

RESOLUTION 19-150

**A RESOLUTION TO AUTHORIZE THE PURCHASE OF 2020 PIERCE 100 FT.
AERIAL TOWER**

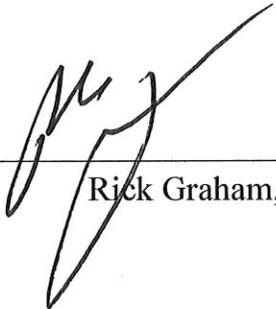
WHEREAS, the Spring Hill Fire Department is replacing a 2007 E-One 75ft. Ladder truck;
and

WHEREAS, Spring Hill Fire Department request to purchase 2020 Pierce 100 FT. Aerial
Tower Truck to be paid for from the Departments Budget; and

WHEREAS; the purchase of the Pierce 100 FT. Aerial Tower Truck will be purchased
through Sourcewell, Spring Hill Contract ID 37473;

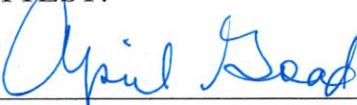
NOW, THEREFORE BE IT RESOLVED, that the City of Spring Hill authorizes the
purchase of Pierce 100 FT. Aerial Tower Truck, from EVS/ Pierce Manufacturing for
\$1,374,252.00 as recommended by the Budget and Finance Advisory Committee on September
2, 2019.

Passed and adopted by the Board of Mayor and Aldermen of the City of Spring Hill,
Tennessee on the 16th day of September, 2019.



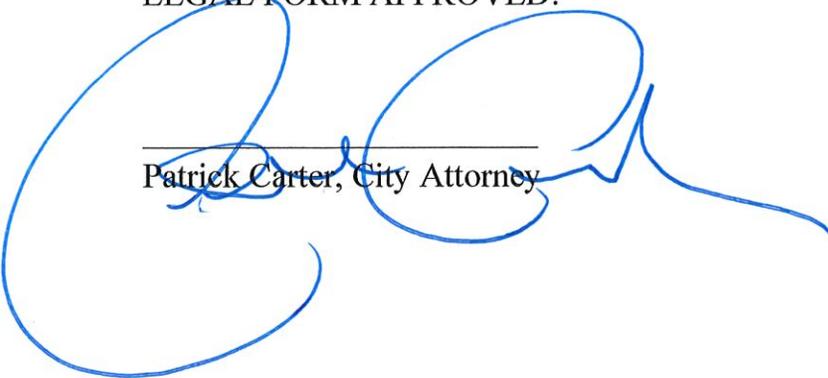
Rick Graham, Mayor

ATTEST:



April Goad, City Recorder

LEGAL FORM APPROVED:



Patrick Carter, City Attorney



**City of Spring Hill
Budget and Finance Committee
Purchase Evaluation Form**

Department: Fire

Presented By: Terry Hood

Date: September 2, 2019

Department Budget Status:

I. Purpose/Overview: To purchase for replacement of 2007 75 ft. Ladder

II. Background Information: The fire department was allocated funding for a 2020 Pierce 100 ft. aerial. Due to wear and tear of current 2007 75 ft. E-One. This vehicle is being purchased through Sourcewell, Spring Hill Tn. ID number is 37473.

III. Financial Impact to Budget. Depend on which option is chosen by budget and finance which are included in your packet. Budgeted for this vehicle was set at \$1.4 million.

IV. Alternative Options: another vendor.

V. Staff Recommendations: It is recommended to award purchase to EVS/ Pierce Manufacturing, based on pricing and Sourcewell Contract.

Terry Hood

From: Mike Sims <MSims@gwevs.com>
Sent: Thursday, August 15, 2019 2:05 PM
To: Terry Hood
Subject: [External] Pricing Recap

****External Email****

Chief,

I have entered the changes we discussed and adjusted the loose equipment list per our review. The only option that I can not provide is the 2.5" crosslay. There is just not enough room above the pump to fit it in. We can discuss other ways to accommodate the 2.5: pre-connect.

We are now a lot closer to your budget figure. See the recap below and let me know what you think. We can get together again if you want to dig further or if they will accept the pre-pay offer, we are there. Look this over and let me know our next move.

Truck Cost.....\$1,360,591.00

Loose Equipment adjusted cost.....\$70,881.00

Total truck and equipment.....\$1,431,472.00 (if paid for at delivery)

Pre-Payment Discount.....(\$57,220.00)

Total Truck and Equipment.....\$1,374,252.00 (If paid within 15 days of order placement...This includes a 100% Performance Bond for your protection)

Delivery can be made in 10.5 – 11.5 months after order placement.

Thank You, just let me know when you are ready to finalize the deal.

Mike Sims
Territory Sales Manager – Emergency Vehicles
Cell- (615) 290-0503



Serving Our Customers Since 1958

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Spring Hill Fire Department

8/16/2019

Based on Quote #1098 for Pierce 100' Aerial Tower and list of loose truck equipment.

Total Price for Truck and equipment: ordered and Paid at Delivery Completion. \$1431,472.00, fob delivered.

Delivery Quoted: 10.5-11.5 months after order placement.

The following are various Pre-Payment options and discount involved:

Option A: Total Pre-payment at order placement.

Net Total pre-pay amount.....\$1,374,252.00.

Reflects discount of \$57,220.00

Option B: Pre-Pay Chassis and Aerial cost at order placement.

Pre-Pay at order placement.....\$839,134.00

Payment a delivery completion.....\$549,334.00

Total of payments.....\$1,388,468.00

Reflects discount of \$43,004.00

Option C: Progressive Payment:

Pre-Pay at order placement.....\$500,000.00
Pre-Pay 60 days prior to Pick Up Date.....\$500,000.00
Remainder due at Delivery.....\$396,891.00
Total of Payments.....\$1,396,891.00
Reflects Discount of \$34,581.00

Option D: Split Pre-Pay:

Pre-pay at order placement.....\$616,741.00
Payment at Delivery completion.....\$781,273.00
Total of Payments.....\$1,398,014.00
Reflects discount of \$33,458.00

Option E: Chassis pre-pay:

Pre-Pay Chassis portion at order placement..\$419,518.00
Payment at Delivery completion.....\$989,144.00
Total of Payments.....\$1,408,662.00
Reflects discount of \$22,810.00

A Performance Bond will be issued to cover any pre-payment amounts.

Mike Sims

Territory Manager, EVS, inc.

615-290-0503

msims@gwevs.com

EVS is pleased to submit a proposal to Spring Hill Fire Department for a **Pierce® 100' Heavy Duty Aerial Tower** per your request for quotation. The following paragraphs will describe in detail the apparatus, construction methods, and equipment proposed. This proposal will indicate size, type, model and make of components parts and equipment, providing proof of compliance with each and every item (except where noted) in the departments advertised specifications.

PIERCE MANUFACTURING was founded in 1913. Since then we have been building bodies with one philosophy, "BUILD THE FINEST". Our skilled craftsmen take pride in their work which is reflected in the final product. We have been building fire apparatus since the early "forties" giving Pierce Manufacturing over 75 years of experience in the fire apparatus market. Pierce Manufacturing has built and put into service more than 62,500 apparatus, including more than 33,900 on Pierce custom chassis designed and built specifically for fire and emergency applications. Our Appleton, Wisconsin facility has over 870,000 total square feet of floor space situated on approximately 105 acres of land. Our Bradenton, Florida facility has 300,000 square feet of floor space situated on approximately 38 acres of land.

Our beliefs in high ethical standards are carried through in all of our commitments and to everyone with whom we do business. Honesty, Integrity, Accountability and Citizenship are global tenets by which we all live and work. Consequently, we neither engage in, nor have we ever been convicted of price fixing, bid rigging, or collusion in any domestic or international fire apparatus market.

Pierce has only one brand of fire apparatus "Pierce", ensuring you are receiving top of the line product that meets your specification.

In accordance with the current edition of NFPA 1901 standards, this proposal will specify whether the fire department, manufacturer, or apparatus dealership will provide required loose equipment.

Images and illustrative material in this proposal are as accurate as known at the time of publication, but are subject to change without notice. Images and illustrative material is for reference only, and may include optional equipment and accessories and may not include all standard equipment.

GENERAL DESIGN AND CONSTRUCTION

To control quality, ensure compatibility, and provide a single source for service and warranty, the custom cab, chassis, pump module and body will be entirely designed, assembled/welded and painted in Pierce owned manufacturing facilities. This includes, but not limited to the cab weldment, the pumphouse module assembly, the chassis assembly, the body and the electrical system.

QUALITY AND WORKMANSHIP

Pierce has set the pace for quality and workmanship in the fire apparatus field. Our tradition of building the highest quality units with craftsmen second to none has been the rule right from the beginning and we demonstrate that ongoing commitment by: Ensuring all steel welding follows American Welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding follows American Welding society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding follows American welding Society B2.1-2000 requirements for structural welding of sheet metal. Our flux core arc welding uses alloy rods, type 7000 and is performed to American Welding Society standards A5.20-E70T1. Furthermore, all employees classified as welders are tested

In addition to the dealership, Pierce has service facilities located in both, Weyauwega, Wisconsin and Bradenton, Florida. Pierce also maintains a dedicated parts facility of over 100,000 square feet in Appleton, Wisconsin. The parts facility stocks in excess of \$5,000,000 in parts dedicated to service and replacement parts. The parts facility employs a staff dedicated solely for the distribution and shipment of service and replacement parts.

Service parts for the apparatus being proposed can be found via Pierceparts.com which, is an interactive online tool that delivers information regarding your specific apparatus as well as the opportunity to register for training classes.

As a Pierce customer you have the ability to view the complete bill of materials for your specific apparatus, including assembly drawings, piece part drawings, and beneficial parts notations. You will also have the ability to search the complete Pierce item master through a parts search function which offers all Pierce SKU's and descriptions offered on all Pierce apparatus. Published component catalogs, which include proprietary systems along with an extensive operators manual library is available for easy reference.

Pierce Manufacturing maintains a dedicated service and warranty staff of over 35 personnel, dedicated to customer support, which also maintains a 24 hour 7 day a week toll free hot line, four (4) on staff EVT's, and offers hands-on repair and maintenance training classes multiple times a year.

LIABILITY

The successful bidder will defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract.

INSURANCE PROVIDED BY BIDDER

COMMERCIAL GENERAL LIABILITY INSURANCE

The successful bidder will, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:

Each Occurrence\$1,000,000

Products/Completed Operations Aggregate\$1,000,000

Personal and Advertising Injury\$1,000,000

General Aggregate\$2,000,000

Coverage will be written on a Commercial General Liability form. The policy will be written on an occurrence form and will include Contractual Liability coverage for bodily injury and property damage subject to the terms and conditions of the policy. The policy will include Owner as an additional insured when required by written contract.

UMBRELLA/EXCESS LIABILITY INSURANCE

The manufacturer will, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Each Occurrence:\$25,000,000

Aggregate:\$25,000,000

The umbrella policy will be written on an occurrence basis and provide excess to the manufacturer's General Liability/Products policies.

The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.

Coverage will be provided by a carrier(s) rated A- or better by A.M. Best.

All policies will provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance will provide the following cancellation clause: Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

Manufacturer agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate will show the purchaser as the certificate holder.

SINGLE SOURCE MANUFACTURER

Pierce Manufacturing, Inc. provides an integrated approach to the design and manufacture of our products that delivers superior apparatus and a dedicated support team. From our facilities, the chassis, cab weldment, cab, pump house (including the sheet metal enclosure, valve controls, piping and operators panel) body and aerial device will be entirely designed, tested, and hand assembled to the customer's exact specifications. The electrical system either hardwired or multiplexed, will be both designed and integrated by Pierce Manufacturing. The warranties relative to these major components (excluding component warranties such as engine, transmission, axles, pump, etc.) will be provided by Pierce as a single source manufacturer. Pierce's single source solution adds value by providing a fully engineered product that offers durability, reliability, maintainability, performance, and a high level of quality.

Your apparatus will be manufactured in Appleton, Wisconsin.

NFPA 2016 STANDARDS

This unit will comply with the NFPA standards effective January 1, 2016, except for fire department directed exceptions. These exceptions will be set forth in the Statement of Exceptions.

Certification of slip resistance of all stepping, standing and walking surfaces will be supplied with delivery of the apparatus.

