinforced rubber dielectric barrier between the aluminum 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.

Rear Body Design

The rear body shall be designed to provide ground ladder storage, hose deployment, and service access to aerial components. The center rear of the body shall be open for ground ladder storage. The area below the ground ladder storage shall be for a waterway inlet (if applicable), the stabilizer control panel and have access doors to hydraulic components.

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.

Side Aerial Access Staircase

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 rubrail to reduce ground to staircase step height when the unit is up on jacks. The angled staircase shall be supplied with extruded aluminum handrails on both sides of the staircase frame.

Water Tank Mounting System

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.

The booster tank mounting system shall utilize a floating design to reduce stress from road travel and vibration. To maintain low vehicle center 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 center of gravity shall not be acceptable.

Compartments

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

Compartment floors shall be constructed of 1/8" aluminum 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 aluminum 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. Right side rear compartment to have .5" extruded aluminum flabar welded to the underside centered equally between outside to inside for added support.

Handrails

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 aluminum. 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 aluminum shall be ribbed to assure a good grip for personnel safety.

The handrails shall be installed as follows:

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

Steps, Standing, and Walking Surfaces

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.

All exterior steps shall be designed with a minimum slip resistance of 0.52 when tested wet using the Brungraber Mark II tester in accordance with the manufacturer's instructions.

Apparatus Warning Labels

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 15.7.5. A label shall be applied to both sides of the apparatus and the rear to warn operators that the aerial is not insulated.

Rubrail

The body shall have a rubrail along the length of the body on each side and at the rear. The rubrail shall be constructed of minimum 3/16" thick anodized aluminum 6463T6 extrusion. The rubrail 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.

The rubrail shall be of a C-channel design to allow marker and warning lights to be recessed inside for protection. The top surface of the rubrail 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 rubrail 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 rubrail C-channel shall be inset with a reflective material for increased side and rear visibility.

Pump Compartment

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

ISO Compliance

The manufacturer shall ensure that the construction of the apparatus aerial body shall be in conformance with the established ISO-compliant quality system. All written quality procedures and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts this process shall be strictly adhered to. By virtue of its ISO compliance the manufacturer shall provide an apparatus aerial device that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

BODY COMPT REAR

Rear Body Panels

The rear body panels shall be smooth 1/8" un-painted aluminum plate to facilitate rear body striping. The panels shall be bolt-on for a clean appearance and easier repair in the event of damage.

AERIAL BODY OPTIONS

Triple Crosslay Hosebed

Three (3) crosslay hosebeds shall be provided at the front area of the body. Each of the three (3) crosslay sections shall have a capacity for up to 200` of 2.0" double-jacket fire hose single stacked and preconnected to the pump discharge. The crosslay decking shall be constructed entirely of maintenance-free 3/4" x 2-3/4" hollow aluminum extrusions.

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.

Dunnage Pan

A dunnage pan constructed of 3/16" (.188") aluminum treadplate shall be located rearward of the crosslays. The dunnage pan shall be sized to maximize available storage space.

Ladder Tunnel Door

A 3/16" (.188) lift-up door with D-ring style handle shall be installed for access to the rear ladder tunnel.

The door shall be constructed using a box pan configuration. The outer door pan shall match the rear body finish. The inner door pan shall be constructed from 3/32" (0.090") smooth aluminum plate and shall have threaded inserts to attach door hold-open hardware. The inner pan shall have a 95 degree bend to form an internal drip rail. A drain hole shall be installed in the lower corner of all inside door pans to assist with drainage.

The door shall open 20 degrees past horizontal to allow easy removal of ground ladders.

Rear Control Doors

The driver/officer jack and master control switch panels at the rear of the body shall be provided with access doors. The doors shall have the same finish as the rear of the body.

Outrigger Covers

Two (2) piece outrigger covers constructed of .187`` aluminum smooth plate painted job color shall be provided for the jack leg openings. One piece of the cover shall be sized to cover just the extending outrigger in order to require a minimal amount of set-up space. The second piece of the cover shall be fixed and mounted to the body to cover the remaining outrigger opening.

Fuel Fill Door

The hinged fuel fill door and fixed panel below door each side to rear of rear axle shall be 14 ga brushed S/S.

Auxiliary Ground Pads

Four (4) auxiliary ground pads shall be provided. The pads shall be 24" x 24" x 1/2" thick aluminum plate with a 20 degree formed handle with cutout for hand hold. The pads shall be stored in double brackets holding two (2) pads each that are welded below the body.

Front Body Module

There shall be a forward body module that will enclose the water tank and provide additional compartmentation. The body design shall provide 32.44 cubic feet of storage.

Compartment Sizes

The compartment sizes and location shall be as follows:

Left Side:

There shall be one (1) compartment (L1) over the forward stabilizer. The compartment shall be approximately 47.5" wide x 28.5" high x 16" deep and contain approximately 12.53 cubic feet of storage space. The door opening shall be approximately 47.5" wide x 28.5" high.

Right Side:

There shall be one (1) compartment (R1) over the forward stabilizer. The compartment shall be approximately 29" wide x 28.5" high x 16" deep and contain approximately 7.65 cubic feet of storage space. The door opening shall be approximately 29" wide x 28.5" high.

There shall be one (1) compartment (OS1) over the forward stabilizer. The compartment shall be approximately 14.5" wide x 63.5" high x 23" deep and contain approximately 12.26 cubic feet of storage space. The door opening shall be approximately 14" wide x 63.5" high.

Driver Side Compartments

The driver side body design shall provide 95.82 cubic feet of storage, which exceeds the minimum NFPA 1901 Chapter 8.5 requirement of 40 cubic feet.

There shall be one (1) compartment (L2) ahead of the rear wheels. The compartment shall be approximately 44" wide x 11.5" high x 21" deep (upper) and 44" wide x 57" high x 26" deep (lower) and contain approximately 44.67 cubic feet of storage space. The door opening shall be approximately 44" wide x 69.5" high.

There shall be one (1) compartment (L3) over the rear wheels. The compartment shall be approximately 62.5" wide x 23" high x 26" deep (forward) and 7" wide x 23" high x 23" deep (rearward) and contain approximately 23.77 cubic feet of storage space. The door opening shall be approximately 69.5" wide x 23" high.

There shall be one (1) compartment (L4) over the rear stabilizer. The compartment shall be approximately 45" wide x 23" high x 23" deep (upper), 28" wide x 28" high x 16" deep (lower forward) and 17" wide x 28" high x 23" deep (lower rearward) and contain approximately 27.38 cubic feet of storage space. The door opening shall be approximately 45" wide x 51" high.

Fuel Fill

The apparatus shall be supplied with a fuel fill on the driver side of the body. The fuel fill shall have a hinged door.

Officer Side Compartments

The officer side body design shall provide 64.61 cubic feet of storage.

There shall be one (1) compartment (R2) ahead of the rear wheels. The compartment shall be approximately 44" wide x 11.5" high x 21" deep (upper) and 44" wide x 57" high x 26" deep (lower) and contain approximately 44.67 cubic feet of storage space. The door opening shall be approximately 44" wide x 69.5" high.

There shall be one (1) compartment (R3) over the rear stabilizer. The compartment shall be approximately 25" wide x 24" high x 16" deep and contain approximately 5.56 cubic feet of storage space. The door opening shall be approximately 25" wide x 24" high.

There shall be one (1) compartment (R4) behind the rear stabilizer. The compartment shall be approximately 40" wide x 27" high x 23" deep and contain approximately 14.38 cubic feet of storage space. The door opening shall be approximately 40" wide x 27" high.

The hosebed shall contain 40 cubic feet. The hosebed shall measure 21" deep by 23" wide and 146" long.

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. The track shall hold the nut straight so only a TORX`s head screwdriver is required to adjust the divider from side to side.

The hosebed sides shall consist of aluminum plate and a framework of 1.5" x 4" x 3/16" and 3" x 3" x 3/16" aluminum slotted extrusions welded both vertically and horizontally for high rigidity.

Fuel Fill

The apparatus shall be supplied with a fuel fill on the officer side of the body. The fuel fill shall have a hinged door.

Rear Pike Pole/Attic Ladder Storage

A storage compartment shall be provided at the rear of the body for four (4) pike poles and one (1) attic ladder with feet. The storage area shall be labeled for two (2) 6` poles, one (1) 8` pole, one (1) 10` pole

and one (1) 10` attic ladder. The pike poles and attic ladder shall be secured by a hinged aluminum plate door that matches the rear body finish.

DOORS

Single Compartment Door

A single compartment door shall be constructed using a box pan configuration. The outer door pan shall beveled and shall be constructed from 3/16" (0.188") aluminum plate. The inner door pan shall be constructed from 3/32" (0.090") smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pan shall have a 95-degree bend to form an integral drip rail.

The compartment door shall have a 1" x 9/16" (1" x 0.43") closed-cell "P" EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the door to provide a seal that is resistant to oil, sunlight, and ozone.

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

A polished stainless steel Hansen D-ring style twist-lock door handle a with #459 latch shall be provided on the door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance.

The compartment door shall be securely attached to the apparatus body with a full-length stainless steel 1/4" (0.25") rod piano-type hinge isolated from the body and compartment door with a dielectric barrier. The door shall be attached with machine screws threaded into the doorframe. The door shall have a gas shock-style hold-open device.

An anodized aluminum drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

The door(s) shall be installed in the following location(s): R1, R3

Single Compartment Door

A single compartment door shall be constructed using a box pan configuration. The outer door pan shall beveled and shall be constructed from 3/16" (0.188") aluminum plate. The inner door pan shall be constructed from 3/32" (0.090") smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pan shall have a 95-degree bend to form an integral drip rail.

The compartment door shall have a 1" x 9/16" (1" x 0.43") closed-cell "P" EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the door to provide a seal that is resistant to oil, sunlight, and ozone.

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

A polished stainless steel Hansen D-ring style twist-lock door handle a with #459 latch shall be provided on the door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance.

The compartment door shall be securely attached to the apparatus body with a full-length stainless steel 1/4" (0.25") rod piano-type hinge isolated from the body and compartment door with a dielectric barrier. The door shall be attached with machine screws threaded into the doorframe. The door shall have gas shock-style hold-open devices.

An anodized aluminum drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

The door(s) shall be installed in the following location(s): L3

Painted Roll Up Compartment Door

A ROM brand roll up door painted job color shall be provided on a compartment greater than 45" tall. The door(s) shall be installed in the following location(s): L2, L4, R2.

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.

The track shall be painted 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.

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

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

The door opening shall be reduced by 2" in width and approximately 8-9" in height depending on door height.

Single Compartment Door

A single compartment door shall be constructed using a box pan configuration. The outer door pan shall beveled and shall be constructed from 3/16" (0.188") aluminum plate. The inner door pan shall be constructed from 3/32" (0.090") smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pan shall have a 95-degree bend to form an integral drip rail.

The compartment door shall have a 1" x 9/16" (1" x 0.43") closed-cell "P" EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the door to provide a seal that is resistant to oil, sunlight, and ozone.

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

A polished stainless steel Hansen D-ring style twist-lock door handle a with #459 latch shall be provided on the door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance.

The compartment door shall be securely attached to the apparatus body with a full-length stainless steel 1/4" (0.25") rod piano-type hinge isolated from the body and compartment door with a dielectric barrier. The door shall be attached with machine screws threaded into the doorframe. The door shall have a gas shock-style hold-open device.

An anodized aluminum drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

The door(s) shall be installed in the following location(s): OS1

Drip Pan

Drip pan (E-ONE style) for a roll-up door (EA). Location(s): L2, L4, R2.

Double Compartment Door

Double compartment doors shall be constructed using a box pan configuration. The outer door pans shall beveled and shall be constructed from 3/16" (0.188") aluminum plate. The inner door pans shall be constructed from 3/32" (0.090") smooth aluminum plate and shall have nutsert fittings to attach hold-open hardware. The inner pans shall have a 90-degree bend to form an integral drip rail.

The compartment doors shall have a 1" x 9/16" (1" x 0.43") closed-cell "P" EPDM sponge gasket meeting ASTM D-1066 2A4 standards installed around the perimeter of the doors to provide a seal that is resistant to oil, sunlight, and ozone.

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

A polished stainless steel Hansen D-ring style twist-lock door handle a with #459 latch shall be provided on the primary door. The 4-1/2" (4.5") D-ring handle shall be mounted directly to the door latching mechanism with screws that do not penetrate the door material for improved corrosion resistance.

The secondary door shall have a dual stage rotary latch with a 750 lb rating to hold the door in the closed position. The latch shall be mounted at the top of the door. A stainless steel paddle style handle shall be mounted on the interior pan of the door to actuate the rotary latch. The paddle handle shall be connected to the rotary latch by a 5/32" (.156") diameter rod. Cable actuation shall be deemed un-acceptable due to the potential for cable stretch and slippage. The striker pin shall be 3/8" (.38") diameter with slotted mounting holes for adjustment.

Double door latch to have latch brackets fabricated from .125 aluminum smooth plate, installed with "PULL" tags #1032993 for left side and #1032294 for right side.

The compartment doors shall be securely attached to the apparatus body with a full-length stainless steel 1/4" (0.25") rod piano-type hinge isolated from the body and compartment doors with a dielectric barrier. The doors shall be attached with machine screws threaded into the doorframe.

The doors shall have a gas shock-style hold-open device. The gas shocks shall have a 30 lb rating and be mounted near the top of the door (when possible).

An anodized aluminum drip rail shall be mounted over the compartment opening to assist in directing water runoff away from the compartment.

The door(s) shall be installed in the following location(s): L1, R4

SHELVES

Permanent Shelf

There shall be a permanent mounted aluminum shelf provided for a compartment as specified. The shelf shall be at the offset within the compartment.

The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front lip for added strength and reinforcement and to accommodate optional plastic interlocking compartment tile systems.

The shelf shall be capable of holding 100 lbs.

Adjustable Shelf [Qty: 2]

There shall be an aluminum adjustable shelf provided for a compartment as specified.

The shelf shall be constructed of 3/16" (.187") smooth aluminum plate. The shelf shall have a minimum 2" front and rear lips to accommodate optional plastic interlocking compartment tile systems and shall be capable of holding 100 lbs on compartments with tracks mounted on back wall (compartments up to appoximately 12" deep) or shall be capable of holding 250 lbs with tracks mounted on forward and rearward walls.

The shelf shall be sized, width and depth, to match the size and location in the compartment.

COMPARTMENT DIVIDERS

Partition Vertical Bolt-In [Qty: 2]

Partition, bolt-in vertical partition wall. Locate in a compartment as specified. Partition constructed out of 3/16" 3003 smooth plate.

TRAYS / TOOLBOARDS

Roll-Out Tray [Qty: 4]

There shall be a floor mounted roll-out tray provided in a compartment as specified.

The roll-out tray shall be constructed of 3/16" (.187") smooth aluminum plate with a sanded finish and welded corners for increased strength and rigidity. The tray shall be sized in width and depth as applicable.

For greater tray accessibility, the drawer slides shall feature one hundred percent extension. The tray shall utilize a gas spring to secure the tray in the open or closed position.

The tray shall have a total capacity of 500 lbs.

Roll-Out/Tilt-Down Tray [Qty: 2]

A roll-out/tilt-down tray shall be adjustable mounted in a compartment as specified.

The tray shall be constructed of 3/16" (.187) aluminum with welded corners for strength and rigidity. The tray shall be sized in width and depth as applicable.

An Innovative Industries SlideMaster (model MT) aluminum tip down frame and channel assembly shall be provided for the tray for the ease of operation and long service life. A positive twist lock shall be provided to lock the tray in the stored position. The tray shall roll out approximately 90% from its stored position and shall tip 30 degrees from horizontal.

The capacity rating of the tray, in the extended position, shall be 200 lbs. uniformly distributed load.

Tool Board PAC [Qty: 2]

Tool Board, Pac brand double sided adjustable slide out tool board on slide model VSO-24 shall be provided in a compartment as specified.

