CITY OF Savannah

PURCHASING DEPARTMENT

EVENT #4551

FIRE PUMPERS

SPECIFIC SPECIFICATIONS AND SPECIAL CONDITIONS

4.0 The purpose of these specifications is to describe requirements for two (2) fire pumpers. These specifications cover only the general requirements regarding the type of construction and tests to which the apparatus must conform, along with certain details regarding finish, equipment, and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features. The apparatus shall conform to the requirements of the current National Fire Protection Association (NFPA) Pamphlet #1901 for Motor Fire Apparatus unless otherwise specified in these specifications. Bids shall only be considered from companies which have an established reputation in the field of fire apparatus construction and have been in business for a minimum of thirty (30) years. **Corporate paperwork indicating how long vendor has been in business shall be provided with submission for bids to be considered further.**

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform. Computer run-off sheets shall not be acceptable as descriptive literature. The specifications shall indicate size, type, model, and make of all component parts and equipment. This must be included in a bidder's response to be considered further.

Electronic submissions will not be considered. Complete the attached bid proposal form and submit all required documentation per the specifications. Bids must be submitted on the bid proposal forms contained in these specifications in order to be considered.

A pre-bid conference has been scheduled to be conducted at the Purchasing Office, City Hall, third floor, 2 East Bay Street, Savannah, Georgia 31401. This meeting shall allow contractors to discuss the specifications and resolve any questions and/or misunderstandings that may arise with City staff. You are invited to attend.

4.1 Scope of Work

4.2 Statement of Exceptions to NFPA 1901

If, at the time of delivery, the apparatus manufacturer is not in compliance, a statement of exceptions must be provided as follows:

- The specific standard affected.
- A statement describing why the manufacturer is not in compliance.
- A description of the remedy and who the responsible party is.

The document must be signed by an officer of the company and an authorized agent of the purchaser.

4.3 Quality and Workmanship

4.3.1 The design of the apparatus must embody the latest approved automotive engineering practices.

4.3.2 The workmanship must be the highest quality in its respective field. Special consideration shall be given to the following points: Accessibility to various areas requiring periodic maintenance, ease of operation (including both pumping and driving), and symmetrical proportions.

4.3.3 Construction must be rugged and ample safety factors must be provided to carry loads as set forth in Section 4.4-Performance Test and Requirements.

4.4 Performance Tests and Requirements

A road test shall be documented with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft(s) and rear axles shall run quietly and free from abnormal vibration or noise throughout the operating range of the apparatus. The apparatus, when loaded, shall be approximately 66% on the rear axle. The successful bidder shall furnish a weight certification showing weight on the front and rear axle and the total weight of the completed apparatus at the time of delivery.

4.4.1 The apparatus must be capable of accelerating to 30 MPH from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed engine RPM.

4.4.2 The service brakes must be capable of stopping the fully loaded vehicle within 35 feet from a speed of 25 MPH on a level concrete highway.

4.4.3 The apparatus, fully loaded, must be capable of obtaining a speed of 50 MPH on a level highway with the engine not exceeding 95% of its governed RPM (full load).

4.4.4 The apparatus must be tested and approved by a qualified testing agency in accordance with their standard practices for pumping engines.

4.4.5 The contractor shall furnish copies of the Pump Manufacturer's Certification of Hydrostatic Test (if applicable), the engine manufacturer's current certified brake horsepower curve and the manufacturer's record of construction details.

4.5 Failure to Meet Tests

In the event the apparatus fails to meet the test requirements of these specifications on the first trial, a second trial may be made at the option of the bidder within 30 days of the date of the first trials. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Permission to keep and/or store the apparatus in any building owned or occupied by the purchaser shall not constitute acceptance of same.

4.6 Exceptions to Specifications

The following specifications shall be strictly adhered to. Exceptions shall only be considered if they are deemed equal to or superior to the specifications, provided they are fully explained on a separate page entitled "Exceptions to Specifications." Exceptions shall be listed by page and paragraph.

Failure to denote exceptions in the above manner shall result in rejection of the proposal. In addition, a general statement taking "Total Exception" to the specifications shall result in rejection of bid.

4.7 General Construction

The apparatus shall be designed and the equipment mounted with due consideration to distribution of load between the front and rear axles so that all specified equipment, including filled water tank, a full complement of personnel, and fire hose shall be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of the International Association of Fire Chiefs and National Fire Association (or American Insurance Association). Certified Laboratories certificate shall be submitted by the manufacturer. Weight of apparatus shall meet all federal axle load laws.

4.8 Delivery Requirements

The apparatus shall be completely equipped per these specifications upon arrival and on completion of the required tests shall be ready for immediate service in the City of Savannah Fire and Emergency Services Bureau. Any and all alterations required at the scene of delivery to comply with these specifications must be done at the contractor's expense.

4.9 Purchaser Rights

The City reserves the right to accept or reject any bid. The City also reserves the right waive any formalities.

4.10 U.S.A. Manufacturer

The entire apparatus shall be assembled within the borders of the Continental United States to insure more readily available parts (without added costs and delays caused by tariffs and customs) and service, as well as protecting the City should legal action ever be required.

4.11 Manufacturer's Experience

Each manufacturer shall have been in business making similar apparatus for a minimum of thirty (30) years and must have had single ownership for more than fifteen (15) years. **Corporate paperwork indicating how long vendor has been in business shall be provided with submission for bid to be considered further.**

4.12 Elimination of Divided Responsibility

It is required that each bidder produce both the chassis and complete apparatus. To eliminate divided responsibility and service, the chassis and body must be manufactured by the same company. The manufacturer shall state the number of years the Company has been producing their own chassis and body. Manufacturer shall state compliance with the paragraph.

4.13 FAMA Compliance

Manufacturer must be a current member of the Fire Apparatus Manufacturer's Association.

4.14 Pricing of Future Purchases and Tag-On Orders

The successful bidder shall accept tag on orders to this bid proposal for a period not to exceed three (3) years from the bid opening date. The successful bidder shall honor the price quoted for a period of 90 days from the date of the bid opening. For the remainder of the year (275 days), the bidder shall agree to an economic price escalation of one and one half percent (1.5%). Future years beyond the initial first year shall have an economic price escalation of three percent (3%) as a normal course of business. Items outside the normal course shall include changes legislated by federal, state or local Governments that impact the cost to manufacture the truck. In addition, changes to NFPA 1901 that require additional cost shall be borne by the purchaser. These may include, but are not limited to, changes that affect the major vendors of the fire apparatus industry such as pump manufacturer, seat manufacturer, electrical power supplies (generators) and power-train (engine and transmission).

The bidder shall honor the tag on order from any municipality within the United States or Canada.

The City may or may not desire to purchase additional units over and above the units specified herein for a period not to exceed three (3) years.

4.15 Configuration of Tag-On Orders

In many cases the entity wishing to "tag on" to an existing order may require their apparatus to be configured differently from the original proposed apparatus. The successful bidder shall allow changes to the configuration within good engineering guidelines. The changes shall be subject to current pricing in effect at the time of order. For example, a different engine may be required. This shall be considered a "change order" and the purchase price shall be adjusted up or down depending on the current option price.

4.16 Bid Sequence

For ease of evaluation, all bid proposals shall be submitted in the same order as the Fire Department's specification.

4.17 Proposal Drawing

A general layout drawing depicting the apparatus layout and appearance shall be provided with the bid. The drawing shall consist of left side, right side, frontal and rear elevation views. Apparatus equipped with a fire pump shall have a general layout view of the pump operators panel scaled the same as the elevation views. The drawing shall be a depiction of the actual apparatus proposed and not of a generic similar product.

4.18 Approval Drawing

After the award of bid and pre-construction conference, a detailed layout drawing depicting the apparatus layout and appearance including any changes agreed upon shall be provided for the City's review and authorizing signature. The drawing shall become part of the contract documents. The drawing shall consist of left side, right side, frontal, and rear elevation views. Apparatus equipped with a fire pump shall have a general layout view of the pump operators panel scaled the same as the elevation views.

4.19 Wiring Schematics

A CD containing wiring diagrams and part numbers of the apparatus shall be provided at the time of delivery.

4.20 Proposal Guarantee

A certified check or bid bond in the sum of five percent (5%) of the total bid price shall be submitted with the bid proposal at the time of the bid. The full amount of the bid surety shall be returned to the bidders following the award of the contract to the successful bidder.

4.21 Performance Bond

Within 20 days of notification to the successful bidder by the City and prior to any work commencing on the proposed apparatus, the successful bidder shall, at its own expense, obtain and submit to the City a performance bond in the amount of 100% equal to the total contract price.

Additionally, each bidder must provide proof of their bonding capacity with their submission in order for their bid to be considered further.

4.22 Chassis

The chassis shall be manufactured in the factory of the bidder. The chassis shall be designed and manufactured for heavy duty service with adequate strength and capacity of all components for the intended load to be sustained and the type of service required. There shall be no divided responsibility in the production of the apparatus.

4.23 Aluminum Cab

4.23.1 The cab shall be a full tilt six-person cab with a ten inch (10") rear raised roof designed specifically for the fire service and manufactured by the chassis builder.

4.23.2 Cab shall be built entirely by the apparatus manufacturer within the same facilities.

4.24 Cab Design

4.24.1 The cab shall be designed specifically for the fire service and manufactured by the chassis builder.

4.24.2 The apparatus chassis shall be of an engine forward fully enclosed tilt cab design. There shall be four (4) side entry doors.

4.24.3 The cab shall be of a fully open design with no divider wall or window separating the front and rear cab sections.

4.24.4 Construction of the cab shall consist of high strength 5052H32 aluminum welded to extruded aluminum framing of 6061-T6 material.

4.24.5 The cab roof shall utilize extruded radiuses outer corner rails with integral drip channel and box tubing type cross brace supports.

4.24.6 The cab sides shall be constructed from extruded door pillars and posts that provide a finished door opening, extruded and formed wheel well openings supports, formed aluminum wheel well liners, and box tubing type support braces.

4.24.7 The cab floor and rear cab wall shall utilize box tubing type framing and support bracing.

4.24.8 The framework shall be of a welded construction that fully unitizes the structural frame of the cab.

4.24.9 The structural extrusion framework shall be overlaid with interlocked aluminum alloy sheet metal panels to form the exterior skin of the cab.

4.24.10 The structural extrusion framework shall support and distribute the forces and stresses imposed by the chassis and cab loads and shall not rely on the sheet metal skin for any structural integrity.

4.25 Cab Sub-Frame

4.25.1 The cab shall be mounted to a steel box tube sub-frame, and shall be isolated from the chassis through the use of no less than six (6) elastomeric bushings. The sub frame shall be painted to match the primary chassis color.

4.25.2 The sub-frame shall be mounted to the chassis through the use of lubricated Kaiser bushing for the front pivot point and two (2) hydraulically activated cab latches to secure the rear.

4.26 Cab Tilt System

4.26.1 An electrically powered hydraulic cab tilt system shall be provided, and shall lift the cab to an angle of 45 degrees, exposing the engine and accessories for service. The system shall be interlocked to only operate when the parking brake is set.

4.26.2 The lift system shall be comprised of two (2) hydraulic lift cylinders, an electrically driven hydraulic pump, and a control switch. A mechanical locking system shall be provided to ensure the cab remains in the raised position in the event of a hydraulic failure. The cab tilt controls shall be interlocked to the parking brake to ensure the cab shall not move, unless the parking brake is set.

4.26.3 The hydraulic lift cylinders shall be connected to a steel cab sub-frame, and not directly to the cab.

4.27 Cab Dimensions

The cab shall be designed to satisfy the following minimum width and length dimensions:

Cab width (excluding mirrors)	98"
Cab length (from C/L of front axle):	
To front of cab (excluding bumper)	68"
To rear of cab	62"
Total cab length (excluding bumper)	130"

4.28 Fender Crowns

Polished stainless steel front axle fenderettes with full depth radiused wheel well liners shall be provided.

4.29 Grille

The front of the cab shall be equipped with a stainless steel grille with sufficient area to allow proper airflow into the cooling system and engine compartment.

4.30 Cab Insulation

The exterior walls, doors, and ceiling of the cab shall be insulated from the heat and cold and to further reduce noise levels inside the cab. The cab interior sound levels shall not exceed 90 decibels at 45 mph in all cab seat positions.

4.31 Roof Design

The cab shall be of a one-half (1/2) ten inch (10") raised roof design with side drip rails and shall satisfy the following minimum height dimensions:

4.31.1 Cab dimensions interior

Front	59"
Rear	65"

4.31.2 Cab dimensions exterior

Front	65"
Rear	75"

4.32 Exterior Glass

The cab windshield shall be of a two (2) piece curved design utilizing tinted and laminated automotive approved safety glass. The window shall be held in place by an extruded rubber molding. The cab shall be finished painted prior to the window installation.

4.33 Sun Visors

The sun visors shall be made of dark smoke colored transparent polycarbonate. There shall be a visor located at both the driver and officer positions, recessed in a molded form for a flush finish.

4.34 Cab Steps

4.34.1 The lower cab steps shall be no more than 22 inches from the ground. An intermediate step shall be provided mid-way between the lower cab step and the cab floor.

4.34.2 The intermediate step shall be slightly inset to provide for safer ingress and egress. All steps shall be covered with material that meets or exceeds the NFPA requirements for stepping surfaces.

4.35 Step Lights

A white LED strip light shall illuminate each interior cab step. These lights shall illuminate whenever the battery switch is on and the cab door is opened.

4.36 Cab Structural Integrity

4.36.1 The cab of the apparatus shall be designed and so attached to the vehicle as to eliminate, to the greatest possible extent, the risk of injury to the occupants in the event of an accident.

4.36.2 The apparatus cab shall be tested to specific load and impact tests with regard to the protection of occupants of a commercial vehicle.

4.36.3 A test shall be conducted to evaluate the frontal impact strength of the apparatus cab to conform to the test J2420 and the "United Nations Regulation 29, Annex 3, paragraph 4, (Test A). A second test shall be conducted to evaluate the roof strength of the apparatus cab to conform to the Society Of Automotive Engineers (SAE) SAE J2422/SAE J2420 and "United Nations Regulation 29, Annex 3, paragraph 5, (Test B) and SAE J2420. The evaluation shall consist of the requirements imposed by ECE Regulation 29, Paragraph 5.

4.36.4 The test shall be conducted by a certified independent third party testing institution.

4.36.5 A letter stating successful completion of the above test on the brand of cab being supplied shall be included in the bid. There shall be no exception to this requirement.

4.37 Seat Belt Testing

4.37.1 The seat belt anchorage system shall be tested to meet FMVSS 207 Section 4.2a and FMVSS 210 Section 4.2. Testing shall be conducted by an independent third party product evaluation company.

4.37.2 A copy of the certification letter shall be supplied with the bid documents in order to be considered further.

4.38 Manual Cab Lift

There shall be a manually operated hydraulic pump for tilting the cab in case the main pump should fail. Access to the pump shall be located under the left corner of the front bumper.

4.39 Cab Doors

4.39.1 The cab doorframes shall be constructed from aluminum extrusions fitted with an aluminum sheet metal skin and shall be equipped with dual weather seals. The outside cab door window opening shall be framed by a black anodized aluminum trim, to provide a clean appearance. The cab doors shall be equipped with heavy-duty door latching hardware, which complies with FMVSS 206. The door latch mechanism shall utilize control cable linkage for positive operation. A rubber coated nylon web doorstop shall be provided. A provision for rubber glove boxes in the upper cab doors.

4.39.2 The doors shall be lap type with a full-length stainless steel 3/8" diameter hinge and shall be fully adjustable.

4.39.3 All openings in the cab shall be grommeted or equipped with rubber boots to seal the cab from extraneous noise and moisture.

4.39.4 The cab doors shall be designed to satisfy the following minimum opening and step area dimensions:

4.39.5 Door Opening

Front:	36.5" x 73"
Rear:	36.5" x 73"

4.40 Power Windows

All four (4) cab entry doors shall have power windows. Each door shall be individually operated and the driver's position shall have master control over all windows. All four (4) windows shall roll down completely.

4.41 Window Tinting

The crew cab windows and doors, with the exception of the driver's and officer's doors, and the windshield, shall be tinted with deep limo tint.

4.42 Work Surface

There shall be a flat work surface in front of the officer's seat.

4.43 Map Box

A map box compartment shall be provided between driver and officer. The map box shall have the capacity to hold two (2) three-inch (3") and two (2) two-inch (2") 3-ring binders. The construction shall be of .125" aluminum plate and finished to match the interior of the cab. The map holder shall be equipped with a Velcro strap to hold the binder in place.

4.44 Interior Door Panels

The interior of the cab entry doors shall have a 304 brushed stainless steel scuff plate contoured to the door from the door sill down.

4.45 Reflective Material

The lower portion of the door panels shall include a total of 245 square inches of reflective material on each door, exceeding the NFPA requirement of 96 square inches. The layout shall be opposing ruby red chevron stripes on each side. The red striping shall be laid over white 3M reflective materials. The reflective decal shall be plainly visible to oncoming traffic when the doors are in the open position.

4.46 Cab Accessory Fuse Panel

A fuse panel shall be located underneath the rear facing seat on the officer's side. The fuse panel shall consist of six (6) battery hot and six (6) ignition switch circuits. Each circuit shall be capable of ten (10) ampere twelve (12) volt power and total output of 50 amps. The fuse panel shall be capable of powering accessories such as hand held spotlights, radio chargers, hand lantern chargers and other miscellaneous twelve volt electrical components.

4.47 Officers Doors Switch Controls

Officer shall have a total of four (4) switches in its door for operation of window, air horn, Q2, Q2 brake, and or electronic siren tone changer. These shall be at the window control position.

4.48 Air Horns

Two (2) Grover 2040 Stuttertone rectangular, chrome plated, air horns shall be recess mounted, one (1) each side behind the perforated grille of the bumper. The air horns shall be controlled by a toggle switch wired through the horn button. A push button for the air horns shall also be provided on the officer's side door.

