

# Proposal



530 JOHN DIETSCH BOULEVARD  
NORTH ATTLEBORO, MA 02763-1080  
PHONE: 508.695.7138  
FAX: 508.699.6842  
PARTS: 1.800.347.3878

August 3, 2022  
Ledyard Fire Department  
Bid 2022-15

On behalf of Greenwood Emergency Vehicles and E-ONE Fire Apparatus, I would like to thank you for the opportunity to provide you with the following Proposals for:

**(1) E-ONE COMMERCIAL TANKER:**

**\$680,000**

**\*880 CHASSIS SPEC HAS NOT BEEN RECEIVED BACK FROM KENWORTH. WE HAVE ALLOCATED A CHASSIS PLACE HOLDER IN THE AMOUNT OF \$175,000 AND WILL FORWARD SPEC AND PROOF OF COST ONCE RECEIVED BACK. COMMERCIAL CHASSIS QUOTES HAVE BEEN TAKING OVER 1 MONTH TO RECEIVE BACK. IN THE EVENT CHASSIS IS CHEAPER THAN OUR PROJECTION WE WILL EDIT PROPOSAL PRICE, IF HIGHER WE WILL NEED TO EDIT PROPOSAL PRICE.**

**Pricing Includes:**

- Performance Bond
- Pre-build & Final Inspection trip to Manufacturer for (3) Department personnel
- Ground Ladders
- Booster Hose
- 1 day on sight department training for fire personnel
- Department Lettering

Respectfully,

A handwritten signature in black ink, appearing to be "M. Pinto", is written over the typed name.

Regional Sales Manager  
508-713-7791  
mpinto@greenwoodev.com

# Contracts

**GREENWOOD EMERGENCY VEHICLES, LLC**  
530 John Dietsch Boulevard  
North Attleboro, Massachusetts 02763  
(508) 695-7138

2022 Tanker/Pumper Fire Apparatus #2022-15

8/4/22

THIS PROPOSAL HAS BEEN PREPARED FOR:

**LEDYARD FIRE COMPANY**  
11 FAIRWAY DR,  
LEDYARD, CT 06339

WE HEREBY PROPOSE TO FURNISH TO YOU, SUBJECT TO PROPER EXECUTION OF THE ATTACHED AGREEMENT BY YOU AND BY AN OFFICER OF THIS COMPANY, THE FOLLOWING VEHICLE AND EQUIPMENT TO BE BUILT IN ACCORDANCE WITH THE ATTACHED SPECIFICATIONS:

**QUANTITY:** ONE (1)  
**MODEL:** E-ONE COMMERCIAL TANKER  
**PRICE:** \$ 680,000.00

DELIVERY WILL BE **F.O.B. LEDYARD, CT** AFTER RECEIPT AND PROPER EXECUTION OF THE ATTACHED AGREEMENT BY BOTH PARTIES. VEHICLE WILL BE COMPLETED AT THE FACTORY **600 DAYS** AFTER RECEIPT OF SIGNED CONTRACT.

THIS PROPOSAL SHALL EXPIRE UNLESS ACCEPTED WITHIN **THIRTY (30)** DAYS AND MAY BE EXTENDED, IN WRITING, AT THE DISCRETION OF THE COMPANY.

THE UNDERSIGNED CERTIFIES UNDER PENALTIES OF PERJURY THAT THIS BID OR PROPOSAL HAS BEEN MADE AND SUBMITTED IN GOOD FAITH AND WITHOUT COLLUSION OR FRAUD WITH ANY OTHER PERSON. AS USED IN THIS CERTIFICATION, THE WORD "PERSON" SHALL MEAN ANY NATURAL PERSON, BUSINESS, PARTNERSHIP, CORPORATION, UNION, COMMITTEE, CLUB OR OTHER ORGANIZATION, ENTITY OR GROUP OF INDIVIDUALS.

GREENWOOD EMERGENCY VEHICLES, LLC

**LORNA R. MARCOUX**  
DIRECTOR OF SALES & MARKETING

## CONTRACT

THIS CONTRACT MADE IN DUPLICATE, BY AND **BETWEEN GREENWOOD EMERGENCY VEHICLES, LLC.** - PARTY OF THE FIRST PART, HEREINAFTER REFERRED TO AS "THE COMPANY", AND: **LEDYARD, CT,** BY ITS AUTHORIZED REPRESENTATIVES - PARTY OF THE SECOND PART, HEREINAFTER REFERRED TO AS "THE BUYER", WITNESSETH AS FOLLOWS:

1. THE COMPANY AGREES TO SELL, UPON THE CONDITIONS WRITTEN BELOW, VEHICLE AND EQUIPMENT IN ACCORDANCE WITH THE ATTACHED SPECIFICATIONS, WHICH ARE MADE A PART OF THIS AGREEMENT AND CONTRACT. IN THE EVENT THAT THE COMPANY'S SPECIFICATIONS AND THE BUYER'S SPECIFICATIONS ARE INCORPORATED IN THIS AGREEMENT, BUT ARE IN CONFLICT WITH ONE ANOTHER, THE COMPANY'S SPECIFICATIONS SHALL APPLY.
2. THE SAID VEHICLE AND EQUIPMENT SHALL BE DELIVERED BY THE COMPANY AFTER RECEIPT OF ORDER AND THE EXECUTION OF THE CONTRACT BY THE BUYER, AND THE RECEIPT AND ACCEPTANCE OF THE SAME BY THE COMPANY AT THE COMPANY'S OFFICE IN NORTH ATTLEBOROUGH, MASS. DELIVERY SHALL BE SUBJECT TO DELAYS DUE TO STRIKES, MATERIALS AVAILABILITY AND OTHER CAUSES BEYOND THE COMPANY'S CONTROL. VEHICLE AND EQUIPMENT SHALL BE ACCEPTED BY THE BUYER **F.O.B., HAMDEN, CT** INCLUDING ALL APPLICABLE FEDERAL AND STATE TAXES. IF THE BUYER OF THE PRODUCT IS EXEMPT FROM TAXES, IT SHALL BE THE RESPONSIBILITY OF THE BUYER TO COMPLETE THE ATTACHED TAX EXEMPT CERTIFICATE.
3. IF FULL ACCEPTANCE TESTS ARE REQUIRED TO BE PERFORMED AT THE BUYER'S LOCATION, SUCH TESTS SHALL BE MADE UPON ARRIVAL AT DESTINATION, WHILE THE VEHICLE IS IN THE CARE, CUSTODY, AND CONTROL OF THE COMPANY. IF DESIRED, A PUMP TEST (IF APPLICABLE) MAY BE PERFORMED AT THE COMPANY LOCATION, UNDER THE BUYER'S SUPERVISION, BEFORE SHIPMENT. IF NO SUCH TESTS ARE MADE, THEN SAID VEHICLE AND EQUIPMENT SHALL BE CONSIDERED ACCEPTABLE AND IN COMPLIANCE WITH THE CONTRACT AND SPECIFICATIONS.
4. IF MORE THAN ONE VEHICLE IS COVERED BY THIS CONTRACT, AND THE VEHICLES ARE SHIPPED ON DIFFERENT DATES, AN INVOICE COVERING EACH VEHICLE OR SHIPMENT SHALL BE RENDERED. LOOSE EQUIPMENT SHIPPED SEPARATELY SHALL BE INVOICED SEPARATELY, AND AMOUNTS PAID AGAINST SUCH INVOICES SHALL BE DEDUCTED FROM THE CONTRACT PRICE UPON FINAL SETTLEMENT.
5. THE BUYER AGREES TO MAKE THE VEHICLE OR EQUIPMENT AVAILABLE TO THE SELLER FOR DISPLAY PURPOSES AT TIMES CONVENIENT TO THE BUYER, WITH PRIOR AUTHORIZATION BY THE FIRE CHIEF, OR HIS OR HER DESIGNEE.
6. ALL CONTRACTS ARE TAKEN SUBJECT TO THE WRITTEN ACCEPTANCE OF GREENWOOD EMERGENCY VEHICLES, LLC. BY AN OFFICER OF THE COMPANY. WHEN REQUESTED, THE BUYER SHALL FURNISH SATISFACTORY OPINION OF THE BUYER'S ATTORNEY AS TO THE POWER OF THE BUYER TO ENTER INTO SAID CONTRACT, AND THAT SAID CONTRACT IS A VALID, LEGAL AND ENFORCEABLE OBLIGATION OF THE BUYER, AND THAT THE OFFICIAL EXECUTING THE CONTRACT FOR THE BUYER HAS THE AUTHORITY TO DO SO.

7. THIS AGREEMENT, INCLUDING ITS APPENDICES, EMBODIES THE ENTIRE UNDERSTANDING BETWEEN THE PARTIES RELATING TO THE SUBJECT MATTER CONTAINED HEREIN, AND MERGES ALL PRIOR DISCUSSIONS AND AGREEMENTS BETWEEN THEM. NO AGENT OR REPRESENTATIVE OF THE COMPANY HAS THE AUTHORITY TO MAKE ANY REPRESENTATIONS, STATEMENTS OR AGREEMENTS NOT EXPRESSED HEREIN. ALL MODIFICATIONS OR AMENDMENTS OF THIS CONTRACT, INCLUDING ITS APPENDICES, MUST BE IN WRITING AND MUST BE SIGNED BY AN AUTHORIZED REPRESENTATIVE OF EACH PARTY.
8. THE VEHICLE COVERED BY THIS CONTRACT IS NOT WARRANTED BY THE COMPANY BY ANY EXPRESS OR IMPLIED WARRANTIES. THE VEHICLE IS SUBJECT TO LIMITED WARRANTIES AS PROVIDED BY THE MANUFACTURERS OF BOTH THE COMPLETED VEHICLE AND ITS COMPONENTS. THE COMPANY IS AN AUTHORIZED SERVICE AND WARRANTY AGENCY FOR MANY OF THE COMPONENTS FURNISHED ON THE VEHICLE, AND ALSO OFFERS THE BUYER ASSISTANCE IN RESOLVING WARRANTY CLAIMS RELATING TO COMPONENTS SERVICED BY OTHER AGENCIES. COPIES OF MAJOR COMPONENT WARRANTIES SHALL BE PROVIDED ON DELIVERY. THE COMPANY SHALL NOT BE LIABLE FOR TECHNICAL OR EDITORIAL ERRORS OR OMISSIONS CONTAINED IN ANY WARRANTY SUPPLIED BY THE MANUFACTURER. TO THE EXTENT ALLOWED BY APPLICABLE LAW, THE COMPANY DISCLAIMS ALL IMPLIED WARRANTIES OR CONDITIONS, WHETHER WRITTEN OR ORAL, AND NO WARRANTY IS EXPRESSED OR IMPLIED, AND THE COMPANY SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY AND FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT ALLOWED BY APPLICABLE LAW, IN NO EVENT SHALL THE COMPANY BE LIABLE FOR DIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGE, WHETHER BASED ON CONTRACT, TORT OR OTHERWISE.
9. THE COMPANY MAKES NO WARRANTY ON, NOR WILL THE COMPANY BE HELD RESPONSIBLE FOR ANY CUSTOMER SUPPLIED EQUIPMENT. THE COMPANY SHALL NOT BE HELD LIABLE FOR ANY EQUIPMENT MALFUNCTIONS ON CUSTOMER SUPPLIED ITEMS SUCH AS EXTRICATION EQUIPMENT, SAWS, RAMS, ETC... THE COMPANY USES THIS EQUIPMENT ONLY FOR THE PURPOSE OF FABRICATING TRAYS AND BRACKETRY AND IS NOT RESPONSIBLE FOR ENSURING PROPER EQUIPMENT OPERATION.
10. THE COMPANY RESERVES THE RIGHT TO MAKE PRODUCT IMPROVEMENTS WITHOUT NOTICE.
11. DELIVERY INSTRUCTIONS SHALL BE GIVEN IN ACCORDANCE WITH A MUTUALLY AGREEABLE SCHEDULE. TRANSFER OF OWNERSHIP SHALL TAKE PLACE BEFORE DELIVERY INSTRUCTIONS BEGIN. THE BUYER AGREES THAT FIRE FIGHTERS PARTICIPATING IN DELIVERY INSTRUCTIONS MUST BE FAMILIAR WITH BASIC FIRE APPARATUS OPERATING PRINCIPLES. DRIVER TRAINING SHALL BE THE RESPONSIBILITY OF THE BUYER. BUYER HEREBY ACKNOWLEDGES THAT THE COMPANY HIGHLY RECOMMENDS THAT ALL INDIVIDUALS WHO WILL BE OPERATING THE EQUIPMENT PURCHASED UNDER THIS AGREEMENT ATTEND A TRAINING PROGRAM OFFERED BY THE COMPANY AND THAT THE PURPOSE OF SAID TRAINING PROGRAM IS **NOT** TO INSTRUCT THE BUYER'S PERSONNEL ON SKILLS ONE WOULD ACQUIRE IN FIREFIGHTER TRAINING SCHOOL AND/OR PROFESSIONAL DRIVER TRAINING SCHOOL, BUT TO DEMONSTRATE THE FEATURES AND COMPONENTS OF THE EQUIPMENT PURCHASED HEREUNDER AND FAMILIARIZE BUYER'S PERSONNEL WITH THE PROPER USE AND OPERATION THEREOF. THE COMPANY FURTHER RECOMMENDS TO THE BUYER (1) THAT AS NEW PERSONNEL ARE ASSIGNED TO THE EQUIPMENT PURCHASED HEREUNDER TRAINING SESSIONS BE SCHEDULED FOR SUCH NEW PERSONNEL; AND (2) THAT REFRESHER TRAINING SESSIONS FOR ALL PERSONNEL OPERATING THE PURCHASED EQUIPMENT BE SCHEDULED AT LEAST EVERY FIVE (5) YEARS FROM THE DATE OF DELIVERY. FURTHER INFORMATION ON TRAINING SESSIONS AND ANY COSTS ASSOCIATED THEREWITH MAY BE OBTAINED BY CALLING THE COMPANY'S TRAINING DIVISION.