- The Vertical Slide Out P/N VSO-24 is a double sided full extension slide out mounting product. 24 inches of travel.
- Equipment mounting on both sides of panel.
- Compatible with all PAC tool brackets.
- 250lb capacity.
- Locks in closed and open positions for stability.

  The tool board shall be mounted at top and bottom on adjustable tracking for ease of placement.

  The capacity rating shall be 250 lbs. maximum at full extension.

COVERS

Rear Hose Bed Cover

A cover constructed of Black 18 oz. PVC vinyl coated polyester shall be installed at the rear apparatus hose bed. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 per square inch.

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

Cover Hose Bed-Aluminum

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

The hose bed cover shall be constructed of 1/8" aluminum tread brite and shall be one (1) piece in design. The cover shall be hinged with a full-length stainless steel knuckle hinge. For ease of use a pneumatic cylinder (gas shock) shall be used at the front of the cover. Recessed handles shall be provided at the front and rear of the cover.

The cover shall have a single water and corrosion resistant switch that will activate the red flashing door ajar light in the cab to alert the driver that the cover is open.

Crosslay Cover

A crosslay cover shall be provided for the crosslay storage area of the pump module. The crosslay cover shall be provided in compliance with NFPA.

The crosslay cover shall be constructed from a minimum .125" aluminum treadplate. The crosslay cover shall include two (2) full-length stainless steel (0.25") rod piano-type hinges. The cover shall be hinged to open and not interfere with applicable plumbing components on the apparatus. The two (2) hinges shall provide a bi-fold application that shall allow an area of the crosslay to be accessible without completely opening the cover.

The crosslay cover shall include applicable grab handles and two (2) hold downs to secure the cover in the closed position.

Crosslay Cover Hinge

The crosslay cover shall be hinged along the forward edge of the crosslay area.

Crosslay Cover - Sides

A pair of covers constructed of Black 18 oz. PVC vinyl coated polyester shall be installed over the side openings of the apparatus crosslay. The base fabric shall be 1000 x 1300 Denier Polyester with a fabric count of 20 x 20 square inch.

The covers shall be secured in place to comply with the latest edition of NFPA 1901.

Hold Open

Hold open device(s) shall be provided for aluminum crosslay (single or bi-fold) cover.

PUMP PANELS

Side Mount Pump Panels

The driver and officer side pump panels shall be constructed of 14 gauge stainless steel. Each panel shall have the ability to be removed from the module for easier access and for maintenance in the pump area.

Pump Access Door

The officer side pump module shall include an upper horizontally-hinged pump access door.

The door shall be constructed of 14 gauge brushed stainless steel. The compartment door shall be securely attached with a full-length stainless steel piano type hinge with 1/4" pins. The hinge shall be "staked" on every other knuckle to prevent the pin from sliding. The door shall include two (2) push-button style latches to secure the door in the closed position and one (1) hold-open device to hold the door in the open position.

MISC PUMP PANEL OPTIONS

Pump Panel Tags

Color coded pump panel labels shall be supplied to be in accordance with NFPA 1901 compliance.

PUMP MODULE OPTIONS

Pump Compartment Heaters

Two (2) 24,000 BTU heaters shall be installed in the lower pump compartment area. The heaters shall be connected to the chassis engine coolant system and shall include 12 volt blowers. The heaters shall be controlled at the pump operator`s panel.

Heat Pan

The pump compartment shall have a heat pan installed under the pump area. The heat pan shall be constructed of 1/8" (.125") smooth aluminum plate and shall be easily removable for fair weather operations.

The heat pan shall be four (4) sided with two (2) removable bottoms. The bottoms shall provide access to the lower area of the pump/pump compartment. The bottoms shall include butterfly latches to secure them in the closed position.

Notched Preconnect Divider

The crosslay preconnect divider(s) shall be notched to accommodate a bail handled nozzle. The notch(es) shall be approximately 5" high x 12" deep to allow nozzle(s) to be stowed in the preconnect storage area and allow for the addition of a preconnect cover.

Flex Joint

The area between the pump modules and body shall include a rubber flex joint.

Air Horn Switch

A heavy duty weatherproof push-button switch shall be installed at the pump operator`s panel to operate the air horns.

The switch shall be labeled "Evacuation Alert".

Location: driver side pump panel.

WATER TANK

Booster Tank

The booster tank shall be T-shaped in configuration and shall have a useable capacity of 500 gallons (U.S.).
The booster tank shall be constructed of polypropylene material. The booster tank shall be completely removable without disturbing or dismounting the apparatus body structure. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal.

The booster tank top, sides, and bottom shall be constructed of a minimum 1/2" (0.50") thick black UV-stabilized copolymer polypropylene. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The tank cover shall be constructed of 1/2" thick polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall

be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40" apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions.

The tank shall have a combination vent and manual fill tower with a hinged lid. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall have a 1/4" thick removable polypropylene screen and a polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid.

The booster tank shall have two (2) tank plumbing openings. One (1) for a tank-to-pump suction line with an anti-swirl plate, and one (1) for a tank fill line. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates per the tank fill inlet size.

The sump shall be constructed of a minimum of 1/2" polypropylene. The sump shall have a minimum 3" N.P.T. threaded outlet for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3" above the inside floor.

The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength.

Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with an I.D. of 3" or larger that is designed to run through the tank. This outlet shall direct the draining of overflow water past the rear axle, thus reducing the possibility of freeze-up of these components in cold environments. This drain configuration shall also assure that rear axle tire traction shall not be affected when moving forward.

The booster tank shall undergo extensive testing prior to installation in the truck. All water tanks shall be tested and certified as to capacity on a calibrated and certified tilting scale.

Each tank shall be weighed empty and full to provide precise fluid capacity. Each tank shall be delivered with a Certificate of Capacity delineating the weight empty and full and the resultant capacity based on weight. Engineering estimates for capacity calculations shall not be permitted for capacity certification. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

A tag shall be installed on the apparatus in a convenient location and contain pertinent information including a QR code readable by commercially available smart phones. The information contained on the tag shall include the capacity of the water and foam (s), the maximum fill and pressure rates, the serial number of the tank, the date of manufacture, the tank manufacturer, and contact information. The

QR code will allow the user to connect with the tank manufacturer for additional information and assistance.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.

TANK PLUMBING

Tank Fill 1.5 Akron Valve

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

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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.

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

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

Tank to Pump 3 Akron Air Valve

One (1) air actuated 3" Akron valve shall be installed between the pump suction and the booster tank. Includes flex hose with stainless steel hose clamps for connection to the 4" tank sump outlet. The valve control shall be located at the pump operator`s panel and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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.

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

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

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

FOAM TANK

30 Gallon Foam Tank

A 30 gallon (U.S.) foam cell for Class A foam shall be supplied. The foam cell shall be integral to the water tank.

The integral tank top, sides, and bottom shall be constructed of black polypropylene material. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The foam tank shall have a manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a typical dimension of 8" x 8" outer perimeter (subject to change for specific design applications). Foam fill tower shall be constructed of a Green colored material indicating type of foam utilized. The capacity of the tank shall be engraved on the top of the fill tower lid. The fill tower shall be located in the forward area of the tank. The tower shall have a 1/4" thick removable polypropylene screen. Inside the fill tower, approximately 1.5" down from the top, there shall be an anti-foam fill tube that extends down to the bottom of the tank. A pressure vacuum vent shall be provided in the lid of the fill tower. The foam fill tower shall be removable to facilitate the cleaning of the foam tank.

The foam tank shall undergo extensive testing prior to installation in the truck. All foam tanks shall be tested and certified as to capacity. The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

The tank shall have a limited Lifetime warranty that provides warranty service for the life of the fire apparatus in which the tank is installed. Warranties are transferable if the apparatus ownership changes by requesting the transfer from the tank manufacturer.

LADDER STORAGE / RACKS

Bracket Horizontal Ladder

Extension ladder mounting assembly shall consist of a 1/8" diamond plate boot bolted to the compartment top and a chrome plated handle to secure the ladder into the boot.

Location and type of ladder: over L2 for Little Giant model 17.

Rear Ladder Storage

A ladder storage tunnel shall be provided beneath the aerial device frame work. There shall be access to the ladders via an opening at the rear.

This tunnel shall be lined with .090" aluminum. The ladders will be held captive top and bottom by aluminum tracks and slide on friction reducing material. All ladders shall be removable individually without having to remove any other ladder.

The ladder tunnel shall hold: PEL3-35, PEL-28, PEL-24, PRL-16 and PRL-14.

HANDRAILS / STEPS

Slide-Out Platform

The slide-out platform shall be approximately 21" deep and shall be constructed of 1/8" aluminum treadplate. The platform shall be mounted under the apparatus body. The platform shall utilize a maintenance-free slide system incorporating stainless steel shoulder bolts that slide in slotted heavy wall aluminum angles. Notches shall be provided at each end of the slots to hold the platform in both the extended and retracted positions.

A chrome grab handle shall be provided on the front face of the platform for ease of operation.

Non-slip aluminum hand rail(s) with chrome plated stanchions shall be provided as best suited for use with the platform operation.

If applicable, NFPA pump throttle height requirement shall be measured from the top of the slide-out platform on all aerials and from the ground on side mounted pump operator panels on non-aerial apparatus.

Location: below driver side pump panel.

Auxiliary Step

A step below the body shall be provided. The step shall be constructed of .188" aluminum tread brite. The step surface shall be provided with an aggressive skid-resistant surface. The step shall be in accordance with current NFPA requirements and shall include a multi-directional aggressive gripping surface incorporated into the diamond plate. The surface shall extend 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 on centers not to exceed 4". The step shall be located below rear of officer side pump panel.

One (1) handrail shall be installed in compliance with current NFPA. The handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Folding Steps [Qty: 3]

Innovative Controls dual lighted LED folding step(s) shall be located driver side front compartment face. The folding step(s) shall meet current NFPA in step height and surface area.

Innovative Controls dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lb with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications. Corrosion resistance shall be demonstrated by a 1000 hr salt spray test with no visible signs of deterioration of the step body or hardware.

One (1) hand rail shall be installed in compliance with current NFPA. The hand rail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

Right Side Pump Panel Step Package

An intermediate pump panel step with three (3) folding step and a minumum of one (1) handrail shall be provided at the right side pump panel.

Intermediate Pump Panel Step

The intermediate step shall be constructed of 3/16" (.187") aluminum treadplate. The step shall include a multi-directional, aggressive gripping surface incorporated into the treadplate. The surface shall extend vertically from the diamond plate sheet a minimum of 1/8" (.125"). Gripping surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". The step shall be bolted onto the pump module and be easily removable for replacement in the case of damage.

Folding Step

Innovative Controls dual lighted LED folding steps shall be located two (2) above and one (1) below the intermediate step. The folding steps shall meet current NFPA in step height and surface area.

Innovative Controls dual lighted LED folding step with LED lights integral to the step on the top to provide NFPA requirements of 2 fc (20 lx) on the stepping surface. Folding step shall also have a LED light integral to the bottom of the step to meet NFPA requirements of a stepping surface up to 18" below the step. The folding step shall sustain a minimum static load of 500 lb with a 3 to 1 safety factor. The folding step shall also meet NFPA slip resistance qualifications. Corrosion resistance shall be demonstrated by a 1000 hr salt spray test with no visible signs of deterioration of the step body or hardware.

Handrail

A minumum of one (1) handrail shall be installed for the step package in compliance with current NFPA. The handrail shall be constructed of 6063T5 1.25" OD anodized aluminum tube, with an integral ribbed surface to assure a good grip for personnel safety, mounted between chrome stanchions.

MISC BODY OPTIONS

Mud Flaps

Black mud flaps with E-ONE logo shall be provided for the body wheel wells.

Hose Bed Divider

There shall be a hose bed divider provided the full fore-aft length of the hose bed.

The hose bed divider shall be constructed of 1/4" (0.25") smooth aluminum plate with an extruded aluminum base welded to the bottom. The rear end of the divider shall have a 3" radius corner to protect personnel. The divider shall be natural finish aluminum for long-lasting appearance and shall be sanded and de-burred to prevent damage to the hose.

The divider shall be adjustable from side to side in the hose bed to accommodate varying hose loads.

Hose Bed Divider Hand Hold

There shall be a hand hole cut-out(s) on the trailing edge of each hose bed divider. The cut-out(s) is specifically sized for use in adjusting of the hose bed divider.

Floor Matting

This unit shall have all applicable compartment floors, shelves, and trays covered with a heavy duty Dri-Dek brand Black floor matting.

Side Body Platework

The painted aluminum smooth plate body side panels shall be flush with the supporting extrusions.

Anodize Aluminum Trim

A anodize aluminum trim shall be located at the bottom edge of all body compartment openings with painted edge (as applicable). The trim shall provide added protection of the painted surface of the body when equipment is removed from the compartment.

Backboard Storage

A backboard storage sleve shall be supplied. The rack shall be constructed of smooth aluminum. The sleve shall be designed to hold one 3" X 18" X 72"L backboard. A retaining strap shall be provided on both ends of the storage sleve.

Locate: rear interior wall.

Tilt Jack Location

The cab tilt jack shall be located right side forward jack leg compartment low behind door in access panel (tilt sw behind door).

Body Wheel Well

The body wheel well frame shall be constructed from 6063-T5 aluminum extrusion with a slot the full length to permit an internal fit of 3/16" (0.188") aluminum smooth plate supports. The outer body side wheel well plate shall be 3/16" (0.188") aluminum smooth plate welded flush with the body side and painted job color.

The fenderettes shall be bolt-on and shall be easily removable. The fenderette shall be constructed from .080" aluminum with a mirror finish. The fenderette shall be 2 1/2" (2.5") wide x 2 1/4" (2.25") tall with a 26 7/8" (26.875") radius. A "P" shaped rubber gasket shall be provided between the fenerette and wheel well body panel.

The wheel well liners shall be constructed of a 3/16" (.187") composite material. The liners shall be bolt-on and shall provide a maintenance-free and damage-resistant surface.

SCBA BOTTLE STORAGE

SCBA Wheel Well Bottle Storage

The body wheel well area shall store up to eight (8) SCBA bottles- four (4) on the officer side and four (4) on the driver side. The bottles shall be secured in each storage area by a vertical hinged door which shall be secured in the closed position by a push button latch. The doors shall have a brushed stainless steel finish.

Each storage area shall provide individual storage of a bottle and shall not allow forward or rearward movement of the bottle. The bottle(s) shall be removable from the storage area without the bottle(s) coming into contact with any surface area of the wheel well (NO EXCEPTIONS).

SCBA Strap

Straps shall be provided in each exterior storage compartment to provide secondary means to hold each SCBA bottle in the compartment. The straps shall be constructed from 1" nylon webbing formed in a loop. The strap(s) shall be mounted to the storage compartment ceiling directly inside the door opening at each bottle location.

PUMPS

Pump Rating

The fire pump shall be rated at 1750 GPM.

Fire Pump System

A Waterous Model S100C20 series centrifugal single stage pump shall be installed. This pump shall be capable of pumping up to 2000 gpm at 150 psi.

Pump

The pump body shall be cast in ductile iron with a double stripping edge volute to minimize radial forces at all flow rates. A bronze impeller shall be provided. The impeller shall be balanced mechanically and hydraulically for vibration-free operation. The impeller shaft shall be stainless steel shaft with a spring-loaded mechanical shaft seal. Self-adjusting mechanical seal eliminates leakage and routine maintenance. The wear rings shall be bronze labyrinth-type (reverse flow) that are replaceable.

The pump shall have an 8 inch x 13 ASA flange intake. A stainless steel intake manifold shall be provided with two (2) 6" NST inlets located one each side of the apparatus.

Transmission

The pump transmission shall be constructed of high-strength aluminum. The case shall be a three-piece design that is horizontally split. The drive line shafts shall be made from alloy steel forgings, hardened and ground to size.

The gearbox shall have all steel drive hardened sprockets with a Morse HV high strength drive chain. The gearbox ball bearings shall be deep groove, anti-friction to provide support and proper alignment to the impeller shaft assembly. Bearings shall be oil splash-lubricated, completely separated from the water being pumped, and protected by a V-ring and oil seals.