4.49 Alternator

4.49.1 A 320 ampere Prestolite/Leece Neville alternator with serpentine belt shall be provided. The alternator shall generate 260 amperes at idle.

4.49.2 A low voltage alarm, audible and visual, shall be provided.

4.50 Front Axle

4.50.1 A Meritor™ MFS-20-133A non-driving, front steer axle with a capacity 20,000 pounds shall be provided.

4.50.2 The axle shall have a 3.74" dropped I-beam, be ten bolt hub piloted and furnished with oil seals.

4.51 Rear Axle

The rear axle shall be a Meritor™ RS-26-160 single reduction drive axle with a capacity of 27,000 pounds. The axles shall be hub piloted, ten (10) studs, furnished with oil seals.

4.52 Top Speed

Rear axle speed shall be approximately 65 MPH.

4.53 Batteries

4.53.1 The battery system shall be a single system consisting of four (4) negative ground, twelve volt Interstate Group 31 MHD batteries, cranking performance of 950 CCA each with total of 3800 amps, 185 minute reserve capacity with 25 ampere draw at 80 degrees Fahrenheit. Each battery shall have 114 plates. Warranty must be accepted nationwide.

4.53.2 The batteries shall be installed in a vented 304 stainless steel battery box with a removable aluminum cover to protect the batteries from road dirt and moisture. The battery cover shall be secured with four (4) T handle rubber hold downs to provide easy access for maintenance and inspection. Stainless steel hardware shall be used for installation. The batteries are to be placed on dri-deck and secured with a fiberglass hold down. The batteries shall be wired directly to starter motor and alternator.

4.53.3 The battery cables shall be 3/0 gauge. Battery cable terminals shall be soldering dipped, color-coded, and labeled on heat shrink tubing with a color-coded rubber boot protecting the terminals from corrosion.

4.53.4 There shall be a 350-ampere fuse protecting the pump primer and a 250-ampere fuse protecting the electric cab tilt pump and other options as required.

4.54 Battery Charging

4.54.1 A Kussmaul Auto Charge 1200 battery system charger shall be provided. The Auto Charge 1200 is a fully automatic battery charger with a very high output for vehicles with a single battery system. A remote single bar graph display is provided to indicate the state of charge of the battery system. The rated output shall be 40 amps for the battery system.

4.54.2 A Kussmaul Model 091-55-20-120 super electric auto-eject with weatherproof cover and power interrupt shall be provided. This Kussmal Unit shall come with four (4) female auto eject pigtails to ensure shore power connection.

4.54.3 A 120 volt auto pump air compressor shall also be provided to maintain air within the air brake system.

4.54.4 A miniature air filter that mounts in the output pressure line of the air pump to trap moisture shall be provided. The micron filter element removes contaminants from the air line. A transparent bowl permits easy monitoring of water collected and a manual purge valve allows the operator to conveniently drain the bowl. A Bendix DV2 heated automatic drain valve shall be provided.

4.55 Battery Jumper Terminal

There shall be one (1) set of two (2) studs of battery jumper terminals located by the battery box under the cab. The terminals shall have plastic color-coded covers. Each terminal shall be tagged to indicate positive/negative.

4.56 Brakes (Front)

The front brakes shall be Meritor S-cam style. They shall be 16.5 inches x 6 inches with heavy-duty return springs, and a double anchor pin design. They shall also have quick-change shoes for fast easy brake relining.

4.57 Brakes (Rear)

The rear brakes shall be Meritor S-cam style. They shall be 16.5 inches x 7 inches with heavy-duty return springs and a double anchor pin design. They shall also have quick-change shoes for fast, easy brake relining.

4.58 Air Brake System

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

4.58.2 Each wheel shall have a separate brake chamber. A dual treadle valve shall split the braking power between the front and rear systems.

4.58.3 All main brake lines shall be color-coded nylon type protected in high temperature rated split plastic loom. The brake hoses from frame to axle shall have spring guards on both ends to prevent wear and crimping as they move with the suspension. All fittings for brake system plumbing shall be brass.

4.58.4 AD 9 air dryer is required

4.58.5 The air system shall be provided with a rapid build-up feature designed to meet current NFPA 1901 requirements. The system shall be designed so the vehicle can be moved within 60 seconds of startup. The quick build up system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time. The vehicle shall not be required to have a separate on-board electrical air compressor or shoreline hookup to meet this requirement.

4.58.6 Four (4) supply tanks shall be provided. One air reservoir shall serve as a wet tank and a minimum of one tank shall be supplied for each the front and rear axles. A Schrader fill valve shall be mounted in the front of the driver's step well.

4.58.7 A spring actuated air release emergency/parking brake shall be provided on the rear axle. One (1) parking brake control shall be provided and located on the engine hood next to the transmission shifter within easy reach of the driver. The parking brake shall automatically apply at 35 ±10 PSI reservoir pressure. A Meritor WABCO IR-2 inversion relay valve, supplied by both the primary and secondary air systems, shall be used to activate the parking brake and to provide parking brake modulation in the event of a primary air system failure.

4.58.8 Accessories plumbed from the air system shall go through a pressure protection valve and to a manifold so that if accessories fail they shall not interfere with the air brake system.

4.59 Air Outlet

One (1) air chuck shall be provided at a location specified by the City. The system shall tie into the wet tank of the brake system and include an 85-psi pressure protection valve in the outlet line to prevent the brake system from losing all air.

Note: The City shall specify type of hose fitting.

4.60 Air Inlet

An air system inlet/fill connection shall be provided. The inlet shall be connected to the air brake to allow constant air feed. The location of the inlet shall be determined during the pre-construction conference.

4.61 Air Braking Abs System

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

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

4.61.3 The system shall consist of a sensor clip, sensor, and electronic control unit and solenoid control valve. The sensor clip shall hold the sensor in close proximity to the tooth wheel. An inductive sensor consisting of a permanent magnet with a round pole pin and coil shall produce an alternating current with a frequency proportional to wheel speed. The unit shall be sealed, corrosion-resistant and protected from electro-magnetic interference. The electronic control unit shall monitor the speed of each wheel sensor and a microcomputer shall evaluate wheel slip in milliseconds.

4.62 Electronic Stability Control System

An Arvin Meritor/Wabco Electronic Stability Control (ESC) system shall be provided and installed. The ESC system continually monitors the vertical acceleration and yaw (horizontal plain rotation) of the vehicle and compares it to a critical threshold where vehicle rollover may occur. When the critical threshold is met, the ESC shall intervene by reducing engine torque and engaging the engine retarder, while automatically applying both the steering and drive axle brakes as needed. In many cases, activation occurs before the driver is even aware it is needed.

4.63 Painted Steel Bumper

There shall be a twelve inch (12") high painted formed steel wrap-around (45 degree) bumper provided at the front of the apparatus. The bumper shall be mounted to a reinforcement plate constructed of 1/4 inch x 12 inch x 70 inch carbon steel. The frame rail extension shall be a reinforced four-sided boxed frame rail for superior safety protection. A gravel shield shall be provided, constructed of .188 inch aluminum diamond plate. The bumper extension shall be approximately 24 inch.

4.64 Diamond Plate Bumper Lid

There shall be a one-eighth inch (1/8") diamond plate cover with latches provided for the front bumper trough. The cover shall have a two inch (2") rise to accommodate the storage well requirements.

4.65 Storage Well Compartment

There shall be a hose well compartment located in the center of the front bumper. The compartment shall run the full width of the bumper and measure approximately 75 inch wide x 16 inch long x 6 inch deep at the ends and 12 inch deep in the center. The compartment shall be constructed of .125 inch smooth aluminum plate.

4.66 Bumper Guards

The front bumper shall come complete with rubber bumpers like Savannah Fire's existing fleet.

4.67 Cooling System

4.67.1 The cooling system shall be designed to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the engine and transmission manufacturer's requirements and EPA regulations.

4.67.2 The complete cooling system shall be mounted in a manner to isolate the system from vibration and stress. The individual cores shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress to the adjoining core(s).

4.67.3 The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler (bolted to the top of the radiator to maximize cooling) recirculation shields, a shroud, a fan, and required tubing. All components shall consist of an individually sealed system.

4.68 Radiator

4.68.1 The radiator shall be a cross-flow design constructed completely of aluminum with welded side tanks. The radiator shall be bolted to the bottom of the charge air cooler to allow a single depth core to allow a more efficient and serviceable cooling system.

4.68.2 The radiator shall be equipped with a drain cock to drain the coolant for serviceability. The drain cock shall be located at the lowest point of the aluminum cooling system to maximize draining of the system.

4.69 Charge Air Cooler

The charge air cooler shall be of a cross-flow design and constructed completely of aluminum with extruded tanks. The charge air cooler shall be bolted to the top of the radiator to allow a single depth core.

4.70 Coolant

The cooling system shall be filled with a 50/50 mix. The coolant makeup shall contain ethylene glycol and de-ionized water to prevent the coolant from freezing to a temperature of –34 degrees F.

4.71 Hoses and Clamps

4.71.1 Silicone hoses shall be provided for all engine coolant lines.

4.71.2 All radiator hose clamps shall be spring loaded stainless steel constant torque hose clamps for all main hose connections to prevent leaks. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

4.72 Fan

4.72.1 The engine cooling system shall incorporate a heavy-duty composite 11 blade Z-series fan. It shall provide the highest cooling efficiently while producing the lowest amount of noise. This robust yet light-weight fan results in less wear and stress on motors and bearings.

4.72.2 A shroud and recirculation shield system shall be used to ensure air that has passed through the radiator is not drawn through again.

4.72.3 The fan tip to radiator core clearance shall be kept at a minimal distance to increase the efficiency of the fan and reduce fan blast noise.

4.73 Fan Clutch

A fan clutch shall be provided that shall allow the cooling fan to operate only when needed. The fan shall remain continuously activated when the truck is placed in pump gear.

4.74 Surge Tank

4.74.1 The cooling system shall be equipped with an aluminum surge tank mounted to the officer's side of the cooling system core. The surge tank shall house a low coolant probe and sight glass to monitor the coolant level. Low coolant shall be alarmed with the check engine light. The surge tank shall be equipped with a dual seal cap that meets the engine manufacturer's pressure requirements, and system design requirements.

4.74.2 The tank shall allow for expansion and to remove entrained air from the system. There shall also be an extended fill neck to prevent system overfill and encroachment of expansion air space. Baffling shall be installed in the tank to prevent agitated coolant from being drawn into the engine cooling system.

4.75 Driveline

The driveline shall consist of Spicer 1710 series dual grease fitting universal joints with half-round end yokes. The drive shaft shall be built with a heavy-duty steel tube 4.095 inch outside diameter x .180 wall thickness. The shafts shall be dynamically balanced prior to installation into the chassis. A splined slip joint shall be provided in each shaft assembly. Universal joints shall have extended life. There shall be two (2) Zerk fittings in each universal joint assembly so the joint can be greased without turning the shaft.

4.76 Engine Enclosure and Raptor Skin Covering

4.76.1 An integral formed aluminum and composite engine enclosure shall be provided. The engine enclosure shall be contoured and blended in an aesthetically pleasing manner with the interior dash and flooring of the cab. The enclosure shall be kept as low as possible to maximize space and increase crew comfort.

4.76.2 The enclosure shall be constructed from 5052 H2 aluminum plate and GRP composite materials providing high strength, low weight, and superior heat and sound deadening qualities. The exterior sides shall be covered with rubberized carpeting to aid in sound deadening and heat resistance. The top shall be covered with a fiberglass grade cover with a heavy duty, black Raptor Skin, wear resistant covering, further reducing noise and heat in the cab.

4.76.3 The underside of the engine enclosure shall be covered with a sound deadening, heat reflective insulation system and shall further minimize noise (DB levels) and eliminate engine heat from the front and rear of the cab. The insulation material shall be bonded with adhesive and mechanically fastened to the underside of the cab. All component wiring and hoses shall be sealed and enclosed as well. All seams shall be sealed to prevent water absorption.

4.77 Mounting Plates

A 3/16 inch aluminum plate shall be mounted on the engine cover for tool mounting.

4.78 Numbering Plates

Four (4) removable numbering plates with reflective numbers shall be provided and four (4) removable number mounts shall be installed on all four (4) sides of apparatus to match Savannah's existing fleet.

4.79 Engine

4.79.1 Cummins Diesel ISL 9, 450 H.P. at 2100 R.P.M., 1250 feet pound Torque @ 1400 R.P.M.

Displacement:	8.9 liter displacement
Cylinders:	6
Bore:	4.49" (114mm)
Stroke:	5.69" (145mm)

4.79.2 The engine shall have a five (5) year or 100,000 mile warranty and approval by Cummins Diesel for installation in the chassis.

4.79.3 The engine shall be equipped with the following:

- Air cleaner
- Air compressor - 18.7 CFM
- Exhaust - single with discharge right side, ahead of rear wheels
- Primary fuels filter with shut off valve on supply side
- Lube oil cooler
- Lube oil filter - full flow
- Starting motor - twelve volt

4.80 Exhaust System

4.80.1 The engine exhaust system shall include the following components:

- Diesel Particulate Filter (DPF)
- Diesel Oxidation Catalyst (DOC)
- Diesel Exhaust Fluid (DEF)
- Selective Catalytic Reduction Filter (SCR)

4.80.2 The SCR catalyst utilizes the DEF, which consists of urea and purified water to convert NOx into nitrogen and water. This shall meet or exceed 2013 EPA emissions requirements.

4.80.3 The engine exhaust system shall be horizontal design constructed from heavy-duty truck components. The exhaust tubing shall be stainless steel to the DPF through to the SCR aluminized steel from the SCR to the exhaust tip. A heavy duty stainless steel bellows tube shall be used to isolate the exhaust system from the engine. The system shall be equipped with single canister consisting of a Diesel Oxidation Catalyst (DOC) and a Diesel Particulate Filter (DPF), and shall be mounted under the right side frame rail meeting the specific engine manufacturer's specifications and current emission level requirements. The outlet shall be directed to the forward side of the rear wheels, exiting the right side with a heavy duty heat diffuser. The heat diffuser shall prevent the exhaust temperature from exceeding 851 degrees Fahrenheit during a regeneration cycle. A heat-absorbing sleeve shall be provided on the exhaust pipe in the engine compartment area to reduce the heat, protect the alternator, and also to protect personnel while servicing the engine compartment.

4.81 After Treatment System

To meet EPA requirements of Particulate output, a DPF (Diesel Particulate Filter) shall be used. To meet EPA requirements of Nitrous Oxide output an SCR (Selective Catalytic Reduction) system utilizing DEF (Diesel Exhaust Fluid) shall be used.

4.82 On-Board Diagnostic System

The engine shall be equipped with an on-board diagnostic (OBD) system which shall monitor emissions-related engine systems and components and alert the operator of any malfunctions. The OBD system shall be designed to further enhance the engine and operating system by providing early detection of emission-related faults. The engine control unit (ECU) shall manage smart sensors located throughout the engine and after-treatment system. The system shall monitor component verification and sensor operation. There shall be warning lights located in the dash instrument panel to alert the operator of a malfunction. A data port shall be provided under the driver's side dash for the purpose of code reading and troubleshooting. All communication shall be provided through the J1939 data link.

4.83 Air Cleaner/Intake

4.83.1 The engine air intake and filter shall be designed in accordance with the engine manufacturer's recommendations. It shall be 99.9% effective in removing airborne contaminants when tested per the industry standard SAE J726 procedure and offer a dirt holding capacity of at least 3.0 gm/cfm of fine dust (tested per SAE J726) offering superior engine protection.

4.83.2 The air filter shall be located at the front of the apparatus and shall be at least 66 inches above the ground to allow fording deep water in an emergency situation.

4.83.3 An ember separator shall be provided in the engine air intake meeting the requirements of NFPA 1901.

4.83.4 An air restriction warning light shall be provided and located on the cab dash.

4.84 Remote Filters

All filters on engine shall be remote mounted for easy access.

4.85 Engine Brake

4.85.1 The engine shall be equipped with a Jacobs compression engine brake. An "on/off" switch and a control for "low/high" shall be provided on the instrument panel within easy reach of the driver.

4.85.2 The engine brake shall interface with the Wabco ABS brake controller to prevent engine brake operations during adverse braking conditions.

4.85.3 A pump shift interlock circuit shall be provided to prevent the engine brake from activating during pumping operations.

4.85.4 The brake light shall activate when the engine brake is engaged.

4.86 Diesel Exhaust Fluid Tank

4.86.1 The exhaust system shall include a molded cross linked polyethylene tank. The tank shall have a capacity of five (5) usable gallons and shall be mounted on the left side of the chassis frame.

4.86.2 The DEF tank fill neck shall accept only a 19mm dispensing nozzle versus the standard 22mm diesel fuel dispensing nozzle to prevent cross contamination. The DEF tank cap shall be blue in color to further prevent cross contamination.

4.86.3 A placard shall accompany fill location noting DEF specifications.

4.87 Frame

4.87.1 The chassis frame shall be of a ladder type design utilizing industry accepted engineering best practices. The frame shall be specifically designed for fire apparatus use. Each frame rail shall be constructed of two 3/8 inch thick-formed channels. The outer channel shall be 10.06 inch x 3.50 inch x .375 inch and the inner channel (liner) shall be 9.31 inch x 3.13 inch x .375 inch. The section modulus shall be 31.28 inches. The resistance to bending moment (RBM) shall be 1,569,160 inch/pounds. The cross-members shall be constructed of minimum 3/8 inch formed channels and have formed gusseted ends at the frame rail attachment.

4.87.2 .625 inch, grade 8 flange, huck bolt fasteners shall be used on all permanently attached brackets to the frame to eliminate the need for bolt re-tightening.

4.87.3 A lifetime warranty shall be provided, per the manufacturer's written statement.

4.88 Fuel Tank

4.88.1 The chassis shall be equipped with a 65-gallon stainless steel rectangular fuel tank.

4.88.2 The fuel tank shall be certified to meet FMVSS 393.67 tests. It shall also maintain engine manufacturer's recommended expansion room of 5%.