12. "TRADE-IN" VEHICLES (IF APPLICABLE): ALL VEHICLES THAT ARE TO BE TAKEN IN TRADE AS PART OF THIS CONTRACT SHALL BE, ON THE DAY OF DELIVERY, IN THE SAME OPERATING CONDITION AS ON THE DATE OF THIS CONTRACT EXCEPT FOR ORDINARY WEAR AND TEAR. THE BUYER SHALL NOT SELL THE VEHICLE TO A THIRD PARTY WITHOUT THE WRITTEN APPROVAL OF THE COMPANY. TRADE-INS SHALL BE SURRENDERED WITH ALL SUCTION CAPS, DISCHARGE CAPS, AND OTHER EQUIPMENT WHICH MAY BE NOTED ON ANY ADDITIONAL DESCRIPTIVE DOCUMENTS THAT MAY BE NECESSARY. ALL TRADE-INS SHALL BE DELIVERED BY THE BUYER TO THE COMPANY. OWNERSHIP TRANSFER TO THE COMPANY SHALL NOT TAKE PLACE UNTIL THE TRADE-IN IS DELIVERED AND TRANSFER OF TITLE TAKES PLACE.

13. APPARATUS PAINT COLOR(S) SHALL BE:

**BODY: DEPARTMENT SPECIFIED**  
**CAB: DEPARTMENT SPECIFIED**  
**CAB ROOF: DEPARTMENT SPECIFIED**

14. IN THE EVENT AN ORDER IS CANCELLED BEFORE CONSTRUCTION HAS STARTED, A 1% CANCELLATION CHARGE SHALL APPLY. IF WORK HAS STARTED ON THE VEHICLE, CANCELLATION CHARGE SHALL BE 1% PLUS THE ACTUAL COST FOR WORK DONE TO DATE, AS DETERMINED BY THE COMPANY.

15. THE VEHICLE BEING PURCHASED SHALL COMPLY TO NFPA 1901 STANDARD TO THE EXTENT THE ATTACHED SPECIFICATIONS PERMIT. IF AN ITEM IN ONE OF THESE STANDARDS IS NOT SUPPLIED WITH OR DESIGNED INTO THE VEHICLE, IT IS BECAUSE THE BUYER DID NOT DESIRE TO INCLUDE IT ON THE VEHICLE.

16. ALL THREADS PROVIDED ON THE VEHICLE OR ON SUPPLIED EQUIPMENT SHALL BE NST, UNLESS NOTED TO THE CONTRARY.

17. THE BUYER ACKNOWLEDGES THAT EXTENDED WARRANTIES ARE AVAILABLE ON VARIOUS COMPONENTS OF THE VEHICLE, AND THAT THESE WARRANTIES HAVE BEEN OFFERED FOR PURCHASE AT ADDITIONAL COST. BY EXECUTING THIS CONTRACT, THE BUYER ACKNOWLEDGES THAT NO EXTENDED WARRANTIES ARE A PART OF THIS AGREEMENT UNLESS THEY ARE INCORPORATED INTO THE ATTACHED SPECIFICATIONS.

18. THE BUYER AGREES TO PAY AS PURCHASE PRICE FOR THE VEHICLE, ACCEPTED AS AFORESAID, THE SUM OF:

**SIX HUNDRED EIGHTY THOUSAND DOLLARS**

**\$680,000.00**

19. **PAYMENT TERMS:** 100% PAYMENT SHALL BE MADE WITHIN FIVE (5) CALENDAR DAYS OF ARRIVAL AT GREENWOOD EMERGENCY VEHICLES, LLC. THE MANUFACTURER'S STATEMENT OF ORIGIN FOR THE VEHICLE SHALL BE PRESENTED TO THE BUYER UPON PAYMENT. IN THE EVENT THAT PAYMENT IS NOT AVAILABLE WITHIN THE FIVE (5) DAY PAYMENT TERMS THE COMPANY RESERVES THE RIGHT TO CHARGE THE BUYER INTEREST AT 2% OVER THE PREVAILING PRIME RATE FOR THE PERIOD FROM THE PAYMENT DUE DATE TO THE ACTUAL PAYMENT DATE. THE INVOICE FOR THE VEHICLE SHALL BE MAILED TO THE BUYER AT LEAST FIFTEEN (15) DAYS PRIOR TO THE ARRIVAL OF THE UNIT AT GREENWOOD EMERGENCY VEHICLES, LLC.

IN WITNESS WHEREOF, BUYER AND COMPANY HAVE CAUSED THIS CONTRACT TO BE EXECUTED BY THEIR DULY AUTHORIZED REPRESENTATIVES THIS 4<sup>TH</sup> OF **AUGUST 2022.**

BUYER'S REGISTERED NAME:

**LEDYARD FIRE COMPANY  
11 FAIRWAY DR  
LEDYARD, CT 06339**

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

GREENWOOD EMERGENCY VEHICLES, LLC  
530 JOHN DIETSCH BOULEVARD  
NORTH ATTLEBOROUGH, MA 02763

BY: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_



**FEDERAL EXCISE TAX EXEMPTION CERTIFICATE**

THE UNDERSIGNED HEREBY CERTIFIES THAT HE/SHE IS \_\_\_\_\_(TITLE OF OFFICER) **LEDYARD, CT** (STATE, TERRITORY OF THE UNITED STATES, OR POLITICAL SUBDIVISION THEREOF, OR THE DISTRICT OF COLUMBIA, OR TAX-EXEMPT VOLUNTEER FIRE DEPARTMENT) THAT HE IS AUTHORIZED TO EXECUTE THIS CERTIFICATE AND THAT THE ARTICLE OR ARTICLES SPECIFIED IN THE ACCOMPANYING ORDER ARE PURCHASED FROM GREENWOOD EMERGENCY VEHICLES, LLC. FOR THE EXCLUSIVE USE OF \_\_\_\_\_, \_\_\_\_\_ (STATE, TERRITORY OF UNITED STATES, OR POLITICAL SUBDIVISION THEREOF, OF THE DISTRICT OF COLUMBIA, OR TAX EXEMPT VOLUNTEER FIRE DEPARTMENT).

IT IS UNDERSTOOD THAT THE EXEMPTION FROM TAX IN THE CASE OF SALES OF ARTICLES UNDER THIS EXEMPTION CERTIFICATE TO THE STATES, TERRITORIES OF THE UNITED STATES, ETC., IS FOR ITS EXCLUSIVE USE, AND IT IS AGREED THAT IF ARTICLES ARE PURCHASED OR SOLD TO EMPLOYEES OR OTHERS, SUCH FACT WILL BE REPORTED AND TAX PAID BY ME TO THE DISTRICT DIRECTOR OF INTERNAL REVENUE FOR THE DISTRICT IN WHICH THAT SALE WAS MADE.

IT IS ALSO UNDERSTOOD THAT THE FRAUDULENT USE OF THIS CERTIFICATE TO SECURE EXEMPTION WILL SUBJECT THE UNDERSIGNED AND ALL GUILTY PARTIES TO A FINE OF NOT MORE THAN \$10,000.00 OR TO IMPRISONMENT FOR NOT MORE THAN FIVE (5) YEARS OR BOTH, TOGETHER WITH COSTS OF PROSECUTION.

BY: \_\_\_\_\_  
(SIGNATURE)

\_\_\_\_\_  
(TITLE)

\_\_\_\_\_  
(DATE)

NOTE: FEDERAL EXCISE TAX WILL BE ADDED IF THE ABOVE FORM IS NOT COMPLETED AND SIGNED.

# Specifications

## BID EXCEPTIONS

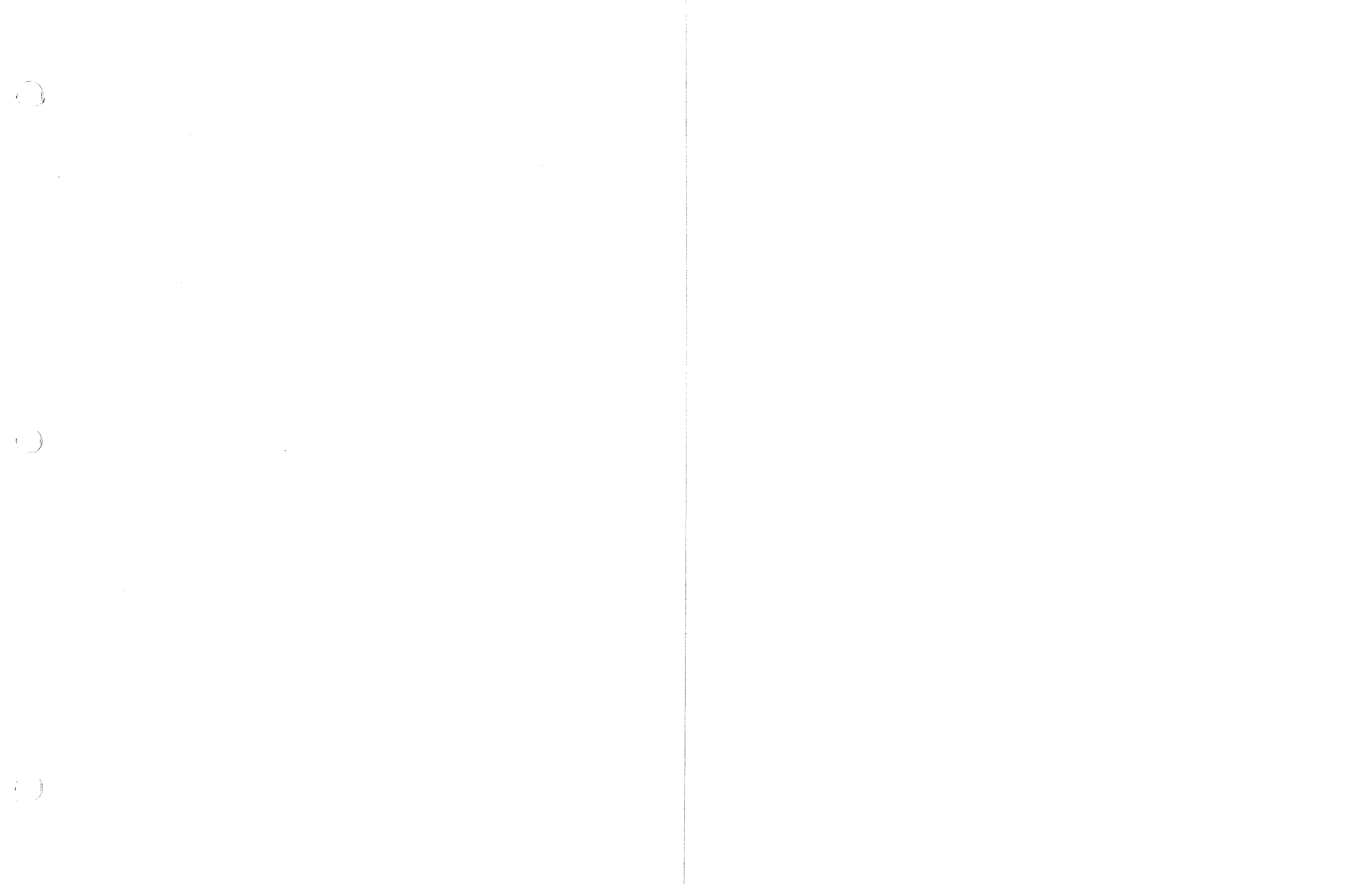
Requested fuel tank relocated to fit in-between frame rails in standard custom apparatus location:

CANNOT ALTER COMMERCIAL CHASSIS FUEL SYSTEM PER KENWORTH. CAN RELOCATE BATTERIES TO MORE DESIRABLE LOCATION IF AWARDED BID AT PREBUILD

OVERALL LENGTH:

LENGTH IS BEING DRIVEN BY REQUESTED KENWORTH CHASSIS. WE CAN GET WITH ENGINEERING TO GET IDEAS AT PREBUILD IF SELECTED.