The pump shall feature a passive lubrication system that eliminates the need for a separate oil pump.

Pump Mounting

The pump shall be mounted with steel angles and channel from the chassis frame using grade 8 bolts, to both the frame and pump to permit removal of the pump for service. The pump shall be equipped with bolt flanges or Victaulic couplings on the suction and discharge side of the pump to provide for removal of fire pump without disturbing piping.

Pump Shift

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

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

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.

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

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

Discharge Manifold

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

Test Ports

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

PUMP CERTIFICATION

Pump Certification

The pump, when dry, shall be capable of taking suction and discharging water in 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.

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 vacuum test, and the water tank to pump flow test as outlined in current NFPA 1901.

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

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

A test plate, installed at the pump panel, shall provide the rated discharges and pressures together with the speed of the engine as determined by the certification test, and the no-load governed speed of the engine.

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.

PUMP OPTIONS

Steamers, Flush+1

The pump 6" steamer intake(s) shall be mounted approximately 1" from the pump panel to back of cap when installed. The "Flush+1" dimension can vary + or - 1-1/4" or as practicable depending on the pump module width and options selected. (Example 72" or 76" modules.)

Location: driver's side, officer's side.

Anodes, Waterous Pump

The anodes help prevent damage caused by galvanic corrosion within the pump. The system provides a sacrificial metal which helps to diminish or prevent pump and pump shaft galvanic corrosion. One (1) anode will be located on the suction side and one (1) will be located on the discharge side of the pump.

Master Drain

A master drain valve shall be installed and operated from driver side. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal and turning handle. The master drain shall be locate in the heat pan and a remote handle control knot shall be locate below running board on driver side or L1 compartment.

The manual Master Drain Valve shall have twelve (12) individually-sealed ports that allow quick and simultaneous draining of multiple intake and discharge lines. It shall be constructed of corrosion-resistant material and be capable of operating at a pressure of up to 600 PSI.

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

Pump Cooler

The pump shall have a 3/8" line installed from the pump discharge to the booster tank to allow a small amount of water to circulate through the pump casing in order to cool the pump during sustained periods of pump operation when water is not being discharged. The pump cooler line shall be controlled from the pump operator`s panel by a Innovative Controls 1/4 turn valve with "T" handle. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag

Trident Primer

A Trident air operated priming system shall be installed. The unit shall be of all brass and stainless steel construction and designed for fire pumps of 1,250 GPM (4,600 LPM) or more. Due to corrosion exposure no aluminum or vanes shall be used in the primer design. The primer shall be three-barrel design with ¾" NPT connection to the fire pump.

The primer shall be mounted above the pump impeller so that the priming line will automatically drain back to the pump. The primer shall also automatically drain when the panel control actuator is not in operation. The inlet side of the primer shall include a brass "wye" type strainer with removable stainless steel fine mesh strainer to prevent entry of debris into the primer body.

The system shall create vacuum by using air from the chassis air brake system through a two-barrel multi-stage internal "venturi nozzles" within the primer body. The noise level during operation of the primer shall not exceed 75 Db.

Air Flow Requirements

The primer shall require a minimum of 15.6 cubic foot per minute air compressor and shall be capable of meeting drafting requirements at high idle engine speed. The air supply shall be from a chassis supplied "protected" air storage tank with a pressure protection valve. The air supply line shall have a pressure protection valve set between 70 to 80 PSIG.

Primer Control

The primer control shall have a manually operated, panel mounted "push to prime" air valve. The valve shall direct air pressure from the air brake storage tank to the primer body. To prevent freezing, no water shall flow to and from the panel control.

Warranty

The primer shall be covered by a five (5) year parts warranty.

INTAKES

Left Intake 2.5 Akron Valve

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

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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.

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

The outlet of the valve shall be connected to the suction side of the pump with the 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 rockerlug plug with a retainer device.

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

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

A 3/4" bleeder valve assembly will be installed on the left side pump panel.

Right Intake 2.5 Akron Valve

One (1) 2-1/2" gated suction inlet with a manual operated Akron valve shall be installed in the right side pump panel with the valve body behind the panel. The valve control shall be located at the intake and shall visually indicate the position of the valve at all times.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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.

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

The outlet of the valve shall be connected to the suction side of the pump with the 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 rockerlug plug with a retainer device.

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

A 3/4" bleeder valve assembly will be installed on the right side pump panel.

INTAKE OPTIONS

Intake Pressure Relief

A18 Series - PRESSURE RELIEF VALVE - TFT`s pressure relief valve is adjustable from 50 to 250 psi (3 to 14 bar) with easy to see 25 psi (2 bar) increments. The aluminum casting is plastic impregnated, hard coat anodized, and TFT powder coat finished inside and out for maximum corrosion protection. Works with Darley, Waterous, or Hale bolt hole patterns for direct use on pump flanges.

DISCHARGES AND PRECONNECTS

1.5 Single Crosslay Akron Valve [Qty: 2]

One (1) single crosslay discharge shall be provided at the front area of the body. The crosslay shall include one (1) 2" brass swivel with a 1-1/2" hose connection to permit the use of hose from either side of the apparatus.

The crosslay hose bed shall consist of a 2" heavy-duty hose coming from the pump discharge manifold to the 2" swivel. The hose shall be connected to a manually operated 2" Akron valve. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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 with water flowing through it.

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

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

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

Location: crosslay 1 & 2.

Single Crosslay 2.5 Akron Valve

One (1) single crosslay discharge shall be provided at the front area of the body. The crosslay shall have one (1) 2-1/2" mechanical swivel hose connection to permit the use of the hose from either side of the apparatus.

The crosslay hose bed shall consist of a 2-1/2" heavy-duty hose coming from the pump discharge manifold to the 2-1/2" swivel. The hose shall be connected to a manually operated 2-1/2" Akron valve. The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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 with water flowing through it.

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

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

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

Location: crosslay 3.

Discharge Left Panel 2.5 Akron Droop

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

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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.

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

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

The discharge shall extend out beyond the pump panel with a 30 degree downward angle with 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30 degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.

The discharge shall be supplied with a 3/4" bleeder valve assembly. The bleeder valve shall be installed to drain water from the gauge pressure line to prevent freezing of the line. The drain shall be controlled with a quarter-turn valve on the pump panel.

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

Location: left side discharge 1, left side discharge 2.

Discharge Right Panel 2.5 Akron Droop

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

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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 with water flowing through it.

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

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

The discharge shall extend out beyond the pump panel with a 30 degree downward angle with chrome plated 2-1/2" NST threads to help prevent kinking of the discharge hose. The 30 degree chrome droop shall be an integral part of the discharge valve and shall be equipped with a chrome plated rocker lug cap with a retainer chain.

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

Location: right side discharge 2.

4in Discharge

One (1) 4" discharge outlet with a 3" manually operated Akron valve shall be provided at the right side pump panel. The discharge shall consist of a 3" valve connected with 30 degree droop to a 3" FNST x 4" MNST chrome adapter. The end of the discharge adapter shall be equipped with a chrome plated rockerlug cap with a retainer cable.

The valve shall be an Akron 8800HD series with a 316 stainless steel ball and 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 with water flowing through it.

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

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

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

Location: right side discharge 1.

4" Waterway Discharge w/ 3" Electric Akron

A 4" diameter discharge with an 3" electrically actuated Akron valve shall be provided from the pump to the aerial waterway.

The valve shall be an 3" Akron 8600HD series with 316 stainless ball and polymer seals 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 ball when in a throttle position with water flowing. The valve shall be of the unique Akron Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

The valve shall utilize an electric driven worm gear actuator. The valve may also be operated manually in case of electrical system failure.

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

DISCHARGE OPTIONS

IC Push/Pull Control

The apparatus pump panel shall be equipped with Innovative Controls Side Mount Valve Controls. The ergonomically designed ¼ turn push-pull T-handle shall be chrome-plated zinc with recessed labels for color-coding and verbiage. An anodized aluminum control rod and housing shall, together with a stainless spring steel locking mechanism, eliminate valve drift. Teflon impregnated bronze bushings in both ends of the rod housing shall minimize rod deflection, never need lubrication, and ensure consistent long-term operation. The control assembly shall include a decorative chrome-plated zinc panel-mounting bezel with areas for color-coding and/or FOAM and CAFS identification labels.

Bleeder Drain Valve [Qty: 8]

The bleeder/drain valves shall be Innovative Controls ¾" ball brass drain valves with chrome-plated lift lever handles and ergonomic grips. Each lift handle grip shall feature built-in color-coding labels and a verbiage tag identifying each valve, also supplied by Innovative Controls. The color labels shall also include valve open and close verbiage.

Discharge/Intake Bezel

Innovative Controls intake and/or discharge swing handle bezels shall be installed to the apparatus with mounting bolts. These bezel assemblies will be used to identify intake and/or discharge ports with color and verbiage. These bezel are designed and manufactured to withstand the specified apparatus service environment and shall be backed by a warranty equal to that of the exterior paint and finish. The specified assemblies feature a chrome-plated panel-mount bezel with durable UV resistant polycarbonate inserts. These UV resistant polycarbonate graphic inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. All insert labels shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

Akron Electric Valve 9333 Controller

An Akron Brass Style 9333 Valve Controller shall be provided with a five year manufacturer warranty. The display shall be a full color LCD display with a backlight and manual adjustment of the brightness as well as an auto-dimming option. The electric controls shall provide true position feedback, requiring no clutches in the motor or current limiting. The unit shall be sealed with momentary open, close as well

as an optional one touch full open feature to operate the actuator. The controller will provide an LCD display showing valve position indication and have up to three preset locations that can be user set and easily recalled upon each use. Valve position indication will be determined from true position feedback and indicate the exact position of the valve.

Two additional buttons shall be available to be used for preset selection, preset activation and menu navigation.

Locate on pump operator panel to control waterway discharge.

PRESSURE GOVERNORS

FRC TGA400 Governor

Fire Research InControl series TGA400-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5-1/2" high by 10-1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1-3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

- Pump discharge; shown with four daylight bright LED digits more than 1/2" high
- Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- Pressure / RPM setting; shown on a dot matrix message display
- Pressure and RPM operating mode LEDs
- Throttle ready LED
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display.

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Battery Voltage

- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only).

The program features shall be accessed via push buttons and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 PSI. The intake pressure display shall show pressures from -30 in. Hg to 600 PSI.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 PSI. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push-button to return the engine to idle.

The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine.

Location of the governor and monitoring display shall be: Pump Operator`s Panel.

GAUGES

2.5" Gauge [Qty: 8]

The valve discharge gauges shall be 2 ½"(63mm) diameter Innovative Controls pressure gauges. Each gauge shall have a rugged corrosion free stainless steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40F to +160F. Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy.

A polished chrome-plated stainless steel bezel shall be provided to prevent corrosion and protect the lens and gauge case. The gauges shall be installed into decorative chrome-plated mounting bezels that

incorporate valve-identifying verbiage and/or color labels. The gauges shall display a range from 0 to 400 psi with black graphics on a white background.

GAUGE IC SL PLUS LED FOAM A TANK LEVEL

An Innovative Controls SL Plus Tank Level Monitor System shall be installed. The system shall include [1] electronic display module(s), a stainless steel pressure transducer sender unit, and the necessary wiring with water-tight plug terminations that do not require sealing grease.

The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The master display shall have a backlit area above at the top with illuminated [foam A icon / FOAM A text] and a backlit area at the bottom with illuminated [tank capacity / OEM logo].

A wide-angle polycarbonate diffusion lens in front of the LEDs shall produce a 180° viewing angle. The electronic display module shall be waterproof and shock resistant being encapsulated in a urethane-based potting compound. The potted display electronics shall be integral to a chrome-plated panel-mount reflector that is secured to the apparatus panel with 4 screws installed from the inside of the panel or optional decorative bezel, through the reflector, and into 4 threaded inserts in the outer diffusion lens.

Gauge IC SL Plus Water/IC Monster

One (1) Innovative Controls brand water tank level gauge shall be located at the pump operator`s panel to provide a high-visibility display of the water tank level. An Innovative Controls SL Plus Tank Level Monitor System shall be installed. The master display module shall show the tank level using 16 super-bright easy-to-see LEDs. Tank level indication shall be achieved by the appropriate illumination of 4 horizontal rows of LEDs, with 4 LEDs per row. Full and near-full levels shall be indicated with the illumination of all 4 rows of LEDs, including the illumination of the top row of 4 green LEDs. Tank levels between ½ and ¾ full shall be indicated with the illumination of the bottom 3 rows of LEDs, including the illumination of the top row of 4 blue LEDs. Tank levels between ¼ and ½ full shall be indicated with the illumination of the bottom 2 rows of LEDs, including the illumination of the top row of 4 amber LEDs. Tank levels between ¼ full and near empty shall be indicated with the illumination of the bottom row of 4 red LEDs only. Tank levels between near empty and empty shall be indicated by flashing the bottom row of 4 red LEDs.

The display module shall be protected from vibration and contamination with the components being encased in an encapsulated plastic housing. The long life and extreme durability of LED indicators

eliminates light bulb replacement and maintenance. Color coded cover plates shall complete the assembly of the display module to the pump panel. System calibration shall be accomplished via supplied magnet . Each display level can be set independently for maximum reliability.

The display shall provide a steady indication of fluid level despite sloshing inside of the tank when the vehicle is in motion due to an "anti-slosh" feature.

In addition to the pump panel mounted lights there shall be two (2) IC Monster series LED light installed as specified.

The system shall be controlled by an Innovative Control tank level driver module that is integral of the NFPA required pump panel mounted tank level light assembly.

The additional tank level system shall be interlocked through the parking brake assembly so as not to be on while the vehicle is in motion.

The remote strip-light shall be arranged as follows.

A tank level gauge package shall be supplied that includes displays at the pump operator`s panel.

FOAM SYSTEMS

Foam System

There shall be a FoamPro 2001 fully automatic electronic direct injection foam proportioning system furnished and installed on the apparatus for the specified discharge(s). The system shall be capable of Class A foam concentrates and most Class B foam concentrates. The proportioning operation shall be based on an accurate direct measurement of water flow with no restriction. The proportioning system shall meet NFPA standards for foam proportioning systems and the design shall have passed testing against SAE automotive reliability standards appropriate for the application. The foam system shall be installed in accordance with the manufacturer`s recommendations.

The system shall be equipped with a digital electronic control display. It shall be installed on the pump operator`s panel and enable the pump operator to perform the following control and operation functions:

- Activate the foam system.
- Change foam concentrate proportioning rates from .1% to 3% in .1% increments.
- From discharges plumbed after the paddlewheel type flow meter: show current flow in gpm, show total volume of water pump, show total amounts of foam concentrate used.
- Provide simulated flow for manual operation.
- Perform set-up and diagnostic functions.
- Flash a "low concentrate" warning for two (2) minutes when the foam concentrate tank(s) run low of concentrate.
- Flash "no concentrate" warning if foam concentrate tank was not changed or foam concentrate was not added to the low tank and shut down foam concentrate pump.

The display shall have the capabilities when using a Hypro/FoamPro manual or electronic dual tank switching system of the following additional function:

- Display which foam concentrate tank is selected (tank A: PA or tank B: PB).
- Separate default setting for foam concentrate injection rate.
- Total amount of foam concentrate used from selected tank.
- Dual foam concentrate foam pump calibration.

The foam system shall have a 12 volt, 3/4 hp "TENV" electric motor designed for wet and high humidity environments, direct coupled to a positive displacement piston type foam concentrate pump with a rated capacity of .01 to 2.6 GPM with operating pressures up to 400 PSI.

Foam System Certification

The foam system performance shall be tested and certified in compliance with the applicable NFPA 1901 requirements.

FOAM SYSTEM OPTIONS

Foam System Plumbing

The specified foam system shall be plumbed to 1.5 first crosslay, 1.5 second crosslay, first 2.5 crosslay.