4.88.3 The tank shall be removable by means of six (6) bolted connections and dropped. One (1) tank baffle shall be used.

4.88.4 Dual pick-up and return ports with a single 3/4 inch tank drawtube shall be provided for diesel generators if required.

4.88.5 The fuel tank shall be equipped with a 2 1/4 inch filler neck assembly with a 3/4 inch vent located on the left hand side of the tank. A fuel fill cap attached with a lanyard shall be provided. The bottom of the fuel tank shall contain a 1/2 inch drain plug.

4.88.6 The fuel lines shall be nylon braid reinforced fuel hose with brass fittings. The lines shall be carefully routed along the inside of the frame rails. All fuel lines shall be covered in high temperature rated split plastic loom. Single suction and return fuel lines shall be provided.

4.88.7 The fuel tank shall be mounted in a saddle with a barrier between the tank and the saddle. Rear compartment adjacent to fuel cell access panel to fuel cell shall be required.

4.89 Fuel Cooler

Installed on the apparatus fuel system shall be an air-to-liquid aluminum fuel cooler. The fuel cooler shall be located in the lowest module of the cooling system.

4.90 Cab Hadrails

4.90.1 There shall be a 24 inch long, handrail provided and installed, at each cab entrance. The handrails shall be constructed of type 304 stainless steel 1.25 inch diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from seven gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one structural unit. The handrails shall be mounted using 1.25 inch SS Hex bolts, with a barrier rubber gasket at each flange.

4.90.2 Sufficient space shall allow for a gloved hand to firmly grip the rail.

4.90.3 There shall be two (2) rubber coated grab handles provided and mounted on the interior of the cab, one each side, on the windshield post for ingress assistance. The handrail on the driver's side shall be approximately eleven inches (11") long and the handrail on the officer's side shall be approximately 18 inches long.

4.91 Cab Door Handrails

Two (2) 1.25 inch diameter knurled stainless steel handrails shall be provided on the inside of the rear crew doors just above the windowsill.

4.92 Heavy Duty Heater/Defroster/Air Conditioner

4.92.1 There shall be a minimum 80,000 cool BTU and 65,000 heat BTU single unit heater/air conditioner mounted over the engine cover. The unit shall be mounted in center of the cab on the engine hood/enclosure. The unit shall have a shutoff valve at the right side of the frame, next to the engine. Airflow of the heater/air conditioner shall be a minimum 1200 CFM. To achieve maximum cooling, a TM-31 Compressor (19.1 cubic inch) shall be used. There shall be ductwork to the floor of the cab, facing forward to provide heat for the front of cab floor area.

4.92.2 The defroster/heater shall be a minimum of 35,000 BTU and shall be a separate unit mounted over the windshield. There shall be eight (8) louvers/diffusers to direct to windshield and door glass. Airflow of the defroster/heater shall be a minimum 350 CFM. The unit shall be painted Zolatone greystone to match the cab ceiling.

4.92.3 The condenser shall be roof mounted and have 80,000 BTU rating. The unit shall include two (2) fan motors. Airflow of the condenser shall be a minimum 2250 CFM. This roof-mounted condenser shall work at full rated capacity at an idle with no engine heat problems.

4.93 Heater/Defroster/Air Conditioning Controls

The heater/defroster/air conditioning shall be located in the overhead console in the center of the apparatus cab within reach of the driver and officer. The controls shall be illuminated for easy locating in dark conditions. The controls shall be located in such a way that the driver shall not be forced to turn away from the road to make climate control adjustments. Control of all heater/defroster/air conditioning functions for the entire apparatus cab shall be achieved through these controls.

4.94 Defroster Diffuser

A molded diffuser made of durable ABS plastic ductwork system shall be provided. It shall be form fitted and shall attach to the cab's overhead defroster unit to provide temperature controlled air to the windshields. Air flow of up to 280 cfm shall be balanced and directed across the entire windshield for optimum defrosting capability in all types of weather.

4.95 Load Manager

4.95.1 Load manager shall have the ability to sequence loads on and off.

4.95.2 It shall also be able to shed eight (8) loads when the vehicle is stationary, starting at 12.7 volts lowest priority load to be shed, then respectively at 12.6, 12.4, 12.2, 12.0, 11.8, 11.4 and 11.0 volts DC. Any load that has been shed shall be off for a minimum of five (5) minutes, and then if voltage has rebounded above shed voltage, the shed load shall automatically come on. There shall also be an indicator panel alongside the rocker switches, which indicate power is on, battery warning and fast idle. Battery warning indicator shall flash at a rate proportional to the voltage discharge rate.

4.96 Automatic High Idle Activation

The load management system shall be capable of activating the apparatus high idle system when the system voltage drops below 12.3 volts DC. The system shall raise engine speed for a minimum of five (5) minutes until voltage exceeds 13.0 volt DC. The load management system shall activate the high idle feature before any devices are automatically shed off. The high idle function request from the load management device shall function only if the appropriate interlocks are present; that is, control of the high idle system is monitored and shall be superseded by the state of the interlock control module. The automatic high idle system shall be deactivated whenever the brake pedal is pressed, and shall remain inactive for two (2) minutes thereafter to allow an operator to override the high idle function and return the engine to idle before PTO engagement.

5.0 Instrument Panel

5.0.1 The main dash shroud, which shall cover the area directly in front of the driver from the doorpost to the engine hood, shall be custom molded and covered with a non-glare black vinyl. The dash shall be a one-piece hinged panel that tilts outward for easy access to service the internal components. The gauge panel shall be constructed of durable aesthetically pleasing light gray polymer material, placed over a heavy duty steel backing plate for added strength and durability.

5.0.2 The gauges shall be Beede Instruments, NexSys Link gauges with built-in self-diagnostics and red warning lights to alert the driver of any problems. All gauges and controls shall be backlit for night vision and identified for function. All main gauges and warning lights shall be visible to the driver through the steering wheel.

5.1 Master Battery and Ignition Switch

The vehicle shall be equipped with a keyless ignition with a three (3) position master battery rocker switch, "off/ACC/on" and a two (2)-position engine start rocker switch, "off/start".

5.2 Diesel Particulate Filter Controls

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one control shall be to inhibit engine regeneration. These shall be located below the steering wheel in the kick panel.

5.3 Instrumentation and Controls

5.3.1 Instrumentation on dash panel in front of the driver

- Tachometer/hour meter with high exhaust system regeneration temperature, and instrument malfunction indicators
- Speedometer/odometer with built in turn signal, high beam, and resettable trip odometer
- Voltmeter
- Diesel fuel gauge
- DEF (diesel exhaust fluid) gauge
- Engine oil pressure
- Transmission temperature
- Engine temperature
- Primary air pressure
- Secondary air pressure

5.3.2 Indicators and warning lights in front of the driver

- Parking brake engaged
- Low air with buzzer
- Antilock brake warning
- Check transmission
- Transmission temperature
- Upper power indicator
- Seat belt
- Engine temperature
- Low oil indicator
- Low voltage indicator
- Air filter restriction light
- Low coolant indicator
- High idle indicator
- Power on indicator
- Check engine
- Stop engine
- Check engine MIL lamp
- DPF indicator
- High exhaust temperature
- Wait to start

5.3.3 Other indicator and warning lights (if applicable)

- Differential locked
- PTO (s) engaged
- Auto-slip response
- Retarder engaged
- Retarder temperature
- ESC indicator

5.3.4 Controls located on main dash panel in front of the driver

- Master power disconnect with ignition switch

- Engine start switch
- Headlight switch
- Windshield wiper/washer switch
- Differential lock switch (if applicable)
- Dimmer switch for backlighting

5.3.5 Controls included in steering column:
- Horn button
- Turn signal switch
- Hi-beam low-beam switch
- Four-way flasher switch
- Tilt-telescopic steering wheel controls

5.4 Center Control Console

5.4.1 There shall be an ergonomically designed center control console. The console shall be constructed of 1/8 inch smooth aluminum and shall be mounted on the engine hood between the driver and officer. The console shall have a durable coating to match the color of the engine hood covering and shall feature surfaces on each side that are contoured to face the driver and the officer for easy viewing and accessibility. The switches and other customer specified electrical items shall be mounted in removable 1/8 inch smooth aluminum panels with a black wrinkle finish. The console shall have an aluminum lift-up lid with quick release latch. The lid shall be held in the open position with a gas strut to allow for easy access and serviceability.

5.4.2 Controls located in the console conveniently accessible to the driver
- Transmission shifter
- Pump shift control with "ok to pump and pump engaged" lights
- Remote mirror control
- Illuminated rocker switches to control high idle, Jacob's brake, siren/horn, siren brake, master emergency, and other City specified components
- Twelve volt power point (if applicable)

5.4.3 Controls located in the console conveniently accessible to the driver and the officer (center)
- Parking brake control with a guard to prevent accidental engagement

5.4.4 Controls located in the console conveniently accessible to the officer
- Illuminated rocker switches to control City specified components that are easily reachable to the officer and do not allow for compromise of the driver's view and eliminate the need for foot switches
- Surface to recess siren head, radio head, or other desired items as space permits
- Twelve volt power point (if applicable)

5.4.5 Driving compartment warning labels shall include:
- Height of vehicle
- Occupants must be seated and belted when apparatus is in motion
- Do not use auxiliary braking systems on wet or slippery roads
- Exit warnings

5.4.6 Additional labels included:
- Computer code switch
- Abs code switch

- Fluid data tag
- Chassis data tag

5.5 Overhead Control Console

5.5.1 An ergonomically designed overhead console shall be provided above the driver and officer, running the full width of the cab. The overhead console shall be constructed from 1/8 inch aluminum plate and shall be painted with a durable finish to match the inside of the cab. There shall be seven (7) removable 1/8 inch smooth aluminum plates with a black wrinkle finish to house switches and other electrical items.

5.5.2 Directly above the driver there shall be two (2) panels with no cutouts, unless otherwise specified by the City.

5.5.3 There shall be a panel located to the right of the driver that shall be designated for defroster, heat, and air conditioning controls (if specified).

5.5.4 The center overhead panel shall be designated for up to seven (7) door ajar indicators. Upon releasing the apparatus parking brake, one (1) or more of these lights shall automatically illuminate (flash) when any of the following conditions occur that may cause damage if the apparatus is moved: cab or compartment door is open, ladder or equipment rack is not stowed, stabilizer system deployed, or any other device has not been properly stowed.

5.5.5 There shall be a panel to the left of the officer as well as two (2) directly above the officer. These panels shall have no cutouts, unless otherwise specified by the City.

5.6 Engine Warning System

5.6.1 An engine warning system shall be provided to monitor engine conditions such as low oil pressure, high engine temperature, and low coolant level. Warning indication shall include a stop engine (red) light with audible buzzer activation and a check engine (amber) light.

5.6.2 Note: Some engine configurations may also include a fluid warning light.

5.6.3 There shall be a master information light bar with 24 lights located across the center of the dash panel that covers up to 24 functions. These are defined under Indicators and Warning Lights in Section 5.3.

5.7 Chassis Wiring

All chassis wiring shall have XL high temperature crosslink insulation. All wiring shall be color-coded and the function and number stamped at three inch (3") intervals on each wire. All wiring shall be covered with high temperature rated split loom for easy access to wires when trouble shooting. All electrical connectors and main connectors throughout the chassis shall be treated to prevent corrosion.

5.8 Master Electrical Panel

5.8.1 The main chassis breaker panel shall be wired through the master disconnect solenoid and controlled by the three-position ignition rocker switch. The breaker panel shall be located in front of the officer on the interior firewall and shall be protected by a removable aluminum cover. The cover shall have an aluminum notebook holder on the exterior face accessible to

the officer. The cover shall be painted with a durable finish to match the interior of the cab and shall be secured with two (2) thumb screws.

5.8.2 The breaker panel shall include up to 22 ground switched relays with circuit breaker protection. An integrated electrical sub-panel shall be provided and interfaced to the body and chassis through an engineered wire harness system.

5.8.3 Twelve (12) 20-ampere relays and one (1) 70-ampere relay shall be provided for cab light bar and other electrical items. If the option for a mechanical siren has been selected two (2) additional relays shall be provided.

5.8.4 Up to two (2) additional relay boards with circuit breaker protection shall be provided for additional loads as required. Each board shall contain four (4) relays. The relay boards shall be configured to trip with input from switch of positive-negative or load manager by moving the connector on the board (no tools required).

5.8.5 All relay boards shall be equipped with a power-on indicator light (red), input indicator light (green) and power output indicator light (red).

5.8.6 Up to 23 additional automatic reset circuit breakers for non-switched loads that are remotely switched (ie: heater fans, hood lights, etc.) shall be provided.

5.8.7 All relays and circuit breakers on the relay boards shall be pull-out/push-in replaceable.

5.8.8 All circuit breakers on the relay boards shall be 20 ampere automatic reset which can be doubled or tripled for 40 or 60-ampere capacity.

5.8.9 The system shall utilize Deutch DRC weather resistant connectors at the breaker panel, toe board and main dash connections.

5.8.10 All internal wire end terminals, including locking connectors, shall be mechanically affixed to the wire ends by matching terminal crimping presses to assure the highest quality terminations.

5.8.11 All internal splices shall be ultrasonically welded connections and all internal wiring shall be high temperature GXL type wire that is protected by wiring duct wherever possible.

5.8.12 All switches shall be ground controlled; no power going through any rocker switch.

5.8.13 Any switch controlling a relay in the breaker panel shall be capable of being set to function only when the parking brake is set. All relays shall be tagged with the function that the relay is controlling.

5.9 Pump Shift Module

A pump shift module with indicating lights shall be located within easy reach of the driver. A gear lockup shall be provided to hold the transmission in direct drive for pump operation.

5.10 High Idle

The engine shall have a "high idle" switch on the dash that shall maintain an engine RPM of 1,000. The switch shall be installed at the cab instrument panel for activation/deactivation. The "high idle" mode shall become operational only when the parking brake is on and the truck transmission is in neutral.

5.11 Auxiliary Power Points

Two (2) 12-volt 20-ampere auxiliary lighter socket type plug-ins, shall be provided in the cab, one (1) near the driver and one near the officer.

5.12 Vehicle Data Recorder

An Akron / Weldon vehicle data recorder as required by the 2009 edition of NFPA 1901, shall be installed. Vehicle data shall be sampled at the rate of one (1) second per 48 hours, and one (1) minute per 100 engine hours. Software shall be provided to allow the Fire Department to collect the data as needed.

5.13 Interior

The cab interior shall have Zolatone gray/black rubberized, mar resistant, textured finish. The full front and rear headliners and rear firewall shall be finished in gray Durawear.

5.14 Lighting Cab Exterior

Exterior lighting and reflectors shall meet or exceed Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at the time of this bid.

5.15 Halogen Headlights

5.15.1 There shall be dual beam LED rectangular headlights in custom housings on each side of the front of the cab.

5.15.2 Headlight alignment shall conform to SAE J599 August 1997
- DOT Approved FMVSS 108
- SAE J96 ECE Reg. 112
- Sealed to IP67

5.16 Alternating Head Lamp

The headlights shall have an alternating flash feature for emergency response use.

5.17 Cornering Lights

Two (2) Whelen 600 LED scene/cornering lights shall be mounted on the sides of the bumper, one (1) each side. The lights shall come on steady with their coordinating turn signal.

5.18 Lighting Cab Interior

Interior lighting shall be provided inside the front of the cab for passenger safety. Two (2) ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens. One (1) light shall be located over each the officer and driver's position. The lights shall also activate from the open door switch located in each cab doorjamb.

5.19 Door Lights

Whelen Model 500 LED flashing lights shall be provided in each cab door. The lights shall be activated from the open door switch located in each cab doorjamb.

5.20 Lighting Crew Cab Interior

Interior lighting shall be provided inside the crew cab for passenger safety. Two (2) ceiling mounted combination red/clear LED dome lights with a push button on/off switch in the light lens shall be provided. The lights shall also activate from the open door switch located in each cab doorjamb.

5.21 Mirrors

5.21.1 Two (2) Lang Mekra 300 Series smooth chrome plated Aero style main and convex mirrors shall be installed on each side of the vehicle. The main mirror shall be four-way remote adjustable 7 inch x 16 inch second surface chromed flat glass. The convex shall be 6 inch x 8 inch second surface chromed 400 mm radius glass. Each mirror housing assembly shall be constructed of lightweight textured chrome ABS with on truck glass and housing back cover replacement. In the event the mirror breaks the glass shall be replaceable in three (3) minutes or less.

5.21.2 The glass shall include a safety adhesive backing to keep broken glass in place. The mirror assembly shall be supported by a "C" loop bracket constructed of polished stainless steel tube utilizing two (2) point mounting reducing vibration of mirror glass during normal vehicle operation. The lower section of the holder shall include a spring loaded single detent position 20 degrees forward with easy return to operating position without refocusing.

5.22 Mirror Over Officer Window

A mirror shall be supplied over officer's front window for site of bumper in turning situations.

5.23 Helmet Storage

5.23.1 A universal style helmet bracket shall be provided for each riding position.

5.23.2 A placard shall be provided for each riding position warning that injury may occur if helmets are worn while seated.

5.24 Seat Belt Warning System

An Akron/Weldon seat belt warning system shall be provided, and shall monitor each seating position. Each seat shall be supplied with a sensor that, in conjunction with the display module located on the dash, shall determine when the seat belt was fastened and if the seat is occupied. An icon shall represent that the seat is properly occupied. An audible and visual alarm shall be activated if the seat is occupied and/or the belt is not fastened in the proper sequence.

5.25 Driver's Seat

The driver's seat shall be a Bostrom Sierra FX air ride high back, adjustable fore/aft, and upholstered with gray tweed Durawear. A 3-point seat belt shall be provided.

5.26 Officer's Seat

The officer's seat shall be a Bostrom Sierra FX air ride high back seat, adjustable fore/aft, and the seat shall be upholstered with gray tweed Durawear. A three-point seat belt shall be provided.