BID BOND / INSURANCE CERT ONLY POSSIBLE ONCE WE RECEIVE CHASSIS QUOTE FROM KENWORTH, WILL SUPPLY AS SOON AS WE RECEIVE CHASSIS QUOTE BACK



# **LEDYARD VOLUNTEER FIRE COMPANY**

**BID: 2022-15**

## **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: 500' 3" DJ, 1000' 5" LDH

### **Overall Height Restriction**

The apparatus shall have overall height restriction (unloaded condition) of 11'6".

The height of the apparatus shall be measured with no water/foam in the water/foam tank, no equipment, no ground ladders and no hoses.

### **Overall Length Restriction**

The completed unit shall have an overall length restriction of 35'.

### **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 1000 lbs. This allowance is in addition to the weight of the hoses and ground ladders listed in the shop order as applicable.

## **CHASSIS PREP**

### **Kenworth Chassis Prep**

The commercial chassis shall be made ready for installation of components required by the fire apparatus specifications such as warning lights and sirens, cab wire harness, etc. Preparation shall also include relocating of components as necessary to meet the fire apparatus requirements such as exhaust tail pipe, air system components, batteries, etc.

## **BUMPERS**

### **Front Bumper**

The vehicle shall be equipped with a one-piece 10" high bumper, made from 10 gauge (0.135" nominal) polished stainless steel for corrosion resistance, strength, and long-lasting appearance. It shall be mounted directly to the front frame extensions for maximum strength. The bumper shall incorporate two (2) stiffening ribs.

### **Bumper Extension**

The front bumper extension shall be approximately 12" from the face of the cab as required.

### **Bumper Gravel Shield**

The extended front bumper gravel shield shall be made of 3/16" (.375") aluminum tread plate material.

## **TIRE OPTIONS**

### **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

## **AIR SYSTEM OPTIONS**

### **Air Inlet Auto-Eject**

A Kussmaul Air Auto-Eject #091-28 airline disconnect shall be installed for the air inlet connection. The airline will automatically disconnect when the vehicle is started. A Red weatherproof gasketed cover, which automatically closes when the airline is ejected, shall be supplied.

The Auto-Eject shall be located driver's door step area.

### **Isolated Air Reservoir**

The air system shall have an additional 1738 cu. in. isolated reservoir. The supply side of the reservoir shall be equipped with a check valve and an 85 psi pressure protection valve.

Specified options shall be plumbed to the isolated air tank.

### **Auxiliary Air Tank Plumbing**

The auxiliary air tank shall be plumbed to air primer.

### **Air Horns**

Dual air horns shall be provided, connected to the chassis air system. The horns shall be mounted on the hood of the vehicle. A pressure protection valve shall be installed to prevent the air brake system from being depleted of air pressure.

## **ENGINES & TRANSMISSIONS**

### **Vehicle Speed**

The maximum speed shall be electronic limited to 60 MPH as required by NFPA 1901.

### **Engine**

Cummins X15 565 gross BHP at 1800 RPM and a peak torque of 1645 lb.ft. at 1200 RPM with a governed RPM of 2100.

## **BATTERIES**

### **Commercial Chassis Battery Relocation**

Batteries shall be placed on non-corrosive rubber matting and shall be located R1 floor mounted. The batteries shall be 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 (if applicable). 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.

## **CHASSIS OPTIONS**

### **Rear Tow Eyes**

Two (2) heavy duty tow eyes made of 3/4" (0.75") thick steel having 2-1/2" diameter holes shall be mounted below the body at the rear of the vehicle to allow towing (not lifting) of the apparatus without damage. The tow eyes will be welded to the lower end of a 5" steel channel that is bolted at the end of the chassis frame rails. The tow eyes shall be painted chassis black.

### **Front Tow Hooks**

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

### **OEM STD Chassis Trim Package**

OEM standard chassis trim package shall be supplied by the commercial chassis vendor. A mounting plate for the battery charger receptacle, display, air inlet, etc shall be provided by E-ONE.

## **CAB MODEL**

### **Commercial Chassis**

Kenworth commercial cab and chassis two (2) door T880 6X4. See chassis specifications for details

## **CAB BADGE PACKAGE**

### **Logo Package**

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

## **CAB DOOR OPTIONS**

### **Cab Door Interior Striping**

Reflective striping shall be installed on commercial cab doors, visible when the door is open, meeting NFPA requirement of 96 sq. in. coverage for each door.



## **MISC EXTERIOR CAB OPTIONS**

### **Label "Diesel Fuel Only"**

Located above each fuel filler housing shall be a metallic label that designates "Diesel Fuel Only" requirements. It shall be black with white or equivalent contrasting letters a minimum of 1/2" high.

## **SEATS**

### **Seating Capacity Tag**

A tag that is in view of the driver stating seating capacity of two (2) personnel shall be provided.

## **MISC INTERIOR CAB OPTIONS**

### **Cab Console**

The console shall be centrally located and shall allow the driver and/or officer access to all components while seated with seat belts secured.

The console shall be constructed of aluminum smooth plate with a black Zolatone finish. The top surface shall have a non-reflective material for increased visibility of labels and controls.

All switches located on the console shall be clearly labeled and shall be back-lit for easy operation and visibility.

## **CAB ELECTRICAL OPTIONS**

### **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 driver's door step area and the cover color shall be Red.

### **Battery Charger with Remote**

A Kussmaul Auto Charger 1200 battery charger with remote mounted bar graph display shall be installed.

The battery charger shall be completely automatic with an output of 0-40 amp @ 12 volts DC and an input current requirement of 10 amps @ 120 volts AC.

### **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 driver side forward with coaxial cable terminating at the center of the dash board, driver side rearward with coaxial cable terminating at the center of the dash board, officer side forward with coaxial cable terminating at the center of the dash board.

### **Cab Dome Lights**

A Whelen model 60CREGCS LED dome light shall be installed. The light shall have twelve (12) high intensity Super LEDs; six (6) white and six (6) red. Two (2) switches shall be provided on the face of the light to activate the red or white lights. The white light shall activate with appropriate cab door and light assembly switch, the red light activates with light assembly mounted switch only.

There shall be two (2) mounted in the front of the cab, one (1) in the driver and one (1) in the officer ceiling.

## **BODY COMPT LEFT SIDE**

### **Driver Side Assembly**

The driver side assembly shall be constructed entirely of aluminum extrusions and interlocking aluminum plates. This aluminum modular design shall provide a high strength-to-weight ratio for increased equipment carrying capacity.

The driver side body corners shall be 6063-T5 extruded aluminum corner sections with a 3/16" (0.188") wall thickness. The side body extrusions shall be 6063-T5 aluminum tubing with a 3/16" (0.188") wall thickness and 3/16" (0.188") outside corner radius. The corners and sides shall be welded both internally and externally at each joint using an aluminum alloy welding wire.

The driver side body shall be completely sanded and deburred to assure a smooth finish and painted job color.

### **Driver Side Compartments**

The four (4) driver side compartments shall be constructed from 3003 H14 1/8" (.125") smooth aluminum plate. The compartments shall be modular in design and shall not be a part of the body support structure.

There shall be one (1) compartment located ahead of the rear wheels. This compartment shall be approximately 60" wide x 50" high x 26" deep in the lower 34" high section and 12" deep in the upper 16" high section. The compartment shall contain approximately 37.3 cu. ft. of combined storage space. The door opening shall be approximately 60" wide x 50" high.

There shall be two (2) compartment located over the rear wheel. Each compartment shall be approximately 51.5" wide x 12" high x 12" deep and contain approximately 4.2 cu. ft. of storage space. Each door opening shall be approximately 51.5" wide x 12" high. The compartments shall be transverse front to rear.

There shall be one (1) compartment located rearward of the rear wheels. This compartment shall be approximately 54" wide x 50" high x 26" deep in the lower 34" high section and 12" deep in the upper 16" high section. The compartment shall contain approximately 33.6 cu. ft. of combined storage space. The door opening shall be approximately 54" wide x 50" high.

Each compartment seam shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation.

An externally-mounted compartment top shall be provided and constructed of a 1/8" (.125") aluminum treadplate. The compartment top shall be removable for easy access to the main body wiring harness.

## **BODY COMPT RIGHT SIDE**

### **Officer Side Assembly**

The officer side assembly shall be constructed entirely of aluminum extrusions and interlocking aluminum plates. This aluminum modular design shall provide a high strength-to-weight ratio for increased equipment carrying capacity.

The officer side body corners shall be 6063-T5 extruded aluminum corner sections with a 3/16" (0.188") wall thickness. The side body extrusions shall be 6063-T5 aluminum tubing with a 3/16" (0.188") wall thickness and 3/16" (0.188") outside corner radius. The corners and sides shall be welded both internally and externally at each joint using an aluminum alloy welding wire.

The officer side body shall be completely sanded and deburred to assure a smooth finish and painted job color.

### **Officer Side Compartments**

The four (4) officer side compartments shall be constructed from 3003 H14 1/8" (.125") smooth aluminum plate. The compartments shall be modular in design and shall not be a part of the body support structure.

There shall be one (1) compartment located ahead of the rear wheels. This compartment shall be approximately 60" wide x 50" high x 26" deep in the lower 34" high section and 12" deep in the upper 16" high section. The compartment shall contain approximately 37.3 cu. ft. of combined storage space. The door opening shall be approximately 60" wide x 50" high.

There shall be two (2) compartment located over the rear wheel. Each compartment shall be approximately 51.5" wide x 12" high x 12" deep and contain approximately 4.2 cu. ft. of storage space. Each door opening shall be approximately 51.5" wide x 12" high. The compartments shall be transverse front to rear.

There shall be one (1) compartment located rearward of the rear wheels. This compartment shall be approximately 54" wide x 50" high x 26" deep in the lower 34" high section and 12" deep in the upper 16" high section. The compartment shall contain approximately 33.6 cu. ft. of combined storage space. The door opening shall be approximately 54" wide x 50" high.

Each compartment seam shall be sealed using a permanent pliable silicone caulk. The walls of each compartment shall be machine-louvered for adequate ventilation.

An externally-mounted compartment top shall be provided and constructed of a 1/8" (.125") aluminum treadplate.

## **BODY COMPT REAR**

### **Tailboard**

#### **Tailboard Step**

A tailboard step shall be provided at the rear of the body. The tailboard shall 16" in depth and in accordance with NFPA in both step height and stepping surface. The maximum rear step height to the tailboard shall not exceed 24".