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and

- Ultrasonic inspection will be conducted on all aerials to detect any flaws in pins, bolts and other critical mounting components.

In addition to the tests above, functional tests, load tests, and stability tests will be performed on all aerials. These tests will determine any unusual deflection, noise, vibration, or instability characteristics of the unit.

PUMP TEST

The pump will be tested, approved and certified by Underwriter's Laboratory at the manufacturer's expense. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the manufacturer's record of pump construction details will be forwarded to the Fire Department.

GENERATOR TEST

If the unit has a generator, the generator will be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results will be provided to the Fire Department at the time of delivery.

BREATHING AIR TEST

If the unit has breathing air, Pierce Manufacturing will draw an air sample from the air system and certify that the air quality meets the requirements of NFPA 1989, *Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection*.

AFTERMARKET SUPPORT WEBSITE

Pierceparts.com will provide Pierce authorized dealer access to comprehensive information pertaining to the maintenance and service of their customer's apparatus. This tool will provide the Pierce authorized dealer the ability to service and support their customers to the best of their ability with factory support at their fingertips.

Pierceparts.com is also accessible to the end user through the guest login. Limited access is available and vehicle specific parts information accessible by entering a specific VIN number. All end users should see their local authorized Pierce dealer for additional support and service.

The website will consist of the following screens at the dealer level:

My Fleet Screen

The My Fleet screen will provide access to truck detail information on the major components of the vehicle, warranty information, available vehicle photographs, vehicle drawings, sales options, applicable vehicle software downloads, etc.

Parts Screens

The Parts screens will provide parts look-up capability of Pierce Manufacturing sourced items, with the aid of digital photographs, part drawings and assembly drawings. The parts search application will permit the searching of parts by item description or function group (major system category). The parts application will provide the ability to submit electronically a parts order, parts quote, or parts return request directly to Pierce Manufacturing for processing.

PERFORMANCE BOND NOT REQUESTED

A performance bond will not be included. If requested at a later date, one will be provided to you for an additional cost and the following will apply:

The successful bidder will furnish a Performance and Payment bond (Bond) equal to 100 percent of the total contract amount within 30 days of the notice of award. Such Bond will be in a form acceptable to the Owner and issued by a surety company included within the Department of Treasury's Listing of Approved Sureties (Department Circular 570) with a minimum A.M. Best Financial Strength Rating of A and Size Category of XV. In the event of a bond issued by a surety of a lesser Size Category, a minimum Financial Strength rating of A+ is required.

Bidder and Bidder's surety agree that the Bond issued hereunder, whether expressly stated or not, also includes the surety's guarantee of the vehicle manufacturer's Bumper to Bumper warranty period included within this proposal. Owner agrees that the penal amount of this bond will be simultaneously amended to 25 percent of the total contract amount upon satisfactory acceptance and delivery of the vehicle(s) included herein. Notwithstanding anything contained within this contract to the contrary, the surety's liability for any warranties of any type will not exceed three (3) years from the date of such satisfactory acceptance and delivery, or the actual Bumper to Bumper warranty period, whichever is shorter.

APPROVAL DRAWING

A drawing of the proposed apparatus will be prepared and provided to the purchaser for approval before construction begins. The Pierce sales representative will also be provided with a copy of the same drawing. The finalized and approved drawing will become part of the contract documents. This drawing will indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

A "revised" approval drawing of the apparatus will be prepared and submitted by Pierce to the purchaser showing any changes made to the approval drawing.

ELECTRICAL WIRING DIAGRAMS

Two (2) electrical wiring diagrams, prepared for the model of chassis and body, will be provided.

ARROW XT CHASSIS

The Pierce Arrow XT™ is the custom chassis developed exclusively for the fire service. Chassis provided will be a new, tilt type custom fire apparatus. The chassis will be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis will be designed and manufactured for heavy duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis will be the manufacturer's heavy duty line tilt cab.

WHEELBASE

The wheelbase of the vehicle will be 262.00.

GVW RATING

The gross vehicle weight rating will be 76,000.

The steering linkage will provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle will have a third party certified turning angle of 40 degrees. Front discharge, front suction, or aluminum wheels will not infringe on this cramp angle.

FRONT SUSPENSION

Front Oshkosh TAK-4™ independent suspension will be provided with a minimum ground rating of 24,000 lb.

The independent suspension system has been designed to provide maximum ride comfort. The design will allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel will have a torsion bar type spring. In addition, each front wheel end will also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design will be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

The independent suspension was put through a durability test that simulated 140,000 miles of inner city driving.

FRONT SHOCK ABSORBERS

KONI heavy-duty telescoping shock absorbers will be provided on the front suspension.

FRONT OIL SEALS

Oil seals with viewing window will be provided on the front axle.

FRONT TIRES

Front tires will be Goodyear radials 445/65R22.50, 20 ply all-position G296 MSA tread, rated for 24,600 lb maximum axle load and 68 mph maximum speed.

The tires will be mounted on Alcoa 22.50" x 13.00" polished aluminum disc type wheels with a ten (10)stud, 11.25" bolt circle.

REAR AXLE

The rear axle will be a Meritor™, Model RT-50-160, tandem axle assembly with a capacity of 52,000 lb.

An inter-axle differential, which divides torque evenly between axles, will be provided with an indicator light mounted on the cab instrument panel.

TOP SPEED OF VEHICLE

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 60 mph.

WHEEL CHOCK BRACKETS

There will be one (1) pair of Zico, Model SQCH-44-H, horizontal mounting wheel chock brackets provided for the Ziamatic, Model SAC-44-E, folding wheel chocks. The brackets will be made of aluminum and consist of a quick release spring loaded rod to hold the wheel chocks in place. The brackets will be mounted rearward of the left side rear tire.

ANTI-LOCK BRAKE SYSTEM

The vehicle will be equipped with a Wabco 4S4M, anti-lock braking system. The ABS will provide a four (4) channel anti-lock braking control on both the front and rear wheels (rear tandem wheels). A digitally controlled system that utilizes microprocessor technology will control the anti-lock braking system. Each wheel will be monitored by the system. When any particular wheel begins to lockup, a signal will be sent to the control unit. This control unit then will reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system will eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

BRAKES

The service brake system will be full air type.

The front brakes will be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system will be certified, third party inspected, for improved stopping distance.

The rear brakes will be Meritor™ 16.50" x 7.00" cam operated with automatic slack adjusters. Dust shields will be provided.

AIR COMPRESSOR, BRAKE SYSTEM

The air compressor will be a Bendix®, Model BA-921, with 15.80 cubic feet per minute output at 1,250 rpm.

BRAKE SYSTEM

The brake system will include:

- Bendix dual brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system capacity of 6,653 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve
- A parking "brake on" indicator light on instrument panel

The engine will include On-board diagnostics (OBD), which provides self diagnostic and reporting. The system will give the owner or repair technician access to state of health information for various vehicle sub systems. The system will monitor vehicle systems, engine and after treatment. The system will illuminate a malfunction indicator light on the dash console if a problem is detected.

HIGH IDLE

A high idle switch will be provided, inside the cab, on the instrument panel, that will automatically maintain a preset engine rpm. A switch will be installed, at the cab instrument panel, for activation/deactivation.

The high idle will be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light will be provided, adjacent to the switch. The light will illuminate when the above conditions are met. The light will be labeled "OK to Engage High Idle."

ENGINE BRAKE

A Jacobs® engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver will be able to turn the engine brake system on/off and have a high, medium and low setting.

The engine brake will be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system will automatically disengage the auxiliary braking device when required.

CLUTCH FAN

A Horton® fan clutch will be provided. The fan clutch will be automatic when the pump transmission is in "Road" position, and fully engaged in "Pump" position.

ENGINE AIR INTAKE

The air intake with an ember separator will be mounted high on the passenger side of the cab, to the front of the crew cab door. The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine. The ember separator will be easily accessible through a hinged stainless steel grille, with one (1) flush quarter turn latch.

EXHAUST SYSTEM

The exhaust system will include a diesel particulate filter (DPF) and a selective catalytic reduction (SCR) device to meet current EPA standards. The exhaust system will be stainless steel from the turbo to the inlet of the SCR device and will be 5.00" in diameter. An insulation wrap will be provided on all exhaust pipes between the turbo and SCR to minimize the transfer of heat to the cab. The exhaust will terminate horizontally ahead of the right side rear wheels. A tailpipe diffuser will be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields will be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

The fuel tank will meet all FHWA 393.67 requirements including a fill capacity of 95 percent of tank volume.

All fuel lines will be provided as recommended by the engine manufacturer.

DIESEL EXHAUST FLUID TANK

A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the driver's side body forward of the rear axle.

A 0.50" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be located on the driver's side of the body and be covered with a hinged, spring loaded, polished stainless steel door that is marked "Diesel Exhaust Fluid Only".

The tank will meet the engine manufacturers requirement for 10 percent expansion space in the event of tank freezing.

The tank will include an integrated heater unit that utilizes engine coolant to thaw the DEF in the event of freezing.

FUEL COOLER

An air to fuel cooler will be installed in the engine fuel return line.

TRANSMISSION

An Allison 5th generation, Model EVS 4000P, electronic, torque converting, automatic transmission will be provided.

The transmission will be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display will indicate when service is due.

Two (2) PTO openings will be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with red light and buzzer will be installed on the cab instrument panel.

TRANSMISSION SHIFTER

A six (6)-speed push button shift module will be mounted to right of driver on console. Shift position indicator will be indirectly lit for after dark operation.

The transmission ratio will be:

1st	3.51 to 1.00
2nd	1.91 to 1.00
3rd	1.43 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
6th	0.64 to 1.00

A gravel pan, constructed of bright aluminum treadplate, will be furnished between the bumper and cab face. The gravel pan will be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

LIFT AND TOW MOUNTS

Mounted to the frame extension will be lift and tow mounts. The lift and tow mounts will be designed and positioned to adapt to certain tow truck lift systems.

The lift and tow mounts with eyes will be painted the same color as the frame.

TOW HOOKS

No tow hooks are to be provided. This truck will be equipped with a lift and tow package with integral tow eyes.

CAB

The Arrow XT cab will be designed specifically for the fire service and will be manufactured by the chassis builder.

The cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

For reasons of structural integrity and enhanced occupant protection, the cab will be of heavy duty design, constructed to the following minimal standards.

The cab will have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts) and rear wall areas. The A-pillar will be constructed of solid A356-T5 aluminum. The B-pillar and C-pillar will be constructed from 0.25" heavy wall extrusions. The rear wall will be constructed of two (2) 4.00" x 2.00" outer aluminum extrusions and two (2) 3.00" x 2.00" inner aluminum extrusions. All main vertical structural members will run from the floor to 6.50" x 4.875" x 0.1875" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.36" thick corner casting at each of the front corners of the roof assembly.

The front of the cab will be constructed of a 0.25" thick gusset plate, covered with a 0.090" front skin (for a total thickness of 0.34"), and reinforced with a 95.00" wide x 11.13" deep x 0.50" thick cross-cab support located just below the windshield. The cross-cab support will run the full width of the cab and weld to each A-pillar, the 0.25" thick gusset plate and the front skin.

The cab floors will be constructed of 0.1875" thick aluminum plate and reinforced at the firewall with an additional 0.50" thick cross-floor support providing a total thickness of 0.6875" of structural material at the front floor area. The front floor area will also be supported with one (1) 0.50" plate bolted to one (1) 0.78" plate that also provides the mounting point for the cab lift. This tubing will run from the front of the cab to the 0.187" thick engine tunnel, creating the structure to support the forces created when lifting the cab.

The cab will be 94.75" wide (outside door skin to outside door skin) to maintain maximum maneuverability.

ENGINE TUNNEL

Engine hood side walls will be constructed of 0.50" aluminum. The top will be constructed of 0.19" aluminum and will be tapered at the top to allow for more driver and passenger elbow room.

The engine hood will be insulated for protection from heat and sound. The noise insulation keeps the dBA level within the limits stated in the current NFPA 1901 standards.

CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab will be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cab is lowered.

CAB LIFT

A hydraulic cab lift system will be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

The hydraulic pump will have a manual override for backup in the event of electrical failure.

Lift controls will be on a panel located on the right side pump panel or front area of the body in a convenient location.