ELECTRICAL SYSTEMS

Multiplex Electrical System

Electrical System

The apparatus shall incorporate a Weldon V-MUX multiplex 12 volt electrical system. The system shall have the capability of delivering multiple signals via a CAN bus. The electrical system installed by the apparatus manufacturer shall conform to current SAE standards, the latest FMVSS standards, and the requirements of the applicable NFPA 1901standards.

The electrical system shall be pre-wired for optional computer modem accessibility to allow service personnel to easily plug in a modem to allow remote diagnostics.

The electrical circuits shall be provided with low voltage over-current protective devices. Such devices shall be accessible and located in required terminal connection locations or weather-resistant enclosures. The over-current protection shall be suitable for electrical equipment and shall be automatic reset type and meet SAE standards. All electrical equipment, switches, relays, terminals, and connectors shall have a direct current rating of 125 percent of maximum current for which the circuit is protected. The system shall have electro-magnetic interference suppression provided as required in applicable SAE standards.

Any electrical junction or terminal boxes shall be weather-resistant and located away from water spray conditions.

Multiplex System

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

- The network system must be Peer to Peer technology based on RS485 protocol. No one module shall hold the programming for other modules. One or two modules on a network referred to as Peer to Peer, while the rest of the network consists of a one master and several slaves is not considered Peer to Peer for this application.
- Modules shall be IP67 rated to handle the extreme operating environment found in the fire service industry.
- All modules shall be solid state circuitry utilizing MOS-FET technology and utilize Deutsch series input/output connectors.
- Each module that controls a device shall hold its own configuration program.
- Each module should be able to function as a standalone module. No "add- on" module will be acceptable to achieve this form of operation.
- Load shedding power management (8 levels).
- Switch input capability for chassis functions.
- Responsible for lighting device activation.
- Self-contained diagnostic indicators.
- Wire harness needed to interface electrical devices with multiplex modules.
- The grounds from each device should return to main ground trunk in each sub harness by the use of ultrasonic splices.

Wiring

All harnessing, wiring and connectors shall be manufactured to the following standards/guidelines. No exceptions.

- NFPA 1901-Standard for Automotive Fire Apparatus
- SAE J1127 and J1127
- IPC/WHMA-A-620 – Requirements and Acceptance for Cable and Wire Harness Assemblies. (Class 3 – High Performance Electronic Products)

All wiring shall be copper or copper alloys of a gauge rated to carry 125 of the maximum current for which the circuit is protected. Insulated wire and cable 8ga and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6ga and larger shall be SXL or SGT per SAE J1127.

All wiring shall be colored coded and imprinted with the circuit's function. Minimum height of imprinted characters shall not be less than .082" plus or minus .01". The imprinted characters shall repeat at a distance not greater than 3".

A coil of wire shall be provided behind electrical appliances to allow them to be pulled away from mounting area for inspection and service work.

Wiring Protection

The overall covering of the conductors shall be loom or braid.

Braid style wiring covers shall be constructed using a woven PVC-coated nylon multifilament braiding yarn. The yarn shall have a diameter of no less than .04" and a tensile strength of 22lbs. The yarn shall have a service temperature rating of -65 F to 194 F. The braid shall consist of 24 strands of yarn with 21 black and 3 yellow. The yellow shall be oriented the same and be next to each other.

Wiring loom shall be flame retardant black nylon. The loom shall have a service temperature of -40 F to 300 F and be secured to the wire bundle with adhesive-backed vinyl tape.

Wiring Connectors

All connectors shall be Deutsch series unless a different series of connector is needed to mate to a supplier's component. The connectors and terminals shall be assembled per the connector/terminal manufacturer's specification. Crimble/Solderless terminals shall be acceptable. Heat shrink style shall be utilized unless used within the confines of the cab.

NFPA Required Testing of Electrical System

The apparatus shall be electrical tested upon completion of the vehicle and prior to delivery. The electrical testing, certifications, and test results shall be submitted with delivery documentation per requirements of NFPA #1901. The following minimum testing shall be completed by the apparatus manufacturer:

1. Reserve capacity test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test fail.

2. Alternator performance test at idle:

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

3. Alternator performance test at full load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test. However, an alarm sounded by excessive battery discharge, as detected by the system required in NFPA #1901 Standard, or a system voltage of less than 11.7 volts dc for a 12 volt nominal system, for more than 120 seconds, shall be considered a test failure.

4. Low voltage alarm test:

Following the completion of the above tests, the engine shall be shut off. The total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates. The battery voltage shall be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts dc for a 12 volt nominal system shall be considered a test failure. The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

NFPA Required Documentation

The following documentation shall be provided on delivery of the apparatus:

A. Documentation of the electrical system performance tests required above.

B. A written load analysis, including:

a. The nameplate rating of the alternator
b. The alternator rating under the conditions
c. Each specified component load
d. Individual intermittent loads

Vehicle Data Recorder

A vehicle data recorder system shall be provided to comply with the 2009 and 2016 editions of NFPA 1901. The following data shall be monitored:

- Vehicle speed MPH
- Acceleration (from speedometer) MPH/Sec.
- Deceleration (from speedometer) MPH/Sec.
- Engine speed RPM
- Engine throttle position % of full throttle
- ABS Event On/Off
- Seat occupied status Occupied Yes/No by position
- Seat belt status Buckled Yes/No by position
- Master Optical Warning Device Switch On/Off
- Time: 24 hour time

- Date: Year/Month/Day

Occupant Detection System

There shall be a visual and audible warning system installed in the cab that indicates the occupant buckle status of all cab seating positions that are designed to be occupied during vehicle movement.

The audible warning shall activate when the vehicle's park brake is released and a seat position is not in a valid state. A valid state is defined as a seat that is unoccupied and the seat belt is unbuckled, or one that has the seat belt buckled after the seat has been occupied.

The visual warning shall consist of a graphical representation of each cab seat in the multiplex display screen that will continuously indicate the validity of each seat position.

The system shall include a seat sensor and safety belt latch switch for each cab seating position, audible alarm and braided wiring harness.

HVAC Controls

The air conditioning and heating systems of the apparatus chassis cab shall be controlled through the multiplex electrical system`s color display(s). The system shall have the capability to provide automatic climate control.

Multiplex Display

The V-MUX multiplex electrical system shall include a Vista IV color display.

The display shall have the following features:

- Aspect ratio of 16:9 (Wide Screen)
- Diagonal measurement of no less than 7"
- Master warning switch
- Engine high idle switch
- Five (5) tactile switches to access secondary menus
- Eight (8) multi-function programmable tactile switches
- Specific door ajar indication
- Real time clock
- Provides access to the multiplex system diagnostics
- Video capability for optional back-up camera(s) and GPS display

The display shall be located officer's side engine cover, driver's side engine cover.

Electrical Connection Protection

The vehicle electrical system shall be made more robust by the application of a corrosion inhibiting spray coating on all exposed electrical connections on the chassis and body. If equipped with an aerial device, the exposed connections on the aerial components shall also be protected.

The coating shall use nanotechnology to penetrate at the molecular level into uneven surfaces to create a protective water repellant film. The coating shall protect electrical connections against the environmental conditions apparatus are commonly exposed to.

Smart Truck Technology

User Interface

The apparatus shall be equipped with a smart truck technology system designed specifically for first responder apparatus. The system shall interconnect major apparatus CAN networks including but not limited to the chassis J1939/OBD2 data, vehicle multiplex system, water pump pressure governor, electric valves and electric actuated deck gun. The system shall securely report real-time vehicle information from these systems via cellular data to a globally supported cloud computing service for storage and real time access via web dashboards. The dashboards shall be accessible by the department's computers, tablets and smartphones.

The smart truck technology installed on the apparatus shall provide real-time notification via text or e-mail when a check engine light is displayed. The notification shall include the fault code and brief explanation for the code to reduce down-time.

The system shall feature a truck down feature on the web-based user interface to allow instant notification of needed apparatus service to both the authorized dealership and OEM via text or e-mail.

The system shall provide remote diagnostics of vehicle subsystems such as VMUX, pressure governors, electric monitors and electric valves.

By use of the web based user interface, the system shall allow for over the air programming updates to various subsystems should the need arise.

The web-based user interface shall also provide the following:

- Fuel and DEF levels
- GPS tracking
- Data logging for apparatus multiplex system
- Easy access to the NFPA VDR data

The smart truck technology shall also feature seamless integration to the HAAS ALERT Safety Cloud providing Responder to Vehicle (R2V) alerts to motorists using navigation apps such as WAZE.

The system shall be designed with an open architecture to incorporate future growth with new technology partners designed to enhance fireground operations

Hardware

Vehicle Gateway

The vehicle gateway module shall be rugged in construction using a durable cast aluminum enclosure designed for emergency vehicle applications. The module shall have sealed Deutsch connectors providing four (4) CAN network ports, one (1) RS-485 port, one (1) Ethernet RJ45 port, embedded cellular modem, Bluetooth and GPS capability. The IoT Core Vehicle Gateway shall be capable of 2 way vehicle telemetry, supporting both remote diagnostics and remote over-the-air software updates.

Antenna

A low profile cellular antenna shall be installed on the cab roof.

Data Plan

A 5 year data plan shall be provided with the initial vehicle purchase. At the end of the 5 year period the department shall be given the option to extend service.

LIGHT BARS

Light Bars

A pair of Federal Signal Corporation 25" LED Navigator light bars model NVG25 shall be provided. Each bar shall contain one (1) split red/white 4x6 Quadraflare forward facing LEDs, two (2) red 4x6 Quadraflare forward facing LEDs and one (1) red 3x7 Quadraflare side facing LED. Lens configuration is all clear.

The white LEDs shall be switched off in blocking right of way mode.

The light bar shall be installed in the following location: front cab corners at 20 degree angle

Light Bar Mount

Two (2) pairs of 2" tall mounts shall be provided on the front mini light bars

Light Bar Mount

Two (2) pairs of 2" tall mounts shall be provided on the side facing mini light bars.

Light Bars

A pair of Federal Signal Corporation 25" LED Navigator light bars model NVG25 shall be provided. Each bar shall contain three (3) 4x6 Quadraflare split red/white LEDs forward facing and one (1) 3x7 Quadraflare red LED side facing. Lens configuration is all clear.

The light bar shall be installed in the following location: centered above rear cab doors.

WARNING LIGHT PACKAGES

Lower Level LED Warning Light Flash Rate

The lower level Federal Signal QuadraFlare and/or FireRay LED warning lights shall be set to FedPulse 75 - Simultaneous pattern.

Lower Level Warning

Eight (8) Federal Signal FireRay model FR6 LED light heads and two (2) Federal Signal MicroPulse Ultra model MPS300U LED light heads shall be provided. The lights shall be Red with red lenses. Note: MicroPulse Ultra Series lights are only available with clear lenses.

The light heads shall be provided with chrome flanges (as applicable) mounted as close to the corner points of the apparatus (as is practical) as follows:

- Two (2) FR6 light heads on the front of the apparatus facing forward.
- Two (2) FR6 light heads on the rear of the apparatus facing rearward.
- Two (2) FR6 light heads each side of the apparatus, one (1) each side at the forward most point and one (1) centrally located to provide midship warning lighting.
- Two (2) MPS300U LED light heads shall be mounted one (1) each side at the rearward most point (as practical).

The side facing lights shall be located at forward most position, centered in rear wheel well, and side facing at rear of body in rubrail if equipped.

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

WARNING LIGHTS

Hazard (Door Ajar) Light

There shall be a 2" red LED hazard light installed as specified.

The light shall be located center overhead.

Warning Lights

Warning light Federal Signal IMPAXX LED model IPX302-4 w/ bezel (PR). Surfaced mounted with red lens. Location: (1) each side in pump module rubrail if equipped.

Warning Lights

A pair of Federal Signal model VSLR1-R2A02 LED rotating Vision beacons shall be provided. Each beacon shall contain one (1) Solaris red LED rotator with clear lens and one (1) IPX6 Solaris LED amber warning light with clear lens.

Lights shall be located: rear upper body on aerial style brackets.

Warning Lights

Two (2) Federal Signal FireRay model FR6 LED (Light Emitting Diode) light heads with bezels shall be provided. The lights shall be Red with red lenses.

The flashing lights shall be surface mounted where specified.

Location: (1) each side of cab centered over wheel well.

DIRECTIONAL LIGHT BARS

Directional Light Bar Control Location

The directional light bar control head shall be located in the center overhead console offset to officer side.

Directional Light Shield

There shall be a diamond plate shield mounted over the directional light to protect it from damage.

Directional Light Wired to Warning Lights

The rear directional light bar shall be activated when the upper level warning lights are activated to provide additional lighting, in addition to the warning lights, when the vehicle is responding to a scene.

Directional Traffic Warning Light

A Federal Viper EXT LED Signal Master model 320862 light bar with amber lens shall be installed at the rear of the apparatus. The unit shall be 31.0" long with six (6) Viper EXT LED heads. Four operating modes are available: left arrow, right arrow, split (center/out) and a flashing warning pattern.

A Federal 331105 control shall be provided with LED indicators to emulate the warning pattern.

Light bar dimensions are 31.0" long x 3.30" deep x 2.70" high.

SIRENS

Electronic Siren

A Federal PA300 siren model 690010 solid state electronic siren with attached noise-canceling microphone shall be installed. The unit shall be capable of driving a single high power speaker up to 200 watts to achieve a sound output level that meets Class "A" requirements.

Operating modes shall include Hi-Lo, yelp, wail, P.A., air horn and radio re-broadcast.

The siren shall be recessed mounted in the cab.

Electronic Siren Control Location

The electronic siren control shall be located in the center overhead.

Mechanical Siren

A chrome plated flush mounted Federal Q2B-NN coaster siren shall be installed in the front bumper. An electric siren brake switch shall be located in the cab accessible to driver.

The siren shall be located driver side front bumper.

SPEAKERS

Siren Speaker

One (1) Federal Signal model ES100 Dynamax 100 watt speaker shall be flush mounted as far forward and as low as possible on the front of the vehicle. A polished model MSFMT with "E-ONE" grille shall be provided on the outside of the speaker to prevent road debris from entering the speaker.

Speaker dimensions shall be: 5.5 in. high x 5.9 in. wide x 2.5 in. deep. Weight = 5.5 lbs.

The speaker shall produce a minimum sound output of 120 dB at 10 feet to meet current NFPA 1901 requirements.

The speaker shall be located driver side front bumper inboard of frame, officer side front bumper inboard of frame.

DOT LIGHTING

License Plate Light

One (1) Truck-Lite model 15905 white LED license plate light mounted in a Truck-Lite model 15732 chrome plated plastic license plate housing shall be mounted at the rear of the body.

LED Marker Lights

LED clearance/marker lights shall be installed as specified.

Upper Cab:

- Five (5)amber LED clearance lights on the cab roof.

Lower Cab:

- One (1) amber LED side turn/marker each side of cab ahead of the front door hinge.

Upper Body:

- One (1) red Trucklite LED clearance light each side, rear of body to the side.

Lower Body:

- Three (3) red Trucklite LED clearance lights centered at rear, recessed in the rubrail.
- One (1) red Trucklite LED clearance light each side at the trailing edge of the apparatus body, recessed in the rubrail.
- One (1) amber Trucklite LED clearance light each side front of body just in front of rear wheels, recessed in the rubrail.
- One (1) amber Trucklite LED clearance/auxiliary turn light each side front of body, recessed in the rubrail.

Marker Lights

One (1) pair of Britax model L427.203L.12V LED amber/red marker rubber housed lights shall be provided. The lights shall be located on the rear body corners mounted in the down angle position. The red lenses shall illuminate to the rear of the apparatus and the amber shall illuminate to the front of the apparatus. The lights shall be wired to the marker light circuit.

Tail Lights

One (1) Federal Signal FireRay model FR6-BTT red L.E.D. (Light Emitting Diode) light, one (1) Federal Signal FireRay model FR6-ARROW amber LED light and one (1) Federal Signal FireRay model FR6-BACKUP white LED light shall be installed horizontally with individual housings each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

- L.E.D. red running light with red brake light in upper position.
- L.E.D. amber populated arrow pattern turn signal in middle position.
- L.E.D. white backup light in lower position.