The tailboard step shall be formed from 3/16" (0.188") aluminum treadplate and shall be reinforced with 6063-T5 1.5" x 3" aluminum extrusion. The tailboard 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 tailboard step shall be bolted on to the body from the underside assuring a clear surface and shall be easily removable for replacement in the case of damage.

### **Beavertails**

Two (2) squared off beavertails shall be provided at the rear of the body. The beavertails shall be a part of the body framework and provide additional support to the tailboard. Each beavertail

shall be constructed of formed 1/8" (0.125") aluminum treadplate and includes removable outside panels for access to internal wiring and bolt-on accessories.

#### **Rear Access Handrails**

Handrails shall be provided at the rear of the body to assist ground personnel accessing the tailboard step and hosebed area. Each 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, and shall be mounted between chrome stanchions.

The handrails shall be located- two (2) handrails, one (1) on each side, appropriately sized handrail mounted vertical on the trailing edge of the body and appropriately sized handrail(s) mounted horizontal below the rear hosebed opening.

#### **Rear End Assembly**

The rear end shall be set-up as a tanker and shall have no rear body compartment.

The rear end shall be constructed of vertical and horizontal extrusions with interlocking smooth plate upper and lower panels. The lower center area shall have a smooth plate panel area that shall allow for a Jet or Newton tank dumping application.

A storage access door shall be provided in the upper area for access to items stored through the water tank. The door shall be smooth plate and shall include latching for securing the door in the closed position. The door shall be wired to the door ajar indicator light located in the cab.

The vertical, horizontal, and smooth plate panels shall have a sanded 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 smooth plate. 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 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 chain 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): L2, L3, R2, R3

### **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 95-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 with a #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 two (2) dual stage rotary latches, each with a 750 lb. rating to hold the door in the closed position. The latches shall be mounted at the top and bottom of the door. A stainless steel paddle style handle shall be mounted on the interior pan of the door to actuate the rotary latches. The paddle handle shall be connected to the rotary latches by 5/32" (.156") diameter rods. Cable actuation shall not be deemed un-acceptable due to the potential for cable stretch and slippage. The striker pins 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 door frame.

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, L4, R1, R4.

## **SHELVES**

### **Adjustable Shelf [Qty: 3]**

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 approximately 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.

## **TRAYS / TOOLBOARDS**

### **Roll-Out Tray [Qty: 4]**

There shall be an adjustable mounted SlideMaster with roll-out tray provided in a compartment as specified.

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

An Innovative Industries SlideMaster (model SM3-SP) steel frame and channel assembly powder coated silver 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 100% from the stored position.

The capacity rating shall be 1000 pounds uniformly distributed load.

### **Runningboard Suction Tray**

A running board suction hose storage tray "floating style" shall be provided and located in the driver side running board, officer side running board.

The tray shall be "floating style" mounted and constructed of 1/8" (.125") aluminum diamond plate (exterior) with a smooth sanded surface interior. The bottom of the tray shall have removable aluminum slats and drain holes to allow water drainage from hose stored in the tray. The tray shall have a 3" tapered front corner to protect tray against debris. The tray shall be removable for the running board.

### **Swing-Out Tool Board**

A Pac Trac swing out aluminum tool board(s) shall be provided for a compartment as specified.

- The swing out tool board provides two mounting surfaces by utilizing PAC Double Face Dual Trac aluminum extrusion.
- This product is sold as a combination of P/N PM-1000, Pivot Mount Assembly and PAC Double Face Dual Trac aluminum extrusion P/N 7040. The amount and size of the aluminum extrusion is determined by the compartment size and/or the customer requirements. Board heights are in 5-3/4" increments.
- Compatible with all PAC tool brackets.
- Locks in closed and open positions for stability.
- Flexible mounting. Left or right hand opening.

The tool board shall be mounted hinged to the front of the compartment (unless otherwise stated in location).

Toolboard shall be rated to support up to 100 lbs.

## **COVERS**

### **Hose Bed Cover**

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

The front edge of the cover shall be mechanically attached to the body. The sides of the cover shall be held in place with heavy duty Velcro strips running the length of the hose bed.

### **Rear Hose Bed Cover**

A cover constructed of heavy duty black nylon cargo netting shall be installed at the rear apparatus hose bed.



The bottom of the cargo netting shall be mechanically attached to the hose bed. The cover shall be attached to comply with the latest edition of NFPA 1901.

Cover shall secure the hoseload at the rear open back of the hosebed and shall compliment separate top cover of vinyl, diamond plate pr similar cover that secures top of body open areas over hoseload.

### **Vinyl Crosslay Cover**

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

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

### **Battery Cover**

Diamond plate battery cover to protect batteries. Cover is revolvable, includes louvers and butterfly latches. Location: R1 floor mounted

### **Running Board Tray Securing Strap**

A heavy duty black nylon strap with an stainless steel quick-release buckle shall be provided for the running board hose tray(s). The strap shall be attached to the inboard side of the tray as low as practical to allow cinching of strap for securing tray contents and shall not reduce the overall tray capacity.

Location: driver side running board, officer side running board.

## **PUMP MODULE**

### **Pump Module Width**

Pump module shall be 76" wide.

### **Pump Module**

#### **Pump Module Frame**

An extruded aluminum pump module shall be provided and located forward of the apparatus body. The pump module shall be constructed entirely of welded aluminum alloy extrusions and interlocking aluminum plates. The pump module framework shall consist

of 1.5" x 3" x .188" wall, 1.5" x 3" x .375" wall with center web and 3" x 3" x .188" wall extrusions.

The pump module design and mounting shall be separate from the body to allow the pump module and body to move independently of each other in order to reduce stress from frame twisting and vibration.

The exterior surface of the pump module framework shall have a sanded finish.

#### **Pump Module Mounting**

The pump module shall be attached to the chassis using four (4) center bonded isolation mounts and a steel mounting frame. The isolation mounts shall be 2.75" diameter and mount to the chassis with two (2) 4" x 4" x .312" A36 steel angles.

#### **Pump Access**

A pump service access door shall be provided at the front of the pump module. The door shall be secured with two (2) thumb latches. (Access door not provided on fixed cab applications)

#### **Pump Module Running Boards**

The pump module shall include a running board on each side. The running boards shall be in accordance with NFPA in both step height and stepping surface. The running boards shall be formed from .125" aluminum treadplate.

#### **Stepping Surface**

Each running board 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 .125". Gripping

surfaces shall be circular in design, a minimum of 1" diameter and on centers not to exceed 4". Each running board shall be bolted on to the pump module and be easily removable for replacement in the case of damage.

#### **Pump Panel Opening**

The panel opening on the pump module shall be 39" wide.

#### **Pump Module Height**

The pump module height shall be 80".

## **PUMP PANELS**

### **Scorpion Black Pump Panels**

The driver and officer side pump panels shall have a black Scorpion painted finish.

### **Pump Access Door**

The officer side pump module shall have a three (3) piece panel, one (1) above the discharge outlets, one (1) encompassing the discharges and intakes and one (1) low for bleeder valves.

The upper two (2) pump panel sections shall have a vertical stainless steel piano type hinge with 1/4" pins along the forward edge of the pump module. The hinges shall be "staked" on every other knuckle to prevent the pin from sliding. The panels shall have push button style latches to secure the panels in the closed position. The upper panel shall have one (1) pneumatic shock to hold the panel 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.

### **Hose Reel Blow-Out Valve**

A 1/4" Innovative Controls valve shall be installed between the chassis air system and the hose reel. This valve shall be mounted at the pump operator area. Each 1/4 turn handle grip shall feature built-in color-coding labels and a verbiage tag. There shall be a check valve in the air line to prevent water from entering the chassis air system.

### **Tags**

All single tags placed directly on the pump panel to be mechanically fastened with screws.

## **PUMP MODULE OPTIONS**

### **Pump Module Crosslay Divider Notch**

The crosslay divider(s) shall be notched on both ends for line(s) nozzle end storage with NFPA cover(s) in the closed position.

### **Additional Rollers**

An additional booster reel roller assembly shall be provided.

The roller assembly shall include chrome guides with nylon bushings shall be mounted on the opposite side of the booster reel.

### **Booster Reel Rollers**

A booster reel roller assembly shall be provided.

The roller assembly shall include chrome guides with nylon bushings and shall be mounted on the side next to the booster reel.

### **Flex Joint**

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

### **Module Logos**

Logos with the OEM brand name shall be provided and shall be mounted one (1) each side on pump module/pre-connect panels. Logos shall be sized as applicable to available space on panel(s).

### **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.

### **Booster Reel Riser**

Booster Reel Riser for rollers. Locate with officer side dunnage/hosebed pan rollers.

### **Storage Pan**

A storage pan shall be provided in the upper pump module area. The pan shall be constructed of 3/16" (.188") aluminum treadplate and be removable to service items in the pump module below. Holes shall be provided in the corners of the pan to facilitate drainage of water.

## **Double Crosslay Hosebed**

Two (2) crosslay hosebeds shall be provided on the pump module. Each of the two (2) crosslay areas shall have a capacity for up to 200' of 2.0" double-jacket fire hose single stacked. The crosslay floor and side walls shall be constructed of 3/16" (.188) smooth aluminum plate. The floor shall be slotted to prevent the accumulation of water and allow for ventilation of wet hose. One (1) 1/4" (.25") smooth aluminum plate fixed divider with a sanded finish shall be provided to separate the two (2) hose storage areas.

## **WATER TANK**

### **Fill Tower Location**

Fill tower(s) shall be located offset to officer side of water tank.

### **3030 Gallon Water Tank**

A 3030 gallon (U.S.) "T" booster tank shall be supplied. The booster tank shall be of a pinned baffle design. The booster tank shall be completely removable without disturbing or dismounting the apparatus body structure.

The booster tank top, sides, and bottom shall be constructed of 1/2" (0.50") black UV-stabilized copolymer polypropylene. The copolymer polypropylene tank material shall be welded together utilizing thermoplastic welding technology. A clean hot air temperature controlled process, shall ensure that each weld reaches its plasticized state without cold or hot spots. The copolymer polypropylene material shall be used for its high strength and corrosion resistance for a prolonged tank life.

The booster tank shall have a fill tower with a rearward hinged lid. The fill tower shall be located in the forward area of the tank to the driver side of the apparatus and shall assist with tank ventilation. The fill tower shall include a removable 1/4" (0.25") thick polypropylene screen.

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. A 3" cleanout plug shall be provided at the bottom of the tank sump.

The booster tank shall include longitudinal and latitudinal baffles. The baffles shall be interlocking and thermo welded to the shell of the tank to minimize water surge during travel and provide enhanced road handling stability. The baffle design shall allow waterflow in accordance with NFPA during tank filling or pump operations.

A 2.5' length of black flex hose shall be installed to the bottom of the tank. This shall direct the draining of overflow water past the rear axle and fuel tank, 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. The testing shall include an electronic spark and tank fill test after both the internal and external tank shell welds are completed.

A lifetime manufacture's limited warranty shall be included.

Tank capacity is 3030 US gallons / 2523 Imperial gallons / 11469 Liters.

### **Water Tank Size**

The water tank shell size will be increased to maintain water capacity with storage tunnel.

## **WATER TANK OPTIONS**

### **Tank Sump Additional [Qty: 2]**

A second sump shall be added to the tank bottom for customer's special applications.

### **Newton Dump Provision [Qty: 3]**

Special provisions for mounting a Newton dump valve on the poly water tank shall be provided.

### **Tank Dump Valve/Extension Switching**

The tank dump valve/extension switching shall be located to (2) driver (driver side and rear) and (1) officer side outboard side of beavertails/body.

### **Notch Tank**

Notch driver/officer side water tank (overall tank capacity will be reduced for application). Notch to allow for hosebed discharge to be routed from pump module into the hosebed as optioned.

## **TANK PLUMBING**

### **Tank Fill 2 Elkhart Unibody Valve**

One (1) 2" pump-to-tank fill line having a 2" manually operated full flow valve. 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 fill line shall be controlled using a chrome handle with an integral tag.

The valve shall be an Unibody series with stainless steel ball and dual adjustable neoprene 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 ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Elkhart Drop-out or 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.