The engine will be easily accessible and capable of being removed with the cab tilted. The cab will be capable of tilting 45 degrees and 90 degrees with crane assist.

Cab will be locked down by a 2-point automatic spring-loaded hook mechanism that actuates after the cab has been lowered.

The hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the control is located in the tilt position.

For increased safety, a redundant mechanical stay arm will be provided that must be manually put in place on the driver side between the chassis and cab frame when the cab is in the raised position. This device will be manually stowed to its original position before the cab can be lowered.

Cab Lift Interlock

The cab lift system will be interlocked to the parking brake. The cab tilt mechanism will be active only when the parking brake is set and the ignition switch is in the on position. If the parking brake is released, the cab tilt mechanism will be disabled.

The cab lift safety system will also be interlocked to the front stabilizers in the bumper. The cab tilt mechanism will be active only when the front stabilizers are fully stowed, and fully tilted outboard. The cab tilt mechanism will not allow the front stabilizers to be tilted inboard until the cab has been fully lowered and locked into position.

GRILLE

A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, will be provided on the front center of the cab.

drainage. The bottom steps will be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps will be a minimum 24.75" wide, and the crew cab steps will be 21.25" wide with an 8.00" minimum depth. The inside cab steps will not exceed 18.00" in height and be limited to two (2) steps.

CAB EXTERIOR HANDRAILS

A 1.25" diameter slip-resistant, knurled aluminum handrail will be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress.

STEP LIGHTS

For reduced overall maintenance costs compared to incandescent lighting, there will be four (4) white LED step lights provided. The lights will be installed at each cab and crew cab door, one (1) per step. The lights will be located in the driver side front doorstep, driver side crew cab doorstep, passenger side front doorstep and passenger side crew cab doorstep.

In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light.

The lights will be activated when the adjacent door is opened.

FENDER CROWNS

Stainless steel fender crowns will be installed at the cab wheel openings. The fender crowns will have a radius outside corner that will allow the fender crown to extend out further than the standard width crown, thus extending beyond the sidewall of the front tires and allow the crew cab doors to open fully.

CREW CAB WINDOWS

One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the front cab door. The windows will be sized to enhance light penetration into the cab interior. The windows will measure 16.50" wide x 21.88" high.

The rear wall of the crew cab will have two (2) windows, each being 11.29" wide x 17.95" high.

CAB INTERIOR

The left and right side dash and center console will be a flat faced design to provide easy maintenance and will be constructed out of painted aluminum.

The engine tunnel will be padded and covered with 46 ounce leather grain vinyl resistant to oil, grease and mildew.

For durability and ease of maintenance, the cab interior side walls will be painted aluminum. The rear wall will be painted aluminum.

The headliner will be installed in both forward and rear cab sections. Headliner material will be vinyl. A sound barrier will be part of its composition. Material will be installed on aluminum sheet and securely fastened to interior cab ceiling.

The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 72 degrees Fahrenheit at 50 percent relative humidity within 30 minutes. The cooling performance test will be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

A roof-mounted condenser that meets and exceeds the performance specification will be installed on the cab roof. The condenser cover and mounting legs to be painted white as provided by the A/C manufacturer.

An evaporator unit that meets and exceeds the performance specification will be installed in the cab, located in the center of the cab ceiling over the engine tunnel. The evaporator will include two (2) high performance cores and plenums with multiple outlets, one (1) plenum directed to the front and one (1) plenum directed to the rear of the cab.

The evaporator unit will be provided with adjustable air outlets strategically located to direct air flow to the driver, officer and crew cab area.

All hose used will be class 1 type to reduce moisture ingress into the air conditioning system.

The air conditioner refrigerant will be R-134A and will be installed by a certified technician.

The air conditioner will be controlled by a single electronic control panel. For ease of operation, the control panel will include variable adjustment for temperature and fan control and be conveniently located on the dash in clear view of the driver.

WINDOW DEFROST FANS

Two (2) window defrost fans will be mounted on the ceiling of the cab, one (1) on each side of the cab.

SUN VISORS

Two (2) smoked Lexan™ sun visors provided. The sun visors will be located above the windshield with one (1) mounted on each side of the cab.

There will be no retention bracket provided to help secure each sun visor in the stowed position.

GRAB HANDLE

A black rubber covered grab handle will be mounted on the lower portion of the driver's side cab entrance to assist in entering the cab. The grab handle will be securely mounted to the post area between the door and steering wheel column.

A long rubber grab handle will be mounted on the dash board in front of the officer.

ENGINE COMPARTMENT LIGHTS

There will be one (1) Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEK, chrome flange kit(s) installed under the cab to be used as engine compartment illumination.

These light(s) will be activated automatically when the cab is raised.

- Driver side front air bag
- Passenger side knee bolster air bag
- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

SIDE ROLL PROTECTION

The SRS system will provide protection during a fast or slow 90 degree roll to the side, in which the vehicle comes to rest on its side. The system will analyze the vehicle's angle and rate of roll to determine the optimal activation of the advanced occupant restraints.

The SRS system will deploy the following components in the event of a side roll:

- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

SEATING CAPACITY

The seating capacity in the cab will be six (6).

DRIVER SEAT

A seat will be provided in the cab for the driver. The seat design will be a cam action type, with air suspension. For increased convenience, the seat will include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have an adjustable reclining back. The seat back will be a high back style with side bolster pads for maximum support. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A suspension seat safety system will be included. When activated in the event of a side roll, this system will pretension the seat belt and retract the seat to its lowest travel position.

The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

OFFICER SEAT

A seat will be provided in the cab for the passenger. The seat will be a fixed type, with no suspension. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

(elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

The seat back will be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt around the occupant to firmly hold them in place in the event of a side roll.

The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

FORWARD FACING CENTER SEATS

There will be two (2) forward facing seats provided at the center position in the crew cab. For optimal comfort, the seats will be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seats will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

The seat backs will be an SCBA style with 90 degree back. The SCBA cavity will be adjustable from front to rear in 1.00" increments to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seats will include the following feature incorporated into the side roll protection system:

- A seat safety system will be included. When activated, this system will pretension the seat belts around the occupants to firmly hold them in place in the event of a side roll.

The seats will be furnished with 3-point shoulder type seat belts. The seat belts will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

SEAT UPHOLSTERY

All seat upholstery will be black Turnout Tuff material.

AIR BOTTLE HOLDERS

All SCBA type seats in the cab will have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket will include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp will constrain the SCBA bottle in the seat and will exceed the NFPA standard of 9G.

identified by a label adjacent to each item. Actuation of the headlight switch will illuminate the labels in low light conditions. Telltale indicator lamps will not be illuminated unless necessary. The cab instruments and controls will be conveniently located within the forward cab section directly forward of the driver. Gauge and switch panels will be designed to be removable for ease of service and low cost of ownership.

CAB INTERIOR

The wrap-around style high impact ABS plastic cab dash fascia will be designed to provide unobstructed visibility to instrumentation. The dash layout will provide the driver with a quick reference to gauges that allows more time to focus on the road.

GAUGES

The gauge panel will include the following ten (10) ivory gauges with chrome bezels to monitor vehicle performance:

- Voltmeter Gauge (Volts):
 - Low volts (11.8 VDC)
 - Amber indicator on gauge assembly with alarm
 - High volts (15 VDC)
 - Amber indicator on gauge assembly with alarm
 - Very low volts (11.3 VDC)
 - Amber indicator on gauge assembly with alarm
 - Very high volts (16 VDC)
 - Amber indicator on gauge assembly with alarm
- Tachometer (RPM)
- Speedometer (Primary (outside) MPH, Secondary (inside) Km/H)
- Fuel Level Gauge (Empty - Full in fractions):
 - Low fuel (1/8 full)
 - Amber indicator on gauge assembly with alarm
 - Very low fuel (1/32) fuel
 - Amber indicator on gauge assembly with alarm
- Engine Oil Pressure Gauge (PSI):
 - Low oil pressure to activate engine warning lights and alarms
 - Red indicator on gauge assembly with alarm
- Front Air Pressure Gauge (PSI):
 - Low air pressure to activate warning lights and alarm
 - Red indicator on gauge assembly with alarm
- Rear Air Pressure Gauge (PSI):
 - Low air pressure to activate warning lights and alarm.
 - Red indicator on gauge assembly with alarm
- Transmission Oil Temperature Gauge (Fahrenheit):
- High transmission oil temperature activates warning lights and alarm
 - Amber indicator on gauge assembly with alarm
- Engine Coolant Temperature Gauge (Fahrenheit):
 - High engine temperature activates an engine warning light and alarm

- High beam

ALARMS

Audible steady tone warning alarm: A steady audible tone alarm will be provided whenever a warning message is present.

Audible pulsing tone caution alarm: A pulsing audible tone alarm (chime/chirp) will be provided whenever a caution message is present without a warning message being present.

Alarm silence: Any active audible alarm will be able to be silenced by holding the ignition switch at the top position for three (3) to five (5) seconds. For improved safety, silenced audible alarms will intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp will act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition will enable the steady or pulsing tones respectively.

INDICATOR LAMP AND ALARM PROVE-OUT

Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

CONTROL SWITCHES

For ease of use, the following controls will be provided immediately adjacent to the cab instrument panel within easy reach of the driver:

- **Emergency master switch:** A molded plastic push button switch with integral indicator lamp will be provided. Pressing the switch will activate emergency response lights and siren control. A green lamp on the switch provides indication that the emergency master mode is active. Pressing the switch again disables the emergency master mode.
- **Headlight / Parking light switch:** A three (3)-position maintained rocker switch will be provided. The first switch position will deactivate all parking lights and the headlights. The second switch position will activate the parking lights. The third switch position will activate the headlights.
- **Panel back lighting intensity control switch:** A three (3)-position momentary rocker switch will be provided. The first switch position decreases the panel back lighting intensity to a minimum level as the switch is held. The second switch position is the default position that does not affect the back lighting intensity. The third switch position increases the panel back lighting intensity to a maximum level as the switch is held.

The following standard controls will be integral to the gauge assembly and are located below the right hand gauges. All switches have backlit labels for low light applications:

- **High idle engagement switch:** A two (2)-position momentary rocker switch with integral indicator lamp will be provided. The first switch position is the default switch position. The second switch position will activate and deactivate the high idle function when pressed and released. The "Ok To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch will indicate when the high idle function is engaged.

- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

CAB LCD DISPLAY

A digital four (4)-row by 20-character dot matrix display will be integral to the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into three (3) sections. Each section will have a dedicated function. The upper left section will display the outside ambient temperature. The upper right section will display odometer, trip mileage, PTO hours, fuel consumption, engine hours, and other configuration specific information. The bottom section will display INFO, CAUTION, and WARNING messages. Text messages will automatically activate to describe the cause of an audible caution or warning alarm. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist.

AIR RESTRICTION INDICATOR

A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm shall be provided.

"DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light, located in the driving compartment, will be illuminated automatically per the current NFPA requirements. The light will be labeled "Do Not Move Apparatus If Light Is On."

The same circuit that activates the Do Not Move Apparatus indicator will activate a pulsing alarm when the parking brake is released.

DO NOT MOVE TRUCK MESSAGES

Messages will be displayed on the Command Zone™, color display located within sight of the driver whenever the Do Not Move Truck light is active. The messages will designate the item or items not in the stowed for vehicle travel position (parking brake disengaged).

The following messages will be displayed (where applicable):

- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- DS Ladder Rack Down (Driver Side Ladder Rack Down)
- PS Ladder Rack Down (Passenger Side Ladder Rack Down)
- Deck Gun Not Stowed
- Lt Tower Not Stowed (Light Tower Not Stowed)
- Fold Tank Not Stowed (Fold-A-Tank Not Stowed)

The above wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be protected to 15 amps at 12 volts DC
- Power and ground will terminate officer side dash area
- Termination will be with heat shrinkable butt splicing
- Wires will be sized to 125 percent of the protection

The circuit(s) may be load managed when the parking brake is set.

INFORMATION CENTER

An information center employing a 7.00" diagonal touch screen color LCD display will be encased in an ABS plastic housing.

The information center will have the following specifications:

- Operate in temperatures from -40 to 185 degrees Fahrenheit
- An Optical Gel will be placed between the LCD and protective lens
- Five weather resistant user interface switches
- Grey with black accents
- Sunlight Readable
- Linux operating system
- Minimum of 1000nits rated display
- Display can be changed to an available foreign language
- A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

GENERAL SCREEN DESIGN

Where possible, background colors will be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background will be used.