License Plate Bracket

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

Turn Signals

A pair of Weldon model 9186-8580-29 bubble style LED amber auxiliary turn signals with stainless steel bezels shall be installed.

Location: (1) each side of cab centered over wheel well.

LIGHTS - COMPARTMENT, STEP & GROUND

Compartment Light Package

Two (2) Hansen compartment light strips shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have four (4) lights located two (2) each side.

Each light bar shall include white LEDs mounted with a tough polycarbonate tube enclosure to protect the LED circuit board. The lights shall produce 120 lumens per foot and be waterproof up to IP66 rating.

Compartment lights shall be wired to a master on/off rocker switch on the cab switch panel.

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.

Step Light Package

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the steps around the apparatus in accordance with current NFPA requirements. The lights shall be 2" circular Whelen LED (Light Emitting Diode) model T0CACCCR with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

The step lights shall be switched from the cab dash with the work light switch.

Ground Lights

The apparatus shall be equipped with a sufficient quantity of lights to properly illuminate the ground areas around the apparatus in accordance with current NFPA requirements. The lights shall be TecNiq model T440 4" circular LED (Light Emitting Diode) with clear lenses mounted in a resilient shock absorbent mount for improved bulb life. The wiring connections shall be made with a weather resistant plug in style connector.

Ground area lights shall be switched from the cab dash with the work light switch.

One (1) ground light shall be supplied under each side of the front bumper extension if equipped.

Lights in areas under the driver and crew area exits shall be activated automatically when the exit doors are opened.

Cab Ground / Auxiliary Step Lights

The cab shall be equipped with a sufficient quantity of lights to properly illuminate the auxiliary steps and the ground areas below them in accordance with current NFPA requirements. The lights shall be EON LED (Light Emitting Diode) with clear lenses. The wiring connections shall be made with a weather resistant plug in style connector.

The lights shall be switched from the cab dash with the work light switch. The lights shall also be activated automatically when the exit doors are opened.

Ladder Tunnel Light [Qty: 3]

An EON LED light shall be provided to illuminate the ladder tunnel at the opening. The light shall be wired through the door ajar circuit on the ladder tunnel door.

LIGHTS - DECK AND SCENE

Deck/Scene Light Wired to Back-Up Lights

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

Hosebed Light

A FireTech LED light model WL2000 shall be installed at the front of the hosebed to provide crosslay lighting per current NFPA 1901. The hosebed light shall be switched with work light switch in the cab.

Crosslay Light

A FireTech LED light model WL2000 shall be installed at the rear area of the crosslay to provide crosslay lighting per current NFPA 1901. The crosslay light shall be switched with work light switch in the cab.

Rear Work Lights

Two (2) FireTech LED lights model FT-WL-X-9-F-W shall be installed. The lights shall produce 4,281 effective lumens and have a white housing. The lights shall be switched with work light switch in the cab.

Location: (1) each side over rear ladder tunnel.

LIGHTS - NON-WARNING

Light Wiring

Forward pump panel light at the pump operator`s panel shall be wired to the pump shift to provide pump panel illumination when the pump is placed into gear. Top mount application center light at the pump operator`s panel shall be wired to the pump shift to provide pump panel illumination when the pump is placed into gear.

LED Pump Panel Light Package

Three (3) TecNiq model E10 LED lights shall be mounted under a light shield directly above each side pump panel. The work light switch in the cab shall activate the lights when the park brake is set.

Pump Compartment Light

An LED light shall be provided in the pump compartment area for NFPA compliance. The light shall be an Optronics ILL22 Series that has a polycarbonate lense and sealed / waterproof housing. The light shall be wired through a switch inside the pump compartment access door / panel.

Engine Compartment Light

There shall be lighting provided to illuminate the engine compartment area in compliance with NFPA 1901. The light shall be an Optronics ILL22 Series LED that has a polycarbonate lense, sealed / waterproof housing and integral switch. The light wiring circuit shall activate when the cab is tilted and master power is switched on.

LED Pump Panel Light - Additional

One (1) TecNiq model E10 LED light shall be mounted under the light shield, in addition to the existing pump panel lights. The additional light shall be located at the driver side pump panel, officer side pump panel.

CONTROLS / SWITCHES

Door Ajar Alarm

An audible alarm shall be provided through the multiplex display(s) in the cab wired into the door ajar or indicator.

CAMERAS / INTERCOM

Camera Shield

A diamond plate protective shield shall be provided for the top and sides of a camera. The shield shall be designed not to impede in the operational envelope of the camera.

Camera, Officer Side

A Safety Vision model SV-622RS camera will be located on the officer side front corner of the cab. This camera will be interlocked with the turn indicator. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

Requires the option for the Safety Vision back-up camera system which consists of the colored monitor, back-up camera and control box.

Camera, Driver Side

A Safety Vision model SV-622LS camera will be located on the driver side front corner of the cab. This camera will be interlocked with the turn indicator. The system shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator.

Requires the option for the Safety Vision back-up camera system which consists of the colored monitor, back-up camera and control box.

Camera Back-Up

There shall be a Safety Vision camera model number SV-625B-KIT provided. The camera shall be mounted up high at the rear of the vehicle to provide a wide angle rear view with audio. The camera shall include a cable with metallic waterproof threaded o-ring seal connectors to ensure positive connection between video cable and camera to prevent unplugging due to vibration resulting in video loss to vehicle operator. The camera shall be interlocked with the chassis transmission. When the apparatus is placed in reverse the camera shall automatically be activated and when the transmission is placed in any other gear the screen shall return to the previously displayed screen.

Three-Way Intercom

A Fire Research ACT three-way intercom system shall be installed to provide communications between the turntable control station, the aerial tip and driver side pump panel. The intercom system shall include three (3) speakers and three (3) control modules; one (1) with a push-to-talk button at the turntable control station, one (1) with a push-to-talk button at the pump operator`s panel and one (1) hands free at the aerial tip.

The control modules shall have push-button volume control and a LED volume display. The hands free module shall constantly transmit to the other module unless the push-to-talk button is pressed.

The intercom shall have active noise cancellation and be designed for exterior use.

Camera Aerial Tip

A Pro-Vision wireless camera system shall be installed on the aerial. The system shall include a VLI camera mounted at the tip of the aerial that feeds the videa image to the color display at the turntable console. The color camera shall feature 28 infrared LEDs for improved nightime vision, a weatherproof twist lock connector and have an IP69K rating. The camera shall feature a 5 year manufacturer's warranty.

MISC ELECTRICAL

Alternating Headlights

The chassis high beam headlights shall alternately flash and shall be controlled by a switch inside the cab.

Back-Up Alarm

An electronic back-up alarm shall be supplied. The 97 dB alarm shall be wired into the chassis back-up lights to signal when the vehicle is in reverse gear.

12 Volt DC Power Distribution Module

A Blue Sea model 5032 12 place, split bus fuse block with ground, 12 volt DC power distribution module shall be provided. The module shall provide two isolated groups of six circuits, and shall be wired through switched hot and battery hot, and include a battery ground.

Location: behind officer's seat.

LIGHTS - QUARTZ

Cab Brow Light

One (1) FireTech 12V LED model FT-B-72-ML-W 72" white housing brow light with integral marker lights shall be provided. The light shall be installed on the front cab brow in place of the standard DOT marker lights. the light shall feature 54 LEDs` producing 19,665 usable lumens and five (5) DOT approved marker lights. The 285W 12V light shall draw 23.75 amps.

Cab Brow Light [Qty: 2]

One (1) FireTech 12V LED mini-brow flood light model FT-MB-27-W 35" long shall be provided. The light shall feature 27 LEDs` producing 9,317 usable lumens. The 135W 12V light shall draw 11.25 amps. A switch shall be provided, accessible to driver, for activation of light.

The light assembly shall be located driver and officer side over rear cab door.

Extended Brow Brackets

The forward facing brow mounted flood light shall be provided with extended brackets for use with a standard trough aerial cab.

LED Scene Light

A 12V FireTech model FT-SL-30-FT-W LED scene light shall be provided. The 300w light shall produce 22,200 effective lumens and draw 25 amps. The lighthead shall be white. Includes switch accessible to driver.

Location: above forward area of L3, fixed cover ahead of hosebed.

Pedestal Light Mount

Whelen PBAPEDD pedestal mount adaptor shall be provided. Light head not included with mount, must be added seperately. The pole shall allow for 360-degree rotation of the light.

Location: above forward area of L3, fixed cover ahead of hosebed.

RECEPTACLES

Receptacle

A 20 amp, 110 volt 3-prong straight blade NEMA 5-20 duplex household receptacle with stainless steel cover plate shall be installed in a non-weather exposed area as specified by the department. The receptacle shall be wired to the inlet receptacle where it will have overcurrent protection from an external source.

Location: In cab driver side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush), In cab officer side on 3 x 3 post rear facing just above engine cover (or seat riser if in a Hush).

AERIAL MODEL

100` Aerial Device

Aerial Ladder Requirements

It is the intent of these specifications to describe a telescopic aerial ladder of the open truss design that is compliant with NFPA 1901 (2016 edition) chapter 19 sections 19.2 through 19.6 and sections 19.17 through 19.25. Some portions of this specification exceed minimum NFPA recommendations and are to be considered a minimum requirement to be met.

The aerial ladder shall consist of four (4) extruded aluminum telescopic ladder sections operating from -6 degrees to 81 degrees and designed to provide continuous egress for firefighters and civilians from an elevated position to the turntable.

The aerial device shall have a vertical height of 100 ft at full extension and elevation. The measurement of height shall be consistent with NFPA 1901 section 19.2.2.

The rated horizontal reach shall be 92 ft. The measurement of horizontal reach shall be consistent with NFPA 1901 19.2.3. The measurement shall be from the outermost rung at full extension to the centerline of turntable rotation.

The aerial shall have a maximum stabilizer spread of 11 ft from pin to pin.

The ladder shall be able to provide full operating capacities in up to 50 mph wind conditions.

Aluminum Aerial Ladder

The aerial ladder shall exceed the aerial ladder requirements found in section 19.2 of NFPA 1901 as detailed in these specifications. To ensure a high strength-to-weight ratio and an inherent corrosion resistance, the aerial ladder shall be completely constructed of high strength aluminum. All side rails, rungs, handrails, uprights and K-braces shall be made of structural 6061T6 aluminum alloy 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 aluminum alloy welding wire. Structural rivets or bolts shall not be utilized in the ladder weldment sections.

Due to the unpredictable nature of fireground operations, a minimum safety factor of 2.5 to 1 is desired. 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.19.20.1:

DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.

RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.
WL= Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.
FY = Material yield strength. The stress level at which the material exhibits permanent deformation.

2.5 x DL + 2.5 x RL + WL equal to/less than FY

The minimum NFPA specification of 2.0 to 1 is exceeded in this paragraph by requiring a 2.5 to 1 safety margin on dead load and live load while flowing water.

The stability factor or tip over safety margin shall be a minimum of 1.5 to 1 as defined by NFPA 1901 19.21. The 1.5 to 1 stability factor shall be achieved in all ranges, including the front working area, without relying on the chassis front axle for stabilization.

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. Verification shall include written certification from the independent engineering firm made available by the manufacturer upon request from the purchaser.

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 19.22.3.1.

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 19.22.2. 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.

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 four (4) ladder 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.

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 an integral skid-resistant surface as outlined in NFPA 1901 19.2.5 through 19.5.2.3. 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 distributed over a 3 1/2 " wide area per rung as outlined in NFPA 1901 19.2.5.4.

The aerial ladder shall exceed NFPA 1901 sections 19.2.6 and 19.2.8 governing the minimum ladder section width and handrail height.

Section	Width	Height
Base Section	36"	28-1/2"
Second Section	29-3/4"	25-3/4"

Third Section	24-3/8"	23"
Fly Section	19-3/4"	20-3/8"

Ladder Extension Mechanism

Both power extension and retraction shall be furnished and meet the requirements of NFPA 1901 section 19.19, 19.20.3, and 19.5.3. Extension shall be by way of two (2) extending cylinders mounted on the underside of the base section of the ladder.

Extension Cylinder Size

Bore: 3-1/4"
Stroke: 94"

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 cable safety factor shall be 5:1 and the stall safety factor shall be 2:1 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. The cables shall be treated with Pre-Lube 6 for increased service life.

Ladder Cable Size

1st section (4 cables - 2 extend, 2 retract)	1/2" 6 x 19 galvanized cable
2nd section (4 cables - 2 extend, 2 retract)	5/16" 6 x 25 galvanized cable
3rd section (4 cables - 2 extend, 2 retract)	5/16" 6 x 25 galvanized cable

The ladder assembly shall consist of four (4) separate weldments that shall extend and retract within each other. Nylatron NSM slide pads shall be utilized between each section to minimize friction. Nylatron NSM slide pads shall be installed at the tip of the lower three sections to accommodate the sliding loads as the ladder is extended.

Aerial Extension Indicator

Reflective tape stripes shall be installed on the ladder top handrail of the base section to indicate extension in 5 ft increments. Numeric indicators shall be placed at 10 ft increments. A reflective dot on the base of the 2nd section shall provide a visual reference for the operator to estimate aerial elevation.

Aerial Finish

To reduce maintenance expense the aerial shall have a natural aluminum swirled finish. Visible inspection of all ladder weld joints shall be possible without having to remove paint or body filler to reveal the weld bead.

Operation Times

The aerial shall complete the NFPA 1901 19.2.12 time test in no more than 120 seconds. This test involves raising the aerial from the bedded position to full elevation and extension and rotating to 90 degrees. This test is to begin with the stabilizers deployed.

Time to extend ladder	maximum 30 seconds
Time to retract ladder	maximum 30 seconds
Time to raise ladder	maximum 25 seconds
Time to lower ladder	maximum 25 seconds
Time to rotate 180 degrees	maximum 80 seconds

Aerial Ladder Rated Capacity

The aerial device shall have a rated capacity of 500 lbs. consistent with NFPA 19.3.1 through 19.3.2. The aerial device shall be rated in multiple configurations as outlined in 19.3.4. A sign mounted at the base of the aerial shall communicate the following ratings in the unsupported fully extended configuration while maintaining a 2.5 to 1 safety margin as defined in NFPA 1901 A.19.20.1. The loads in each configuration are in addition to 75 lbs. of equipment mounted at the tip.

Condition #1- Tip load only, no water flowing.

Elevation	Capacity	Pounds
- 6 to 30 degrees	2 person	500 lbs.
31 to 50 degrees	3 people	750 lbs.
51 to 81 degrees	4 people	1000 lbs.

Condition #2- Distributed loads no water flowing. (These include one person at the tip)

Elevation	Capacity	Pounds
- 6 to 20 degrees	3 person	750 lbs.
21 to 40 degrees	4 people	1000 lbs.
41 to 60 degrees	6 people	1500 lbs.
61 to 81 degrees	10 people	2500 lbs.

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

Elevation	Capacity	Pounds
-6 to 44 degrees	2 people	500 lbs.
45 to 81 degrees	3 people	750 lbs.

Hydraulic System

The hydraulic plumbing shall consist of hydraulic stainless steel tubing wherever possible in order to:

- Eliminate hose wear.

- Eliminate the corrosion associated with galvanized steel tubing.
- Provide a stronger medium to carry the hydraulic fluid.

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 19.17.3.

The hydraulic system shall be of the latest design and incorporate features to minimize heat build up and provide smooth control of the aerial ladder. The system shall meet the performance requirement in NFPA 19.19.6 and 19.19.7, which requires adequate cooling under 2 1/2 hours of operations.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial shall comply with NFPA 19.19.1 and have burst strength of 4 to 1. Dynamic sealing components whose failure could cause aerial movement shall have a margin of 2 to 1 on maximum operating pressure per NFPA 19.19.1.1. All hydraulic hoses, tubes and connections shall have minimum burst strength of 3 to 1 per NFPA 19.19.2.

A hydraulic oil pressure gauge shall be supplied at the base control location per NFPA 1901 19.19.4.