### **Rear Dump**

Rear tank dump. Includes stainless finish steel assembly with electric actuated valve and integral electrical extension chute.

### **Side Tank Dumps**

Side tank dumps 1080 or 1085 shall be provided with one (1) located each side of the apparatus.

The tank dumps shall be Newton Kwik Dump and shall include a 10" x 10" flip-up valve plate for maximum water flow. Each dump assembly shall have an 5018 extension that shall extend the dump out past the side of the apparatus.

The dump valve and dump extension shall be electrically actuated.

The exterior surface of the dump assembly shall be stainless steel.

### **Tank To Pump 3 Elkhart Unibody Valve**

One (1) manually operated 3" Elkhart valve with 4" plumbing shall be installed between the pump suction and the booster tank in order to pump water from 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 Elkhart Unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Elkhart drop-out or 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. The valve control shall be located at the pump operator's panel and shall visually indicate the position of the valve at all times.

### **Dump Switches**

Additional Dump valve/extension switching if applicable location in Cab accessible to driver.

### **Rear Direct Tank Fill**

One (1) 3" rear direct water tank fill shall be provided.

The valve shall be installed between the fill connection port and the water tank to prevent water from flowing out of the tank after filling or disconnecting of the fill line. The connection shall include an inlet strainer, 3" FNST inlet swivel with droop and plug with retainer. The valve shall be constructed of brass and shall be slow closing per NFPA.

The valve control shall be a swing handle located on the valve that 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.

The direct tank fill shall be located to the driver's side, officer's side rear of the body.

## **LADDER STORAGE / RACKS**

### **Hold Downs**

The ladder brackets/rack to store one (1) 3-section extension and one (1) roof ladder.

### **Ladder Brand**

The ladder brand capable of being carried on the unit shall be Alco-Lite.

### **Hard Suction Tray**

One (1) hard suction storage tray shall be provided and mounted to the top of the Zico drop-down ladder rack. The tray shall provide ground level access to the suction hose with the rack in the lowered position.

The hard suction tray shall be constructed of 1/8" (.125") smooth aluminum plate. The hard suction hose (hose not included) shall be secured in the tray by two (2) securing straps, one (1) each end.



## **Equipment Storage**

A recessed equipment storage compartment shall be provided. The storage compartment shall store two (2) pike poles.

The storage compartment shall be accessed through a hinged 1/8" (.125") aluminum diamond plate door with a push-button latch. The door shall be wired to the door ajar indicator light in the cab and shall be interlocked with the parking brake per NFPA.

The storage compartment shall be located below driver side compartment top.

## **Ladders**

The length of ladders capable of being stored shall be the following: 35' 3-section and 14' roof ladder.

## **Through Tank Portable Storage Tank Storage**

Portable storage tank storage shall be provide through the water tank. The storage area shall capable of storing a 3500 aluminum frame portable storage tank.

Storage through the tank shall reduce the overall total gallon capacity of water tank.

## **Hard Suction Storage**

Two (2) aluminum storage trays shall be provided. Each tray shall be capable of storing one (1) 10' hard suction hose (not included).

The storage trays shall include two (2) NFPA compliant hose restraints each.

The trays shall be located driver side on compartment top.

## **Ladder Storage Rack**

A Zico QUIC-LIFT Ladder Access System (LAS) ladder rack shall be provided. The rack shall lower the ladders approximately 31" from the stored position to provide a safe and convenient height for unloading and loading.

The rack shall be electrically operated by two (2) durable high cycle 12 volt actuators and controlled by a 30 amp two-pole double-throw momentary switch located at the pump module area. The control switch location shall allow the operator to monitor operations, monitor positioning of apparatus mounted equipment in the ladder racks travel path and ground personnel while lowering and raising the rack.

The ladder rack shall be self-locking in any position during operation. A visual signal shall be provided to indicate when the ladder rack is in motion by two (2) yellow flashing lights installed one (1) on each side of the rack.

The rack shall also be wired through the door ajar indicator light located in the cab to alert the driver that the rack is not stowed if the park brake is released.

The ladder rack shall be capable of storing a maximum of three hundred pounds (300 lbs.).

The rack shall be located to the officer's side of the body.

## **HANDRAILS / STEPS**

### **Body Hand Rails Upgrade**

Hansen white LED lighted body hand rails shall be provided (includes pump module if applicable). The rubber insert hand rails 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.

Handrail lighting shall be wired through clearance / headlight switch and only activate when park brake is set.

### **Recessed Rear Folding Steps**

The driver side rear hosebed access steps shall be recessed mounted into a diamond plate box as applicable.

### **Recessed Rear Folding Steps**

The officer side rear hosebed access steps shall be recessed mounted into a diamond plate box as applicable.

### **Hose Bed Folding Steps**

Innovative Controls dual lighted LED folding steps shall be positioned to the driver side rear of the body. The steps shall be NFPA compliant for access to the hose bed storage area and in step height and surface area. The steps shall be staggered stepped as applicable with tailboard depth, not applicable with recessed step mounting.

Innovative Controls dual lighted 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 (as applicable) 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.

### **Hose Bed Folding Steps**

Innovative Controls dual lighted LED folding steps shall be positioned to the officer side rear of the body. The steps shall be NFPA compliant for access to the hose bed storage area and in step height and surface area. The steps shall be staggered stepped as applicable with tailboard depth, not applicable with recessed step mounting.

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 (as applicable) 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.

### **Intermediate Rear Step**

One (1) intermediate rear step shall be provided above the rear Newton dump.

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".

### **Folding Steps [Qty: 3]**

Innovative Controls dual lighted LED folding step(s) shall be located officer side front compartment face, 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.

## **MISC BODY OPTIONS**

### **Mud Flaps**

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

### **Hose Bed**

The area above the booster tank shall have a hose storage area provided. The hose bed shall be constructed entirely from maintenance-free, 3/4" deep x 7.5" wide, extruded aluminum slats that shall be pop-riveted into a one-piece grid system. Each slat shall have all sharp edges removed and have an anodized ribbed top surface that shall prevent the accumulation of water and allow for ventilation of wet hose.

The hose bed design shall incorporate adjustable tracks in the forward area and the rearward area of the hose bed for the installation of an adjustable divider(s). The adjustable tracks shall hold an adjustable divider(s) mounting nut straight, so only a Philips head screwdriver is required to adjust a divider(s) from side to side (as is practical with other hose bed mounted equipment).

The hose bed shall be easily removable to allow access to the booster tank below.

### **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.

### **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 1/8" (0.125") aluminum treadplate. The wheel well trim shall be constructed from 6063-T5 formed aluminum extrusion. 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.

### **Rub Rail**

The pump area module(s) and body shall have rub rails mounted along the sides and at the rear. \*\*

The rub rail shall be C-channel in design and constructed of 3/16" thick 6463T6 anodized aluminum extrusion. The rub rail shall be 2.75" high x 1.25" deep and shall extend beyond the body width to protect compartment doors and the body side. The rub rail depth shall allow marker and/or warning lights to be recessed inside for protection.

The top surface of the rub rail shall have minimum of five (5) raised serrations. Each serration being a minimum of .1" in height and with cross grooves to provide a slip-resistant edge for the tailboard step and pump module running board areas. The rub rail shall be mounted a minimum of 3/16" off the pump module and body with nylon spacers. The ends of each section shall be provided with a finished rounded corner piece.

\*\* 4x4 applications with 30 degree departure angle and flip down tailboard shall omit the rear body rub rails as noted above and shall have the trailing piece of the side rub rails behind rear axle attached in 2 pieces with the rearward piece mounted on an upward angle to match departure angle body. Rearward side marker light as located in rear rub rail shall be mounted angled in the rearward rail as added.

### **Anodize Aluminum Trim**

A anodize aluminum trim shall be located at the bottom edge of all body compartment openings including pump enclosure 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.

### **Side Tank Dump Plates and Doors**

The side tank dumps shall have diamond plate side dump panels. Included shall be lift-up diamond plate doors with spring loaded hinges.

## **Commercial Tandem Axle Tanker**

Commercial chassis tandem axle wheelbase modification. Adds 1" to wheelbase due rear axle offset between commercial and custom chassis.

### **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 body mainframe shall include 3" x 3" 6061-T6 aluminum 3/8" (0.375") wall crossmember extrusion or 3" x 3" I-beam section aluminum extrusion depending on the application at the front of the body. A solid 3" x 3" "I-beam" section aluminum extrusion shall be provided the full width of the body forward and rearward of the rear wheel well. The crossmembers shall be designed to support the compartment framing and shall be welded to 1-3/16" x 3" (1.188" x 3") solid 6063-T5 aluminum frame sill extrusions. The frame sill extrusions shall be shaped to contour with the chassis frame rails and shall be protected from contact with the chassis frame rails by 5/16" x 2" (0.31" x 2") fiber-reinforced rubber strips to prevent wear and galvanic corrosion caused when dissimilar metals come in contact.

### **Body Mounting System**

The main body shall be attached to the chassis frame rails with six (6) of 5/8" (0.625") diameter steel U-bolts. This body mounting system shall be used to allow easy removal of the body for major repair or disassembly.

### **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.

### **Hosebed Side Assembly**

The hosebed side assemblies shall be made of 3" x 3" slotted aluminum extrusion and 3/16" (.188") smooth plate. The hosebed side assemblies shall provide a 100" high body.

The exterior hosebed side surface shall be completely sanded and deburred to assure a smooth finish and painted job color. The interior hosebed side surface shall be completely sanded and deburred to assure a smooth sanded finish.

## **Body Mod High HP Commercial Engines**

Body or pump module shall be notched to accommodate the exhaust canister for high horsepower engines (370 HP or more) on the commercial chassis. The top mount right side walkway and/or speedlay module lower storage compartment may be modified or eliminated. Side mount or under tank pump bodies may have reduced front right side lower storage areas.

## **SCBA BOTTLE STORAGE**

### **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.

### **SCBA 3 BOTTLE STORAGE E-ONE**

E-ONE designed (3) SCBA bottle storage constructed with aluminum plate with hinged door and push button latch shall be provided in the body wheel well area.

The door shall match wheel well area material and finish.

The door shall cover the recessed fuel fill if located adjacent to the SCBA storage.

U-shaped troughs made out of aluminum smooth plate with rubber inserts shall be provided to store standard size SCBA bottles up to 6.75" in diameter and 24.5" in length. The upper two troughs can also store a standard size 20lbs ABC Extinguisher or 2.5 gal Water Extinguisher in each trough.

Location: driver side rear wheel well offset rearward, officer side rear wheel well offset rearward

## **WHEEL CHOCK STORAGE**

E-ONE designed Wheel Chock storage with hinged door and push button latch shall be provided in the body wheel well area.

The door shall match the wheel well area material and finish.

The door shall be wired to "Door Open" indicator inside cab.

The storage area shall be capable of holding (2) Zico Model SAC-44-E or comparable Wheel Chocks (not included).

Location: driver side rear wheel well offset forward, officer side rear wheel well offset forward

# **PUMPS**

## **Pump Rating**

The fire pump shall be rated at 1500 GPM.

## **Fire Pump System**

The pump shall be a midship-mounted Hale QMAX single stage centrifugal pump. The pump shall be mounted on the chassis frame rails of commercial or custom truck chassis and have the capacity of 1,250 to 2,250 gallons per minute (U.S. GPM) NFPA 1901 rated performance, and shall be split-shaft driven from the truck transmission.

The entire pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 psi (207 MPa). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump body shall be horizontally split in two sections, for easy removal of impeller assembly including wear rings and bearings from beneath the pump without disturbing pump mounting or piping.

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

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

Two (2) 6" diameter suction ports with 6" NST male threads and removable screens shall be provided, one each side. The ports shall be mounted one (1) on each side of the midship pump and shall extend through the side pump panels. Inlets shall come equipped with long handle chrome caps.

## **Gearbox – G Gearbox**

Pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of drive through torque of the engine system. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4 inches in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine. All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to



eliminate all possible end thrust. (No exceptions.) The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected. If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat treated, hard anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump. For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two green lights to be located in the truck driving compartment and one green light on pump operators panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

#### **Discharge Manifold**

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

#### **Pump Shift**

The pump shift shall be pneumatically-controlled using a power shifting 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 lock-up (4th gear lock-up).