If a caution or warning situation arises the following will occur:

- An amber background/text color will indicate a caution condition
- A red background/text color will indicate a warning condition
- The information center will utilize an "Alert Center" to display text messages for audible alarm tones. The text messages will be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages will cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" will change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color will be shown for all alert center messages.
- A label for each button will exist. The label will indicate the function for each active button for each screen. Buttons that are not utilized on specific screens will have a button label with no text or symbol.

- Load Manager
 - A list of items to be load managed will be provided. The list will provide a description of the load.
 - The lower the priority numbers the earlier the device will be shed should a low voltage condition occur.
 - The screen will indicate if a load has been shed (disabled) or not shed.
 - "At a glance" color features are utilized on this screen.
- Systems
 - Command Zone
 - Module type and ID number
 - Module Version
 - Input or output number
 - Circuit number connected to that input or output
 - Status of the input or output
 - Power and Constant Current module diagnostic information
 - Foam (if equipped)
 - Pressure Controller (if equipped)
 - Generator Frequency (if equipped)
- Live Data
 - General Truck Data
- Maintenance
 - Engine oil and filter
 - Transmission oil and filter
 - Pump oil (if equipped)
 - Foam (if equipped)
 - Aerial (if equipped)
- Setup
 - Clock Setup
 - Date & Time
 - 12 or 24 hour format
 - Set time and date
 - Backlight
 - Daytime
 - Night time
 - Sensitivity
 - Unit Selection
 - Home Screen
 - Virtual Button Setup
 - On Scene Screen Setup
 - Configure Video Mode
 - Set Video Contrast
 - Set Video Color
 - Set Video Tint
- Do Not Move

- Seat Occupied Status - Yes/No by Position
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

Seat Belt Monitoring System

A seat belt monitoring system (SBMS) will be provided on the Command Zone™ color display and in the center overhead of the cab instrument panel. The SBMS will be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm

The seat belt monitoring screen will become active on the Command Zone color display when:

- The home screen is active:
 - and there is any occupant seated but not buckled or any belt buckled with an occupant.
 - and there are no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS will be activated.

The SBMS will include an audible alarm that will warn that an unbuckled occupant condition exists and the parking brake is released, or the transmission is not in park.

RADIO ANTENNA MOUNT

There will be one (1) standard 1.125", 18 thread antenna-mounting base(s) installed on the right side on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the instrument panel area. A weatherproof cap will be installed on the mount.

ELECTRICAL POWER CONTROL SYSTEM

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

Distribution centers located throughout the vehicle will contain battery powered studs for supplying customer installed equipment thus providing a lower cost of ownership.

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers will be Type-I

The main controller will activate status indicators and audible alarms designed to provide warning of problems before they become critical.

CIRCUIT PROTECTION AND CONTROL DIAGRAM

Copies of all job-specific, computer network input and output (I/O) connections will be provided with each chassis. The sheets will indicate the function of each module connection point, circuit protection information (where applicable), wire numbers, wire colors and load management information.

ON-BOARD ADVANCED/VISUAL ELECTRICAL SYSTEM DIAGNOSTICS

The on-board information center will include the following diagnostic information:

- Text description of active warning or caution alarms
- Simplified warning indicators
- Amber caution indication with intermittent alarm
- Red warning indication with steady tone alarm

All control system modules, with the exception of the main control module, will contain on-board visual diagnostic LEDs that assist in troubleshooting. The LEDs will be enclosed within the sealed, transparent module housing near the face of the module. One LED for each input or output will be provided and will illuminate whenever the respective input or output is active. Color-coded labels within the modules will encompass the LEDs for ease of identification. The LED indicator lights will provide point of use information for reduced troubleshooting time without the need for an additional computer.

TECH MODULE WITH WIFI

An in cab module will provide WiFi wireless interface and data logging capability. The WiFi interface will comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module will provide an external antenna connection allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

The module will transmit a password protected web page to a WiFi enabled device (i.e. most smart phones, tablets or laptops) allowing two levels of user interaction. The firefighter level will allow vehicle monitoring of the vehicle and firefighting systems on the apparatus. The technician level will allow diagnostic access to inputs and outputs installed on the Command Zone™, control and information system.

The data logging capability will record faults from the engine, transmission, ABS and Command Zone™, control and information systems as they occur. No other data will be recorded at the time the fault occurs. The data logger will provide up to 2 Gigabytes of data storage.

A USB connection will be provided on the Tech Module. It will provide a means to download data logger information and update software in the device.

PROGNOSTICS

A software based vehicle tool will be provided to predict remaining life of the vehicles critical fluid and events.

Cab and crew cab dome lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

Cab and crew cab perimeter lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

EMI/RFI PROTECTION

To prevent erroneous signals from crosstalk contamination and interference, the electrical system will meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system will be used to ensure radiated and conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter requirements.

EMI/RFI susceptibility will be controlled by applying appropriate circuit designs and shielding. The electrical system will be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

ELECTRICAL

All 12-volt electrical equipment installed by the apparatus manufacturer will conform to modern automotive practices. All wiring will be high temperature crosslink type. Wiring will be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers will be provided which conform to SAE Standards. Wiring will be color, function and number coded. Function and number codes will be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment will be installed utilizing the following guidelines:

1. All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
2. Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
3. Electrical components designed to be removed for maintenance will not be fastened with nuts and bolts. Metal screws will be used in mounting these devices. Also a coil of wire will be

An indicator light will be provided on the instrument panel to notify the driver of the status of the battery system.

BATTERY COMPARTMENTS

Batteries will be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments will be constructed of 0.188" steel plate and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The battery hold-downs will be of a non-corrosive material. All bolts and nuts will be stainless steel.

The compartments will include formed fit heavy duty roto-molded polyethylene battery trays with drain tubes for the batteries to sit in.

Heavy-duty battery cables will be used to provide maximum power to the electrical system. Cables will be color-coded.

Battery terminal connections will be coated with anti-corrosion compound. Battery solenoid terminal connections will be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS

One (1) set of battery jumper studs with plastic color-coded covers will be installed on the bottom of the driver's side battery box. This will provide for easy jumper cable access.

BATTERY CHARGER

There will be an IOTA™, Model DSL 75, battery charger with IQ4, controller provided.

The battery charger will be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

There will be a Kussmaul™, Model #091-94-12, remote indicator included.

The battery charger will be located in the left body compartment mounted on the left wall as high as possible.

The battery charger indicator will be located near the driver's seat riser with special bracketry.

AUTO EJECT FOR SHORELINE

There will be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet(s) will include red weatherproof flip up cover(s).

There will be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline(s) will be connected to the battery charger.

There will be a mating connector body supplied with the loose equipment.

There will be a label installed near the inlet(s) that state the following:

SEQUENCER

A sequencer will be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation will allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12 volt load to prolong the life of the alternator.

For improved reliability and ease of use, the load sequencing system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load sequencing tasks. Load sequencing systems which require additional components will not be allowed.

Emergency light sequencing will operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights will be activated one by one at half-second intervals. Sequenced emergency light switch indicators will flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer will deactivate the warning light loads in the reverse order.

Sequencing of the following items will also occur, in conjunction with the ignition switch, at half-second intervals:

- Cab Heater and Air Conditioning
- Crew Cab Heater (if applicable)
- Crew Cab Air Conditioning (if applicable)
- Exhaust Fans (if applicable)
- Third Evaporator (if applicable)

HEADLIGHTS

There will be four (4) JW Speaker®, Model 8800, 4" x 6" rectangular LED lights mounted in the front quad style, chrome housing on each side of the cab grille:

- the outside light on each side will contain a part number 055***1 low beam module
- the inside light on each side will contain a part number 055***1 high beam module
- the headlight to include chrome bezels

The low beam lights will be activated when the headlight switch is on.

The high beam and low beam lights will be activated when the headlight switch and the high beam switch is activated.

DIRECTIONAL LIGHTS

There will be two (2) Whelen 600® series, LED combination directional/marker lights provided. The lights will be located on the outside cab corners, next to the headlights.

The color of the lenses will be the same color as the LED's.

INTERMEDIATE LIGHT

There will be two (2) Weldon, Model 9186-8580-29, amber LED turn signal marker lights furnished, one (1) each side, in the rear fender panel. The light will double as a turn signal and marker light.

There will be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There will be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

Per FMVSS 108 and CMVSS 108 requirements.

MARKER LIGHTS

There will be one (1) pair of amber and red LED marker lights with rubber arm, located at the rear most lower corner of the body. The amber lens will face the front and the red lens will face the rear of the truck.

These lights will be activated with the running lights of the vehicle.

REAR FMVSS LIGHTING

The rear stop/tail and directional LED lighting will consist of the following:

- Two (2) Whelen®, Model M6BTT, red LED stop/tail lights
- Two (2) Whelen, Model M6T, amber LED arrow turn lights

The lights shall be provided with color lenses.

The lights will be mounted in a polished combination housing.

There will be two (2) Whelen Model M6BUW, LED backup lights provided in the tail light housing.

LICENSE PLATE BRACKET

There will be one (1) license plate bracket mounted on the rear of the body.

A white LED light will illuminate the license plate. A polished stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

LIGHTING BEZEL

There will be two (2) Whelen, Model M6FCV4P, four (4) place chromed ABS housings with Pierce logos provided for the rear M6 series stop/tail, directional, back up, scene lights or warning lights.

BACK-UP ALARM

A PRECO, Model 1040, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse will be provided. The device will sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

CAB PERIMETER SCENE LIGHTS

There will be four (4) Amdor, Model AY-LB-12HW020, 350 lumens each, 20.00" white LED strip lights provided, one (1) for each cab door.

These lights will be activated automatically when the battery switch is on and the exit doors are opened or by the same means as the body perimeter scene lights.

HOSE BED LIGHTS

There will be white 12 volt DC LED light strips with stainless steel protective cover provided to light the hose bed area. Hose bed lights will meet the photometric levels listed in NFPA 1901 for Hose Bed lighting requirements.

- Light strip will be installed along the front edge of the hose bed.
- Light strip will be installed on the rear of the boom support.

The lights will be activated by a cup switch at the rear of the apparatus no more than 72.00" from the ground.

REAR SCENE LIGHTS

There will be two (2) Whelen, Model M6ZC, LED scene lights installed at the rear of the apparatus. These lights will be installed between 58.00" and 72.00" above the ground.

The lights will be controlled by a switch at the driver's side switch panel.

WALKING SURFACE LIGHT

There will be two (2) Model P25 12 volt DC LED lights provided to illuminate the top of body walking surface. These LED lights will be located on the rear facing surface of the upper portion of the body to illuminate the walking surface to the platform basket. These lights will be activated when the body step lights are on.

WATER TANK

The water tank will have a capacity of 300 gallons and will be constructed of UV stabilized ultra high impact polypropylene plastic.

The joints and seams will be nitrogen welded inside and out.

The tank will be baffled in accordance with the current edition of NFPA 1901 requirements.

The baffles will have vent openings at both the top and bottom of each baffle to permit movement of air and water between compartments.

The longitudinal partitions will be constructed of 0.38" polypropylene plastic and extend from the bottom of the tank through the top cover to allow positive welding.

The transverse partitions extend from 4.00" off the bottom to the underside of the top cover.

All partitions interlock and will be welded to the tank bottom and sides.

The tank top will be constructed of 0.50" polypropylene.

It will be recessed 0.38" and will be welded to the tank sides and the longitudinal partitions.

It will be supported to keep it rigid during fast filling conditions.

Construction will include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions.

RUNNING BOARDS

The running boards will be fabricated of 0.125" bright aluminum treadplate and supported by structural steel angle assemblies bolted to the chassis frame rails.

Running boards will be 13.00" deep and are spaced away from the body 0.50".

A splash guard will be provided to keep road dirt or water from splashing up onto the pump panels.

The running boards will have a riser on the body to protect the painted surface from damage by stepping on the running boards.

The entire surface of the running boards will be covered with bright aluminum treadplate.

TURNTABLE STEPS

Access to the turntable will be provided by a set of swing-down steps on the left side of the truck.

The access steps will be located just behind the front body and in front of the middle stabilizer.