5.27 Crew Seats

The crew cab area shall have four (4) Bostrom Firefighter™ seats. The seating arrangement shall be two (2) rear facing Bostrom Tanker 450 ABTS SCBA seats and two (2) forward facing Bostrom 400CT ABTS SCBA flip up seats. The seats shall have the following features:

- Integrated three-point seat belts
- "Auto-Pivot and Return" head rest
- Built in lumbar support
- 100% Durawear™ gray tweed seat material

5.28 Flip Up Seat

There shall be one (1) spring loaded flip-up seat (driver's side) on the body header at the jump seat area. The seat shall be supplied with a seat belt. In place of the other seat on the officer's side, there shall be a 45 degree mounted SCBA bracket.

5.29 SCBA Bottle Bracket

5.29.1 The crew seats shall come equipped with an H.O. Bostrom SecureAll™ SCBA Locking System capable securing all U.S. and international SCBA brands and sizes while in transit or for storage on fire trucks..

5.29.2 Locking shall be achieved by pushing the SCBA unit (bottle) against the pivot arm to engage the automatic lock system. A top clamp shall surround the top of the SCBA tank for a secure fit in all directions. The bracket shall be equipped with a center guide fork to keep the tank in-place for a safe and comfortable fit in seat cavity.

5.29.3 All adjustment points shall utilize one (1) tool and be easily adjustable.

5.29.4 The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units.

5.29.5 The release handle shall be integrated into the seat cushion for quick and easy release and shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

5.29.6 A mounted SCBA SecureAll bracket shall be mounted for easy access in the rear passenger area for officers SCBA. Determined at prebid.

5.29.7 The bracket system shall meet NFPA 1901 standards and requirements of EN 1846-2.

5.30 Crew Seat Compartment

A compartment shall be provided under the forward facing crew seats on the back wall of the cab. The compartment shall be full through with an access door on each side accessible from the side of the crew cab doors.

5.31 Steering

The steering system shall be a TRW wheel to wheel steering system that is tested and certified by TRW, consisting of a heavy duty TRW/Ross Model TAS-85 power steering gear, TRW PS36 steering pump, miter box, drag links, and a thermostatic controlled fan cooled system (set point 185 degrees Fahrenheit to 170 degrees Fahrenheit). The steering gear shall be bolted to the frame at the cross-member for steering linkage rigidity. Four (4) turns from lock to lock with an 18 inch diameter slip resistant rubber covered steering wheel. Steering column shall have six-position tilt and two inch (2") telescopic adjustment. The cramp angle shall be 45 degrees with 315mm tires or 43 degrees with 425mm tires providing very tight turning ability.

5.32 Suspension (Front)

The front suspension shall be a variable rate taper-leaf design, 54 inch long and four inch (4") wide. Long life, maintenance free, urethane bushed spring shackles shall be utilized. All spring and suspension mounting shall be attached directly to frame with high strength Huck bolts and self-locking round collars. Heavy duty spring shackles and pins that require grease shall not be acceptable.

5.33 Enhanced Front Suspension System

5.33.1 The front suspension shall have the handling, stability, and ride quality enhanced by the use of a ride tech auxiliary spring system and Koni high performance shock absorbers.

5.33.2 This system shall utilize three (3) stage, urethane auxiliary springs, and high performance gas filled shock absorbers to control the deflection of the leaf springs and dampen vibration normally transmitted to the chassis. This maintenance free system shall be custom tuned to the apparatus gross weight rating for maximum performance, while maintaining a soft compliant ride.

5.33.3 A three (3) year 36,0000-mile warranty shall be provided by the manufacturer.

5.34 Suspension (Rear) 27,000 LB Air Ride

A Hendrickson FIREMAAX model FMX272 air ride rear suspension shall be provided. The suspension shall be a dual air spring design equipped with dual height control valves to maintain proper ride height. To reduce axle stress and maintain axle position and pinion angle the suspension design shall incorporate three (3) torque rods. The ground rating of the suspension shall be 27,000 pounds.

5.35 Tire Pressure Monitor

A Real Wheels LED tire pressure sensor shall be provided for each wheel. The pressure sensor shall indicate if a particular tire is not properly inflated. A total of six (6) indicators shall be provided. Tire pressure sensor shall be manufactured by Doran.

5.36 Front Tires

Front tires shall be Goodyear G291 385/65R22.5, load range J, single tubeless type with a GAWR of 20,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 12.25 10 stud 11.25 bolt circle. Chrome plated lug nut caps shall be provided.

5.37 Front Hub Covers

Polished stainless steel hub covers shall be provided for the front axle.

5.38 Rear Hub Covers

Polished stainless steel hub covers shall be provided for the rear axle.

5.39 Rear Tires

Rear tires shall be Goodyear G661 12R22.5, load range H, highway tread, dual tubeless type with a GAWR of 24,000 pounds. Wheels shall be disc type, hub piloted, 22.5 x 8.25 10 stud with 11.25 inch bolt circle. Chrome plated lug nut caps shall be provided.

5.40 Mud Flaps

Hard rubber mud flaps shall be provided for front and rear tires.

5.41 Wheels

The front and rear wheels shall be ALCOA® brand aluminum. DURA-BRIGHT® finish shall be provided on front and outside-rear wheels. Wheel separators shall be provided between dual wheels.

5.42 Tow Eyes (Front)

There shall be two (2) front tow eyes with three inch (3") diameter holes attached directly to the chassis frame.

5.43 Tow Eyes (Rear)

There shall be two (2) tow eyes attached directly to the chassis frame rail and shall be chromate acid etched for superior corrosion resistance and painted to match the chassis.

5.44 Transmission

5.44.1 The chassis shall be equipped with a Generation IV Allison EVS3000 six (6) speed automatic transmission. It shall be programmed five (5) speed, sixth gear locked out, for fire apparatus vocation, in concert with the specified engine.

5.44.2 An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. The fifth gear shall be an overdrive ratio, permitting the vehicle to reach its top speed at the engine's governed speed. The dipstick shall be dipped in a rubber coating for ease in checking oil level when hot.

5.44.3 The chassis to transmission wiring harness shall utilize Metri-Pack 280 connectors with triple lip silicone seals and clip-type positive seal connections to protect electrical connections from contamination without the use of coatings.

Ratings: Max Input (HP)	450	
Max Input (Torque)	1255 (pound/foot)	
Max Turbine (Torque)	1700 (pound/foot)	
Mechanical Ratios:	1st -	3.49:1
	2nd -	1.86:1
	3rd -	1.41:1

4th -	1.00:1
5th -	0.75:1
Reverse -	-5.03:1

5.45 Transmission Cooler

The apparatus transmission shall be equipped with a Liquid-To-Liquid remote mounted cooler with aluminum internal components. The cooler shall be encased in an aluminum housing and mounted to the outside of the officer's side frame rail for accessibility and ease of service.

5.46 Transmission Fluid

The transmission shall come filled with Castrol TranSynd™ synthetic transmission fluid or approved equal meeting the Allison TES-295 specification.

5.47 Transmission Shifter

An Allison touch pad shift selector shall be mounted to the right of the driver on the engine cover accessible to the driver. The shift position indicator shall be indirectly lit for nighttime operation.

5.48 Front Turn Signals

There shall be two Whelen 400 Series LED rectangular amber turn signal lights mounted one (1) on each side in the front of the headlight housing and one mounted on each side of the warning light housing.

5.49 Wheelbase

The wheelbase shall be approximately 185 inches.

5.50 Windshield Wipers

Two (2) black anodized finish two (2) speed synchronized electric windshield wiper system. Dual motors with positive parking. System includes large dual arm wipers with built in washer system. One (1) master control works the wiper, washer and intermittent wipe features. Washer bottle shall be a remote fill with a four (4) quart capacity. Washer fill shall be located just inside of officer cab door.

5.51 Miscellaneous Chassis Equipment

5.51.1 Fluid capacity plate affixed below driver's seat.

5.51.2 Chassis filter part number plate affixed below driver's seat.

5.51.3 Maximum rated tire speed plaque near driver.

5.51.4 Tire pressure label near each wheel location.

5.51.5 Cab occupancy capacity label affixed next to transmission shifter.

5.51.6 Do not wear helmet while riding plaque for each seating position.

5.51.7. NFPA compliant seat belt and standing warning plates provided.

5.52 Fire Pump Hale QMAX-200

5.52.1 Fire pump shall be midship mounted. The fire pump shall be of the double suction single stage centrifugal type, carefully designed in accordance with good modern practice.

5.52.2 The pump shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI.

5.52.3 The pump body shall be horizontally split, on a single plane, casing type with removable lower casing for easy removal of the entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in the chassis.

5.52.4 All moving parts in contact with water shall be of high quality bronze or stainless steel. Easily replaceable bronze labyrinth wear rings shall be provided. Discharge passage shall be designed to accomplish uniform pressure readings as the actual pump pressure. The rated capacity of the fire pump shall be 2000 gallons per minute in accordance with NFPA# 1901.

5.52.5 The pump shaft shall be rigidly supported by three (3) bearings for a minimum deflection. One (1) high lead bronze sleeve bearing shall be located immediately adjacent to the impeller on side opposite the drive unit. The sleeve bearing shall be lubricated by a force fed, automatic lubrication system, pressure balanced to exclude foreign material. The remaining bearings shall be heavy-duty type, deep groove ball bearings in the gearbox and they shall be splash lubricated.

5.52.6 The pump shaft shall have only one (1) packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland must be a full circle threaded design to exert uniform pressure on the packing to prevent "cocking" and uneven packing load when it is tightened. It shall be easily adjustable by hand with a rod or screwdriver and requiring no special tools or wrenches. The packing rings shall be of a unique combination of braided graphite filament and braided synthetic packing and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

5.53 Pump Transfer Case

5.53.1 The drive unit shall be designed of ample capacity for lubricating reserve and to maintain the proper operating temperature. Pump drive unit shall be of sufficient size to withstand up to 16,000 pounds/ foot torque of the engine in both road and pump operating conditions.

5.53.2 The gearbox drive shafts shall be heat-treated chrome nickel steel. Input and output shafts shall be at least 2-3/4inch in diameter. They shall withstand the full torque of the engine in both road and pump operating conditions.

5.53.3 The engagement of the pump transmission shall be of such design so as to permit transfer of power from road to pump operation only after vehicle is completely stopped. The pump shift shall be air actuated from the cab and have both a green "pump engaged" light, and a green "o.k.-To-Pump" light. A third green light shall be provided on the pump operator's panel for "throttle ready."

5.53.4 The pump drive unit shall be cast and completely manufactured and tested at the pump manufacturer's factory.

5.54 Priming System

The priming pump shall be a Trident Emergency Products compressed air powered, high efficiency, multi-stage, venturi based AirPrime system. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. A single panel mounted control shall activate the priming pump and open the priming valve to the pump. The priming system shall have a five (5) year warranty.

5.55 Pump Certification

The pump, when dry, shall be capable of taking suction and discharging water in compliance with NFPA #1901 Chapter 14. The pump shall be tested by National Testing and shall deliver the percentages of rated capacities at pressures indicated below:
100% of rated capacity at 150 PSI net pump pressure.
70% of rated capacity at 200 PSI net pump pressure.
50% of rated capacity at 250 PSI net pump pressure.

5.56 Mechanical Pump Seal

The pump seal shall be a maintenance free mechanical pump type seal.

5.57 Thread Termination

National Standard Thread shall terminate the inlets and outlets of the apparatus.

5.58 Pressure Governor

5.58.1 Apparatus shall be equipped with a Class 1 pressure governor that is connected to the electronic control module (ECM) mounted on the engine. The governor shall operate as a pressure sensor (regulating) governor (PSG) utilizing the engine's data for optimal resolution and response.

5.58.2 Programmable presets for RPM and pressure settings shall be easily configurable using the menu structure.

5.58.3 Engine RPM, system voltage, engine oil pressure, and engine temperature with audible alarm output for all shall be provided.

5.59 Thermal Relief Valve

5.59.1 There shall be a Hale TRV-L thermal relief valve supplied. The valve shall automatically dump a controlled amount of water to atmosphere when the pump water exceeds 120 degrees Fahrenheit. The valve shall reset automatically.

5.59.2 A light shall be provided at the pump panel, which shall illuminate when the pump reaches 120 degrees Fahrenheit to warn the operator that the pump is automatically dumping.

5.60 Intake Relief

There shall be a Hale stainless steel intake relief valve installed on the intake side of the pump. The surplus water shall be discharged away from the pump operator and terminate with male NST hose thread. System is field adjustable.

5.61 Auxiliary Cooler

An auxiliary cooler shall be furnished to provide additional cooling to the engine under extreme pumping conditions. Water from the pump is to be piped to the coils of the heat exchanger allowing the engine fluid to be cooled as required.

5.62 Valves

All valves shall be Akron heavy-duty swing out 8800/8600 series unless otherwise noted. The valve shall have an all cast brass body with flow optimizing stainless steel ball and dual polymer seats. The valve shall be capable of dual directional flow while incorporating a self-locking ball feature using an automatic friction lock design and specially designed flow optimizing stainless steel ball. The valve shall not require the lubrication of seats or any other internal waterway parts and be capable of swinging out of the waterway for maintenance by the removal of six (6) bolts. The valve shall be compatible with a slow close device. This valve shall be actuated using manual handles, a rack and sector, manual gear, or electric actuator. The manual handles shall be quickly adjustable to one (1) of eight (8) handle positions, and require only 90 degrees travel.

5.63 Valve Warranty

The valves shall carry a ten (10) year warranty.

5.64 Pump Connections

All suction and discharge lines (except pump manifolds) one inch (1") and larger shall be heavy-duty stainless steel pipe. Where vibration or chassis flexing may damage or loosen piping or where a coupling is necessary for servicing, a flexible connection shall be furnished. All lines shall be drained by a master drain valve or a separate drain provided at the connection. All individual drain lines for discharges shall be extended with a 90 degree fitting in order to drain below the chassis frame. All water carrying gauge lines shall utilize nylon tubing.

5.65 Six Inch Pump Inlets

Two (2) six inch (6") diameter suction ports with six inch (6”) NST male threads shall be provided, one (1) on each side of vehicle. The inlets shall extend through the side pump panels and come complete with removable strainer and long handle chrome-plated cap. Six inch (6”) NST to five inch (5”) storks adapter and cap shall be provided with each inlet.

5.66 2.5 Inch Right Side Inlet

5.66.1 One (1) two and one-half inches (2-1/2”) gated inlet valve shall be provided on the right side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer.

5.66.2 The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.

5.67 Two and One-Half Inch Left Side Inlet

One (1) two and one-half inches (2-1/2") gated inlet valve shall be provided on the left side pump panel. The valve shall be supplied with chrome plate female swivel, plug, chain, and removable strainer. The valve shall attach directly to the suction side of the pump with the valve body behind the pump panel.

5.68 Tank to Pump

The booster tank shall be connected to the intake side of the pump with a 1/4 turn three inch (3") full flow valve with check valve, with the remote control located at the operator's panel. The three inch (3") tank to pump line shall run from a bottom sump into the three inch (3") valve. To prevent damage due to chassis flexing or vibration, a short three inch (3") flexible rubber hose coupling shall be used to connect the tank to the intake valve.

5.69 Outlets

The discharge valves shall be an inline tork-lok constructed of brass and be of the quarter turn type of fixed pivot design to allow for ease of operation at all pressures. The valves shall be controlled from the operator's panel and shall be equipped with swing type locking handles. Each valve shall be supplied with two and one-half inches (2-1/2") National Standard Threads and come with chrome plated female caps and chains. Two and one-half inches (2-1/2") or larger discharge outlet shall be supplied with a three-quarter inch (3/4") quarter turn drain valve located at the outlet. All two and one-half inches (2-1/2") and larger discharges shall be supplied with a 30 degree angle down elbow.

5.70 Two and One-Half Inch Left Side Discharges

5.70.1 Two (2) two and one-half inches (2-1/2") gated discharges shall be located on the left side pump panel. The valves shall be of the quarter turn tork-lok ball type of fixed pivot design to allow for ease of operation at all pressures. The valve shall be connected to the discharge side of the pump with the valve bodies behind the pump panel.

5.70.2 A chrome swing type handle located on the pump operator's panel shall control the side discharges.

5.71 Two and One-Half Inch Right Side Discharges

One (1) two and one-half inches (2-1/2") gated discharge shall be located on the right side pump panel. The valve shall be of the quarter turn tork-lok ball type of fixed pivot design to allow for ease of operation at all pressures. The valve shall be connected to the discharge side of the pump with the valve bodies behind the pump panel. A chrome swing type handle located on the pump operator's panel shall control the right side discharges.

5.72 Adapter

There shall be a four inch (4") NST swivel female by five inch (5") Storz adapter with cap and chain on the right side four inch (4") discharge.

5.73 Four Inch Outlet

An Akron four inch (4") electric valve shall be provided on the right side pump panel. The valve shall be controlled by an Akron 9313 controller at the pump operator's panel.

5.74 Two and One-Half inches Outlet Left Rear

There shall be a two and one-half inches (2 ½") gated outlet piped to the left rear, adjacent to the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters. Plumbing shall be two and one-half inches (2 ½") piping and a full flow two and one-half inches (2 ½") ball valve with the control at the pump operator's panel.

5.75 Two and One-Half inches Rear Outlet

There shall be a two and one-half inches (2-1/2") gated outlet piped to the right rear, adjacent to the hose bed. The outlet shall be installed with proper clearance for spanner wrenches or adapters. Plumbing shall be two and one-half inches (2-1/2") piping and a full flow two and one-half inches (2-1/2") ball valve with the control at the pump operator's panel.

5.76 Front Bumper Discharge

A two and one-half inches (2-1/2") discharge with two and one-half inches (2-1/2") plumbing shall be provided at the front bumper. The valve shall be remote controlled at the pump panel.

5.77 Deluge Riser

A three inch (3") deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping shall be rigidly braced. The riser shall be gated and controlled from the pump operator's panel.

5.78 Extend-A-Gun

A Task Force Tips Extend-A-Gun model XG18 shall be provided and installed. The unit shall allow the deck gun monitor to extend 18 inches.