The hydraulic system shall consist of a 55 gallon reservoir mounted to the torque box and plumbed to the hydraulic pump. The tank shall be supplied with a removable top to access tank strainer filter. There shall be plumbing for a supply and return line and a tank drain on the reservoir. The reservoir cap shall be marked per NFPA 19.19.5.2. Gated valves under the tank shall facilitate filter changes.

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

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

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.

The hydraulic system shall be designed with an auxiliary power unit meeting the guidelines of NFPA 1901 19.18.7. 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 five (5) minutes of hydraulic power to operate functions.

Hydraulic power to the ladder shall be transferred from the torque box by a hydraulic swivel.

Aerial Torque Box

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 under-slung stabilizers, and additional space for body compartments. The strength of the torque box shall be a minimum 12.6 million-inch pounds resistance to bending moment. The stabilizers and turntable supports shall be welded directly to the torque box.

Stabilization

The unit shall be equipped with two (2) sets of extendable crisscross under-slung stabilizers. The stabilizers shall have a spread of 11 feet centerline to centerline of the stabilizer pads when fully extended. One (1) set of stabilizers shall be mounted in the forward body area and a second set close to the rear axle to minimize impact on departure angle. The stabilizers shall have an inner and outer tube that slide on low friction pads for deployment. The stabilizers shall have a tip over safety margin of 1 1/2 times the rated load imposed by the aerial in any position the aerial device can be placed as outlined in NFPA 1901 19.21.2. The apparatus stabilization shall be accomplished without the assistance of the chassis suspension or tires in contact with the ground.

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 NFPA 1901 19.21.3. The maximum ground slope the apparatus can be set up on is 12 percent. On the 12 percent slope the apparatus can be leveled within a 6 percent operating range for the apparatus.

The cylinders shall be supplied with dual pilot-operated check valves on each stabilizer cylinder to hold the cylinder in the stowed or 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.

The stabilizer lift cylinders shall be sized to maximize ground penetration. The lift cylinders shall be mounted on the side of the torque box for protection and shall have the following dimensions:

Bore: 5"
Stroke: 11"

The stabilizer extension cylinders shall have the following dimensions:

Bore: 2"
Stroke: 26"

Each Stabilizer that can be extended from the body shall be supplied with a red warning light as outlined in NFPA 19.21.4.4. 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.

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 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 19.21.4.2.

Stabilizer Controls

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 19.21.4.1. Stabilizer deployment shall be completed in less than 60 seconds.

There shall be an interlock that prevents the operation of the ladder until the stabilizers are down and properly set as outlined in NFPA 19.17.5. Four (4) micro-switches, one (1) on each jack leg, 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 jack-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.

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

Forward Aerial Support

The aerial ladder support shall be fabricated from steel components and be welded directly to the torque box chassis. The ladder support uprights shall be constructed from 7/8" thick steel plate. Bolt-in diagonal bracing shall be installed on the support structure in an "X" pattern to restrict to side movement. This design shall allow for a pre-determined amount of flex preventing premature failure that can be found in an overly rigid structure. The support shall be located behind the rear wall of the cab.

Turntable Support Assembly

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

The turntable support assembly shall be a steel weldment constructed of four (4) vertical 1/2" x 5" x 5" square tubing with identical tubing welded in between the top ends of the verticals.

A bearing mounting plate shall be welded to the top of the verticals and sides of the horizontals on the turntable pedestal. The bearing mounting plate shall be 43" x 43" and shall have a 1-1/2" thickness. This bearing mounting plate shall be attached to a 3/4" steel plate that is welded to the bottoms of the horizontal tubing. The use of multi-pass welding shall be utilized wherever possible.

A 34-1/4" rotation bearing with a 3" face drive gear shall be bolted to the top of the bearing mounting plate with thirty (30) 3/4" grade 8 plated bolts. The gear tooth shall be stub tooth form.

Upper Turntable

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

The turntable working platform shall be a fabricated steel structure covered with a non-skid 3/16" thick aluminum material for operator safety. Two (2) railings 42" high shall be provided along the perimeter of the turntable as outlined in NFPA 1901 19.18.1. Two (2) Mansaver bars shall be provided to allow access to the turntable area. There shall be a control pedestal mounted on the left side of the turntable. 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 (20) 3/4" grade 8 plated bolts.

An 11" high step shall be installed on the turntable deck to provide convenient access to the ladder sections for egress.

Two (2) lights shall be provided in the turntable step to illuminate the turntable deck area per NFPA requirements.

The ladder pivot point shall connect to the upper turntable assembly by two (2) 2-1/4" ID spherical bearings.

Elevation Mechanism

The aerial shall utilize dual 5" bore 42 5/8" stroke elevating cylinders to attach the upper turntable assembly and bottom of the base ladder section. A 1 3/4" pin and bearing system shall connect to the turntable. A 2" pin and bearing system shall connect to the base section of the ladder. The elevation system shall be designed following NFPA 1901 19.5.1. The elevation hydraulic cylinders shall incorporate cushions on the upper limit of travel. The hydraulic elevation cylinders shall also serve as a locking device to hold the aerial in the stored position for road travel.

Rotation Mechanism

The aerial shall be supplied with a hydraulically-powered rotation system as outlined in NFPA 1901 19.5.2. The hydraulic rotation motor and planetary gear drive system shall provide continuous rotation under all rated conditions and be supplied with a spring-applied brake to prevent unintentional rotation.

Aerial Electric Power

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

Aerial Ladder Operating Position

An aerial ladder operator`s position shall be supplied as outlined in NFPA 1901 19.4.1. The operator`s position shall be located on the left side of the aerial turntable. The apparatus shall be supplied with labels to warn of electrocution hazard. The control console shall provide a service access door on the front and side of the console to access hydraulic and electrical connections. The electrical panel shall be contained in junction box with labeled wires. The console shall be angled, labeled, and supplied with lights f or night operation.

Console Cover

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

Aerial Ladder Control Levers

The control levers shall be arranged as outlined in NFPA 19.17.7. The first lever 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 back for counter clockwise). The third handle shall control elevation (forward for down and back for up). The aerial shall employ direct hydraulic controls for precise control and dependable service with minimal electrical functions. A ring around the control console shall be provided to prevent unintentional movement as outlined in NFPA 19.17.6.2.

Rung Alignment Indicator

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

Aerial Alignment Indicator

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

Load Indication System

A lighted elevation/safe load indicator diagram shall be located on the lower left side 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: tip load only, tip load

with water flowing, and distributed load at full extension. The chart shall identify capacity using graphic characters to indicate each 250 lb. increment. The chart shall be equipped with lighting and warn of electrocution hazards from power lines and lightning.

Aerial Waterway

A pre-piped waterway shall be supplied as outlined in NFPA 1901 19.6. 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 connect to the tubular aerial waterway. The tubular waterway shall run under the aerial ladder. The waterway tubes shall have the following sizes:

Base Section:	5" OD
Mid Section:	4-1/2" OD
3rd Section:	4" OD
Fly Section:	3-1/2" OD

The tubes shall be constructed of hard coat anodized aluminum and shall be telescopic with the aerial ladder through sealed slip joints. The slip joints shall be designed with grease zerk fittings to facilitate lubrication.

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

The water system shall be capable of flowing 1000 gpm at 100 psi nozzle pressure at full elevation and extension. The friction loss between the tip and below the swivel shall not exceed 100 psi while flowing 1000 gpm as outlined in NFPA 1901 19.6.1 and 19.6.2.

Waterway Relief Valve

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

Ladder Tip Step

Two (2) split design 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 19.2.9. The steps shall have a raised surface for traction and cut outs for deployment.

ISO Compliance

The manufacturer shall operate a Quality Management System meeting the requirements of ISO 9001:2015.

The International Organization for Standardization (ISO) is a recognized world leader in establishing and maintaining stringent manufacturing standards and values. The manufacturer`s certificate of

compliance affirms that these principles form the basis for a quality system that unswervingly controls design, manufacture, installation, and service.

The manufacturer`s quality systems shall consist of, but not be limited to, all written quality procedures (aka QOP) and other procedures referenced within the pages of the manufacturer`s Quality Manual, as well as all Work Instructions, Workmanship Standards, and Calibration Administration that directly or indirectly impacts products or processes. In addition, all apparatus assembly processes shall be documented for traceability and reference. The manufacturer shall also engage the services of a certified third party for testing purposes where required.

If the manufacturer operates more than one manufacturing facility each facility must be ISO certified.

By virtue of its ISO compliance the manufacturer shall provide an apparatus that is built to exacting standards, meets the customer`s expectations, and satisfies the customer`s requirements.

A copy of the manufacturer`s certificate of ISO compliance for each manufacturing facility shall be provided with the bid.

AERIAL HYDRAULIC SYSTEM OPTIONS

Aerial Hydraulic Oil Level Gauge

A hydraulic oil level gauge shall be supplied 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. The display shall be located on pump operator's panel.

Aerial Cold Weather Package

The aerial hydraulic system shall be provided with a 1.5" suction hose to improve performance in cold weather climates.

AERIAL CONTROLS

Aerial Console Cover Hold-Open

The aerial console cover shall be equipped with a gas shock-style hold-open device. The gas shock shall hold the cover open 90 degrees to the side.

Aerial Controls at Ladder Tip

A secondary aerial ladder operator`s position shall be supplied at the tip of the aerial ladder. The control station shall be designed to meet NFPA 1901 16-5.4. The turntable control station shall serve as the main control location and be capable of overriding the ladder tip control station. A momentary switch shall be supplied at the turntable control station to enable the tip controls. If the operator releases the momentary switch the tip controls shall deactivate.

The maximum speed of the aerial device shall be reduced when the ladder tip controls are in operation. The reduced speed shall not exceed the NFPA 1901 recommendation of:

- Rotation at full extension of 2 ft/sec (.6 m/sec)
- Elevation and lowering at 1 ft/sec (.3 m/sec)
- Extension and Retraction at .5 ft/sec (.15 m/sec)

The folding steps at the ladder tip shall be designed to prevent operator`s feet from protruding through the outermost fly section. The fold down steps shall be weight supporting before the ladder tip controls are functional.

The ladder tip controls shall be a CAN based switch module with six (6) individual switches to control rotation, extension, and elevation. The module shall have lights to indicate the turntable control station momentary switch is depressed and a light to show the tip control switches are enabled (indicating the tip step switches are also depressed).

Aerial Control System

The aerial hydraulic system shall be equipped with a microprocessor based electric over hydraulic control system. The system shall include electronic ramping to provide smooth acceleration and deceleration of aerial functions during sudden movements of the operator control levers. The ladder shall utilize three (3) combination proportional control valves for smooth aerial device movements. The hydraulic system valve body shall be located in the turntable console.

The switch modules on the console shall be CAN based for reliable operation. The system shall utilize 32-bit control module(s) rated for mobile applications.

The control system shall have manual overrides in the event of a system failure. The overrides shall be located directly on the electric / hydraulic control valve within easy reach of the turntable operator. The manual system shall be organized to match the base controllers with the functions clearly labeled.

Aerial Speed Switch

The control system shall be provided with a "creep speed" switch for precise aerial movement. When activated, the aerial shall operate a slow speed and the chassis engine will remain at idle speed.

Variable Ramping

A three (3) position switch shall be provided to select system ramping (ladder movement when initiating or ceasing movement of a control lever). The switch shall allow selection of normal (1/2 second), firm (1/4 second) or soft (3/4 second) ramping based on operator preference.

End of Stroke Cushioning

The aerial system shall monitor the aerial position and when the ladder is near full extension, retraction and elevation (up and down) will slow the ladder movement down for softer stops. The sensors shall be CAN based for accurate and reliable performance.

Body Protection

The aerial control system shall feature programming to prevent the aerial from contacting the body. The system shall feature multiple zones to optimize operational envelop based on a specific apparatus configuration. When approaching a protected zone the aerial shall automatically ramp down in speed to come to a soft stop. A momentary switch shall be provided to allow the aerial operator to by-pass the body protection zone.

Aerial Information System Display

The aerial device shall be equipped with a color display at the turntable console that provides critical information to the aerial operator for added safety.

Information shall be conveyed to the operator using J1939 protocol through multiple mission-specific screens, each tailored for a specific fireground activity. The screens display shall include available tip load, distributed load, master stream and aerial systems data.

The available tip load shall be represented in simple "Stick-Figure" type symbols that show the allowable quantity of people at the tip based on ladder position. The screen layouts shall be uncluttered allowing the symbols to be easily read at a glance. The system shall also feature programming that calculates the allowable tip load based on elevation and extension, allowing for increased tip capacity when possible. Systems that rely on hydraulic pressure to determine load shall not be acceptable.

In addition to available tip load, the display shall provide the following information:

- Ladder extension (%)
- Ladder inclination in degrees
- Ladder rotation position
- Rated distributed load
- Waterway flow
- Total waterway flow (with reset button)
- Waterway pressure
- Tip temperature
- Hydraulic oil pressure
- Hydraulic oil temperature
- Hydraulic oil level
- Aerial hourmeter
- Rung alignment status
- Cradle alignment status
- Aerial PTO status

- Aerial PTO engage
- Breathing air status (if equipped with breathing air)
- Fuel Level
- Transmission temperature
- Engine RPM
- Coolant temperature
- Engine oil pressure
- Battery voltage
- Pump in gear status (if equipped with a pump)
- OK to pump status (if equipped with a pump)
- Chassis engine start / stop
- Chassis air horn switch

The display shall be capable of showing system units in standard or metric values.

Audible Warnings

The system shall include alarms to indicate when tip temperature is greater than 300°F, tip temp below 32°F, hydraulic oil temperature is above 190°F and when breathing air is below 20% and 5% volume (if equipped),

Visual Warnings

In addition to the audible warnings, the system shall include visual warning indicators for high tip temperature, low tip temperature, high hydraulic oil temperature and low breathing air (if equipped),

Display Screen

- 7" bonded Transflective LCD screen (Sunlight viewable)
- 16-bit color format
- 800 x 480 resolution
- LED backlighted switches
- Environmentally sealed housing
- Fourteen (14) integrated tactile navigation buttons

Sensors

- Ladder extension
- Ladder inclination
- Turntable rotation
- Waterway pressure
- Waterway flow
- Tip temperature
- Hydraulic oil pressure
- Hydraulic oil temperature
- Hydraulic oil level

- Cradle alignment
- Rung alignment
- Breathing air pressure (If equipped with breathing air)

Cradle Assist Switch

The control system shall also include a momentary switch to assist in stowing the aerial. The switch, in conjunction with moving the "down" aerial control lever shall cause the aerial to rotate to center and lower into the cradle. The system shall be operational when the aerial is below 30 degrees in elevation and 30 degrees left or right of center.

Cradle Alignment Light

A green light shall be provided at the turntable control console to indicate when the aerial is aligned for bedding.

Monitor Stow Switch

The control system shall also include a switch to deploy and stow the waterway monitor (if equipped with a pre-piped waterway).

Emergency Stop Switch

An emergency stop switch shall be provided on the console that turns off the controllers and de-energizes the PTO in the event the aerial must be stopped immediately. The system shall include both visual and audible indicators that the switch has been activated.

Durability

The components shall be thoroughly tested and have a proven reliability in severe environments to ensure long life on the fireground. The system shall be capable of operating in a temperature range of -40°C through +85°C.

Diagnostics

The system shall feature diagnostic capabilities that includes an I/O status screen separated by component.

MONITORS

1000 GPM Monitor

The aerial ladder shall be equipped with an TFT Typhoon RC electrically controlled monitor with a powder coated silver finish. The monitor shall be equipped with an Master Stream electrically controlled automatic nozzle capable of discharging 250-1,000 gpm at 100 psi nozzle pressure. This waterflow 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.
The operational range of the electric monitor and nozzle shall be 155 degrees through the vertical plane (110 degrees upwards from a line perpendicular to the aerial ladder and 45 degrees downward), and 180 degrees through the horizontal plane (90 degrees to either side of the aerial ladder center line). The monitor shall be able to move in the horizontal and vertical axis simultaneously.