All steps will have a height no greater than 14.00" from top surface to top surface.

The swing down step mechanism will be constructed of brushed aluminum with aluminum treadplate steps. The steps will be designed with a grip pattern punched into the treadplate material to provide support, slip resistance, and drainage.

The stepwell will be lined with bright aluminum treadplate to act as scuffplates.

Holes will be provided in each side step plate for hand holds.

The bottom step will have a step height not exceeding 24.00" from the ground to the top surface of the step at any time.

The steps will be connected to the "Do Not Move Truck" indicator in the cab.

STEP LIGHTS

There will be three (3) white LED step lights provided for the aerial turntable access steps.

In order to ensure exceptional illumination, each light shall provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The step lights will be actuated by the aerial master switch in the cab.

SMOOTH ALUMINUM REAR WALL

The rear wall will be smooth aluminum.

TOW EYES

Two (2) rear painted tow eyes will be located at the rear of the apparatus and will be mounted directly to the frame rails. The inner and outer edges of the tow eyes will be radiused.

The body will be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure will include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
- Driving the vehicle on at 35 mph on a washboard road.
- Driving the vehicle at 55 mph on a smooth road.
- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of the actual testing techniques will be made available upon request.

LEFT SIDE COMPARTMENTATION

A full height rollup door compartment ahead of the rear wheels will be 29.16" wide x 28.25" high x 27.13" deep inside with a door opening of 26.13" wide x 22.63" high.

One (1) rollup door compartment above the fender compartments and over the rear axles will be provided. The compartment will be 84.00" wide x 22.13" high x 27.13" deep inside with a door opening of 81.00" wide x 16.50" high.

A full height rollup door compartment behind the rear wheels will be 41.25" wide x 53.88" high x 27.13" deep. The door opening will be 38.25" wide x 48.25" high.

One (1) rollup door compartment behind the rear stabilizer will be provided. The compartment will be 18.13" wide x 45.75" high x 27.13" deep inside with a door opening of 15.13" wide x 39.13" high.

Roll-up door compartments will include a drip pan below the roll of the door.

RIGHT SIDE COMPARTMENTATION

A full height rollup door compartment ahead of the front stabilizer will be provided. The compartment will be 18.38" wide x 35.25" high x 9.91" deep inside with a door opening of 15.38" wide x 29.63" high.

A full height rollup door compartment ahead of the rear wheels will be 29.13" wide x 28.25" high x 27.13" deep inside with a door opening of 26.13" wide x 22.63" high.

One (1) rollup door compartment above the fender compartments and over the rear axles will be provided. The compartment will be 59.00" wide x 22.13" high x 15.75" deep inside with a door opening of 56.00" wide x 16.50" high.

A full height rollup door compartment behind the rear wheels will be 41.25" wide x 53.88" high x 27.13" deep in the lower 48.38" of compartment height and 12.75" deep in the remaining upper portion. The door opening will be 38.25" wide x 48.25" high.

MOUNTING TRACKS

There will be recessed tracks installed vertically to support the adjustable shelf(s).

Tracks will not protrude into any compartment in order to provide the greatest compartment space and widest shelves possible.

The tracks will be provided in each compartment except for the one that contains the pump operator's panel.

ADJUSTABLE SHELVES

There will be eight (8) shelves with a capacity of 500 lb provided.

The shelf construction will consist of .188" aluminum painted spatter gray with 2.00" sides.

Each shelf will be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves will be held in place by .12" thick stamped plated brackets and bolts.

The location(s) will be determined at a later date.

RUB RAIL

Bottom edge of the side compartments will be trimmed with a bright aluminum extruded rub rail.

Trim will be 3.12" high with 1.50" flanges turned outward for rigidity.

The rub rails will not be an integral part of the body construction, which allows replacement in the event of damage.

BODY FENDER CROWNS

Polished stainless steel fender crowns will be provided around the rear wheel openings.

An unpainted fender liner will be provided to avoid paint chipping. The liners will be removable to aid in the maintenance of rear suspension components.

A dielectric barrier will be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

The fender crowns will be held in place with stainless steel screws that thread directly into a composite nut and not directly into the parent body sheet metal to eliminate dissimilar metals contact and greatly reduce the chance for corrosion.

HARD SUCTION HOSE

Hard suction hose will not be required.

HANDRAILS

The handrails will be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.

AERIAL FOLDING LADDER

There will be two (2) 10' aluminum Duo-Safety Series 585-A folding ladder(s) provided and located in the aerial torque box.

GROUND LADDER STORAGE

The ground ladders are stored within the torque box and are removable from the rear.

Ladders will be enclosed to prevent road dirt and debris from fouling or damaging the ladders.

The ladders rest in full length stainless steel slides and are arranged in such a manner that any one ladder can be removed without having to move or remove any other ladder.

A Gortite rollup door will be provided at the rear, double faced, aluminum construction, and an anodized satin finish. A polished stainless steel lift bar to be provided for the rear roll-up door. The latching mechanism will consist of a full length lift bar lock with latches on the outer extrusion of the door frame.

A stainless plate with a 2-bend flange and a stainless steel hinge will be provided to secure the aerial ladder complement. The plate assembly will be mounted to the bottom of the entrance of the torque box ladder storage area.

When the plate is vertical, it will secure the ladders and prevent them from migrating to the rear of the apparatus. When the plate is down and not securing the ladders, the rollup door can not close, which will activate the "Open Door Indicator Light" within the cab. The hinged plate will have a positive latching feature that will secure the plate in the vertical position.

Compartment Storage

Below the ground ladder storage will be a storage compartment measuring 37.25" wide x 15.75" high x 26.50" deep. The opening will be 34.75" wide x 15.25" high. The floor and back of this compartment will be removable.

LADDER STORAGE LIGHTING

There will be 36.00" white 12 volt DC LED strip lights provided to illuminate the torque box ladder storage area and the compartment directly below the ladder storage. One (1) light will be provided on each side of the ladder storage area.

The lights will be activated when the ladder storage compartment door is opened.

PIKE POLES

There will be two (2) 12' Duo Safety pike pole(s) with fiberglass handles provided. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

8' PIKE POLE

There will be two (2) 8' Duo Safety pike pole(s) with fiberglass handle provided. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

In addition, a throttling ring will be pressed into the steel chamber cover, providing a very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance will not deteriorate, nor will the pump lose prime, while drafting if the seal fails during pump operation.

Wear rings will be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

PUMP TRANSMISSION

Pump transmission will be made of a three (3) piece, high tensile aluminum, horizontally split casing. Power transfer to pump will be through a passive lubricated, Morse HY-VO drive chain.

Drive shafts will be a minimum of 2.35" diameter hardened and ground alloy steel. All shafts will be ball bearing supported. The case will be designed as to eliminate the need for water cooling.

PUMPING MODE

An interlock system will be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. The interlock system will be designed to allow stationary pumping only.

AIR PUMP SHIFT

Pump shift engagement will be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab.

Two (2) indicator lights will be provided adjacent to the pump shift inside the cab. One (1) green light will indicate the pump shift has been completed and be labeled "pump engaged". The second green light will indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light will be labeled "OK to pump".

Another green indicator light will be installed adjacent to the hand throttle on the pump panel and indicate either the pump is engaged and the road transmission is in pump gear, or the road transmission is in neutral and the pump is not engaged. This indicator light will be labeled "Warning: Do not open throttle unless light is on".

The pump shift will be interlocked to prevent the pump from being shifted out of gear when the chassis transmission is in gear to meet NFPA requirements.

The pump shift control in the cab will be illuminated to meet NFPA requirements.

TRANSMISSION LOCK-UP

The direct gear transmission lock-up for the fire pump operation will engage automatically when the pump shift control in the cab is activated.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger will be cylindrical type and will be a separate unit. The heat exchanger will be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger will be plumbed to the master drain valve.

A pump hour meter will be incorporated in the pressure controller.

The pressure controller will incorporate monitoring for engine temperature, oil pressure, fuel level alarm, and voltage. Pump monitoring will include, pump gearcase temperature, error codes, diagnostic data, pump service reminders, and time stamped data logging, to allow for fast accurate trouble shooting. It will also notify the driver/engineer of any problems with the engine and the apparatus. Complete understandable messages will be provided in a 20-character display, providing for fewer abbreviations in the messages. An automatic dim feature will be included for night operations.

The pressure controller will include a USB port for easy software upgrades, which can be downloaded through a USB memory stick, eliminating the need for a laptop for software installations.

A complete interactive manual will be provided with the pressure controller.

PRIMING PUMP

The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of NFPA 1901.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction.

One (1) priming control will open the priming valve and start the pump primer.

PUMP MANUALS

There will be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals will be provided by the pump manufacturer in the form of two (2) electronic copies. Each manual will cover pump operation, maintenance, and parts.

PLUMBING, STAINLESS STEEL AND HOSE

All inlet and outlet lines will be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hose's will be equipped with brass or stainless steel couplings. All stainless steel hard plumbing will be a minimum of a schedule 10 wall thickness.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping will be equipped with victaulic or rubber couplings.

Plumbing manifold bodies will be ductile cast iron or stainless steel.

All piping lines are to be drained through a master drain valve or will be equipped with individual drain valves. All drain lines will be extended with a hose to drain below the chassis frame.

All water carrying gauge lines will be of flexible polypropylene tubing.

All piping, hose and fittings will have a minimum of a 500 PSI hydrodynamic pressure rating.

MAIN PUMP INLETS

Two (2) 6.00" pump inlets will be provided on the right side of the vehicle.

LEFT SIDE DISCHARGE OUTLETS

There will be two (2) discharge outlets with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

RIGHT SIDE DISCHARGE OUTLETS

There will be one (1) discharge outlet with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

LARGE DIAMETER DISCHARGE OUTLET

There will be a 4.00" discharge outlet with a 4.00" Akron valve installed on the right side of the apparatus, terminating with a 4.00" (M) National Standard hose thread adapter. This discharge outlet will be actuated with a small handwheel control at the pump operator's control panel.

An indicator will be provided to show when the valve is in the closed position.

DISCHARGE CAPS/ INLET PLUGS

Chrome plated, rocker lug, caps with chain will be furnished for all discharge outlets 1.00" thru 3.00" in size, besides the pre-connected hose outlets.

Chrome plated, rocker lug, plugs with chain will be furnished for all auxiliary inlets 1.00" thru 3.00" in size.

The caps and plugs will incorporate a thread design to automatically relieve stored pressure in the line when disconnected (no exception).

OUTLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves will be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders will be located at the bottom of the pump panel. They will be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders will be routed below the chassis frame rails.

LEFT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the left side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow will be Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

RIGHT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the right side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

PUMP COMPARTMENT

The pump compartment will be separate from the hose body and compartments so that each may flex independently of the other. The pump compartment will be constructed of the same material as the body compartmentation.

The pump compartment substructure will be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment will be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels will be removable from the chassis in a single assembly.

PUMP MOUNTING

Pump will be mounted to a substructure which will be mounted to the chassis frame rail using rubber isolators. The mounting will allow chassis frame rails to flex independently without damage to the fire pump.

LEFT SIDE PUMP CONTROL PANELS

All pump controls and gauges will be located at the left side of the apparatus and properly identified.

Layout of the pump control panel will be ergonomically efficient and systematically organized.

The pump operator's control panel will be removable in two (2) main sections for ease of maintenance:

The upper section will contain sub panels for the mounting of the pump pressure control device, engine monitoring gauges, electrical switches, and foam controls (if applicable). Sub panels will be removable from the face of the pump panel for ease of maintenance. Below the sub panels will be located all valve controls and line pressure gauges.

The lower section of the panel will contain all inlets, outlets, and drains.

All push/pull valve controls will have 1/4 turn locking control rods with polished chrome plated zinc tee handles. Guides for the push/pull control rods will be chrome plated zinc castings securely mounted to the pump panel. Push/pull valve controls will be capable of locking in any position. The control rods will pull straight out of the panel and will be equipped with universal joints to eliminate binding.

IDENTIFICATION TAGS

The identification tag for each valve control will be recessed in the face of the tee handle.

All discharge outlets will have color coded identification tags, with each discharge having its own unique color. Color coding will include the labeling of the outlet and the drain for each corresponding discharge.

All line pressure gauges will be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

The pump pressure and vacuum gauges will be installed adjacent to each other at the pump operator's control panel.