5.79 Deck Gun Monitor

There shall be a Task Force Tips Model XFC-52 Crossfire monitor with safety flow valve mounted above the pump. This shall be connected to the deluge riser and shall be removable. Quad stacked tips, stream shaper, master stream nozzle, and truck mount shall be provided.

5.80 Crosslays

5.80.1 Two (2) crosslay hose beds shall be supplied. The piping and valves shall be two inches (2"), the swivel shall be one and one-half inch (1-1/2"). The valves shall be the "drop-out" style, push/pull controlled from the pump panel.

5.80.2 Each compartment shall hold 200 feet of one and three-quarters inch (1-3/4") double jacket hose. Both beds shall be of the same dimension.

5.81 Crosslay Cover

The crosslays shall be fitted with an .125 inch aluminum cover. The cover shall have a stainless steel hinge and flaps on the sides capable of being securely fastened.

5.82 Tank Fill

A two inch (2") tank fill line shall be provided, using a quarter turn full flow ball valve controlled from the pump operator's panel.

5.83 Pump and Gauge Panels

5.83.1 The panels shall be constructed of brushed stainless steel for maximum protection against abrasion caused during normal use. The pump and gauge panels shall be flush mounted on the aluminum extruded pump module framework.

5.83.2 Pump panels on both sides shall be easily removable. The gauge and control panels shall be two (2) separate panels for ease of maintenance. The upper gauge panel shall be hinged with a full-length stainless steel hinge held closed with a quarter (1/4) turn latch. There shall be one (1) hinged access door as large as possible located over the right side pump panel. This door shall have a full-length stainless steel hinge and a quarter (1/4) turn latching mechanism.

5.84 Valve Controls

5.84.1 The pump controls and gauges shall be located at the left side of the apparatus and properly marked. The control panel shall be laid out in a user-friendly manner.

5.84.2 All valve controls shall have the corresponding discharge gauge located immediately adjacent to control handle to allow operator to view the discharge pressure without searching the panel.

5.85 Escutcheon Plates

The pump panel shall be equipped with color-coded removable escutcheon plates around the suction and discharge valves.

5.86 Color Coding

Each discharge valve control, outlet, and corresponding line gauge shall be color-coded. All signage shall be fastened to the apparatus with stainless steel bolts and locking nuts in addition to the adhesiveness of the signage. The color-coding shall be as follows:

- Front cross lay-Orange
- Rear cross lay– Yellow
- Left side 2 ½ rear discharge - Red
- Right side 2 ½ rear discharge – Half green/ half red
- Deck gun - Silver
- Tank fill – Lime green
- #4 discharges - Green
- Front bumper line- Turquoise
- Tank to pump - Burgundy
- Front bumper line - Blue
- Right rear discharge – Light blue
- Deck gun – Silver
- Inlets – Burgundy
- Tank fill-Lime green

5.87 Pump Module Framework and Pump Finish

The pump module framework and the fire pump shall be painted to match the primary body color. All fittings, pipe ends and valve ends shall be properly taped off prior to applying paint. The paint finish shall be applied before the installation of any wiring, gauge lines, valve linkages, or operator's panel. The paint shall be the same material used for the finished body and cab.

5.88 Running Board Trough

A trough shall be provided in the left side running board. Velcro straps shall be provided to secure the hose.

5.89 Running Board Trough

A trough shall be provided in the right side running board. Velcro straps shall be provided to secure the hose.

5.90 Pump Panel Crows Nest Access Doors

A door shall be provided at the pump panel sides for access to crow's nest.

5.91 Pump Panel Lights

The pump panel controls and gauges shall be illuminated by a minimum of two (2) LED lights.

5.92 Pump Panel Illumination

One (1) pump panel illumination light shall be activated when the pump is engaged.

5.93 Pump Panel Gauges and Controls

The following gauges and controls shall be provided at the pump panel:

- Two (2) certified laboratory test gauge outlets.
- Pump primer control.
- Master drain control and additional drains as needed.
- Tank-fill and pump cooler valve controls.
- Tank to pump valve control.
- Pump capacity rating plate.
- All discharge controls.
- Two (2) master pump gauges.
- Gauges on all one and one-half inch (1-1/2") and larger discharge lines.

5.94 Air Horn Button

A push button switch shall be provided on pump operator's panel to activate the air horns.

5.95 Air Outlet

5.95.1 Two (2) air chucks shall be provided adjacent to the pump operator's panel, one (1) on each side. The system shall tie into the wet tank of the brake system and include an 85-PSI pressure protection valve in the outlet line to prevent the brake system from losing all air. Two (2) 50 foot air hoses shall be provided.

5.95.2 Note: The City will specify type of hose fitting.

5.96 Four Inch Master Gauges

NoShok liquid filled pump pressure and vacuum gauges shall be provided. The gauges shall be four inches (4") in diameter with white faces and black lettering. The gauges shall have a pressure range of 30 inch-0-400 PSI.

5.97 Two and One-Half Inch Pressure Gauges

NoShok liquid filled individual line pressure gauges shall be provided. The gauges shall be two and one-half inches (2-1/2") in diameter with white faces and black lettering. The gauges shall have a pressure range of 0-400 psi.

6.0 Water Tank Gauge

An Innovative Controls weather proof encapsulated fourteen (14) super bright LED light indicator shall monitor the water tank level and shall be mounted on the pump operator's panel. The fourteen (14) LED lights are arranged in a "V" pattern for easy identification of liquid level. When the liquid level reaches less than a one-quarter (1/4) full, the refill level begins to flash. The tank-sensing probe shall be chemical resistant PVC with stainless steel sensing wires. The cover plate shall be aluminum sub-plate, black background and blue graphics, with an outdoor exposure rated composite overlay.

6.1 Body Sub-Frame

6.1.1 The body compartments shall be attached to an aluminum sub-frame using aircraft type Huck fasteners. The sub-frame shall be constructed from six inch (6") by two inch (2") by five-sixteenths of an inch (5/16") structural channel, three inch (3") by one and one-half inch (1-1/2") by three-sixteenths of an inch (3/16") tubing, and one and one-half inch (1-1/2") by three-sixteenths of an inch (3/16") angle. This sub-frame shall rest directly on the chassis frame rails and shall be separated from the chassis using one-quarter inch (1/4") thick ultra-high-molecular-weight (UHMW) polyethylene pads at all contact points.

6.1.2 The bottom of the side body and rear body compartments shall be supported from the chassis frame rails using a steel support system. At the front of the body there shall be a minimum of two (2) steel support members constructed from one-half inch (1/2") by five inch (5") plate and three-sixteenths of an inch (3/16") thick formed channel. These supports shall be secured to the chassis using five-eighths of an inch (5/8") grade-8 zinc-plated bolts.

6.1.3 At the rear of the body there shall be a heavy-duty steel rear platform constructed from one-half inch (1/2") by five inch (5") plate, three-sixteenths of an inch (3/16") and one-quarter inch (1/4") thick formed angles and channels, and two inch (2") by two inch (2") by three-sixteenths of an inch (3/16") tubing. This rear platform shall be attached to the chassis frame rails using five-eighths of an inch (5/8") and three-quarters of an inch (3/4") grade-8 zinc-plated bolts. The bottom of the side body and rear body compartments shall be attached to the steel support system using aircraft type Huck fasteners.

6.1.4 Self-supporting bodies shall not be acceptable.

6.2 Apparatus Body

6.2.1 The body shall be constructed of no less than three-sixteenths of an inch (3/16")#5052 aluminum sheet, #3003 bright aluminum diamond plate, and structural aluminum extrusions. The body shall be of the modular design to allow for proper flexing of the truck chassis. The body shall be custom built and engineered for proper load distribution on the chassis. An insulator material shall be used where aluminum and steel are in contact to prevent corrosion.

6.2.2 The ceilings, sidewalls, and floors of the body compartments shall be constructed of three-sixteenths of an inch (3/16") 5052-H32 smooth aluminum plate with a tensile strength range of 32,000 to 44,000 PSI. Continuous 5356 fill welding shall seal compartment panels.

6.2.3 The body framework shall be constructed of custom-designed aluminum alloy 6063-T5 extrusions with a tensile strength of 35,000 PSI.

6.2.4 To eliminate dead space and to maximize compartment interior space, there shall be no more than one-quarter inch (1/4") between outer and inner walls.

6.2.5 The compartment extrusions shall be slotted full-length on backside for uniform fitting of the aluminum plate work that forms the compartment interiors.

6.2.6 The aluminum extrusion profiles shall incorporate one inch (1") by one and three-quarters inch (1-3/4") recessed continuous door seal at the bottom of the compartment. The extrusions shall be designed to allow unobstructed, sweep-out floors in all compartments.

6.2.7 The front, top, and rear surfaces of body shall be covered with .125 inch bright aluminum diamond tread plate. The forward and rear recessed surfaces shall be flush with the corner extrusions.

6.2.8 The compartment tops shall extend downward over the extrusions and form a drip molding. The material shall be .125 aluminum tread plate with approved aerated service for walking.

6.2.9 The compartment assemblies are to be fastened to the sub-frame with mechanical Huck-type bolts.

6.2.10 The apparatus body shall be a separate module form the pump enclosure and shall not be fastened together in any manner.

6.2.11 Each compartment shall be properly vented with louvers.

6.3 Rear Step Compartmentation

A1-There shall be a compartment provided at the rear step. The compartment shall be approximately 40 inches wide by 40 inches high by 29-1/2 inches deep inside. The compartment shall be provided with a roll-up door. There shall be an access panel in the rear wall of compartment to ensure access to fuel tank sending unit.

6.4 Compartmentation Left Side

6.4.1 L1-There shall be a compartment, ahead of the rear wheels approximately 43 inches wide by 66 inches high by 27-1/4 inches deep.

6.4.2 L2-There shall be a compartment above rear wheel approximately 61-1/2 inches wide by 36-1/2 inches high by 27-1/4 inches deep.

6.4.3 L3-There shall be a compartment behind the rear wheels approximately 53-1/2 inches wide by 66 inches high by 27-1/4 inches deep.

6.5 Compartmentation Right Side

6.5.1 R1-There shall be a compartment ahead of the rear wheels approximately 43 inches wide by 66 inches high by 27-1/4 inches deep at lower half and twelve inches (12") deep at upper half.

6.5.2 R2-There shall be a compartment above rear wheels approximately 61-1/2 inches wide by 36-1/2 inches high by twelve inches (12") deep.

6.5.3 R3-There shall be a compartment behind the rear wheels approximately 53-1/2 inches wide by 66 inches high by 27-1/4 inches deep at lower half and twelve inches (12") at upper half.

6.6 Roll-Up Compartment Doors

6.6.1 The apparatus body shall be equipped with R.O.M Robinson Shutter doors. The door slats shall be double wall box frame, manufactured from anodized aluminum with a satin finish. The doors shall have the following features:

- Manufactured wholly in the United States.
- Concave individual slat design to prevent loose equipment from hindering door operation.
- Co-Extruded stretch resistant inner seal between slats to prevent metal-to-metal contact and inhibit moisture and dust penetration.
- Interlocking swaged/dimpled end shoes shall be utilized to provide a tight fitting assembly and allow for easy removal in the event of damage.
- Effective counter balancing for ease of lifting and lowering the doors.
- One-piece side rail and track to provide an unobstructed slide area and reduce the risk of binding.
- Non-abrasive replaceable water and dust barrier to keep compartment equipment clean and dry.
- A magnetic type switch integral to the door shall be supplied for door ajar indication and compartment light activation.
- A full width positive latch bar shall be operable with one (1) hand, even with heavy gloves.

6.6.2 A door open indicator light shall be provided in the cab.

6.6.3 A 3M clear protective material shall be provided along the outer edge of the compartment floor to protect this area from scratches that could occur when installing or removing equipment from the compartments.

6.7 Roll Up Door Drip Pan/Splashguard

Each roller shutter door shall be equipped with a drip pan with built in splashguard.

The drip pan shall attach to the pennant plate with spring pins to allow for easy removal and cleaning. The construction of the pan shall be a corrosion resistant extruded and injection molded high impact styrene.

6.8 Door Locks

The compartment doors shall be equipped with locks. The locks shall all be keyed alike.

6.9 SCBA Cylinder Compartments

There shall be four (4) spare breathing air cylinder compartments recessed in the rear fender wells, two (2) left and two (2) right. The compartments shall have brushed stainless doors equipped with a weather resistant flush fitting thumb latch. The interior of the door shall incorporate a rubber seal to keep the compartment free of road debris and moisture. The interior compartment shall be constructed of a high-density polyethylene plastic. These shall be capable of storing 45 or 60 minute bottles. Each compartment shall include nylon strapping material attached to the inner compartment that can be secured around the neck of the SCBA bottle and serve as a secondary secure feature.

6.10 Compartment Matting

Turtle Tile interlock matting material shall be provided in each compartment.

6.11 Adjustable Shelf

There shall be two (2) adjustable shelves provided and installed in each compartment. The shelves shall be fabricated of .188 inch aluminum plate.

6.12 Unistrut

Each compartment shall come equipped with 1.625 inch by .875 inch by .125 inch aluminum Unistrut channel. The Unistrut shall be securely fastened to the interior walls of the compartment.

6.13 Hose Bed

The hose bed shall be provided with aluminum slatted flooring radiused at the edges to prevent hose damage from sharp edges. Each hose bed floor section shall be removable for easy access to the water tank.

6.14 Hose Bed Dividier

The hose bed shall be four (4) divided by a three-sixteenths of an inch (3/16") aluminum partition that is fully adjustable by sliding in tracks located at the front and rear of the hose bed. The divider shall be located as needed. The dividers shall have hand holds cut into the rear facing edge to assist in maneuvering on and off the apparatus

6.15 Hose Bed Cover

An aluminum two-piece, hinged hose bed cover constructed of .125 inch aluminum diamond plate and square aluminum extrusion shall be provided for the main hose bed. Four (4) shock assist devices shall be installed to assist in opening covers. Hose bed lighting shall be installed and shall be LED.

6.16 Body Handrails

6.16.1 Handrails shall be constructed of type 304 stainless steel one and one-quarter inch (1-1/4") diameter tubing with bright finish and knurled gripping surface. Mounting flanges shall be constructed from seven (7) gauge, .180 thick, stainless sheet. Each grab rail shall have 90 degree returns to flanges. The ends of grab rail shall pass through the flanges and be welded to form one (1) structural unit. The handrails, shall be mounted using one and one-quarter inch (1-1/4") SS Hex bolts, with a barrier rubber gasket at each flange. Sufficient space shall allow for a gloved hand to firmly grip the rail.

6.16.2 Note: These are in addition to those previously mentioned in the cab section.

6.16.3 There shall be one (1) vertical handrail at rear of the body one each side of the rear compartment.

6.16.4 There shall be two (2) handrails mounted horizontally, above the pump panel, one (1) on each side as large as possible.

6.17 Steps

6.17.1 There shall be fold-down steps mounted on each side of the front face of body to provide access to the top of the pump module and dunnage area.

6.17.2 The rear of the body shall be equipped with fixed steps. The bottom step shall measure fourteen inch (14") by eleven (11") to provide a stable footing position. Each additional step above shall measure fourteen inches (14") x eight inches (8") for clearance while climbing. Thinly fabricated aluminum steps shall not be utilized.

6.17.3 The quantity and location of steps and handrails shall meet the Current NFPA 1901 pamphlet in effect at the time the apparatus is ordered.

6.18 Rear Access Ladder

There shall be a ladder located at the rear of the apparatus to access the top of the vehicle body. The ladder shall be a Ziamatic model RL-2-6 "Quick-Lift" swing out and fold down type. The ladder shall be constructed of one and one-quarter inch (1-1/4") inch heavy-wall aluminum tubing and cast aluminum rungs with a non-skid footing surface. Each step shall be three inches (3") deep by 15.5 inch wide.

6.19 Grab Handle

A chrome grab handle shall be provided in specified locations.

6.20 Rub Rails

The body shall be equipped with anodized aluminum channel style rub rails at the sides. Rub rails shall be spaced away from the body by one-half inch (1/2 ") polymer spacers. The rub rails shall be polished to a bright finish.

6.21 Aluminum Treadplate

All load bearing aluminum treadplate running boards shall be .155 thick bright-annealed finish. Running boards and rear step edges shall be flanged down for added strength. Running boards shall also be flanged up to form kick plates. All non-load bearing aluminum shall be .125 inch thick bright annealed finish. In areas where aluminum treadplate shall function as a load-bearing surface, there shall be a heavy steel sub-structure. This structure shall consist of three inch (3") channel and one and one-half inches (1-1/2") angle welded support. This shall assure that there shall be no flexing or cracking of running boards. The aluminum shall be insulated from the steel by closed cell foam body barrier material.

Treadplate locations

1. Skirting around front bumper.
2. The step at the cab entrance.
3. The jump seat steps.
4. The body header.
5. The running boards.
6. The rear step.
7. The top of the compartments.
8. The rear of the apparatus.
9. The rear fenders.

6.22 Booster Tank

6.22.1 The tank shall have a capacity of 750 U.S. gallons.

6.22.2 The tank shall be constructed of one-half inch (1/2") thick polypropylene sheet stock. This material shall be a non-corrosive stress relieved copolymer thermo-plastic. The booster tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. All joints and seams shall be welded and/or formed and tested for maximum strength and integrity. The top of the booster tank is fitted with removable lifting eyes designed with a three to one (3 to 1) safety factor to facilitate easy removability. The transverse swash partitions shall be manufactured of three-eighths of an inch (3/8") polypropylene and extend from approximately four inch (4") off the floor to just under the cover.

6.22.3 The longitudinal swash partitions shall be constructed of three-eighths of one inch (3/8") polypropylene and extend from the floor of the tank through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are welded to each other as well as to the walls of the tank.

6.22.4 The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of one-half inch (1/2") polypropylene and shall be a minimum dimension of eight inch (8") by eight inch (8") outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have one-quarter inch (1/4") thick removable polypropylene screen and a polypropylene hinged-type cover. The cover tank shall be constructed of one-half inch (1/2") thick polypropylene to incorporate a multi three-piece locking design which allows for individual removal and inspection if necessary.