#### **Test Ports**

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

#### **Gearbox Cooler**

A gearbox cooler shall be provided to maintain safe operating temperatures during prolonged pumping operations for pump rating 1500 GPM and over.

## **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.

### **Zinc Anodes**

The zinc anodes help prevent damage caused by galvanic corrosion within the fire pump. The system provides a sacrificial metal which helps to diminish or prevent pump and pump shaft

galvanic corrosion. One anode will be located on the suction side and one will be located on the discharge side of the pump.

### **Thermal Relief Valve**

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

### **Engine Throttle**

Fire Research ThrottleXcel engine throttle and monitoring display shall be installed at the pump operator's panel. The case shall be waterproof and have dimensions not to exceed 6-3/4" high by 4-5/8" wide by 1-3/4" deep. The engine throttle control knob shall be 2" in diameter with a serrated grip, with a red idle push button in the center, and no mechanical stops. Inputs for engine information shall be from a J1939 databus, other inputs shall be 12 volts DC or from independent sensors.

The engine RPM shall be set to idle when the pump engaged interlock signal is recognized regardless of the throttle control knob position. Optical technology shall be used to detect the direction and speed that the control knob rotated for RPM control.

The following continuous displays shall be provided:

- Engine RPM; shown with four daylight bright LED digits more than 1/2" high, updated in 10 RPM increments
- Engine oil pressure; shown on an LED bar graph display in 10 psi increments
- Engine coolant temperature; shown on an LED bar graph display in 10 degree increments
- Battery voltage; shown on an LED bar graph display in 0.5 volt increments
- Time and date; shown on a dot matrix message display
- Interlock; OK TO PUMP LED is green to indicate throttle ready

A 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. Operator selections and inputs shall be via push buttons on the front panel.

The program shall store the accumulated operating hours for the pump and engine, previous incident hours, and current incident hours in a non-volatile memory. Stored elapsed hours shall be displayed at the push of a button. The program shall have calibration and self-diagnostic capabilities. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- Low Oil Pressure
- High Engine Coolant Temperature
- High Transmission Temperature
- Low Battery Voltage (Engine Off)

- Low Battery Voltage (Engine Running)
- High Battery Voltage
- High Engine RPM

The engine throttle and monitoring display shall be programmed at installation for a specific engine.

### **Throttle Selection Switch**

A throttle selection switch shall be provided and mounted on the pump operator's panel. The switch shall be provided to allow the operator to toggle between the pump/throttle relief system and the pressure governor.

The throttle selection switch and pump discharge relief valve controller shall be provided as a back-up to the pressure governor.

### **Inlet Valve**

A Hale Master Intake Valve (MIV-E) shall be provided for the specified intake. The large diameter inlet valve shall be capable of achieving an NFPA test rating of 1500 GPM through a single 6" suction hose.

The inlet valve shall be operated by a 12 VDC electric motor with a remote switch provided at the pump operator's position. The 12 VDC motor shall be provided with an automatic resetting, thermally-compensated over-current protection circuit breaker to protect the 12 VDC motor and apparatus electrical system. The gear actuator on the valve will cycle from full closed to full open in not less than three (3) seconds. A hand controlled pump panel mounted manual override (knob style) shall be provided.

An indicator light panel shall be located at the pump operator's position to show valve open, closed, or traversing from open to closed.

A built-in adjustable pressure relief valve shall be provided. The pressure relief valve shall be factory set to 125 psi. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed.

A 3/4" air bleeder valve shall be provided and controlled at the pump operator's position.

A 1/4" water bleeder shall be supplied and controlled at the pump operator's position.

Location: driver side pump panel, officer side pump panel, 5 in. rear intake.

### **Mechanical Pump Seal**

The midship pump shall be equipped with a high quality, spring loaded, self-adjusting mechanical seal capable of providing a positive seal to atmosphere under all pumping conditions.

This positive seal to atmosphere must be achievable under vacuum conditions up to 26 Hg (draft) or positive suction pressures up to 250 psi.

The mechanical seal assembly shall be 2 inches in diameter and consist of a carbon sealing ring, stainless steel coil spring, Viton rubber boot, and a tungsten carbide seat, with a Teflon back-up seal provided.

Only one mechanical seal shall be required, located on the first stage suction (inboard) side of the pump and be designed to be compatible with a one piece pump shaft (no exceptions). A continuous cooling flow of water from the pump shall be directed through the seal chamber when the pump is in operation.

### **Hale Pressure Relief Valve**

A Hale pressure relief valve shall be provided and mounted on the pump operator's panel. The pump shall be equipped with an automatic pressure control device. A single bronze variable pressure setting relief valve shall be provided and be of ample capacity to prevent an undue pressure rise as outlined in NFPA 1901. The relief valve shall be normally closed and shall open against pump pressure. A relief valve control wheel with a control light to signal when open shall be mounted on the pump operator's panel.

### **Master Drain Valve**

A manual master drain valve shall be installed on the pump panel. The master pump drain assembly shall consist of a Class 1 bronze master drain with a rubber disc seal. The master drain shall have a rubber seal to prevent water from running out on the running board.

The manual master drain valve shall have twelve (12) individual-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.

### **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 ¼" 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**

#### **Right Rear Intake, No Valve 5**

A 5" stainless steel pipe shall extend from the right suction side of the pump to the rear of the apparatus. The suction shall mount horizontally through the rear of the apparatus. All fabricated piping in the intake shall be constructed of a minimum of Schedule 10 stainless steel for superior corrosion resistance. 3/4" valve(s) shall be provided to allow water to be drained.

#### **Left Intake 2.5 Elkhart Unibody Valve**

One (1) 2 1/2" suction inlet with a manually operated 2 1/2" Elkhart Unibody valve with chrome valve face shall be provided on the left side of the apparatus at the pump panel.

The valve shall be an Elkhart Unibody 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 Elkhart 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, rocker-lug 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.

## **INTAKE OPTIONS**

### **Adapter Intake 5 NST Rear**

The outside end of the rear intake shall have a 5" female NPT x 5" male NST chrome adapter with suction strainer. The suction shall come with a 5" chrome cap.

## **DISCHARGES AND PRECONNECTS**

### **Deck Gun 3 Elkhart Unibody Valve**

One (1) 3" deck gun discharge outlet with a manually-operated Elkhart valve and 3" stainless steel pipe shall be provided above the pump compartment.

The valve shall be an Elkhart unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position with water flowing through it.

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

The valve shall be equipped with a device that limits the opening and closing speeds to comply with the current edition of NFPA 1901.

The valve control shall be located at the pump operator 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.

### **Left Front Discharge 2.5**

One (1) 2-1/2" preconnect outlet with a manually operated Elkhart valve shall be supplied to the lower left front of the apparatus hose bed. The preconnect shall consist of a 2-1/2" heavy duty hose coming from the pump discharge manifold to a 2-1/2" adapter.

The valve shall be an Elkhart Unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position with water flowing through it.

The valve shall be of the unique Elkhart Drop-out or 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.

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

#### **Crosslay 1.5 Elkhart Manual Unibody [Qty: 2]**

One (1) 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 an manual operated 2" Elkhart valve. The valve shall be an Elkhart Unibody series with an stainless steel ball, and dual UHMWPE 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 ball when in a throttle position and water is flowing through it.

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

The Unibody series valve shall have the following features:

The system shall include a valve-controller and valve actuator.

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.



### **Left Panel 2.5 Elkhart Unibody Valve**

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

The valve shall be an Elkhart Unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Elkhart Drop-out or 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 cast brass with 2-1/2" NST . 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: left side discharge 1, left side discharge 2

### **Right Panel 2.5 Elkhart Unibody Valve**

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

The valve shall be an Elkhart Unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position and water is flowing through it.

The valve shall be of the unique Elkhart Drop-out or 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 cast brass 2-1/2" NST threads.

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

### **Left Rear 3 Elkhart Unibody Valve**

One (1) 3" discharge outlet with a manually-operated Elkhart valve shall be supplied to the left rear of the apparatus by a 3" stainless steel pipe.

Piping shall be rigidly braced and installed securely so no movement develops when the line is charged.

The valve shall be an Elkhart Unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position with water flowing through it.

The valve shall be of the unique Elkhart Drop-out or 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.

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

Location: left rear discharge

### **Discharge 3in Right Side Panel**

One (1) 3" discharge outlet with a manually-operated Elkhart valve shall be provided at the right side pump panel.

The discharge shall be equipped with a device that shall not allow the valve to open or close in less than three (3) seconds.

The valve shall be an unibody series with an stainless steel ball and dual adjustable neoprene 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 acetal ball when in a throttle position with water flowing through it.

The valve shall be of the unique Elkhart Drop-out or Swing-out design to allow the valve body to be removed for servicing without disassembling the plumbing.

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.

The valve control shall be located at the pump operator 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

### **Decontamination Discharge**

A .75" decontamination discharge outlet shall be provided on the driver side pump panel. The outlet shall include a valve, hose bib connection and pressure reducing valve.

### **Deck Gun Location**

Deck gun piping shall be positioned dunnage pan offset to officer side. This location shall allow for optimal operation of a deck gun monitor once installed.

## **DISCHARGE OPTIONS**

### **Elkhart 8598 Extender**

Elkhart model 8598 3" electrically actuated extender shall be installed. The waterway shall be capable of being lowered to deck level (or into a monitor well) for storage and transportation and shall be capable of being raised to an extended height of 18" using panel mounted controls. These controls shall be capable of moving the waterway in either the raised or lowered position while maintaining the ability to horizontally rotate the monitor device 360 degrees. There shall be an accessible manual override control for use in the event power failure occurs. A power cable shall be supplied for connection from the panel control box to the extender.

A sensor shall be located on the waterway that signals a 12 volt indicator light installed in the cab to illuminate to indicate that the monitor is raised.

The extender shall have a 3" waterway and a connection for an Elkhart remote controlled monitor.

### **Monitor Elkhart Cobra**

An Elkhart Cobra RF with panel mounted control and hand held control and an adapter to mount to deck gun discharge or extender shall be provided with a 3" inlet. The monitor shall be capable of remote controlled 360 degree left/right travel (in deck mount mode), programmable automatic oscillating from 2 to 360 degree (in deck mount mode) and programmable stow feature. The monitor shall include a SM-1250E nozzle.

The charging base shall be mounted in L1 on forward wall.

## **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: 9]**

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 bezels 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.

## **BOOSTER REEL**

### **Booster Hose Reel**

A Hannay booster reel shall be provided and located dunnage pan offset to driver side.

The booster reel shall be constructed utilizing an all aluminum welded base. Reel bushings shall be manufactured from Nylatron to ensure maintenance free operation. A 12 volt electrical motor shall be provided and will rewind the reel with a chain and sprocket drive mechanism. All electrical switch connections shall be coated to protect against moisture. The booster reel shall have a capacity for up to 200' of 1" booster hose.

Plumbing to the reel shall be a 1-1/2" flexible line with the discharge airactuated control located at the operator's control panel.

All fabricated piping shall be constructed of a minimum of Schedule 10 stainless steel pipe to reduce corrosion of the lines.

## **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**

### **Fuel Gauge**

A 2" weatherproof engine fuel gauge shall be pump panel mounted.

### **GAUGE IC 10 LED TANK LEVEL WATER, ADDITIONAL**

An additional Innovative Controls brand water tank level gauge shall be located at the officer rear to provide a high-visibility display of the water tank water level. Ten (10) high-intensity light emitting diodes (LED's) on the display module shall have a 3 dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance within full 180 degree visibility.

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. 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.

### **GAUGE IC 10 LED TANK LEVEL WATER MINI**

Innovative Controls miniature tank indicator shall be installed in the cab cab dash. The indicator shall show the volume of water in the tank on five (5) *easy to see super bright LED's* with auto dimming feature. The miniature indicator shall receive input information over a single wire from a tank primary indicator.

### **GAUGE IC 10 LED TANK LEVEL WATER/WHELEN 500**

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 water level. Ten (10) high-intensity light emitting diodes (LEDs) on the display module shall have a 3 dimensional lens allowing the full, 3/4, 1/2, 1/4, and refill levels to be easily distinguished at a glance full 180 degree visibility.