The monitor shall include an extended vertical travel range to allow operation up to 20 degrees above parallel to the ladder. This feature shall allow water to be directed upwards from the ladder tip. The ladder rung placement shall not be altered from the standard configuration for this feature.

The monitor relay box shall include solid state components and shall be coated to resist corrosion. The monitor shall have fully enclosed motors and gears with built in manual override capability.

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

Monitor Tip Controls

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

Shut-Off Valve

A TFT model VUM AKM112111D valve shall be provided at the base of the monitor. The valve body shall be constructed from cast aluminum with a pivoting cast stainless steel shut-off assembly. The valve shall allow the monitor to be shut off when using of the 2.5" auxiliary discharge.

2.5" Valve

An auxiliary 2.5" discharge valve (with 4.75" extension pipe) shall be mounted on the VUM at the tip of the ladder.

AERIAL WARNING LIGHTS

LED Outrigger Lights (4)

Four (4) Truck-Lite model 91 LED outrigger warning lights with red lenses shall be provided.

The lights shall be surface mounted on the outrigger covers in compliance with current NFPA 1901.

Warning Lights

Two (2) Whelen ION-T Series model TLI Super LED light heads shall be provided. The lights shall be Red with clear lenses. The lights shall include chrome flanges where applicable.

Location: [#LOC].

AERIAL LIGHTING

Tip Light Locations

All spot, flood and quarts lights at the the tip of the fly section shall be mounted back as far as possible from the tip of the ladder.

Ladder Climbing Lights

A Luma-Bar Pathfinder LED lighting system shall be provided to illuminate the climbing area inside each ladder section. The strip type lights shall be located above ladder rung level and directed toward the centerline of the ladder to reduce glare. The lights shall be mounted to a 1.25" x .5" x .125" extruded aluminum channel and wired to not be an obstruction during climbing. The lights shall be controlled with the ladder lights switch at the operators control console.

The LED lights shall be Blue.

Base Flood/Spot Light

A pair of 12V FireTech model FT-WL3500-FT-W LED flood/spot lights shall be provided on the base section of the aerial device. Includes hardwired switch at turntable console.

Tip Light

A 12V FireTech model FT-WL-X-20-F-W LED flood light shall be provided on the tip of the aerial device and produce 20,000 lumens. Includes switch at the turntable console. The light shall be located left side tip, right side tip.

WATERWAY OPTIONS

Pinned Waterway Upgrade

A remote-controlled monitor/nozzle assembly shall be attached to a ladder fly section through C-channel slide pads which shall allow the monitor/nozzle assembly to be positioned at the tip of a section for maximum master stream reach or at the tip of the next section down for unobstructed rescue capabilities. The monitor/ nozzle assembly shall be pinned at either operating location with a single stainless steel "T" handle locking ball pin. A monitor control station shall be attached to the sliding monitor/nozzle assembly and shall move with it.

The turntable monitor controls shall be connected to the sliding monitor system using an electronic multiplexing system that sends all monitor control signals over a shielded pair of wires through a spring retract electric cable reel. The collector rings in the cable reel shall be specifically designed for accurate transmission of electronic signals.

A gel-cell rechargeable battery shall be located on the sliding monitor assembly. A dedicated ground wire and 12VDC positive charging wire shall be routed from the turntable control station through the electric cable reel to the monitor battery. The charging wire shall be directly connected to the chassis 12VDC battery system through a 20 amp auto reset circuit breaker.

The moveable monitor/nozzle assembly shall be capable of flowing from 300 gpm to 1000 gpm while maintaining a constant 80-100 psi nozzle pressure for maximum stream projection.

Waterway Inlet

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 aerial waterway from an outside source. All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel piping to help prevent corrosion. The threads shall be NST. A long handle chrome plated 4" NST cap shall be installed on the inlet.

Waterway Relief Valve

A Hale P40 pilot operated relief valve shall be provided for the aerial waterway.

Waterway Pressure Gauge

The valve discharge gauges shall be 2 ½"(63mm) diameter Innovative Controls pressure gauges. Each gauge shall have a rugged corrosion free stainless steel case and clear scratch resistant molded crystals with captive O-ring seals to ensure distortion free viewing and seal the gauge. The gauges shall be filled with a synthetic mixture to dampen shock and vibration, lubricate the internal mechanisms, prevent lens condensation and ensure proper operation from –40F to +160F.

Each gauge shall exceed ANSI B40.1 Grade A requirements with an accuracy of +/- 1.5% full scale and include a size appropriate phosphorous bronze bourdon tube with a reinforced lap joint and large tube base to increase the tube life and gauge accuracy.

A polished chrome-plated stainless steel bezel shall be provided to prevent corrosion and protect the lens and gauge case. The gauges shall be installed into decorative chrome-plated mounting bezels that incorporate valve-identifying verbiage and/or color labels.
The gauges shall display a range from 0 to 400 psi with black graphics on a white background.

AERIAL EQUIPMENT

Axe Bracket

An axe bracket shall be provided on the aerial ladder. The bracket shall be Zico model# H-AB blade guard and PAC TRAC model# 1004 clamp for the handle. The bracket shall be designed to hold a 6 lb. axe.

Location: left side fly section.

Stokes Basket Brackets

Brackets shall be provided to mount a stokes basket to the aerial base section while not in use. Brackets shall hold a Junkin JSA-200 stokes. The stokes basket shall mount on the base section on the left side towards rear (over breathing air bottle if equipped). Stokes not included.

Pike Pole Mount

There shall be (2) two PAC TRAC positive locking brackets for one (1) 6` pike pole. Location: left side fly section.

Lifting Eyes

A pair of lifting eyes shall be located one each side at the ladder tip. The lifting eyes shall be constructed of 6061T6 aluminum and be welded one each side to the tip of the aerial`s fly section main rail. The hole in the eye shall have chamfered edges and be designed to allow attachment of 2" webbing. The lifting eyes shall have a capacity of 250 lbs. each / 500 lbs. Load on eyes and personnel at tip not to exceed rated capacity of the ladder.

AERIAL LADDER BRACKETS

Roof Ladder Bracket

A lift-out style roof ladder mounting bracket shall be installed on the outside of the ladder base section. The bracket shall be designed to hold a PRL-12 on right side of base section.

SIGN PLATES

Aerial Sign Plate

Two (2) 22" 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 Job Color as specified by the customer.

AERIAL TESTING

Third-Party Flow Test

A flow test shall be conducted to determine that the water system is capable of 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 for the onboard pump shall not exceed 20 psi.

In addition to the flow test, a hydrostatic test shall be done on the waterway system. 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.

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

Aerial Certification

All certification shall be performed by a certification organization that is accredited for inspection and testing systems on fire apparatus in accordance with ISO/IEC 17020.

The aerial ladder shall be tested in compliance with the current editions of NFPA 1901 and NFPA 1911. All critical structural components of the aerial shall include 100% nondestructive testing (NDT) before assembly and body mounting. All NDT testing shall be performed by Level II or Level III technicians who have been certified in the test methods used in accordance with ANSI/ASNT CP-189.

Welds for structural load-supporting elements shall be performed by certified welders under the guidelines of AWS. Each aluminum ladder section shall be subjected to 100% NDT visual weld inspection followed by Liquid Penetrant NDT inspection as required to qualify suspected weld defect indications. Each steel ladder section shall be subjected to 100% Magnetic Particle NDT weld inspection to assure the structural integrity of the welds.

A 100% Magnetic Particle weld inspection 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 structural integrity of the weldment.

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 1911.

In addition to the above tests, the aerial shall successfully complete the following operational tests:

1) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. The aerial shall lift a test weight equal to the rated tip load capacity, as specified herein, with the aerial at full extension, 0 degrees elevation, and rotated 90 degrees to either side of the truck chassis. The test weight shall be lifted from 0 degrees to 15-20 degrees. The test weight shall be suspended from a position equal to the position of the outermost rung of the fly section or the center of the platform when so equipped. The aerial shall lift the test weight smoothly and evenly with no twisting or jerking. This test shall be performed at the normal hydraulic system relief valve setting. No temporary adjustments to the relief valve shall be allowed.
2) The completed apparatus shall be placed on a firm, level surface with the aerial ladder stabilizers extended and down. A test weight equal to 1.5 times the aerial`s rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead

position. The aerial shall then be rotated a full 360 degrees around the vehicle with the aerial at full extension and at 0 degrees elevation (or high enough to clear vehicle-mounted equipment). The aerial and vehicle shall show no signs of instability. This test shall be performed with no water in the tank, or hose, ladders, or removable equipment that would act as a counterbalance in order to simulate a worst-case condition.

3) The completed apparatus shall be placed on a firm surface having a minimum 5 degrees side slope with the aerial stabilizers extended and down. A test weight equal to 1.5 times the aerial`s rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position. The aerial shall then be rotated 90 degrees to the downhill side with the aerial at full extension, 0 degrees elevation (or high enough to clear vehicle-mounted equipment). The aerial and vehicle shall show no signs of instability, and all of the stabilizers shall remain firmly on the ground. This test shall be performed with no water in the tank, or hose, ladders, or removable equipment that would act as a counterbalance in order to simulate a worst-case condition.

4) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. A test weight equal to 2.0 times the aerial`s rated tip load capacity, shall be suspended from a position equal to the position of the outermost rung of the fly section (or center of the platform when so equipped), with the aerial in the straight-ahead position at full extension and at 8 degrees elevation (or high enough to clear vehicle-mounted equipment). After ten (10) minutes, the weight shall be removed, and the aerial shall be inspected for any abnormal twist or deflection.

5) The completed apparatus shall be placed on a firm, level surface with the aerial stabilizers extended and down. The aerial will be positioned at full extension at 0 degrees elevation at some position out of the travel rest and off the side or rear of the truck. For units without a pre-piped waterway to the tip, a test weight of 220# shall be applied horizontally and perpendicular to the tip of the aerial at the location of the outermost rung. The rotation brake shall not release nor shall the aerial`s deflection exceed the manufacturer`s accepted tolerances. For aerials with pre-piped waterways, a test weight of 350# will be applied at the location of water nozzle.

Upon satisfactory completion of all inspections and tests, an independent third-party inspection firm shall submit a certificate indicating that all specified standards have been met.

ADAPTERS

Storz Adapter [Qty: 2]

Storz Swivel 4" FNST x 5" 30 Degree Elbow

An aluminum 4" female NST x 5" Storz swivel elbow adapter with a tethered cap shall be supplied.

HAND TOOLS

Pick Head Axe with Fiberglass Handle

A 6 lb. steel pick head axe with fiberglass handle shall be supplied.

Pike Pole Fiberglass

6` Pike Pole

One (1) Ziamatic Plasticore model PCM 6 6` hollow fiberglass pike pole, 1-3/4" (1.75") outside diameter, with painted steel pike shall be supplied.

Pike Pole Fiberglass [Qty: 2]

8` Pike Pole

One (1) Ziamatic Plasticore model PCM 8, 8` hollow fiberglass pike pole, 1-3/4" (1.75") outside diameter, with painted steel pike shall be supplied.

Pike Pole Fiberglass [Qty: 2]

10` Pike Pole

One (1) 10` hollow fiberglass pike pole 1-3/4" OD, with a painted steel pike shall be supplied.

GROUND LADDERS

Alco-Lite Folding Ladder

One (1) Alco-Lite FL-10, 10` aluminum folding ladder shall be provided. Both ends shall be equipped with molded rubber end caps and the ladder shall have handles for easy carrying. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Alco-Lite Roof Ladder

An Alco-Lite PRL-12, 12` roof ladder shall be provided. Folding steel roof hooks shall be attached to one end of the ladder with steel spikes on the other.

Alco-Lite Roof Ladder

An Alco-Lite PRL-14, 14` aluminum roof ladder shall be provided. Folding steel roof hooks shall be attached to one end of the ladder with steel spikes on the other.

Alco-Lite Roof Ladder

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

Alco-Lite Extension Ladder

One (1) Alco-Lite PEL-24, 24` aluminum 2-section extension ladder shall be provided. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Alco-Lite Extension Ladder

An Alco-Lite PEL-28, 28` aluminum two-section extension ladder shall be provided.

Alco-Lite 3-Section Extension Ladder

One (1) Alco-Lite PEL3-35, 35` aluminum 3-section extension ladder shall be provided. The fly section shall be operated by a cable and shall automatically extend as the center section is raised. The ladder shall meet or exceed the requirements of the current edition of NFPA 1931.

Little Giant Model 17 Ladder

A-Frame Ladder

One (1) Wing Enterprises Little Giant model 17 aluminum A-frame ladder shall be supplied. The ladder shall be equipped with a heavy gauge steel locking device and ladder shoes for extra safety. It shall be capable of being used either as a 9` to 15` variable-length straight ladder or as an adjustable step ladder with the ability to be erected on stairs or other offset horizontal surfaces.

MISC LOOSE EQUIPMENT

Wheel Chocks CFR

This unit shall be supplied with one (1) pair of AC-32 aluminum wheel chocks to fit a 19.5" tire and QCH-32-H horizontal holder.

DOT Required Drive Away Kit

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

Backboard

A Ferno Millenia 18 inch wide Backboard shall be supplied for this vehicle.

Stokes Basket

One (1) Junkin model JSA-200 stokes basket shall be provided and shipped loose.

EXTERIOR PAINT

Paint Break with Dip to Grille

The cab shall have a two-tone paint break. The break line shall be approximately 31.5 inches below the cab roof drip rail. The paint break shall include a dip down to the corners of the cab grille.

Painted Pump/Pre-Connect Module(s)

The apparatus pump/pre-connect module(s) shall be painted job color.

The paint process shall match what is applied to the body.

Tip Paint

The tip of the aerial ladder shall be painted job color to assist firefighters in locating the ladder tip. The last three rungs, uprights and beams from the tip shall be painted; including nozzle guard (if equipped).

Paint Spray Out

A paint sample spray out of the cab two-tone paint colors will be provided for approval prior to painting.

Painted Header Plate

The roll up door header plates shall be painted job color for all painted roll-up doors.

Paint Custom Cab

The apparatus cab shall be painted Sikkens FLNA3225E-1 Red. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The aluminum cab exterior shall have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces. Cab doors and any hinged smooth-plate compartment doors shall be painted separately to assure proper paint coverage on cab, door jambs and door edges.

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Paint Cab Two-Tone Color

The upper section of the cab shall be painted FLNA4001 WHITE.

The paint process of the secondary cab color shall be the same as the primary color.

Paint Body Large

The apparatus body shall be painted Sikkens FLNA3225E-1 Red. The paint process shall meet or exceed current state regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. Contractor shall, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

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

Paint process shall feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces shall be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.

- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer shall be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat shall be applied, providing excellent coverage and durability. A minimum of two (2) coats shall be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat shall be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats shall be applied.

Any location where aluminum is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components shall be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment shall be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components shall be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit shall be tested with a 20 degree gloss meter. Coating thickness shall be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

Aerial Paint

The lift cylinders, extension cylinders and upper turntable steelwork (less turntable) shall be painted to match the primary job color.

INTERIOR PAINT

Cab Interior Paint

The interior of the cab shall be painted Zolatone gray #20-64. Prior to painting, all exposed interior metal surfaces shall be pretreated using a corrosion prevention system.

LETTERING

Sign Gold Letter [Qty: 51]

Sign Gold letters upto 6" tall shall be applied.

The exact size and location of the letters shall be as specified by the customer.

Sign Gold Letters [Qty: 34]

Sign Gold letters upto 12" tall shall be applied.

The exact size, color and location of the letters shall be as specified by the customer.

Lettering Shade and/or Outline [Qty: 85]

Existing letters shall be shaded and/or outlined as specified by the customer to provide a contrast.

STRIPING

Reflective Stripe in Rubrail

The reflective stripe in the body rubrail shall be white.

Cab and Body Stripe

A single Scotchlite stripe, upto 6 inches in width shall be installed on the cab and body . The stripe shall have a hockey style, Z or S style or any other customer specific design style.

The stripe shall be NFPA compliant and the size, color and location shall be as specified by the customer.