6.22.5 The sump shall be constructed of one-half inch (1/2") polypropylene and be located in the left front quarter of the tank. The sump shall have a minimum of three inches (3") national

pipe threaded outlet on the bottom for a drain plug. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately two inch (2") above the sump.

6.22.6 All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank.

6.22.7 The tank shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor.

6.22.8 The tank shall be completely removable without disturbing or dismantling the apparatus structure.

6.23 Master Electrical Panel

6.23.1 The main breaker panel shall be wired through the master disconnect solenoid and controlled with a three-position ignition rocker switch. Circuit breakers and flashers shall be located at officer's right side lower interior firewall with removable cover and schematic provided with notebook holder on outside cover.

6.23.2 A deluxe breaker panel with up to 22 ground switched relays with circuit breaker protection shall be provided.

6.23.3 An integrated electrical sub-panel shall be provided and interfaced to the body and chassis through an engineered wire harness system.

6.23.4 Twelve (12) 20-ampere and one (1) 70-ampere relay for cab lightbar and assemblies shall be provided.

6.23.5 If the option for a mechanical siren has been selected, two (2) additional relays shall be provided.

6.23.6 Additional four (4) relay boards with circuit breaker protection for additional loads. Maximum two (2) boards, eight (8) relays per breaker panel. All relay boards shall be set up to trip with input from switch of positive-negative or load manager by moving connector on board (no tools needed to do this).

6.23.7 All relay boards shall be equipped with a power-on indicator light (red), input indicator light (green) and power output indicator light (red).

6.23.8 Up to 23 additional automatic reset circuit breakers for non-switched loads that are remotely switched (ie: heater fans, hood lights, etc.).

6.23.9 All relays and circuit breakers on the relay boards shall be pull-out/push-in replaceable.

6.23.10 All circuit breakers on the relay boards shall be 20 ampere automatic reset which can be doubled or tripled for 40 or 60-ampere capacity.

6.23.11 The system shall utilize Deutch DRC weather resistant connectors at the breaker panel, toe board, and main dash connections.

6.23.12 All internal wire end terminals, including locking connectors, shall be mechanically affixed to the wire ends by matching terminal crimping presses to assure the highest quality terminations.

6.23.13 All internal splices shall be ultrasonically welded connections and all internal wiring shall be high temperature GXL type wire that is protected by wiring duct wherever possible.

6.23.14 All switches shall be ground controlled; no power going through any rocker switch.

6.23.15 Any switch controlling a relay in the breaker panel shall be capable of being set to function only when the parking brake is set. All relays shall be tagged with the function that the relay is controlling.

6.24 Body Electric System

6.24.1 All body electrical wiring in the chassis shall be XLP cross link-insulated type. Wiring is to be color-coded and include function codes every three inches (3"). Wiring harnesses shall be routed in protective, heat resistant loom, securely and neatly installed. Two (2) power distribution centers shall be provided in central locations for greater accessibility. The power distribution centers contain automatic thermal self-resetting breakers, power control relays, flashers, diode modules, daytime driving light module, and engine and transmission data links.

6.24.2 All breakers and relays shall be utilized in circuits which amp loads are substantially lower than the respective component rating thus ensuring long component life. Power distribution centers shall be composed of a system of interlocking plastic modules for ease in custom construction. The power distribution centers shall be function oriented. The first is to control major truck function and the second controls overhead switching and interior operations. Each module shall be single function coded and labeled to aid in troubleshooting. The centers also have accessory breakers and relays for future installations. All harnesses and power distribution centers shall be electrically tested prior to installation to ensure the highest system reliability.

6.24.3 All external harness interfaces shall be of a triple seal type connection to ensure a proper connection. The cab/chassis and the chassis/body connection points shall be mounted in accessible locations. Complete chassis wiring schematics shall be supplied with the apparatus.

6.24.4 The wiring harness contained on the chassis shall be designed to utilize wires of stranded copper or copper alloy of a gauge rated to carry 125% of maximum current for which the circuit is protected without exceeding ten percent (10%) voltage drop across the circuit. The wiring shall be uniquely identified by color code or circuit function code labeled at a minimum of every three inches (3"). The identification of the wiring shall be referenced on a wiring diagram. All wires conform to SAEJ1127 (Battery Cable), SAEJ1128 (Low Tension Primary Cable), SAEJ1560 (Low Tension Thin Wall Primary Cable).

6.24.5 All harnesses shall be covered with moisture resistant loom with a minimum rating of 300 degrees Fahrenheit and a flammability rating of VW-1 as defined in UL62. The covering of jacketed cable shall have a minimum rating of 289 degree Fahrenheit.

6.24.6 All harnesses shall be securely installed in areas protected against heat, liquid contaminants, and damage. The harness connections and terminations shall use a method that provides a

positive mechanical and electrical connection and are in accordance to the device manufacturer's instructions. No connections within the harness shall utilize wire nut, insulation displacement, or insulation piercing.

6.24.7 All circuits shall conform to SAE1292. All circuits shall be provided with low voltage over current protective devices. These devices are readily accessible and protected against heat in excess of component rating, mechanical damage, and water spray. Star washers shall not be used for ground connections.

6.25 Back-up Alarm

An Ecco model SA917 automatic self-adjusting electronic back-up alarm producing 87-112 Db shall be installed at the rear between the frame rails. It shall operate whenever the transmission's reverse gear is selected.

6.26 Compartment Lighting

Each compartment shall be equipped with two (2) LED light strips which shall provide a consistent pattern to illuminate to entire compartment.

6.27 License Plate Bracket

A Cast Products LP0013 cast aluminum license plate bracket with LED light shall be provided at the rear of the apparatus.

6.28 Tail/Stop/Turn Lights

The taillights are to be Whelen 600 LED style. The brake/tail lights shall be four (4) red and exceed SAE requirements. The turn signal shall be populated in an arrow pattern, amber in color. The backup lights are to be halogen. A backup alarm, actuated by backup light circuit, shall be provided.

6.29 LED ICC/Marker Lights

LED type ICC/marker lights shall be provided to meet D.O.T. requirements.

6.30 Step Lights

6.30.1 The pump module running board area shall be illuminated by Whelen 2G four inches (4") diameter LED lights mounted one (1) on each side on the front of the body in chrome flanges.

6.30.2 LED strip lighting shall be provided at the front and rear of the body to illuminate all stepping surfaces.

6.31 Ground Lighting

The apparatus shall be equipped with lighting capable of illumination to meet NFPA requirements. Lighting shall be provided at areas under the driver and crew riding area exits and shall be automatically activated when the exit doors are opened. The ground lights shall be Truck-lite® LED model #44042C. Lighting required in other areas such as work areas, steps, and walkways shall be activated when the parking brake is applied, provided the ICC lights are on.

6.32 Work Lights

There shall be two (2) Whelan PAR-36 LED spot/flood lights provided. The lights shall be securely mounted at the upper rear of the apparatus body. Each light shall be supplied with individual switches.

6.33 Scene Lights

A pair of Whelen M9 LED scene lights shall be installed and controlled from cab dash and reverse switch.

6.34 Optical Warning System

6.34.1 The optical warning system shall be capable of two (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way and the other mode shall signal that the apparatus is stopped and is blocking the right-of-way. Switching shall be provided that senses the position of the parking brake.

6.34.2 A master optical warning device switch shall be provided to energize all of the optical warning devices provided. All lights shall operate at not less than the minimum flash rate per minute as specified by NFPA.

6.35 Upper Level Warning Devices

6.35.1 The upper level is divided into zones A, B, C, and D and the approved lighting package to be provided shall be as follows:

6.35.2 Zone A (front) shall have one (1) Whelen Freedom 72 inch Model FN72QLED NFPA 1901 compliant light bar, with twelve (12) LED modules. The light bar shall have ten (10) red LED and two (2) clear LED heads and shall be mounted on the cab roof.

6.35.3 Zone B (right side) shall be covered by the module from the light bar and the right rear stanchion beacon.

6.35.4 Zone C (rear) shall have two (2) Whelen Model MCFLED2R Micro Edge Freedom LED light bars, red, mounted on rear stanchions.

6.35.5 Zone D (left side) shall be covered by the module from the light bar and the left rear stanchion beacon.

6.36 Traffic Advisor

A Whelen LED TAL65 Traffic Advisor with a TACTRL1 Control Head shall be provided. The low profile Traffic Advisor is approximately one and one-half inch (1-1/2") high by two and one-half inches (2-1/2") deep by 36 inches long. The six (6) LED lamp group is in a cap style extruded aluminum housing with black powder painted finish and surface mounted to eliminate large body panel cutouts. The high intensity LED's shall be rated for over 100,000 hours of operation and have extremely low current consumption. The control head shall have a four (4) function rotary switch for selection of center to left, center to right, center to left and right, or flash patterns. The dip switch on

the rear panel shall select the choice of eight (8) different programmable flash patterns. The control head features a visual LED status display.

6.37 Lower Level Warning Devices

6.37.1 The lower level shall be divided into zones A, B, C, and D and the approved lighting package to be provided shall be as follows:

6.37.2 Zone A (front) shall have a stainless steel warning light housing each side with two (2) Whelen 600 Super LED red lights mounted in the front of each housing. The inboard pair of lights is in addition to the minimum NFPA warning system and shall be wired through a load-shedding device.

6.37.3 Zone B (right side) shall have two (2) Whelen 600 Series Super LED red lights mounted one (1) on the side of the headlight housing and one (1) on the body side at rear of apparatus.

6.37.4 Zone C (rear) shall have two (2) Whelen 600 Series Super LED, red lights mounted one (1) on each side of the rear of the apparatus.

6.37.5 Zone D (left side) shall have two (2) Whelen 600 Series Super LED red lights mounted one (1) on the side of the headlight housing and one (1) on the body side at rear of apparatus.

6.38 Warning Light, Roto-Ray, LED

6.38.1 There shall be one (1) LED Roto-Ray warning light mounted on the front of the cab below the windshield. The Roto-Ray shall contain three (3) independent LED lights, one (1) white and two (2) red.

6.38.2 The lights shall be mounted in a motorized housing and shall be activated by a switch in the cab. The light shall be wired to the parking brake to deactivate when the parking brake has been depressed.

6.39 Siren

One (1) Whelen Model 295 SLSA1 electronic siren shall be installed at the cab instrument panel complete with noise canceling microphone. The horn button in the steering wheel, a switch on right hand side of cab floor, and the control on the siren head shall actuate the siren. A selector switch shall be provided on the instrument panel for control of horn or siren by steering wheel button.

6.40 Siren Speaker

One Cast Products SA4201-5-A weatherproof siren speaker shall be provided mounted behind the bumper.

6.41 Whelen Pioneer Plus LED Brow Light

6.41.1 A Whelen model PFP2 LED brow light shall be provided. The light shall be mounted at the front of the cab.

6.41.2 The light shall be controlled from a switch in the cab.

6.42 Whelen Pioneer Plus LED Scene Light (cab)

6.42.1 Two (2) Whelen model PFP2 LED scene lights shall be provided with PBA203 flush mount brackets. The lights shall be flush mounted, one (1) on each side, in the raised roof portion of the cab.

6.42.2 The lights shall be individually controlled from a switch in the cab.

6.43 Suction Hose and Strainer

6.43.1 Two (2) ten feet (10') lengths of six inch (6") lightweight transparent (KOCHEK) fire department hard suction hose with lightweight long handle couplings and pin lug male couplings shall be provided and shipped loose.

6.43.2 A six-inch (6") floatable strainer especially designed for fire department service. Strainer area equals four and one-half (4.5) times the area of the hose.

6.44 Ground Ladders

6.44.1 The apparatus shall be equipped with heavy duty, box type "I" beam rail, ground ladders. The ladders shall meet the requirements of NFPA 1931 to ensure proper design and that sufficient strength is available for the service intended. The ground ladders shall be constructed of aluminum with non-welded, field replaceable rung to rail connections to simplify field repairs and removable plated steel butt spurs for added strength. A full ½ inch, non-rotting, poly rope shall be provided for easy ladder operation.

6.44.2 One (1) Alco-Lite PEL-24 24 foot two-section aluminum extension ladder.

6.44.3 One (1) Alco-Lite PRL-14 14 foot aluminum roof ladder.

6.44.4 One (1) Alco-Lite FL-10' 10 foot folding ladder.

6.44.5 The ladders shall have lifetime warranty against manufacturing defects.

6.45 Pike Pole

One (1) six-foot (6') Duo-Safety fiberglass pike pole shall be provided and mounted.

6.46 Pike Pole

One (1) eight-foot (8') Duo-Safety fiberglass pike pole shall be provided and mounted.

6.47 Pike Pole

One (1) ten-foot (10') Duo-Safety fiberglass pike pole shall be provided and mounted.

6.48 Ladder Chute

The ground ladders shall be mounted behind the right upper compartments in an area accessible from the rear of the apparatus. The ladders shall be individually located in holders lined with anti-wear strips. An aluminum diamond plate door shall enclose the ladders at the rear. The ladder chute shall be completely enclosed.

6.49 Corrosion Reduction Policy

6.49.1 The manufacturer shall have in place a formal corrosion reduction program and assembly procedures designed for reducing and eliminating the possibility of corrosion. It is understood that the fire apparatus shall operate in harsh environments. At the time of this bid, the apparatus manufacturer must show proof of a corrosion policy. Failure to submit this information will be grounds for rejection. If a formal policy is not in place, explain in your bid how your firm shall take the necessary steps for corrosion reduction. **There shall be no exception to this requirement. This documentation must be submitted with bidder's response in order to be considered further.**

6.49.2 In addition to a formal program the manufacture must show proof of testing corrosion reduction processes to ASTMB117. **A copy of recent test must be included in the bid in order to be considered further.**

6.50 Frame Rails

The chassis frame rails shall be coated with a high performance, two (2) component, reinforced inorganic zinc rich primer with a proven cathodic protection makeup preferably Cathacoat 302HB. The surface shall be clean and free of all salts, chalk, and oils prior to application. Where the primer has been broken during the frame assembly process, the area shall be touched up to reestablish the seal. Prior to finish paint, a second primer Devran 201 shall be applied. Once the assembly of the frame is complete and the second primer is applied, the entire assembly shall be covered with high quality top coat paint preferably Imron 5000 or equal. **The manufacturer must submit with the bid a copy of the product brochure and or description of the primer to be used in order to be considered.**

6.51 Electro Plating

Steel and Iron brackets such as the pump module bracket shall be Zinc plated to protect against corrosion. Plating shall be in accordance with ASTM B663. The apparatus manufacturer shall list all components with plating.

6.52 Fasteners

6.52.1 In any area that a stainless steel screw or bolt head is to come in contact with aluminum or steel, painted or non-painted, the fastener shall have the underside of the head pre-coated with nylon. The nylon coating shall act as a barrier between the fastener head and the metal or painted surface.

6.52.2 Screw or bolt taped into the metal shall be pre-coated with a threadlocker type material pre-applied on the threads.

6.52.3 When bolting together stainless steel the manufacturer shall use a pan-head bolt with nylon coating under the head, a stainless washer with a rubber backing, and a Stover flange nut to secure the bolt.

6.52.4 When mounting aluminum components such as a step to the apparatus body; the manufacturer shall use stainless washers with rubber backing. All mounted components shall have a barrier material between the two (2) surfaces.

6.52.5 All rivet type fasteners shall be of the same material being secured.

6.52.6 Whenever possible, pre-drill and tap all holes for mounting components such as lights, steps and hand rails prior to the paint process to reduce the corrosion opportunity. If a hole must be drilled into a previously painted surface, re-establish the paint barrier around the hole and use a flange-type nutsert with a gasket under the flange.

6.52.7 Where possible, minimize the number of stainless trim screws in aluminum. Structural tape and/or adhesive shall be used where possible for mounting trim to the body or cab.

6.52.8 If a pre-treated screw or bolt is not available, hand apply Dynatex Boltlocker or Theadlocker on the threads of the screw, bolt, or nutsert. This shall help seal threads from moisture and help prevent the fasteners from loosening.

6.52.9 If lubricant is used when tapping the hole, clean out the lubricant and the shavings before applying blue Threadlocker into the hole.

6.53 Barrier Tape

6.53.1 Barrier tape shall be used on the backsides of all lights, trim pieces, or other components when bolting them to the apparatus; also, when attaching stainless steel over an aluminum surface or when attaching aluminum treadplate to the stainless steel. All instances of dis-similar metals contacting each other require the addition of barrier tape between the metals where contact is made.

6.53.2 Before applying the tape, be sure the metal surface is clean from oil or dirt by cleaning the surface with a 50/50 mix of alcohol and water or similar solvent.

6.54 Gaskets

6.54.1 Gaskets shall be used under all snaps, loops, and fasteners for such items as for hose bed covers. Reestablish paint seal around the mounting hole edges after drilling.

6.54.2 Mounting with Threadlocker coating shall be used.

6.54.3 Flat washers with rubber backing shall be used behind all lights that have stainless screws.

6.55 Rollup Doors

6.55.1 One and three-quarter inch (1-3/4") by one-sixteenth inch (1/16") barrier tape shall be used on the frame opening to act as barrier between the aluminum door rail and the painted door opening surface.

6.55.2 Use a paint stick around the holes after drilling and tapping. In mounting the rails, use screws with the nylon under the head and Threadlocker on the threads for mounting the doorframes.

6.55.3 Install barrier tape to the painted surface where the trim is located on top of the door opening.

6.56 Hinged Doors

6.56.1 Barrier tape shall be applied to the painted surface of the body and on the painted hinge side of the door.

6.56.2 On the hinge side, mount tape out toward the edge to space over the barrel of the hinge, being sure to not touch the door.

6.56.3 Make sure the hinge fits into the extrusion frame with no corner weld beads interfering with the door fit. Do not put the hinge in a bind or cause the stainless steel hinge to touch the aluminum. Install the doors using a truss head bolt with the nylon coating under the head and Threadlocker on the threads.