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. 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 four (4) Whelen 500 series LED (Light Emitting Diode) light heads installed each side as specified.

The system shall be controlled by an Innovative Controls 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 light heads shall be arranged as follows.

Full Green  
3/4 Blue  
1/2 Amber  
1/4 Red

Location of Whelen 500 tank level lights: each side of pump module up high.

### **2.5" Discharge Pressure Gauge (Dual Read) [Qty: 9]**

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 0-2750KPA/0-400PSI with black graphics on a white background.

## **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 1901 standards.

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 8 gauge and smaller shall be SXL, GXL, or TXL per SAE J1128. Conductors 6 gauge and larger shall be SXL or SGT per SAE J1127.

All wiring shall be colored coded and imprinted with the circuits 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 22 lbs. 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.

#### **Multiplex Display**

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

The display shall have the following features:

- Aspect ratio of 16:9 (Wide Screen)
- Diagonal measurement of no less than 7"
- Touch screen design with "virtual" switch capability
- 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 center console, mounted on a Panavise Swivel Arm Mounting Option Weldon C624 series brkt to allow clear sight from either driver or officer positions.

#### **Vehicle Data Recorder**

A vehicle data recorder system shall be provided to comply with NFPA 1901, 2009 edition. 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 wiring harness.

### **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 repellent film. The coating shall protect electrical connections against the environmental conditions apparatus are commonly exposed to.

## **LIGHT BARS**

### **Light Bar Mount**

One (1) pair of Whelen 1.5" tall (model MKEZ7) mounts shall be provided on the front light bar.

### **Front Light Bar Color(s)**

The front light bar shall be provided with the following color LED modules: Red/White with clear lenses

If applicable, includes side facing light bars when colors are the same.

### **Light Bar**

A Whelen Freedom IV Series 60" LED light bar model F4X0 with eight (8) LED modules shall be provided; two (2) front corner mounted LED modules, four (4) forward facing LED modules and two (2) side facing LED modules (with front vista windows) or two (2) rear corner LED modules (without front vista windows).

No rear facing LEDs.

The light bars shall have clear lenses.

The white LEDs (if equipped) shall be switched off in blocking right of way mode.

The light bar shall be installed centered on the front cab roof.

## **WARNING LIGHTS**

### **Whelen LED Warning Light Flasher**

Three (3) Whelen model UFM8 warning light flashers shall be provided to control warning lights. One (1) flasher shall be located in the cab and two (2) located in the body. Each flasher shall have seventeen (17) selectable patterns with eight (8) outputs.

### **Upper Rear Warning Lights**

Two (2) Whelen model L31H Super LED beacons with Red LED with Clear lens domes shall be supplied.

The lights shall be located rear upper body on aerial style brackets to meet Zone C upper requirements.

### **Hazard (Door Ajar) Light**

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

The light shall be located center console.

### **Painted Mounting Box [Qty: 2]**

One (1) painted job color (two-tone if equipped) smooth plate mounting box shall be provided for a warning light (includes adjacent scene light if optioned). Boxes shall be constructed of 1/8" aluminum smooth plate.

Location: (1) each side of body on forward upper body corners, (1) each side of body on rearward upper body corners.

### **Warning Light**

One (1) pair of Whelen model PSR01FCR red LED strip lights with clear lenses shall be provided. The light shall be horizontally mounted and located (1) each side just behind rear wheels in rubrail if equipped, (1) each side in pump module rubrail if equipped. The lights shall be wired to the lower level warning.

### **Warning Lights**

Two (2) Whelen M6 series Linear Super LED RED with CLEAR lenses, RED with CLEAR lenses, RED with CLEAR lenses, RED with CLEAR lenses shall be provided. The rectangular lights shall include chrome flanges where applicable.

Location: (1) each side NFPA/ULC required lower zone front facing, (1) each side NFPA/ULC required lower zone forward side facing, (1) each side NFPA/ULC required lower zone midship side facing, (1) each side NFPA/ULC required lower zone rear side facing, (1) each side NFPA/ULC required lower zone rear facing.

### **Warning Lights**

Two (2) Whelen 900 series Super LED light heads shall be provided. The lights shall be RED with CLEAR lenses, RED with CLEAR lenses. The rectangular lights shall include chrome flanges where applicable.

Location: (1) each side of body on forward upper body corners, (1) each side of body on rearward upper body corners.

## **DIRECTIONAL LIGHT BARS**

### **Directional Traffic Warning Light**

One (1) Whelen TAL65 LED 36" long Traffic Advisor with amber lenses shall be provided.

The directional bar shall include a TACTL5 control head. The control head shall include a remote flash control and end lamp enable/disable feature.

The light shall be installed at the rear of the body to direct traffic around the vehicle.

### **Recessed Box for Directional Light Bar**

Smooth plate sanded box shall be provided at the rear of the body for recess mounting of a directional light bar. The recess shall reduce the opening height of the rear compartment(s) (if applicable).

### **Directional Light Bar Control Location**

The directional light bar control head shall be located in the center console.

## **SIRENS**

### **Electronic Siren**

A Whelen 295SLSA1 electronic siren shall be installed in the cab. The siren amplifier and control panel module shall include a rotary selector for six (6) functions, on/off switch, push button switch for manual siren or air horn tones, and noise canceling microphone.

### **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 officer side front bumper.

### **Electronic Siren Control Location**

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

## **SPEAKERS**

### **Siren Speaker**

One (1) Whelen model SP123BMC, 100 watt speaker with chrome grill shall be recessed in the front bumper.

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.

## **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.

### **Body Marker Lights**

Trucklite LED clearance lights shall be installed as specified.

#### **Upper Body:**

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

#### **Lower Body:**

- Three (3) red LED clearance lights centered at rear, recessed in the rubrail.
- One (1) red LED clearance light each side at the trailing edge on either side of the apparatus body, recessed in the rubrail.
- One (1) amber LED clearance / auxiliary turn light each side front of body/module, recessed in the rubrail.
- A rectangular shaped marker light with a red colored lens shall be installed at the trailing edge on each side of the apparatus 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**

Three (3) Whelen model M6 series LED (Light Emitting Diode) lights shall be installed in a four (4) light vertical housing each side at rear and wired with weatherproof connectors.

Light functions shall be as follows:

- One (1) model M62BTT LED red running light with red brake light in upper position.
- One (1) model M62T LED amber turn signal in middle position.
- One (1) model M62BU LED clear back-up light in lower position.

A one-piece cast housing shall be mounted around the three (3) individual lights in a vertical position. The lower space will be used by the M6 or equivalent lower NFPA warning light.

### **Turn Signal Flash Pattern**

The forward (if applicable) and rear turn signals shall have a sequential arrow flash pattern.



## **LIGHTS - COMPARTMENT, STEP & GROUND**

### **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.

### **Compartment Light Package**

One (1) TecNiq E45 LED compartment light strip shall be mounted in each body compartment greater than 4 cu. ft. Transverse compartments shall have two (2) lights, located one (1) each side of the body.

Each light bar shall include super bright white LEDs mounted to circuit boards encapsulated in an aluminum extrusion using TecSeal with TPE sealed end caps. The lights shall produce approx. 300 lumens per foot and shall be provided with a limited lifetime warranty.

Compartment lights shall be wired to a master on/off switch located in the cab.

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.

## **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.

### **Scene Lights**

Two (2) Whelen model M9 series Linear Super LED clear scene lights shall be provided.

Each shall have Linear Super LED diodes with internal light deflecting optics. The internal light deflecting optics shall redirect the light without the use of angle brackets.

The lights shall be located (1) each side of body on forward upper body corners, (1) each side of body on rearward upper body corners and be controlled by a switch in cab accessible to driver (lights on sides of apparatus to be switched separately).

### **Rear Work Lights**

Two (2) FireTech LED lights model FT-WL3500-FT-W shall be installed. The lights shall produce 1,981 effective lumens and have a white housing. The lights shall be switched with work light switch in the cab.

Location: rear body/beavertail area on the trailing edge up high.

### **Crosslay Light**

A FireTech LED light model WL2000 with white housing 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.

### **Hose Bed Light**

One (1) Federal Signal 64LEDSCENE LED light with a clear lens shall be installed at the front area of the hose bed to provide hose bed lighting per current NFPA 1901. All electrical connectors are to be enclosed in the housing providing protection against the elements.

The hose bed light shall be switched with work light switch in the cab.

## **LIGHTS - NON-WARNING**

### **Engine Compartment Light**

There shall be lighting provided in compliance with NFPA to illuminate the engine compartment area. The light wiring circuit shall activate when the cab is tilted and master power is switched on.

### **Pump Compartment LED Light**

An LED light shall be provided in the pump compartment area for NFPA compliance. The light shall be wired to operate with the work light switch in the cab.

### **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.

### **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 officer side pump panel.

## **CONTROLS / SWITCHES**

### **Foot Switch**

A heavy duty metal floor mounted foot switch shall be installed to operate the air horns. It shall be located driver's side, officer's side.

### **Foot Switch**

A heavy duty metal floor mounted foot switch shall be installed to operate the Q2B siren. It shall be located driver's side.

### **Additional Switch**

A 12 volt switch shall be provided.

The switch shall be located pump operator's panel for pump panel lights.

### **Hose Reel Button**

A heavy duty rubber covered electric reel rewind button shall be installed to assist with rewinding the deployed hose.

Location: driver side pump panel, officer side pump panel.

### **Programming Instructions**

Additional programming shall be provided. Additional programming shall be: dump chute cameras to activate when master dump switch turned on, side facing rearward flood/scene lights switch through reverse IATS.

### **Master Activation Switch**

Apparatus shall have a Master Newton Dump Activation Switch with red cover in cab with easy access to Driver.

## **CAMERAS / INTERCOM**

### **Camera Shield [Qty: 3]**

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 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.

### **Safety Vision Camera**

A Safety Vision camera consisting of Safety Vision model SV-625B camera will be located one (1) each side of body for viewing of the dump chute. This camera will be interlocked with each dump chute. 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 multiplex display or Safety Vision backup camera system.

### **Two-Way Intercom**

A Fire Research ACT Intercom model ICA900-112 two-way intercom system shall be installed to provide communications between the cab and the rear of body. The intercom system shall include one (1) push-to-talk button control module in the cab and one (1) hands free speaker at the rear body area.

The control module 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.

The intercom shall come on when the vehicle is placed in reverse or when the master dump/chute switch is engaged.

## **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.

### **Lighted Bumper Guides**

One (1) pair of Bores Manufacturing model 848211 lighted bumper guides shall be provided. The guides shall be installed one (1) each side of front bumper extension.

### **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 driver's seat.

## **BREAKER BOXES**

### **Breaker Panel**

A two (2) place breaker box with up to two (2) appropriately sized circuit breakers shall be installed as specified.

Dimensions: 9.30" high x 4.81" wide x 3.19" deep.

Location: L1 forward wall.

## **LIGHTS - AREA**

### **Whelen Pioneer 12V LED Flood Light**

A Whelen Pioneer Plus series 80 watt 12V flood light model PFH1 single panel LED light head shall be provided on a cab brow mount. The rectangular extruded light fixture with die cast end caps shall measure 8.35" wide by 4.25" high by 3" deep and have a white powder coat finish. The light fixture shall have eighteen (18) white Super-LEDs with molded vacuum metalized reflector that draws 6.5 amps and produce 8,875 usable lumens.

Location(s): center of front cab brow.

### **Bracket Mount Light**

One (1) Pioneer Summit Series 12V LED bracket mounted flood light model S30MW 30" long shall be provided. The light shall feature 24 LEDs. The 135W 12V light shall draw 7.2 amps. A switch shall be provided, accessible to driver, for activation of light.

The light assembly shall be located center rear of body up high.

## **MISC LOOSE EQUIPMENT**

### **DOT Required Drive Away Kit**

Three (3) triangular warning reflectors with carrying case shall be supplied to satisfy the DOT requirement.

## **EXTERIOR PAINT**

### **Paint Sample Spray Out**

A paint sample spray out of the base cab / body paint color will be provided for approval prior to painting.