Test port connections will be provided at the pump operator's panel. One will be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They will have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They will be marked with a label.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

PRESSURE GAUGES

The individual "line" pressure gauges for the discharges will be Class 1© interlube filled.

They will be a minimum of 2.00" in diameter and have white faces with black lettering.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges will have a pressure range of 30"-0-400#.

The individual pressure gauge will be installed as close to the outlet control as practical.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

WATER LEVEL GAUGE

An electric water level gauge will be incorporated in the pressure controller that registers water level by means of 9 LEDs. They will be at 1/8 level increments with a tank empty LED. The LEDs will be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

To further alert the pump operator, the gauge will have a warning flash when the tank volume is less than 25%, and will have "Down Chasing LEDs when the tank is almost empty.

The level measurement will be ascertained by sensing the head pressure of the fluid in the tank or cell.

PUMP PANEL ILLUMINATION

There will be a stainless steel light shield installed over the pump operators panel. This shield will include three (3) 12 volt DC white LED lights to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch.

There will be two (2) 12 volt DC white LED lights to illuminate the pump panel under the pump operators panel. These lights will be activated by the same switch as the lights over the pump operators panel.

There will be one (1) 12 volt DC white LED light to illuminate the pump panel under the pump operators panel. This light will be activated when the pump is in "Ok to Pump" mode.

The mechanical siren will be mounted on the front grille, partially recessed. The motor will be mounted behind the front grille and will include a reinforcement plate for mounting.

The mechanical siren will be actuated by two (2) foot switches, one (1) located on the officer's side and one (1) on the driver's side.

FRONT ZONE UPPER WARNING LIGHTS

There will be one (1) 72.00" Whelen Freedom IV LED lightbar mounted on the cab roof.

The lightbar will include the following:

- One (1) red flashing LED module in the driver's side end position.
- One (1) red flashing LED module in the driver's side front corner position.
- One (1) white flashing LED module in the driver's side first front position.
- One (1) red flashing LED module in the driver's side second front position.
- One (1) red flashing LED module in the driver's side third front position.
- One (1) red flashing LED module in the driver's side fourth front position.
- Open in the driver's side fifth front position.
- Open in the driver's side sixth front position.
- Open in the passenger's side sixth front position.
- Open in the passenger's side fifth front position.
- One (1) red flashing LED module in the passenger's side fourth front position.
- One (1) red flashing LED module in the passenger's side third front position.
- One (1) red flashing LED module in the passenger's side second front position.
- One (1) white flashing LED module in the passenger's side first front position.
- One (1) red flashing LED module in the passenger's side front corner position.
- One (1) red flashing LED module in the passenger's side end position.

There will be clear lenses included on the lightbar.

There will be a switch in the cab on the switch panel to control this lightbar.

The white LEDs will be disabled when the parking brake is applied.

The six (6) red flashing LED modules in the front positions may be load managed when the parking brake is applied.

CAB FACE WARNING LIGHTS

There will be four (4) Whelen®, Model M6*C, LED flashing warning lights installed on the cab face, above the headlights, mounted in a common bezel.

- The driver's side front outside warning light to be red
- The driver's side front inside warning light to be red
- The passenger's side front inside warning light to be red
- The passenger's side front outside warning light to be red

All four (4) lights will include a clear lens.

The auxiliary flash not activated.

This traffic directing light will be mounted on top of the body below the turntable with a treadplate box at the rear of the apparatus.

The traffic directing light control head will be located in the driver side overhead switch panel in the right panel position.

GENERAL INFORMATION

It is the intent of these specifications to describe a mid-mounted telescoping, elevating platform. The unit will consist of a five (5) section, steel ladder with a self-leveling basket attached to the ladder fly section.

OPERATION ON GRADES

The aerial unit will be capable of operating safely, on any slope up to 10 degrees at full capacities. (Operation beyond this limit will be at the operator's discretion.)

CONSTRUCTION STANDARDS

The ladder will be constructed to meet all of the requirements as described in the current edition of NFPA 1901.

These capabilities will be established in an unsupported configuration.

All structural load supporting elements of the aerial device that are made of a ductile material will have a design stress of not more than 50% of the minimum yield strength of the material based on the combination of the live load and the dead load. This 2:1 structural safety factor meets the current NFPA 1901 standard.

All structural load supporting elements of the aerial device that are made of non-ductile material will have a design stress of not more than 20% of the minimum ultimate strength of the material, based on the combination of the rated capacity and the dead load. This 5:1 safety factor meets the current 1901 NFPA standard.

The aerial device will be capable of sustaining a static load one and one-half times its rated tip load capacity (live load) in every position in which the aerial device can be placed when the vehicle is on a firm level surface.

The aerial device will be capable of sustaining a static load one and one-third times its rated tip load capacity (live load) in every position the aerial device can be placed when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning.

With the aerial device out of the cradle in the in the fully extended position at zero degrees elevation, a test load will be applied in a horizontal direction normal to the centerline of the ladder. The turntable will not rotate and the ladder will not deflect beyond what the product specification allows.

All welding will be in compliance with the American Welding Society standards. All welding personnel will be certified, as qualified under AWS welding codes.

VERTICAL HEIGHT

The height of the unit will extend to no less than 100', as measured by a plumb line from the top surface of the basket handrail assembly to the ground, with the basket raised to a 77 degree angle.

HORIZONTAL REACH

The rated horizontal reach will be 93'. The measurement of horizontal reach will be consistent with NFPA standards.

MOUNTING OF ELEVATING PLATFORM

The aerial device will be mid mounted, to a torque box, on the truck chassis.

TORQUE BOX

A "torsion box" subframe will be installed between two sets of stabilizers. The torque box will be constructed of 100,000 pounds per square inch yield steel with an integral ladder storage box. The torque box assembly will be capable of withstanding all torsional and horizontal loads when the unit is on the stabilizers. The torque box will be bolted to the chassis frame rails using forty-eight .750" SAE grade 8 bolts with nuts.

TURNTABLE

The turntable will be coated with a non-skid, chemical resistant material in the walking areas. The stepping surfaces will meet the skid-resistance requirements in the current NFPA 1901 standard.

The turntable will serve as a step for access to the ladder.

The turntable handrails will be a minimum 42.00" high and will not increase the overall travel height of the vehicle. The handrails will be constructed from 1.62" diameter extruded 6061-T6 aluminum with a slip resistant knurled surface. The handrails will be anodized to resist corrosion.

ELEVATION SYSTEM

Two (2) double acting, lift cylinders will be utilized to provide smooth, precise elevation from 15 degrees below horizontal to 77 degrees above horizontal. The lift cylinder will be attached to each side of the base section. The lift cylinders will have a 7.50" internal diameter (bore), 3.50" diameter cylinder rod and a 53.89" stroke. The lift cylinder rod will be chrome plated, to provide smooth operation of the aerial and reduce seal wear. The lift cylinders will be equipped with integral holding valves located in the cylinder, to prevent the unit from descending should the charged lines be severed, at any point within the hydraulic system and to maintain the ladder in the bedded position during road travel. The integral holding valves will NOT be located in the transfer tubes.

The elevation system will be controlled by the microprocessor. The microprocessor will provide the following features:

- Collision avoidance of the elevation system to prevent accidental body damage
- Automatic deceleration when the aerial device is lowered into the cradle
- Automatic deceleration at the end of stroke, in maximum raise and lower positions
- Deceleration of the aerial device from 0 to -15 degrees

MANUAL OVERRIDE CONTROLS

Manual override controls will be provided for all aerial and stabilizer functions.

LADDER SLIDE MECHANISM

Wear pads will be used between the telescoping ladder sections, to reduce friction for smoother operation. Slide pads will also be used to control side play between the ladder sections.

BASKET LEVELING SYSTEM

A basket leveling system will be provided and so designed, that the basket with it's rated load, can be supported and maintained level, relative to the turntable, regardless of the elevation or flexion of the ladder.

The leveling of the basket features a hydraulic cylinder system mounted between the ladder fly section and the basket with each side capable of supporting the load, while maintaining the basket level.

The hydraulic circuitry includes pressure operated counter balance valves, on the load side of the cylinders, to prevent the basket from tipping should the hydraulic lines be severed.

The microprocessor will control the level of the basket during bedding operations, preventing the basket from hitting the body deck when the truck is setup on unlevel ground.

ROTATION INTERLOCK

The microprocessor will be used to prevent the rotation of the aerial device, to the side in which the stabilizers have not been fully deployed (short-jacked). The microprocessor will allow full and unrestricted use of the aerial, in the 180 degree area, on the side(s) where the stabilizers have been fully deployed. The system will also have a manual override, to comply with NFPA 1901. **SYSTEMS THAT PERMIT THE AERIAL TO ROTATE TO THE "SHORT JACK" SIDE, WITHOUT AUTOMATICALLY STOPPING THE ROTATION AND/OR WITHOUT ACTUATION OF THE "MANUAL OVERRIDE", will NOT BE ACCEPTED. SYSTEMS THAT ONLY INCLUDE AN ALARM ARE NOT CONSIDERED AN INTERLOCK AND will NOT BE ACCEPTED.**

LOAD CAPACITIES

The following load capacities will be established with the stabilizers at full horizontal extension and placed in the down position to level the truck and to relieve the weight from the tires and axles. Capacities will be based upon full extension and 360 degree rotation.

A load chart, visible at the operator's station, will be provided. The load chart will show the recommended safe load at any condition of the aerial device's elevation and extension.

35 MPH WIND CONDITIONS/DRY

Degree of Elevation	-15 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 77
Basket	1000	1000	1000	1000	1000	1000	1000
Fly	-	-	-	-	250	250	500
Upper Mid	-	-	-	-	250	250	500
Center Mid	-	-	250	250	250	500	500
Lower Mid	-	-	250	250	500	500	500
Base	-	250	500	500	500	500	750

The center portion of each rung cover will be black and the outside 2.00" edge at each side will be safety yellow.

Under no circumstances will the rung covers be fastened to the rungs using screws or rivets.

The rung covers will have a 10-year, limited warranty.

SAW STORAGE BOX

There will be a total of two (2) storage box(es) provided at the base section of the aerial ladder, one (1) on each side of the aerial device. The box(es) will be painted to match the aerial device and located at the tip of the base section. The box(es) will have a hinged cover with D-handle latch and two (2) gas struts to secure the saw. The cover will have the same finish as the box. The box will have a removable drip pan with handles and no louvers.

The maximum capacity of each box will be 75 lb.

BASKET STRUCTURE

The complete basket structure will be constructed of welded high strength steel certified by the manufacturer to have a minimum of 100,000 lb per square inch yield strength on all structural members. The aerial basket will be fully tested and independent third party certified.

The flooring of the basket will be multi-piece Morton Cass material, preventing the accumulation of water on the standing surface. The floor will measure approximately 33.63" long x 72.75" wide. The stepping surfaces will meet the skid-resistance requirements of current NFPA 1901 standard.

The outside basket steps used for transferring in and out of the basket will be at the same level as the basket floor and will be constructed of aluminum treadplate. The steps on the front and sides are approximately 8.00" deep. The front corners of the basket step will be mitered at 45 degrees to allow the basket to be maneuvered closer to buildings when approaching at an angle.

Four (4) stainless steel pompier belt safety loops will be attached to the inside of the basket. Two (2) lifting eyes will be provided on the bottom side of the basket support structure.

Four (4) rubber bumpers are provided on the bottom side of the basket structure for damage protection when setting it down on a surface.

The basket interior will be illuminated as required per the current edition of NFPA 1901. Electrical sub-components will be mounted under the basket in a enclosed area providing protection from heat exposure while allowing for easy servicing and maintaining an unobstructed basket interior.

BASKET SIDES

The sides of the basket will be of tubular steel construction and aluminum sheet skin, and along with the basket doors, will form a continuous 42.00" high wall around the basket.

PLATFORM ENTRANCES/EXITS

Two (2) swing-in, spring-loaded, self-closing doors will be of steel frame construction with an aluminum sheet skin and will be provided on the 45 degree angles at the front of the platform. A paddle style door latch will allow the basket doors to be opened from the outside by applying pressure to the paddle

GENERAL SCREEN DESIGN

Where possible, background colors will be used to provide vehicle information *At A Glance*. If the information provided on a screen is within acceptable limits, a green background color will be used. If the information provided on a screen is not within acceptable limits, an amber background color will indicate a caution condition and a red background color will indicate a warning condition.