6.57 Painting Steel

The manufacturer shall wipe any oil residue dry, remove any rust and remove weld slag or smoke. Clean the surface with solvent before painting. Prime with one (1) even coat of black color primer, and then spray a topcoat over the primer for the finish coat. After bolts are tightened to the proper torque, touch up the bolt area and ends of the bolts with primer or cold galvanizing coating.

6.58 Mounting Emergency Lights and Options

All emergency lights, accessory mountings, Kussmaul covers, and 110 outlet boxes mounted to the body should be mounted with pre-coated Threadlocker and nylon under the head screws or bolts to minimize corrosion between dissimilar metals.

6.59 Electrical Grounding

6.59.1 Grounding straps shall be installed consisting of a minimum two (2) gauge strap bolted to the chassis frame.

- A ground cable from the cab to the right side frame rail
- From the alternator to the right side frame rail
- From the pump module frame to the right side truck frame.
- Aerials: from the hydraulic and pump module framework.
- From the pump mount to the truck frame rail.
- From the body module to the right side truck frame.

6.59.2 Proper grounding shall help eliminate ground loop problems throughout the truck, reducing the possibility for electrolysis and corrosion to occur. Provide clean connection points on all ground connections, remove paint where applicable and spray or brush on electrical sealer as necessary.

6.59.3 When installing foam system pump wiring the power must come from a dedicated breaker to a power solenoid and then to the power terminal provided by FoamLogix or FoamPro. Pay particular attention to the grounding detail for wire size and good grounding practice, including removing the paint at the point of ground attachment to the chassis. Keep the length of ground wire as short as practically possible.

6.60 Salt Spray Testing

6.60.1 Salt spray test shall be used to confirm the relative resistance to corrosion of coated and uncoated metallic specimens, when exposed to a salt spray climate at an elevated temperature. Test specimens shall be placed in an enclosed chamber and exposed to a

continuous indirect spray of neutral (pH 6.5 to 7.2) salt water solution, which falls-out on to the specimens at a rate of 1.0 to 2.0 ml/80cm²/hour, in a chamber temperature of +35C. This climate shall be maintained under constant steady state conditions.

6.60.2 Method: Salt fog testing shall be performed by placing samples in a test cabinet that has been designed in accordance with Paragraph 4 (Apparatus) of ASTM B117 and operated in accordance with Paragraph 10 (Conditions) of ASTM B117.

6.60.3 A 5% salt solution, prepared by dissolving sodium chloride into water that meets the requirements of ASTM D1193 Specification for Reagent Water, Type IV is supplied to the chamber. At the time the samples are placed into test, the cabinet should be pre-conditioned to the operating temperature of 35ºC and fogging a 5% salt solution at the specified rate. The fog collection rate is determined by placing a minimum of two 80 sq. cm. funnels inserted into measuring cylinders graduated in ml. inside the chamber. One (1) collection device shall be located nearest the nozzle and one (1) in the farthest corner.

6.60.4 Orientation: Unless otherwise agreed upon, the samples are placed at a 15-30 degree angle from vertical or tested in the installed position. This orientation allows the condensation to run down the specimens and minimizes condensation pooling. Overcrowding of samples within the cabinet should be avoided. An important aspect of the test is the utilization of a free-falling mist, which uniformly settles on the test samples. Samples should be placed in the chamber so that condensation does not drip from one to another.

6.60.5 Test durations: Test durations shall be 500 hours except for sample rotation and daily monitoring of collection rates, the cabinet should remain closed for the duration of the test.

6.61 Painting

6.61.1 All exposed metal surfaces not chrome plated, polished stainless steel, or bright aluminum tread plate shall be thoroughly cleaned and prepared for painting. All irregularities in painted surfaces shall be rubbed down and all seams shall be caulked before the application of the finish coat.

6.61.2 All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure finish paint behind all mounted items.

6.61.3 Body assemblies that cannot be finish painted after assembly shall be finish painted before assembly. Both aluminum and steel surfaces to be painted shall be primed with a two (2)-component primer which is compatible with the finish coat. The apparatus shall be finish painted with a polyurethane base/clear system.

6.61.4 A barrier gasket/washer of high density closed cell urethane foam shall be used behind all lights, handrails, door hardware, and any miscellaneous items such as stainless steel snaps, hooks, washers, and acorn nuts. The gaskets/washers shall be coated with pressure sensitive acrylic adhesive. All screws used to penetrate painted surfaces shall be pre-treated/coated under the head with nylon and the threads shall have pre-coat #80. This procedure shall be strictly adhered to for corrosion prevention and damage to the finish painted surfaces.

6.61.5 The following paint process shall be utilized:

A. Surface Preparation

1. Wash surface thoroughly with mild detergent.
2. Clean and de-grease with Prep-Sol 3812S.
3. Sand and feather edge using 400 grit or finer on a dual action sander.
4. Remove sanding dust with a cleaner compatible with polyurethane base coat/clear coat final finish.

B. Substrate treatment
Use a metal conditioner followed with a conversion coating product.

C. Priming
1. Use a priming 615S pretreatment.
2. Use a self-etching primer applied to achieve a 1.5 mil dft minimum.
3. Use Prime N Seal sealer compatible with polyurethane base coat.

D. Color Coat
1. Apply polyurethane base coat 1-2 mil dft minimum.

E. Clear coat
1. Apply polyurethane clear coat 2 mil dft minimum.

F. Paint-Two Tone Cab
The cab exterior surfaces shall be two (2) colors. The paint break line shall be at the bottom of the windshield.

G. Painted Frame
The frame rails and body sub frame shall be painted glossy black.

H. Lettering
Forty three inch (3") Reflexite V98 series letters, with left hand shading and right hand outline to equal three and five-eighths inches (3-5/8") letter, shall be provided.

I. Striping
1. A one inch (1") by six inch (6") by one inch (1") V 98 series Relexite stripe shall be provided across the front of the cab and along each side of the apparatus.
2. An additional one inch (1") Scotchlite stripe shall be provided.

J. Striping, Chevron Style, Rear Body
The apparatus shall have six inch (6") red and yellow V98 Relexite Chevron style striping affixed to the right and left portions of the rear body. The striping shall be set in a manner to have the effect of an inverted "V" shape. The stripe shall travel low to high from the outside to the inside.
Need to have "SAVANNAH FIRE" on the rear

6.62 Miscellaneous Equipment Furnished

6.62.1 One (1) pint of touch-up paint.

6.62.2 A bag of stainless steel nuts and bolts as used in the construction of the apparatus.

6.63 Wheel Chocks

Two (2) Ziamatic #SAC-44 folding wheel chocks with SQCH-44H holders shall be provided. The wheel chocks shall be located in a area close to the rear axles easily accessible from the side of the apparatus.

6.64 Operation and Service Manuals

6.64.1 Complete Operation and Service manuals shall be supplied with the completed apparatus, two (2) printed copies and two (2) CD. Service manual instructions shall include service, maintenance, and troubleshooting for major and minor components of the truck. The apparatus manufacturer shall supply part numbers for major components (i.e. engine, axles, transmission, pump, etc.). A table of contents, hydraulic, air brake, and overall apparatus wiring schematics shall be included.

6.64.2 A video demonstration DVD on the operation of the truck shall be supplied with the manuals.

6.65 Parts Build List

Two (2) printed and two (2) digital (Excel Spreadsheet) copies of the complete parts build data list complete with brand names and part numbers on all components of the apparatus.

6.66 Warranties

6.66.1 The following warranties shall be supplied:

1. The apparatus shall be warranted to be free from mechanical defects in workmanship for a period of one (1) year. The apparatus shall be covered for parts and labor costs associated with repairs for a period one (1) year.
2. Life-time warranty on the frame.
3. Seven (7) year warranty on paint.
4. Ten (10) body structural warranty
5. Ten (10) year cab structural warranty
6. Manufacturers warranties for all major components.

6.66.2 Detailed warranty documents shall be included for complete coverage on each of these warranties.

6.67 Manufacturing and Locations

The apparatus shall be manufactured in facilities wholly owned and operated by the company. A complete stock of service parts and service shall be provided on a 24 hours around the clock basis. The company shall maintain parts and service for a minimum period of 20 years on each apparatus model manufactured. Specification that the vendor must be able to provide in stock replacement parts for delivery to be received within five (5) business days. A list of custom replacement parts not stocked must be presented during the bid process. The vendor must be able to perform warranty repairs within Chatham County by a manufacturer authorized representative.

6.68 New Engine Equipment

6.68.1 Mounts shall be provided for all tools and equipment. Equipment shall be mounted prior to delivery.

6.68.2 New engine equipment list per vehicle. Mounts shall be provided for all tools and equipment.

A. Adapters

Quantity	Item
1	2 1/2"' Gated Hydrant valve Taskforce AC5ANJ-NJ
1	2 1/2"' x 5 Storz Clapper Siamese Taskforce AS9NJ-ST
1	5" Intake Relief Valve Taskforce AB1ST-NX
2	2 1/2"' x 1 ¾ Reducer Taskforce H-A
2	2 1/2"' x 1 ¾ Gated Wye Taskforce AYNJ-NF
1	Manifold 5" Intake w/4-21/2" Gated Outlet & 2.5" Gated outlet
2	5" Storz Hydrant Connections Taskforce AA1HST-NR
2	2 ½" Double male Adapters
2	2 ½" Double Female Adapters

B. Apparatus Equipment

Quantity	Item
4	2-1/2" Spanner Wrenches (aluminum with mount) Taskforce A 3813
4	LDH Spanner Wrenches with mount Taskforce A 3810
2	Hydrant Wrenches Taskforce A 3835
1	LDH Hose Clamp with mount
1	Two Person Hose Roller Taskforce A 3820
5	Traffic Cones 28" Traffic Cones for Less SKU#03-500-80-5
4	ANSI- Certified Expandable Safety Vests XL (break away)
4	Rechargeable Stream light Vulcan LED Hand Lights with charger mounts
1	1 ¾" Foam Eductor Taskforce UE-125-NF -01
2	2 Gallon Water Extinguisher with charging outlet adapter with mounting brackets
1	20 pounds ABC Dry Chemical Extinguisher with mounting brackets
1	Co2 Extinguisher/with mounting brackets
1	Water rescue disk (ResQ Disc)
2	LED back up wands
3	5 gallon buckets
1	30 gallon Rubbermaid tote
2	Water extinguisher shoulder carry harness
1	3/8" Polypropylene Water Rescue Throw Bag
6	Stearns I424 The Comfort Series Utility Vest (personal floatation devices)
2	LY Retractable 3-Section 7075 Aluminum Alloy Hiking Stick Trekking Pole - Black Yellow
1	Medical bag complete//8 section Trauma bag, complete with 1st responder supplies
1	O2 bag complete/Oxygen Case with Oxygen and supplies
1	AED with 1 spare battery (to match current SFES Fleet)
1	Plastic Backboard Load capacity: 400 lbs.
1	Transfer Safety Can 1 Gal, Single Opening
1	150' Capacity Rope Bag with Shoulder Straps

1	3/8” (10mm) x 150' Utility Rope
2	Barricade Tape (Fire line do not cross)
2	Small/med/ XL latex gloves for 1st responders
1	Cylinder straps (to be able to hold (2) bottles
1	Computer (Panasonic CF-31-5 model) with most current programs for: Microsoft office, anti-virus, Cummings/ Allison/ Wabco beaks system, Akron / Weldon vehicle data recorder, any other product that is related to the vehicle. All cable to have proper connection to the vehicle.
1	5 gallon water cooler
1	4’ A frame ladder, rated for 250pound (fiberglass)
1	Mounted Radio 800 Megahertz and antenna (see Section H - Radio Specifications)
4	Portable radio 800 Megahertz & chargers (see Section H - Radio Specifications)

C. Nozzles

Quantity	Item
5	1 ¾” Task Force Tips combination nozzles with shutoffs FTS200PS
2	2 1/2” Task Force Tips Combination Nozzles with shutoffs JTS250PPS
2	2 1/2” Task Force Straight Stream Nozzles with shutoffs and 1”, 1 1/8” & 1 ¼”tips FS-3STACK
1	1 ¾” Task Force Tips foam nozzle FJ-HMX ME2-VPGI
1	2 ½” Distributing Nozzle S-CM
1	2 ½ “ Taskforce Portable Monitor with ball valve XX482-Kit XXX52 KIT
1	Task Force Tips XFC-52 Deck Gun with ground mount

D. High Rise Kit

Quantity	Items
3	50’ 1 3/4"’ High rise Key Combat Ready hose
1	1 ¾” Taskforce tips F564993 smooth bore nozzle with shutoffs
1	50’ 2 ½” High rise Key Combat Ready Hose
1	2 ½’ x 1 ¾” gated wye Task Force AYNJ-NF
1	Small halogen tool Fire Hooks Inc.
2	High rise Hoboken fire bags to carry equipment

E. Tools and Equipment

Quantity	Item
1	8’ Pike pole with fiberglass
1	6’ Pike pole with fiberglass
1	6’ Trash Hook with fiberglass
1	6 lb. Flat head Axe with fiberglass handle
1	6 lb. Pick head Axe with fiberglass handle
1	8 lb. Sledge Hammer with fiberglass handle
1	Square Point 27” Fiberglass D handle

1	Round point Shovel with 27" Fiberglass D handle
1	36" bolt cutter Fire Hooks Inc.
1	Push broom with detachable handle
1	Household straw sweep broom
1	30" Hooligan tool Fire Hooks Inc.
2	Fire Flaps
1	4' Pinch Bar
1	K-Tool Kit
1	4' Water Key with Tee handle
1	Floatable
1	8 x 42 Binocular Bushnell or Nikon
1	Stihl MS 390 Chainsaw with 20" Bar & (5) extra chains, (6) 50 to 1 mix, (1) quart of bar oil
1	2 ½ reducer to 5/8" hose bib
1	25' water hose to fit the 5/8" hose bib
1	Brass hose nozzle (adjustable) for water hose
1	Strap, (shoulder carry) for a set of irons
6	Heavy-Duty Vinyl Laminate Tarp 18oz (FR)(16' X 20')
1	Tool Box (Tool box and contents must be Craftsman Tools)
1	18" Pipe Wrench
1	Set of eight SAE wrenches
1	Set of eight Metric Wrenches
1	10'Adjustable Wrench
1	Set Phillips & Common Screwdriver #1 #2 and #3 tip size
1	Craftsman 4 piece Pliers Set (31799)
1	10" Cable Cutter
1	Wire Cutters
1	Claw Hammer
1	Rubber Mallet
1	25' tape measure
1	Razor knife/ with spare blades
1	Milwaukee Electric Tool Milwaukee 48-32-4402 35 Pc Drill and Drive Shockwave Impact set (00045242196692)
1	Portable Honda Generator EU2000i Companion with mounted light 500 watts 200 AC output LED light
1	ISG Infrasys X380 Thermal Imaging Camera
4	ISG Infrasys X380 Super Light Battery
1	ISG Infrasys X380 Desktop charger
1	ISG Infrasys X380 Vehicle charger (mounted)
1	Milwaukee Electric Tool Milwaukee 2410-22 M12 Cordless 3/8" Drill Driver and extra battery

F. Hose

Quantity	Item
2	10' Hard Suction with strainer
10	50' 1 ¾" Key Combat Ready Double jacket hose Red in Color
20	50' 2 ½" Key Combat Ready Double jacket hose WHITE in Color
10	100' 5" Key Rubber LDH with locking couplings Yellow in color
10	50' 1 ¾" Combat Ready Double jacket hose Yellow in Color
10	50' 1 ¾" Combat Ready Double jacket hose BLUE in COLOR

G. Additional non equipment

Quantity	Items
3	Preventative maintenance servicing (to include all filters/ lube/oil/ etc...) to be performed in a City of Savannah Shop or a certified facility in Chatham County, Georgia.
2	EVT training classes (Class F-3 Fire pumps and accessories) this is for two (2) fire mechanics, travel, meals, accommodations, and final certifications.
1	Verification of alignment from a local vendor.
1	Verification of most current updates on all systems.

H. Radio Specifications

ANTENNA: PCTEL Model MAX7603, 760-870 MHz whip (available through Tessco)

Motorola APX 6500 ASTRO 25 Remote Mount Digital Trunked 700/800 MHz Mobile Radio
PORTABLE RADIO
H98UCF9PW6 N APX6000 700/800 MODEL 2.5 PORTABLE
H64 ALT: PUBLIC SAFETY YELLOW
QA02006 ENH: APX6000XE RUGGED RADIO
Q806 ADD: ASTRO DIGITAL CAI OPERATION
H38 ADD: SMARTZONE OPERATION
Q361 ADD: P25 9600 BAUD TRUNKING
Extreme One sided noise reduction (included as part of XE radio)
Q629 ENH: AES ENCRYPTION
Q498 ENH: MDC & ASTRO P25 OTAR W/ MULTIKEY
QA00582 ALT: LIION IMPRES 4100 MAH FM/CSA IP67
H122 ALT: 1/4- WAVE 7/800 GPS STUBBY (NAR6595A
WPLN7080 APX 7000 IMPRES CG SU APX6000 US/NA/CA/LA
QA01749 ADD: ADVANCED SYSTEM KEY - SOFTWARE KEY
Q947 RADIO PACKET DATA
QA03399 ADD:ENHANCED DATA APX
G996 ADD: PROGRAMMING OVER P25 (OTAP)
QA00583 ADD: ENABLE BLUETOOTH SOFTWARE
QA00782 ENH: ENABLE GPS BASIC FUNCTIONALITY
H43 ENH: RADIO TRACE/ REMOTE MONITOR
NNTN7033A BATT IMP FM RUGGEDIZED LIION 4100M 4300T BLK
NNTN8203 IMPRES XE RSM FM

Mobile Radio

M25URS9PW1 N APX6500 7/800 MHZ MID POWER MOBILE
G806 ENH: ASTRO DIGITAL CAI OP APX
G51 ENH: SMARTZONE OPERATION APX6500
QA01749 ADD: ADVANCED SYSTEM KEY - SOFTWARE KEY
G361 ADD: P25 TRUNKING SOFTWARE
GA00804 ADD: APX O2 CONTROL HEAD

Q947 RADIO PACKET DATA
QA03399 ADD:ENHANCED DATA APX
G996 ADD: PROGRAMMING OVER P25 (OTAP)
G201 ADD:IMPACT GREEN COLOR HOUSING (O2)
G444 ADD: CONTROL HEAD SOFTWARE
GA00229 ENH: APX GPS ACTIVATION
G89 ADD: NO RF ANTENNA NEEDED
W22 ADD: PALM MICROPHONE
G831 ADD: SPKR 15W WATER RESISTANT
Q629 ENH: AES ENCRYPTION
G298 ADD: ENCRYPTION P25 & MDC OTAR
GA00236 ADD: 3 DAY KEY RETENTION APX
W81 ADD: KEY LOCK MOUNT APX

6.69 Self Contained Breathing Apparatus (SCBA)

There shall be six (6) SCBA units and twelve (12) SCBA Cylinders, 18 SCBA face pieces, supplied with apparatus upon delivery. The SCBA shall meet the specs listed below. To match our current fleet, bottles need to have a manufacture date no older than 90 days from delivery date.