### **Un-Painted Pump/Pre-Connect Module(s)**

All applicable pump application modules shall have a sanded finish (not painted job color). Includes upper and lower pump modules, crosswalk module and/or speedlay/pre-connect module (as applicable). Rear mounted body/pump module shall be painted job color.

### **Paint Body Large**

The apparatus body shall be painted Sikkens As Specified. 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.

### **Undercoating**

Undercoating shall consist of a heavy coating of soft seal film sprayed on the entire underside of the vehicle to repel water and road elements. Shall be applied after customer final inspection.

### **Paint Commercial Cab**

The commercial cab shall be painted the color(s) as specified by the customer.

## **STRIPING**

### **STRIPING**

Reflective striping shall be provided and installed by the dealer/customer.

#### **Reflective Stripe in Rubrail**

The reflective stripe in the body rubrail shall be white.

#### **Rear Body Reflective Striping**

Chevron style Reflexite V98 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.

#### **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**

### **Department Graphics applied at Dealer**

#### **Logo**

A E-ONE logo with a grey background shall be provided on each of the rear vertical M6 tail light housings.

## **WARRANTY / STANDARD & EXTENDED**

### **General 1 Year Warranty**

Purchaser shall receive a General One (1) Year or 24,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0001. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.



### **Body Structural (Aluminum) Warranty**

Purchaser shall receive a Body Structure (Aluminum) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0502. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

### **Plumbing and Piping (Stainless Steel) Warranty**

Purchaser shall receive a Plumbing and Piping (Stainless Steel) Ten (10) Years or 100,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0800. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

### **Electrical Warranty**

Purchaser shall receive an Electrical One (1) Year or 18,000 Miles limited warranty in accordance with, and subject to, warranty certificate RFW0201. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

### **Paint and Finish Warranty**

Purchaser shall receive a Paint and Finish Ten (10) Years limited warranty in accordance with, and subject to, warranty certificate RFW0710. The warranty certificate is incorporated by reference into this proposal, and included with this proposal or available upon request.

## **SUPPORT, DELIVERY, INSPECTIONS AND MANUALS**

### **Pump Panel Approval Drawing**

A detailed large scale approval drawing of the pump panel(s) shall be provided. The drawing shall be provided on an purchased unit prior to the construction process.

### **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.

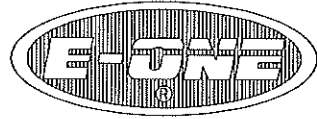
These electronic manuals shall be accessible from any computer operating system capable of supporting portable document format (PDF). Permanent copies of all pertinent data shall be kept file at both the local dealership and at the manufacturer's location.

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.

# Drawings

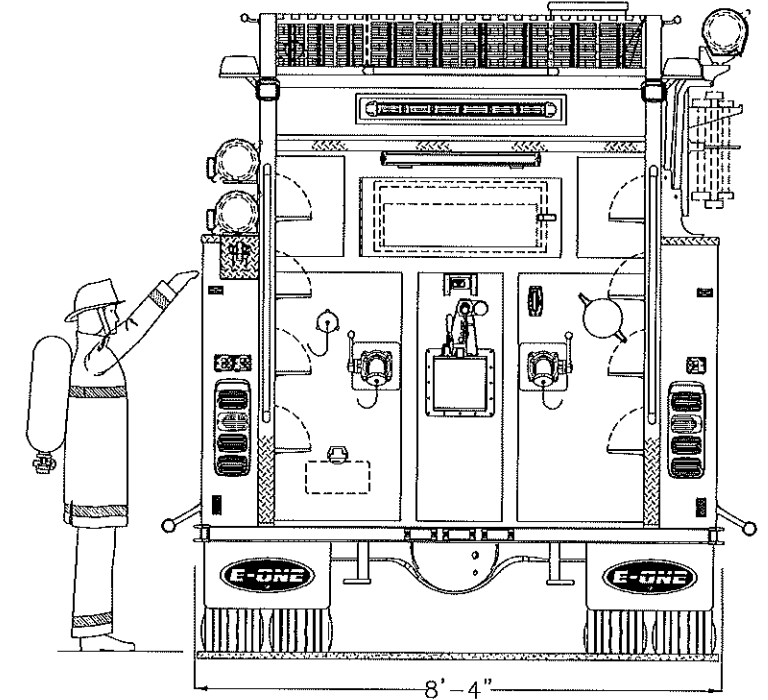


**LEDYARD VOLUNTEER EMERGENCY SQUAD**  
**LEDYARD, CT**  
 QUOTE 119683  
**TANDEM TANKER**  
**KENWORTH T880 6X4 CHASSIS**

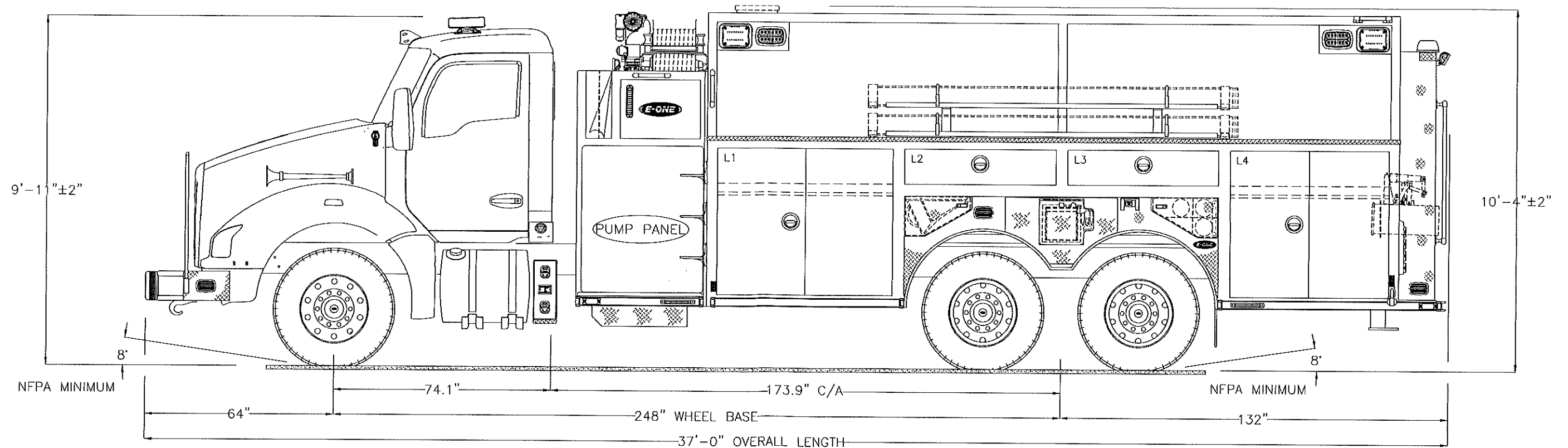
1500 GPM HALE QMAX PUMP		HOSE LOAD:	
3030 GALLON POLY WATER TANK		500' OF 3.00" DJ	
		1000' OF 5.0" LDH	
COMPT.	OPENING	INTERIOR DIMENSION	
L1/R1	60W 50H	60W 12H 12D UPPER	60W 34H 26D LOWER
L2/L3	51W 12H	51W 12H 12D	
R2/R3	51W 12H	51W 12H 12D	
L4/R4	54W 50H	54W 12H 12D UPPER	54W 34H 26D LOWER

THIS DRAWING IS FOR REFERENCE PURPOSES. ALL DIMENSIONS ARE SUBJECT TO MINOR VARIATIONS DUE TO MANUFACTURING PROCESSES.

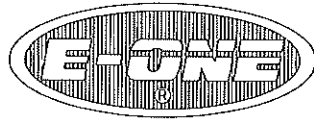
This print is the property of E-ONE, inc. and is loaned to you subject to return on demand, unless otherwise agreed to in writing by E-ONE, inc. Its contents are confidential and must not be copied or submitted to third parties for use or examination.



HOSEBED HEIGHT:  
 (FOR REFERENCE ONLY)  
 TO TAILBOARD: 87"  
 TO GROUND: 111"±2"



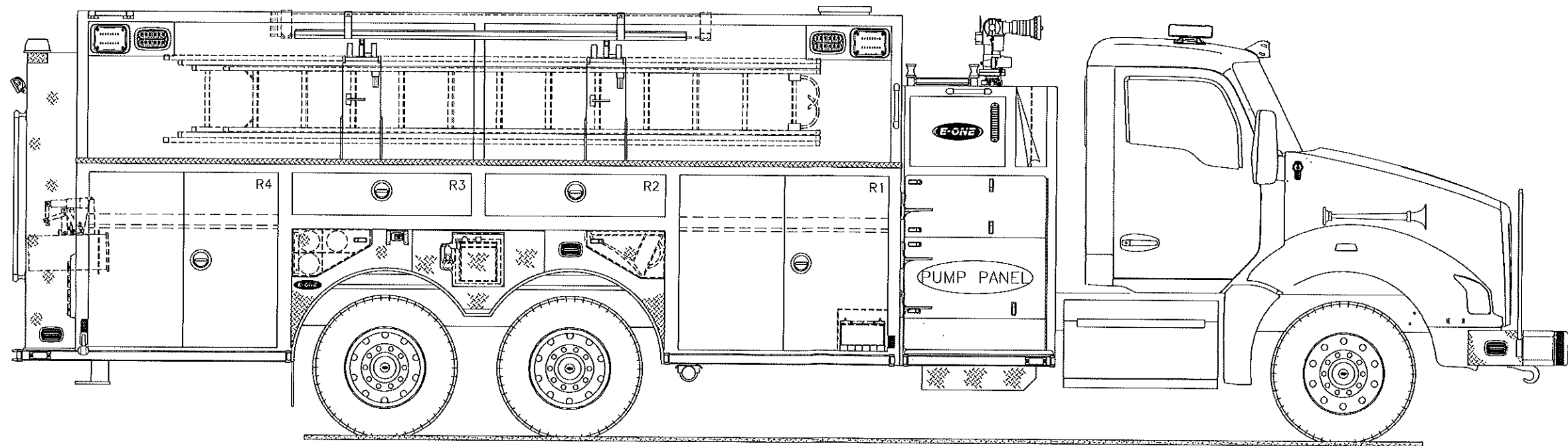
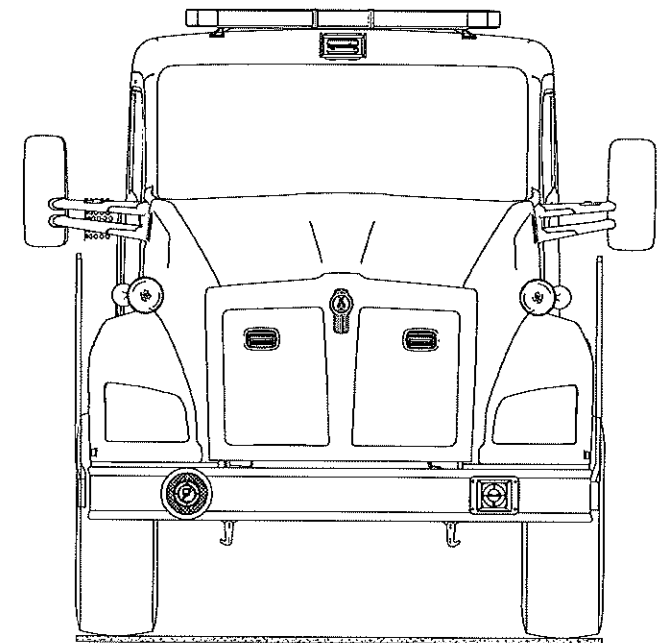
DATE	REV	DESCRIPTION	DATE	APPROVED
2022-AUG-03				



**LEDYARD VOLUNTEER EMERGENCY SQUAD**  
**LEDYARD, CT**  
*QUOTE 119683*  
**TANDEM TANKER**  
**KENWORTH T880 6X4 CHASSIS**

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W/STOCK	A	DATE	REVISED	2022-AUG-03	PH/DOY
DRAWN BY	REV	DESCRIPTION	DATE	APPROVED	SHEET 2 OF 2
		APPROVAL REVISIONS			