Every screen in the information center will include the aerial tip temperature, the time (12- or 24-hour mode) and a text Alert Center. The time will be synchronized between all Command Zone color displays located on the vehicle. The Alert Center will display text messages for audible alarms. The text messages will identify any items causing the audible alarm to sound. If more than one (1) audible alarm is activated, the text message for each alarm will cycle every second until the problems have been resolved. The background for the Alert Center will change to indicate the severity of the warning message. Amber will indicate a caution condition and red will indicate a warning condition. If a warning and a caution condition occur simultaneously, the red background color will be shown for all Alert Center messages.

A label will be provided for each button. The label will indicate the function for each active button for each screen. If the button is not utilized on specific screens, it will have a button label with no text.

Symbols will accurately depict the aerial device type the information pertains to such as rear mount ladder, rear mount platform, mid-mount ladder or mid-mount platform.

PAGE SCREENS

The Information center will include the following pages:

The Aerial Main and Load Chart page will indicate the following information:

- Rungs Aligned and Rungs Not Aligned will be indicated with text and respective green or red colored ladder symbols.
- Ladder Elevation will be indicated via a fire apparatus vehicle with ladder symbol with the degree of elevation indicated between the vehicle and ladder.
- Water Flow (if applicable) will be indicated via a water nozzle symbol and text indicating flow / time.
- Breathing Air Levels will be indicated via an air bottle symbol and text indicating the percent (%) of air remaining. A green bar graphs shown inside the bottle will indicate oxygen levels above 20%. A red bar graph will indicate oxygen levels at or below 20%. When oxygen levels are at or below 10% the red bar graph will flash.
- The Aerial Load Chart will indicate the load limit on each section of the ladder based on actual ladder position and water flow (if applicable).
- *At A Glance* color features will be utilized on this screen. Caution type conditions will be indicated via a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

The Aerial Reach and Hydraulic Systems page will indicate the following information:

- A bedding assist alert will indicate that the aerial device is being aligned by the Command Zone system as the operator lowers the aerial device into the cradle with the joystick.

- *At A Glance* color features will be utilized on this screen. Caution type conditions will be indicated via a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

MENU SCREENS

The following screens will be available through the Menu button:

The View System Information screen will display aerial device hours, aerial PTO hours, ladder aligned for stowing, aerial rotation angle, total water flow (if applicable), and aerial waterway valve status (if applicable).

The Set Display Brightness screen will allow brightness increase and decrease and include a default setting button.

The Configure Video Mode screen will allow setting of video contrast, video color and video tint.

The Set Startup screen allows setting of the screen that will be active at vehicle power-up.

The Set Date and Time screen has a 12- or 24-hour format, and allows setting of the time and date.

The View Active Alarms screen shows a list of all active alarms including the date and time of each alarm occurrence and shows all alarms that are silenced.

The System Diagnostics screen allows the user to view system status for each module and its respective inputs and outputs. Viewable data will include the module type and ID number; the module version; and module diagnostics information including input or output number, the circuit number connected to that input or output, the circuit name (item connected to the circuit), status of the input or output, and other module diagnostic information.

Aerial calibrations screen indicates items that may be calibrated by the user and instructions to follow for proper calibration of the aerial device.

Button functions and button labels may change with each screen.

LOWER CONTROL STATION

A lower control station with pendant control will be located at the rear of the apparatus in an easily accessible area. The controls and indication labels will be illuminated for nighttime operation. The following items will be furnished at the lower control station and will be clearly identified and conveniently located for ease of operation and viewing:

- Level assist switch
- Override switch to override microprocessor
- Emergency power unit switch

HIGH IDLE

The high idle will be controlled by the microprocessor. The microprocessor will automatically adjust the engine rpm, to compensate for the amount of load placed upon the system. The system will include a safety device that allows activation of the high idle, only when the parking brake is set and the transmission is placed in neutral.

INTERIOR BASKET ILLUMINATION

There will be three (3) 20.00" weather resistant strip lights with white LEDs and stainless steel shield provided to illuminate the interior of the aerial basket.

- One (1) light over the control console
- One (1) light on the left side rear of the basket
- One (1) light on the right side rear of the basket

The lights will be activated when the battery switch is on and the aerial master switch is on.

STABILIZERS

The vehicle will come equipped with a stabilization system consisting of six (6) hydraulically operated stabilizers. The middle two (2) will be out and down style, the front and rear two (2) will be down only. This system will meet or exceed all requirements of the NFPA specifications related to stabilization and setup on sloped surfaces.

The stabilizer/leveling jacks will have a maximum spread of 18' measured from the centerline of the jack footpads when the beams are fully extended. The beams will be 6.81" wide x 13.00" high with 1.00" thick top and bottom plates and 1/2" thick sides of 100,000-PSI minimum yield strength steel. The cylinders will have pilot-operated check valves with thermal relief designed to ensure that the beams will not drift out of the stowed position during travel. Wear pads will guide the stabilizers.

The horizontal extension cylinders will be totally enclosed within the beams and will incorporate telescoping hydraulic tubing to supply the jack cylinder hydraulic power. Stabilizer hydraulic hoses will remain stationary during operation of the stabilizers to prevent hose wear and potential failure. The cylinders will be equipped with decelerators to reduce the speed of extension and retraction when the beams are near the fully retracted and extended positions. The stabilizer extension hydraulic cylinders will have the following dimensions: 2.25" bore, 1.38" rod, and 62.25" stroke.

The front vertical jack cylinders will be capable of 15.00" ground penetration. The middle and rear vertical jack cylinders will be capable of 18.00" ground penetration. The cylinders will be supplied with pilot operated check valves on each jack cylinder to hold the cylinder in the stowed or working position, should a charged line be severed at any point in the hydraulic system. For safety, the integral holding valves will be located in the cylinder base, NOT in the transfer tube. Vertical jack cylinder rods will be fully enclosed by a telescoping inner box to protect the cylinder rods from damage. The stabilizer jack hydraulic cylinders will have the following dimensions: 4.25" bore, 3.00" rod, and 34.88" stroke.

The middle and rear stabilizer jack will have a polished stainless steel shield. The stainless steel shield will be a maximum of 14.00" wide so as to allow the extension of the stabilizer between parked cars or other obstacles. This plate will serve as a protective guard and a mounting surface for warning lights.

A "Stabilizers Not Stowed" indicator will be provided in the driver's compartment. It will illuminate automatically whenever the stabilizers are not fully stowed to prevent damage to the apparatus if moved. The stabilizer system will also be wired to the "Do Not Move Indicator Light", which will flash whenever the apparatus parking brake is not fully engaged and the stabilizers are not fully stowed.

CRADLE INTERLOCK SYSTEM

A cradle interlock system will be provided, to prevent the lifting of the aerial from the nested position, until the operator has positioned all the stabilizers in a load supporting configuration. A switch will be installed at the cradle, to prevent operation of the stabilizers once the aerial has been elevated from the nested position.

STABILIZER CONTROL BOX ALUMINUM DOOR

A vertically hinged smooth aluminum door will be provided over the stabilizer control box. The door will be hinged outboard.

HYDRAULIC SYSTEM

All hose assemblies will be assembled and crimped by the hose manufacturers certified technician.

All manufacturing employees responsible for the installation of hydraulic components will be properly trained. Training will include: proper handling, installation, torque requirements, cleanliness and quality control procedures for hydraulic components.

Hoses used in the aerial hydraulic system will be of a premium quality hose with a high abrasion resistant cover. All pressure hoses will have a working pressure of 4000 psi and a burst pressure rating of 16,000 psi.

All hydraulic fittings and tubing will be plated or constructed of 304 stainless steel to minimize corrosion.

The fitting will use an O-ring seal where possible to minimize hydraulic leaks.

An interlock will be provided that prevents activation of the hydraulic pump until the transmission is placed in neutral and the parking brake is set as outlined in the current NFPA 1901 standard.

The system will meet the performance requirement of the current NFPA 1901 standard, which requires adequate cooling less than 2.5 hours of operations.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial will comply with current NFPA 1901 standards and have burst strength of 4:1.

Dynamic sealing components whose failure could cause aerial movement will have a margin of 2:1 on maximum operating pressure per the current NFPA 1901 standard.

All hydraulic hoses, tubes, and connections will have a minimum burst strength of 3:1 per the current NFPA 1901 standard.

An interlock will be provided that allows operation of the aerial power takeoff shift only after the chassis spring brake has been set and the chassis transmission has either been placed in the neutral position or drive position after the driveline has been disengaged from the rear axle.

The hydraulic system will be supplied by a variable displacement load and pressure compensating piston pump. The pump will meet the demands of all three simultaneous aerial functions. The pump will provide proper flow for single aerial function with the engine at idle speed. A switch will be provided on the control console to increase the engine speed for multiple function operation.

EMERGENCY PUMP

The hydraulic system will be designed with an auxiliary power unit meeting the guidelines of the current NFPA 1901 standard.

The aerial will be equipped with an emergency hydraulic pump, electrically driven from the truck batteries. The pump will be capable of running for 30 minutes for limited aerial functions to stow the unit in case of a main pump or truck system failure. A momentary switch will be located at the stabilizer and aerial control locations to activate the emergency pump.

AERIAL CONTROL VALVE

The aerial hydraulic control valve will be designed with special spool flows, limiting the oil flow for the designed function speed. The valve will be electrically controlled and be located below the swivel and integrated with the stabilizer control manifold. The handles will be oriented outward and will be spaced 1.80" apart. The valve spools will be designed to bleed off downstream pressure, in the neutral position and allow proper sealing of any cylinder holding cartridge.

OIL RESERVOIR

The oil reservoir will have a minimum capacity of 39 gallons. The oil fill location will be easily accessible and be labeled "Hydraulic Oil Only" and also indicate the grade of oil that is installed in the reservoir. A drain port will be provided.

Two suction ports will be provided, one for the main hydraulic pump and one for the emergency pump. The emergency suction port will be raised slightly off the bottom of the reservoir.

Magnetic filter will be installed in line with the return hose.

A float type sending unit in the reservoir will provide an indication of oil level on an electronic display. A temperature sending unit in the reservoir will provide indication of the oil temperature on an electronic display.

The hydraulic oil reservoir will be labeled per the current edition of NFPA 1901 standard.

RETURN FILTER

The low pressure oil return filter will be remote mounted in the return line and designed to prevent oil loss during filter change. A 50 psi bypass will be included to protect the element and hydraulic system during lower than normal operating temperatures. The system will incorporate the following filter to provide dependable service:

- return filter: beta 1000 at 6 micron

Ground matrix identification system

The following control system modules will be used:

Control Module

Main controller for the system

USB connection allows for computer diagnostics

Power Module

Built-in fault sensing

Eight (8) digital outputs

Pulse width modulating (PWM) capable

10A continuous per output

Circuit protection based on actual current draw (not affected by heat)

Current Control Module

Built-in fault sensing

Three (3) analog inputs

Eight (8) digital outputs

Pulse width modulating (PWM) capable

3A continuous per output

Closed Loop System

Circuit protection based on actual current draw (not affected by heat)

Input Module

16 software selectable (digital or analog) inputs

Output Module

16 digital outputs

Input/Output Module

Eight (8) software selectable (digital or analog) inputs

Eight (8) digital outputs

STABILIZER WARNING LIGHTS

There will be our (4) Whelen®, Model M6*C, LED flashing warning lights with Whelen, Model M6FC, chrome flanges installed, one (1) on each stabilizer cover panel.

- The front stabilizer pan lights will be red LED with a clear lens
- The rear stabilizer pan lights will be red LED with a clear lens

These warning lights will be activated by the same switch as the side warning lights.

STABILIZER BEAM WARNING LIGHTS

Two (2) 4.00" diameter red LED flashing lights will be mounted on each stabilizer, one (1) facing forward and one (1) facing rearward. The lights will be Grote Supernova 40 series LED lights. The lights will be recessed in the horizontal beam of the stabilizer. These warning lights will be activated with the aerial master switch.

STABILIZER SCENE LIGHTS

There will be one (1) Amdor®, Model AY-LB-12HW012, 190 lumen, 12" long, white LED strip light installed under each stabilizer beam to illuminate the surrounding area. A total of six (6) lights will be installed. The lights will be activated by the aerial master switch.