Cab and Body Stripe [Qty: 2]

An additional Scotchlite stripe, upto 3 inches in width shall be installed on the cab and body.

The stripe shall be NFPA compliant and the design, size, color and location shall be as specified by the customer.

Scotchlite Cab Stripe

Scotchlite cab stripe shall be 3/4" in width total, 1/2" gold stripe with a 1/8" customer specified color outline on both sides and a clear polyurethane coating. Stripe shall be centrally located and shall contour with the cab, following the paint break.

Front Bumper 3M Diamond Grade Striping

Chevron style 3M Diamond Grade striping shall be provided on the front bumper of the apparatus. The stripes shall consist of 6" Red/Fluorescent Yellow Green alternating stripes in an "A" pattern.

Rear Body 3M Diamond Grade Striping

Chevron style 3M Diamond Grade striping shall be provided on the rear of the apparatus. The stripes shall consist of 6" Red/Fluorescent Yellow Green alternating stripes in an "A" pattern. The striping shall be located on the rear facing extrusions, panels and doors inboard and outboard of the beavertails if applicable.

Reflective Tape on Stabilizers

The four (4) aerial ladder stabilizers which protrude beyond the side of the body shall be striped with alternating color diamond grade reflective tape. The stripes shall run at a 45 degree angle sloping down and away from the center, forming an "A" shape when viewed from the front or rear of the unit. The reflective material shall meet NFPA 1901 requirements.

Stripe colors to be Red/Fluorescent Yellow Green.

Designated Standing / Walking Area Indication

1" wide yellow perimeter marking consisting of individual Reflexite diamonds shall be applied to indicate the outside edge of designated standing and walking areas above 48" from the ground in compliance with 2016 NFPA 1901. Steps, ladders and areas with a railing or structure at least 12" high are excluded from this requirement.

GRAPHICS

SignGold Logo

A SignGold customer logo (up to 12") supplied to E-ONE`s Graphics department in a digital format to assist with design. Logo to be installed reference graphics layout drawing.

WARRANTY / STANDARD & EXTENDED

Standard 1 Year Warranty

The apparatus manufacturer shall provide a full 1-year standard warranty. All components manufactured by the apparatus manufacturer shall be covered against defects in materials or workmanship for a 1-year period. All components covered by separate suppliers such as engines, transmissions, tires, and batteries shall maintain the warranty as provided by the component supplier. A copy of the warranty document shall be provided with the proposal.

Lifetime Frame Warranty

The apparatus manufacturer shall provide a full lifetime frame structural warranty. This warranty shall cover all apparatus manufacturer designed frame, frame members, and cross-members against defects in materials or workmanship for the lifetime of the covered apparatus. A copy of the warranty document shall be provided with the proposal. Frame warranties that do not cover cross-members for the life of the vehicle shall not be acceptable.

10 Year 100,000 Mile Structural Warranty

The apparatus manufacturer shall provide a comprehensive 10 year/100,000 mile structural warranty. This warranty shall cover all structural components of the cab and/or body manufactured by the apparatus manufacturer against defects in materials or workmanship for 10 years or 100,000 miles,

whichever occurs first. Excluded from this warranty are all hardware, mechanical items, electrical items, or paint finishes. A copy of the warranty document shall be provided with the proposal.

10 Year Stainless Steel Plumbing Warranty

The apparatus manufacturer shall provide a full 10-year stainless steel plumbing components warranty. This warranty shall cover defects in materials or workmanship of apparatus manufacturer designed foam/water plumbing system stainless steel components for 10 years. A copy of the warranty document shall be provided with the proposal.

20 Year Aerial Device Structural Warranty

The aerial manufacturer shall provide a 20 year structural integrity warranty on the aerial device. This warranty shall cover structural components and shall be extended for a period of 20 years after the date on which the vehicle is delivered to the original purchaser. A copy of the warranty document shall be provided with the proposal. Please refer to warranty document for complete details and exclusions.

10 Year Paint and Corrosion Warranty

The apparatus manufacturer shall provide a 10-year limited paint and corrosion perforation warranty. This warranty shall cover paint peeling, cracking, blistering, and corrosion provided the vehicle is used in a normal and reasonable manner.

The paint shall be prorated for 10 years as follows:

Topcoat & Appearance:
(Gloss, Color Retention, Cracking)
0 to 72 months 100%
73 to 120 months 50%

Coating System, Adhesion & Corrosion:
(Includes Dissimilar metal corrosion, Flaking, Blistering, Bubbling)
0 to 36 months 100%
37 to 84 months 50%
85 to 120 months 25%

Corrosion perforation shall be covered 100% for 10 years. Corrosion perforation is defined as complete penetration through the exterior metal of the apparatus.

The warranty period shall begin upon delivery of the apparatus to the original user-purchaser. A copy of the warranty document shall be provided with the proposal.

UV paint fade shall be covered in a separate warranty supplied by Akzo Nobel (Sikkens) and shall be for a minimum of 10 years.

Meritor Rear Axle Warranty

A 5-year/unlimited miles, 5-year parts and 5-year labor rear drive single or rear drive tandem axle warranty shall be provided by Meritor Automotive.

Front Axle Warranty

A 5-year/unlimited miles, 5-year parts and 5-year labor front non-drive steer axle warranty shall be provided by Dana Corporation.

SUPPORT, DELIVERY, INSPECTIONS AND MANUALS

Training

The manufacturer shall provide three (3) days of training covering vehicle maintenance and operational familiarization.

This training shall be provided by a full time, manufacturer employee trainer who specializes in aerial training.

Approval Drawings

A general arrangement drawing depicting the vehicles appearance shall be provided. The drawing shall consist of left side, right side, front, and rear elevation views.

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

Electronic Manuals

Two (2) copies of all operator, service, and parts manuals MUST be supplied at the time of delivery in digital format -NO EXCEPTIONS! The electronic manuals shall include the following information:

- Operating Instructions, descriptions, specifications, and ratings of the cab, chassis, body, aerial (if applicable), installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.
- Warranty descriptions and coverage.

The electronic document shall incorporate a navigation page with electronic links to the operator`s manual, service manual, parts manual, and warranty information, as well as instructions on how to use

the manual. Each copy shall include a table of contents with links to the specified documents or illustrations.

The electronic document must be formatted in such a manner as to allow not only the printing of the entire manual, but to also the cutting, pasting, or copying of individual documents to other electronic media, such as electronic mail, memos, and the like.

A find feature shall be included to allow for searches by text or by part number.

These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer`s location.

NOTE: Engine overhaul, engine parts, transmission overhaul, and transmission parts manuals are not included.

Fire Apparatus Safety Guide

Fire Apparatus Safety Guide published by FAMA, latest edition. This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of a fire apparatus and to suggest possible ways of dealing with these situations. This manual is NOT a substitute for the E-ONE`s fire apparatus operator and maintenance manuals or commercial chassis manufacturer`s operator and maintenance manuals.

DEALER ADDED EQUIPMENT

Equipment

Qty [2]

BALL INTAKE VALVE

Task Force Tips model #AB1ST-NX-PS manually operated lightweight aluminum ball intake valve shall be provided. The unit shall be equipped with an adjustable pressure relief valve under the main valve body with an eight position adjustable inlet elbow. The valve shall be controlled with an NFPA compliant slow-close crank handle gear operator located on top of the gear box. A 3/4" bleeder valve shall be provided to exhaust excess air or water from the valve and hoseline. A position indicator shall be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions.

For maximum corrosion protection the aluminum casting shall be hardcoat anodized, with a powder coat internal and external finish and all components facing the wet side of the valve shall be constructed from stainless steel. The connections shall be: 5" Storz rigid with 30 degree swiveling detent elbow and a 6" female NH swivel long handle connection and include polymer bearing strips for prevention of galvanic corrosion. The Storz coupling shall be easily configurable to swivel from rigid.

The unit shall be covered by a five-year warranty.

Additional Loose Equipment Included

1	HURST EDRAULIC SP555E2 SPREADER PACKAGE
1	HURST EDRAULIC S799E2 CUTTER PACKAGE
1	HURST EDRAULIC R421E2 RAM PACKAGE
1	HURST AC/DC CONVERTER PACK
1	HURST FIRE SERVICE STRONGARM TOOL PACKAGE
1	STRONGARM SHOULDER STRAP
1	STEAMLIGHT TLR-1S TACTICAL LED LIGHT
1	LRS-C QUICK KICK RAM SUPPORT
1	MOTOROLA MOBILE UNIT (BATTERIES AND CHARGER)
1	KEY SECURE 3B KNOX BOX WITH USB DATA CABLE
1	DEWALT 20 VOLT 5 TOOL KIT
2	STREAMLIGHT PORTABBLE SCENE LIGHT 12V AC/12V DC
4	STREAM LIGHT RECHARGEABLE 1200 LUMEN LED LANTERN
1	1/21N X 150 FT HTP STATIC RESCUE ROPE (RED)
1	10 LB SLEDGE HAMMER
4	SALVAGE COVER-12X14 FT VINYL
1	INCIDENT COMMAND KIT DARLEY
1	ECLIPSE LDX THERMAL IMAGER & ECLIPSE POWERHOUSE
1	PS500 DRYCELL, LD NiMH, PUMP & DATALOGGING MULTIGAS
1	BUMB AND CAL STATION FOR PS500
7	NORTH AMERICAN FIRE HOSE 13/4 X 50' (11/2" COUPLING)
6	NORTH AMERICAN FIRE HOSE 5" STORZ X 100FT
1	LARGE EMS DUFFLE W/SUPPLIES, CYLINDER/REGULATOR
1	BLOW HARD BH-20 BATIERY POWERD PPV DUAL FAN
3	GRIPPER HOSE SYSTEM
1	KOBALT 100-PIECE TOOL SET WITH HARD CASE
1	K970-14 HUSQVARNA RESCUE SAW 14"
1	MS461 STIHL RESCUE CHAIN SAW 20"
1	DEPTH LIMITER KIT FOR K970 RESCUE SAW
2	14" RESCUE BLADE

CITY OF GROSSE POINTE WOODS
GROSSE POINTE WOODS, MI

S.O.Q90561

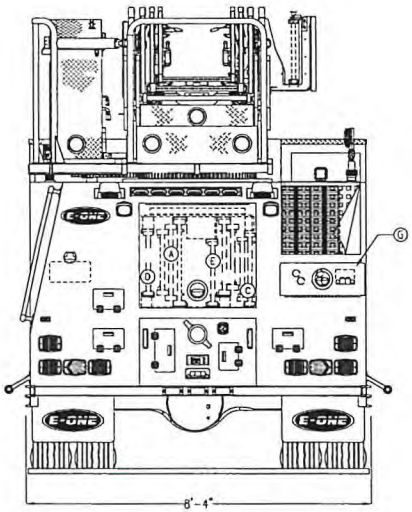
AERIAL BODY W/ SIDE STACKER HOSEBED
CYCLONE II X CHASSIS
HR100 LADDER

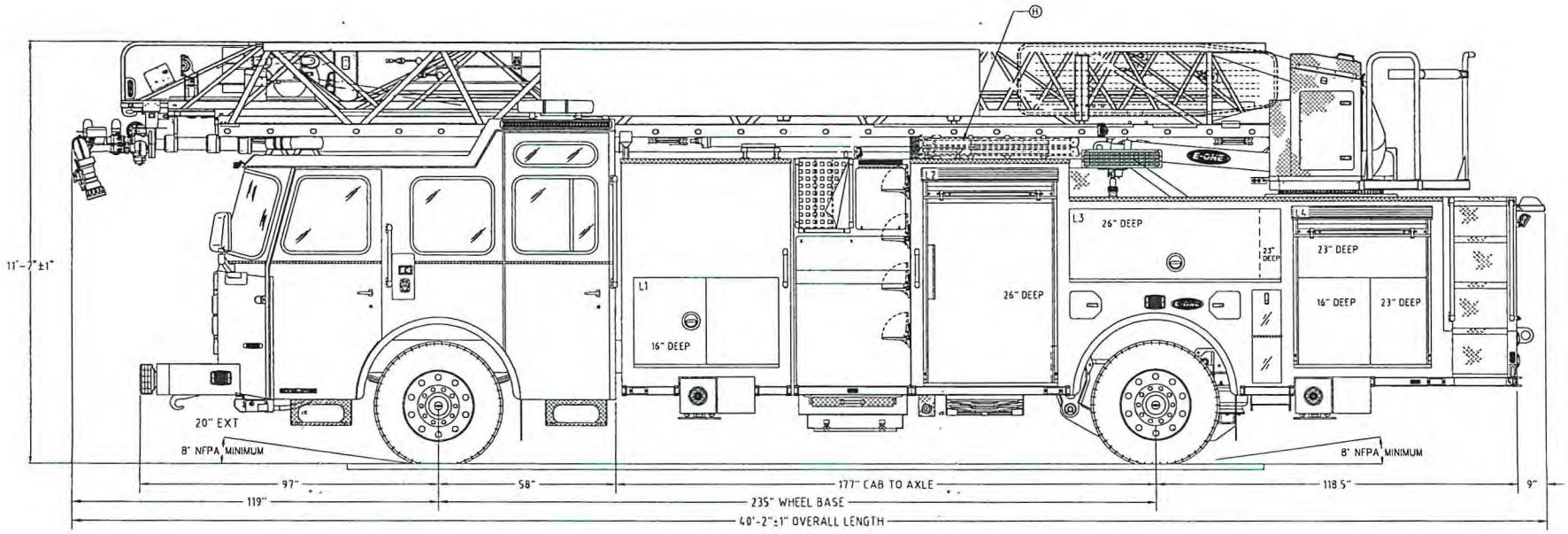
1750 GPM WATEROUS S100C20 PUMP 470 GALLON WATER TANK 30 GALLON CLASS A	HOSE LOAD: 700' OF 5" LDH 300' OF 3" DJ

COMPT.	OPENING	INTERIOR DIMENSION
L1	47W 38H	47W 38H 16D
R1	29W 38H	29W 38H 16D
L2	42W 60H	44W 10H 21D UPPER 44W 59H 26D LOWER
L2	42W 60H	44W 10H 21D UPPER 44W 59H 26D LOWER
L3	69W 23H	69W 23H NOTED
R3	25W 24H	25W 24H 16D
L4	43W 42H	45W 23H 23D UPPER 45W 28H NOTED LOWER
R4	40W 27H	40W 27H 23D
OS1	14W 63H	14W 63H 23D

GROUND LADDERS

ITEM	LADDER LENGTH	MODEL NUMBER	QTY	
A	35' 3-SECT.	PEL3-35	1	
B	28' 2-SECT.	PEL-28	1	
C	24' 2-SECT.	PEL-24	1	
D	16' ROOF	PRL-16	1	
E	14' ROOF	PRL-14	1	
F	12' ROOF	PRL-12	1	ON AERIAL
G	10' FOLDING	FL-10	1	
H	LITTLE GIANT	MODEL-17	1	

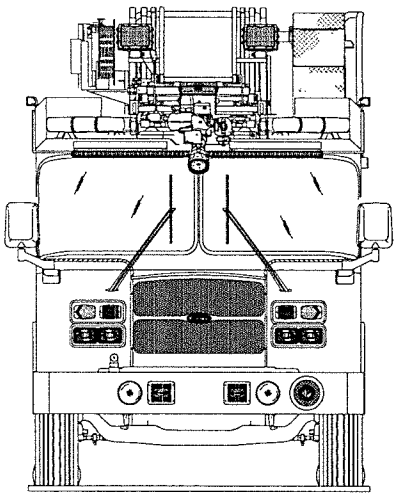




CITY OF GROSSE POINTE WOODS
GROSSE POINTE WOODS, MI

S.O.Q90561

AERIAL BODY W/ SIDE STACKER HOSEBED
CYCLONE II X CHASSIS
HR100 LADDER



THIS DRAWING IS FOR REFERENCE PURPOSES. ALL DIMENSIONS ARE SUBJECT TO MINOR VARIATIONS DUE TO MANUFACTURING PROCESSES.