PLATFORM 120-VOLT ELECTRIC SYSTEM

Two (2), 20 amp, NEMA L5-20, 120-volt, three (3)-prong twist lock receptacles with weatherproof covers will be provided in the aerial platform. Both receptacles will be located on the left side rear of the basket. Each receptacle will be supplied from individual branch circuits protected by dedicated 20 amp/120-volt circuit breakers. All wiring will be sized to and conform to the latest edition of NEC standards.

2-WAY AERIAL COMMUNICATION SYSTEM

There will be a Fire Research model ICA900-112 two-way intercom system provided. The control module will be located on the turntable operator console, provided there is room, and have an LED volume display and push-button volume control.

A hands free module will be located at the aerial tip or platform and constantly transmit to the other module unless the control module push-to-talk button is pressed.

Each intercom unit will be weatherproof.

BREATHING AIR

Breathing air will be supplied to the aerial platform. The air system will incorporate one (1) 437 cubic foot, 4500-psi cylinder. To allow the turntable operator an unobstructed view of the platform the cylinder will be mounted on the left side of the aerial base section while viewed from the turntable. A pressure regulator located at the air cylinder. A shutoff valve with guard will be provided on the cylinder. The air will be routed to the basket using hose especially designed for use in breathing air systems. At the platform, the breathing air will be accessible via two (2) quick couplings for air masks. These will have a Hansen brass 3000 series coupling. Two (2) couplings will be located at the rear of

A 5.00" water swivel will be installed at the aerial heel pivot pin that will permit water tower operations of -15 degrees to 77 degrees. The heel pivot pin will not be integral with the waterway swivel at any point. The waterway design will allow complete servicing of the waterway swivel without disturbing the heel pivot pin.

A telescoping aluminum waterway will be installed on the side of the aerial ladder sections. The waterway will consist of a 5.50" diameter tube for the base section, 5.00" diameter tube for the lower mid section, 4.50" diameter tube for the center mid section, 4.00" diameter tube for the upper mid section, and 3.50" diameter tube for the fly section.

A 1.50" drain will be provided for the waterway.

WATERWAY SEALS

The waterway seals will be of type-B PolyPak design, composed of nitroxile seal and a nitrile wiper, which together offer maximum stability and extrusion resistance on the waterway. The seal will be capable of withstanding pressures up to 2000 psi, temperatures in excess of 250 degrees Fahrenheit and have resistance to all foam generating solutions. The seals will be internally lubricated.

The waterway seals will have automatic centering guides constructed of synthetic thermalpolymer. The guides will provide positive centering of the extendible sections within each other and the base section to insure longer service life and smoother operation.

PLATFORM WATER SYSTEM

A 4.00" (internal diameter) water swivel will connect the fly section waterway to the platform waterway. The water swivel will permit water tower operations from -15 degrees to 77 degrees. The water will be routed from the swivel to a 4.00" gear operated valve(s) on the front of the platform using a combination of 4.00" tubes and piping. The monitor(s) will be bolted onto the valve(s).

A 2.50" preset pressure relief valve will be provided in the waterway system. It will be designed to protect the aerial waterway from excess pressure. It will dump water to the ground when operating.

A shower nozzle rated at 75 gpm will be provided beneath the platform for heat protection for the platform personnel. A direct linkage control for the shower nozzle will be provided.

AERIAL MONITOR

There will be two (2) Task Force Tips monitors provided at the platform.

One will be a Y4-MP1A-P-01 double crank controlled monitor with a TFT YST-4NN stacked tips.

The other will be a Y4-EP1A-P electric monitor with a TFT 2000 gpm Model M-ERP2000 electric nozzle.

The controls for the electronic monitor will be located at the platform and the turntable control console.

WATERWAY FLOWMETER

Waterway flow, including total water flowed, will be monitored by the microprocessor. An LCD display will be located at the upper and lower control stations.

- Two (2) hydrant wrenches.
- One (1) double female 2.50" (65 mm) adapter with National Hose threads.
- One (1) double male 2.50" (65 mm) adapter with National Hose threads.
- One (1) rubber mallet, for use on suction hose connections.
- Four (4) ladder belts meeting the requirements of NFPA 1983.
- One (1) 150 ft (45 m) light-use life safety rope meeting the requirements of NFPA 1983.
- One (1) 150 ft (45 m) general-use life safety rope meeting the requirements of NFPA 1983.
- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, *Standard for High Visibility Public Safety Vests*, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.
- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- One (1) automatic external defibrillator (AED).
- If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, will be carried mounted in brackets fastened to the apparatus.
- If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side will be carried. Any intake connection larger than 3.00" (75 mm) will include a pressure relief device that meets the requirements of 16.6.6.
- If the apparatus does not have a 2.50" National Hose (NH) intake, an adapter from 2.50" NH female to a pump intake will be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.
- If the supply hose carried has other than 2.50" National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2.50" NH thread male discharge and to allow the hose to connect to a 2.50" NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

SOFT SUCTION HOSE

There will be a 15' length of 6.00" soft suction hose provided with a 6.00" long handle swivel coupling on one (1) end and a 4.50" long handle swivel coupling on the other.

DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, section 9.9.4 requires one (1) approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

4. **Finish Sanding** - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.
5. **Sealer Primer** - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. **Basecoat Paint** - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.
7. **Clear Coat** - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacture.

Each batch of basecoat color is checked for a proper match before painting of the cab and the body. After the cab and body are painted, the color is verified again to make sure that it matches the color standard. Electronic color measuring equipment is used to compare the color sample to the color standard entered into the computer. Color specifications are used to determine the color match. A Delta E reading is used to determine a good color match within each family color.

All removable items such as brackets, compartment doors, door hinges, and trim will be removed and separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly will be finish painted before assembly.

Pierce Manufacturing paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) meet or exceed the Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels meet or exceed the #6 A.C.T. standard in critical areas. These requirements are met in order for the exterior paint finish to be considered acceptable. The Pierce Manufacturing written paint standards will be available upon request.

The cab will be two-tone, with the upper section painted #90 red along with a shield design on the cab face and lower section of the cab and body painted #20 white.

PAINT - ENVIRONMENTAL IMPACT

Contractor will meet or exceed all current State regulations concerning paint operations. Pollution control will include measures to protect the atmosphere, water and soil. Controls will include the following conditions:

- Topcoats and primers will be chrome and lead free.
- Metal treatment chemicals will be chrome free. The wastewater generated in the metal treatment process will be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations will have a 99.99% efficiency factor.
- Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter is used, it will have an efficiency rating of 98.00%. Water wash systems will be 99.97% efficient

AERIAL DEVICE PAINT COLOR

The aerial device paint procedure will consist of a seven (7) step finishing process as follows:

1. **Manual Surface Preparation** - All exposed metal surfaces on the aerial device structural components above the rotation point will be thoroughly cleaned and mechanically shot-blasted to remove metal impurities and prepare the aerial for painting.
2. **Zinc Rich Primer** - Zinc rich primer will be applied to the torque box and stabilizers.
3. **Primer/Surfacer Coats** - A two (2) component epoxy primer/surfacer will be applied to the mechanically shot-blasted metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface. All seams will be caulked with a two (2) component epoxy caulk before painting.
4. **Hand Sanding** - The primer/surfacer coat of the outer surfaces of the hand rails and base rails will be lightly sanded to a smooth finish.
5. **Primer Coat** - A two (2) component epoxy primer coat will be applied over the sanded primer.
6. **Topcoat Paint** - Urethane base coat will be applied to opacity for correct color matching.
7. **Clear Coat** - Two (2) coats of an automotive grade two (2) component urethane will be applied.

Surfaces that will not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate.

All buy out components, such as monitor, nozzle, gauges, etc. will be supplied as received from the vendor.

Removable items such as brackets will be removed and painted separately to ensure paint coverage behind all mounted items.

The aerial device components will be painted as follows using the aforementioned seven (7) step finishing process:

- Aerial basket and basket leveling cylinders at tip: white 10
- Aerial device ladder sections and extension cylinders: white 10
- Aerial turntable and leveling cylinders at turntable: white 10
- Aerial control console: white 10
- Aerial lift cylinders: white 10
- Aerial rotation motor (if applicable): black
- Aerial torque box, support structure and components below the rotation point: gloss black primer
- Aerial stabilizers: black 101
- Aerial boom support: gloss black primer

Each manual will be specifically written for the chassis and body model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

SERVICE PARTS INTERNET SITE

The service parts information included in these manuals are also available on the Pierce website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

CHASSIS SERVICE MANUALS

There will be one (1) chassis service manuals on USB flash drives containing parts and service information on major components provided with the completed unit.

The manual will contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine/Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

The manual will be specifically written for the chassis model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

CHASSIS OPERATION MANUAL

The chassis operation manual will be provided on one (1) USB flash drive.

ONE (1) YEAR MATERIAL AND WORKMANSHIP

A Pierce basic apparatus limited warranty certificate, WA0008, is included with this proposal.

ENGINE WARRANTY

A Detroit Diesel **five (5) year** limited engine warranty will be provided. A limited warranty certificate, WA0180, is included with this proposal.

STEERING GEAR WARRANTY

A Sheppard **three (3) year** limited steering gear warranty shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY

A Gortite roll-up door limited warranty will be provided. The mechanical components of the roll-up door will be warranted against defects in material and workmanship for the lifetime of the vehicle. A six (6) year limited warranty will be provided on painted and satin roll up doors.

The limited warranty certificate, WA0190, is included with this proposal.

PUMP WARRANTY

A Waterous pump limited warranty certificate, WA0225, is included with this proposal.

TEN (10) YEAR PUMP PLUMBING WARRANTY

The Pierce apparatus plumbing limited warranty certificate, WA0035, is included with this proposal.

TWENTY (20) YEAR AERIAL DEVICE STRUCTURAL INTEGRITY WARRANTY

The Pierce device limited warranty certificate, WA0052, is included with this proposal.

AERIAL SWIVEL WARRANTY

An Amity five (5) year limited swivel warranty will be provided. A copy of the warranty certificate will be submitted with the bid package.

HYDRAULIC SYSTEM COMPONENTS WARRANTY

Aerial hydraulic system components will be provided with a five (5) year material and workmanship limited warranty.

HYDRAULIC SEAL WARRANTY

Aerial hydraulic seals will be provided with a three (3) year material and workmanship limited warranty.

A copy of the warranty certificates will be submitted with the bid package.

AERIAL WATERWAY WARRANTY

An Amity ten (10) year limited waterway warranty will be provided. A copy of the warranty certificate will be submitted with the bid package.

FOUR (4) YEAR PRO-RATED PAINT AND CORROSION

A Pierce aerial device limited pro-rated paint warranty certificate, WA0047, is included with this proposal.

FIVE (5) YEAR MATERIAL AND WORKMANSHIP

The Pierce Command Zone electronics limited warranty certificate, WA0014, is included with this proposal.

TEN (10) YEAR PRO-RATED PAINT AND CORROSION

A Pierce body limited pro-rated paint warranty certificate, WA0057, is included with this proposal.

THREE (3) YEAR MATERIAL AND WORKMANSHIP

The Pierce Goldstar gold leaf lamination limited warranty limited warranty certificate, WA0018, is included with this proposal.

WINDSHIELD WIPER DURABILITY CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. Windshield wipers will survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles*. The bidder will certify that the wiper system design has been tested and that the wiper system has met these criteria.

SEAT BELT ANCHOR STRENGTH

Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design will withstand 3000 lb of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder will certify that each anchor design was pull tested to the required force and met the appropriate criteria.

SEAT MOUNTING STRENGTH

Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design will be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder will certify that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

CAB DEFROSTER CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. The defroster system will clear the required windshield zones in accordance with SAE J381 *Windshield Defrosting Systems Test Procedure And Performance Requirements - Trucks, Buses, And Multipurpose Vehicles*. The bidder will certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

CAB HEATER CERTIFICATION

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. The cab heaters will warm the cab 77 degrees Fahrenheit from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

CAB AIR CONDITIONING PERFORMANCE CERTIFICATION

Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system will cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 72 degrees Fahrenheit in 30 minutes. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

AMP DRAW REPORT

The bidder will provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus will provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which will include the following:
 - The nameplate rating of the alternator.