6.69.1 Deltair SCBA by Avon Protection General Requirements

- The Deltair SCBA by Avon Protection shall be designed for fire service use to meet the requirements outlined in NFPA and NIOSH standards.
- The apparatus covered by this specification shall be of the open circuit compressed air pressure demand (positive pressure) type.
- It shall be certified by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration for use as either a 30 minute, 45 minute, or 60 minute rated duration breathing apparatus. Additionally, the apparatus must be in compliance with all of the performance requirements of the National Fire Protection.
- Association's 2013 Edition of their NFPA 1981and 1982 standard.
- It shall pass portions of MIL STD 810M.
- It shall pass Intrinsic Safety testing UL913 6th edition.
- The back frame shall withstand 1000 pound lift capacity.

6.69.2 General Components

- The apparatus shall consist of the following major components:
- Two-piece composite back frame assembly with universal cylinder band to accommodate a variety of cylinders from 2216 PSI to 4500 PSI; 30, 45, 60-minute duration.
- A double curve facemask, available in three (3) different sizes with permanent anti-fog and hard coated visor. Facemask shall have inner mask that shall accommodate

"end of service alarm" light display, waterproof microphone for VAS communications, and a spectacle kit mounted on the nose cup. Head harness available in a Kevlar net head harness.

- Integrated Air Switch™ Regulator allows you to switch from ambient air to cylinder air instantly.
- Quick release waist belt and shoulder harness assembly for easy cleaning.
- Enclosed end of service alarms; bell and in-mask head up display (HUD).
- Integrated second stage regulator built into facemask along with the head-up (HUD) display which is completely submersible for easy cleaning and disinfecting.
- Fully sealed first stage pressure reducer.
- Control console with integrated VAS speaker, PASS reset and radio communications control.
- Universal cylinder spoon accommodates all SCBA cylinders.
- Electronics package to include a personal alert safety system, control console with integrated voice amplification and radio/ personal alert safety system controls and analog gauge.
- C-6 battery pack with quick release system.

6.69.3 Pneumatic Assembly

- The first stage sealed pressure reducer shall be protected inside the two-piece back frame assembly.
- The first stage pressure reducer shall be connected to the cylinder valve by a 3/16 inch bore, covered stainless steel and fire retardant rubber wrap over polytetrafluoroethylene high pressure hose.
- The first stage pressure reducer shall have a double spring and a piston that requires no adjustment.
- The 1st stage pressure reducer shall incorporate a self-seating pressure relief valve to prevent high-pressure air from entering the low-pressure side of the assembly and shall require no adjustment.
- All hoses shall attach to the first stage pressure reducer by means of u-clip technology with o-ring seals. High pressure and low-pressure hoses shall be of different sizes so they can only be fitted in their respective positions. All hoses shall then be retained in reducer body by a cover screwed to the reducer body.
- The first stage pressure reducer shall be capable of working at full input cylinder pressure of either 2216 PSI or 4500 psi with no modification or adjustment.

- The first stage pressure reducer shall be capable of accepting breathing air from an outside source through an optional airline pigtail assembly that shall be connected directly to the reducer.

- The airline pigtail shall be attached to the harness waist belt of the wearer for easy connection and disconnection.

- The pneumatic assembly shall be capable of offering an optional dual tether, buddy breathing system that shall allow two (2) or more people to use the same cylinder air in an emergency without unplugging pneumatics in an immediately dangerous to life or health (IDLH) atmosphere.

- All solid state components are waterproof and intrinsically safe.

- The rescue intervention crew fitting shall include a self-checking valve to prevent over pressurizing of a cylinder without venting air to atmosphere.

- The hand wheel connection to the cylinder valve assembly shall be of a large design so that it is easily accessible to the user using gloved or non-gloved hands.

6.69.4 Airswitch Second Stage Demand Valve

- The second stage regulator shall be integrated into the facemask and shall be able to be submersed in disinfectant and water without disassembly.

- The second stage regulator shall incorporate a fresh air mode that allows switching from ambient air to cylinder air instantly.

- The second stage regulator shall incorporate the inhalation and exhalation into one component.

- The second stage regulator shall not protrude from the facemask more than 1 ½ inches.

- The second stage regulator shall be manufactured from rugged non-metallic material that shall not corrode or deteriorate from chemical attack. It must be capable of delivering peak flows in excess of 500 LPM to a minimum of 30 breaths past the sounding of the audible alarm. The demand valve shall have been tested and remained functional after being subjected to direct flame for not less than ten (10) seconds at a peak temperature range of 1500 - 2000 degrees Fahrenheit. The average mean of all peak temperatures shall be no higher than 1742 degrees Fahrenheit. When the flame is extinguished, no part of the assembly shall show an after-flame duration of greater than 2.2 seconds

- The second stage regulator shall incorporate a true emergency bypass, which when manually activated shall flow between 85/120 liters per minute. The bypass on/off hand wheel shall be at least one and one-half inch (1½") in diameter, center mounted on the second stage demand valve, and allow for activation by a gloved hand. It shall take no more than a half turn of the bypass on/off and wheel to activate the bypass fully.

- The second stage demand valve shall incorporate a secondary sintered filter.

6.69.5 Facemask

- The facemask shall be a full facemask type that covers the wearer's nose, mouth and eyes.
- The facemask mask shall have a single intensifier edge seal.
- The facemask visor shall be one piece and constructed of an impact resistant polycarbonate material in a double curve design; it shall be optically correct and have permanent anti-fog and hard coating on the visor. The visor shall be tested to and pass the NFPA Radiant Heat Test.
- The facemask shall have a removable inner mask constructed of the same material as the outer shell of the mask and the inner mask shall be fitted with inlet valves and allow for a nose cup mounted spectacle kit.
- The facemask shall be available in three (3) sizes.
- The facemask shall contain a speech diaphragm and shall be mounted directly in line with the wearer's mouth.
- The facemask shall have a two (2) point pull forward Kevlar net head harness.
- The facemask shall be made of a butyl blend.
- The inner nose cup shall accommodate the end of service alarm light display that shows cylinder pressure in quarter increments, until it reaches 33% of full, by displaying LED lights.
- Voice amplification system and radio interface system shall have an internal waterproof microphone inside the inner nose cup to provide clear communications.
- The in-mask display shall have 7 LED lights. Four (4) lights indicate quarter rating of cylinder pressure, until the 33% of full level. The fifth light indicates low battery status. Personal alert safety system pre-alarm is indicated by alternately flashing red and green LED light. A sixth light indicates radio transmission (green when on and red when transmitting) and blinks green when in voice operated exchange mode and not transmitting. The seventh light shall blink green indicating in range for the telemetry option. It shall blink red for low battery and blink a rapid red for evacuate (along with the audible alarm. Constant red indicates out of range.
- The facemask shall have no loss of operational function after being subjected to direct flame for not less than ten (10) seconds at a peak temperature range of 1500 - 2000 degrees Fahrenheit. The average mean of all peak temperatures shall be no higher than 1742 degrees Fahrenheit. When the flame is extinguished, no part of the assembly shall show an after-flame duration of greater than 2.2 seconds.
- The facemask shall include a robust hanger for hanging the mask when not in use.

6.69.6 Back Frame and Harness

- The back frame shall be made of fire retardant Thermoset Composite, two (2) piece construction to protect the pneumatic system.
- The back frame cover shall be made of a stamped aircraft aluminum material, and the harness assembly and side arms shall be attached to the cover.
- The back frame shall have swinging sidearm to distribute weight for wearer comfort.
- The right and left shoulder straps shall be constructed of two inch (2") woven Kevlar and be padded in areas of contact with PBI/Kevlar. They shall be contoured to the user's body.
- Shoulder strap adjustable slides shall be constructed of stainless steel. Two-inch (2") pull straps shall be fitted to harness to allow easy adjustment even with gloved hands.
- The harness shall have sleeves with reflective graphics for the routing of the pneumatic hoses and electronic cables.
- The harness waist belt shall be of two inch (2") woven Kevlar and be fitted with a "double pull forward" design and incorporate a buckle latch.
- The harness assembly shall experience no loss of operational function after being subjected to direct flame for not less than ten (10) seconds at a peak temperature range of 1500 - 2000 degrees Fahrenheit. The average mean of all peak temperatures shall be no higher than 1742 degrees Fahrenheit. When the flame is extinguished, no part of the assembly shall show an after-flame duration of greater than 2.2 seconds
- The universal cylinder band assembly shall be adjustable in the field to accommodate all sizes of cylinders without the use of tools.
- A universal cylinder band shall be designed so that during cylinder change it can remain in either the closed loop or fully open positions.
- Cylinder changes shall be made without removing cylinder band.
- All SCBA manufacturers' cylinders shall mount easily onto the back frame.
- A standard lumbar support shall be made of PBI/Kevlar
- Flashing locator lights to aid in rescue shall be emitting from the back frame and flash rapidly when the pass is in full alarm.
- Shoulder harnesses shall include large loop style buckles for use with gloved or non-gloved hands.

6.69.7 Alarm and Pressure Indicator Assembly

- The primary "end-of-service" alarm shall be an independent bell. The secondary "end-of-service" alarm shall be a heads-up display with a flashing red light for low air alert.

- The bell alarm shall be located at the top of the back frame, close to the user's ear. The bell shall alarm at 33% of the remaining cylinder life.

- The in-mask display shall have four lights that indicate cylinder pressure, two (2) green, one (1) yellow and one (1) red light. When the cylinder is full, all four lights shall be on. An additional yellow fifth light is off-set from the display indicate a low battery.

- In-mask pressure display shall display one (1) light per quarter increments of cylinder pressure until it reaches the 33% level. As the pressure decreases, the display lights shall go out until the red light is "on" and flashing rapidly as the 33% of full indication.

- One (1) battery source that powers the HUD, personal alert safety system, control console, voice amplification system and radio interface option. They shall be communicating via a wired network.

- A low battery indicator shall illuminate when battery has at least a minimum of three (3) hours remaining.

- A redundant analog gauge shall be incorporated into the console assembly as a backup air pressure indicator.

6.69.8 Control Console

- Personal alert safety system operation shall be displayed within the control console. Light shall change from white to a red LED light when personal alert safety system is in alarm.

- All communications shall be within the control console and can be operated hands free. This includes voice amplification system and radio interface.

- The voice amplification system threshold settings shall have multiple settings and house the information in the HUD.

- The solid state components can be switched between 2216 and 4500 without any component changes.

- The control console shall have a sensor to identify motion.

- The personal alert safety system alarm shall be a wired system from the control console.

6.69.9 PASS

- The personal alert safety system shall activate after 30 seconds of no motion.

- The personal alert safety system shall have motion sensors to detect motion.

- The personal alert safety system shall be enclosed inside the two-piece back frame.

- The personal alert safety system shall only use one (1) piezo alarm to meet the new NFPA standard, reducing battery consumption.

- The personal alert safety system shall have data logging capability to log 2000 events.

6.69.10 Battery

- The SCBA shall only have one (1) battery source to power all standard electronic features to include HUD, personal alert safety system, console radio functions, and voice amplification system.

- The SCBA shall be powered by only six (6) "C" cell batteries.

6.69.11 Rapid Intervention Crew (RIC) Universal Fitting

- The RIC shall have a check valve that stops airflow when the cylinder is full.

- The RIC shall not vent air to atmosphere.

- The RIC connections shall allow a 2216 or 4500 psi cylinder to be used to transfer cylinder air.

6.69.12 Cylinder A Cylinder Valve

- All cylinders supplied with the Deltair are to be approved by the United States Department of Transportation.

- Cylinder valve assemblies shall contain a safety relief device. The cylinder valve shall contain a protected gauge visible from both sides. Cylinder valve hand wheel shall be of the non-ratchet or locking type.

- All high-pressure cylinder valve hand wheels shall be red to identify a high pressure cylinder.

- Low pressure cylinder valve hand wheels shall be black.

- Cylinders are available in 2215 PSI 30 minute carbon and 4500 PSI 30, 45 and 60 minute carbon designs.

6.69.13 Options

- Duo Tether Buddy Breather (Internal) shall provide a two-foot (2') tether from each SCBA when plugged into another Deltair SCBA and stowed inside the back frame. A second Duo Tether Buddy Breather version (External) is an externally stored Kevlar pouch design mounted on the left side of the waist belt with a three foot (3') tether from each SCBA.

- Optional Echo Tracer Ultrasonic Tracking System module shall, when ordered, easily mount on the back frame housing around the cylinder spoon with no required tools. The back frame beacon shall begin transmission when the PASS is in full alarm and cease transmission when PASS is reset.

- Optional Airline attachment shall connect to the first stage reducer using u-clip technology.

- Available airline fittings shall be Hansen HK and Rectus. NIOSH 42 CFR only approval for airline hose sections in 6, 25, 50, 100 and 300 foot sections.

- Optional rescue belt shall replace existing waist belt assembly when attached to the Deltair SCBA and be detachable with no tool to be used as a stand-alone rescue belt. The SCBA shall be able to detach from the rescue belt quickly without removing the rescue belt with the use of two (2) side mounted release straps.

- Radio interface shall be integrated into the Deltair SCBA. An additional radio interface cable is required to connect to user's radio. All radio operations are control console operated and can be put into voice activated or push-to-talk modes.

7.0 Bonding

Bidder's checklist and bond forms are included in Attachment 1. Bid bonds are required to be submitted with a response for a bid to be considered further.

[X] (A) Each bidder shall post a bid bond, certified check or money order made payable to the City in the amount of 5% of the bid price. A company check is not acceptable. No bids shall be read or considered without a proper form of security.

[X] (B) No bond, certified check, or U.S. Money Order is required.

[X] (C) Bidder shall post a payment / performance bond, certified check or money order payable to the City in the amount of 100% of the bid price if awarded the purchase. Such bond(s) are due prior to contract execution as a guarantee that goods meet requirements of the contract including timely delivery, performance specifications and warranty requirements. Such bonds will also guarantee quality performance of services and timely payment of invoices to any subcontractors.

[X] (D)Bidder shall post a performance bond, certified check or money order in the amount of % of the bid price if awarded the purchase. Such bond(s) are due prior to contract execution as a guarantee of timely delivery and that equipment, materials and /or goods are delivered according to specifications.

Whenever a bond is provided, it shall be executed by a surety authorized to do business in the State of Georgia, approved by the City, and must be executed on the attached forms. At the discretion of the City, other forms of security may be considered in lieu of a performance bond.

8.0 General Conditions

8.1 The bid response must include the following documents in this order:

- Bid Proposal Form (as a cover sheet)
- Exception Sheet
- Non-Discrimination Statement
- Proposed Schedule of M/WBE Participation
- Other submittals as stated

All referenced documents must be completed and returned in their entirety to constitute a complete bid.

8.2 Original invoices should be sent to:

City of Savannah
Accounts Payable
P.O. Box 1027
Savannah, Georgia 31402

8.3 The vendor is responsible for determining and acknowledging any addenda issued in connection with this bid solicitation. All addenda issued for this event must be acknowledged in order for a bid to be considered.

8.4 To be awarded bids, vendors must be registered as suppliers on the City of Savannah's website at www.savannahga.gov.

8.5 This contract shall be awarded to the vendor offering the lowest net price to the City, and meeting or exceeding all specifications herein.

EXCEPTION SHEET

Event #4551

If the commodity(ies) and/or services proposed in the response to this bid is in anyway different from that contained in this proposal or bid, the bidder is responsible to clearly identify by specification section number, all such differences in the space provided below. Otherwise, it shall be assumed that bidder's offer is in total compliance with all aspects of the proposal or bid.

Below are the exceptions to the stated specifications:

_____
Date

_____
Signature

_____
Company

_____
Title

BID PROPOSAL FORM

(SUBMIT AS THE COVER SHEET)

City of Savannah Purchasing Department
3rd Floor, City Hall
P. O. Box 1027
Savannah, Georgia 31402
ATTN: Purchasing Director

EVENT NUMBER: 4551

Business Location: (Check One)
_____ Chatham County
_____ City of Savannah
_____ Other

ALL BIDDERS MUST BE REGISTERED VENDORS ON THE CITY'S WEBSITE TO BE AWARDED AN EVENT. PLEASE REGISTER AT WWW.SAVANNAHGA.GOV.

BIDS MUST BE SUBMITTED ON THIS BID PROPOSAL FORM IN ORDER TO BE CONSIDERED.

Name of Bidder: _____

Street Address: _____

City, State, Zip Code: _____

Phone: _____ Fax: _____

Email: _____

DO YOU HAVE A BUSINESS TAX CERTIFICATE ISSUED IN THE STATE OF GEORGIA?
(CHECK ONE) YES: _____ NO: _____

FROM WHAT CITY/COUNTY _____
TAX CERTIFICATE #:_____ FED TAX ID #: _____

INDICATE LEGAL FORM OF OWNERSHIP OF BIDDER (STATISTICAL PURPOSES ONLY):
CHECK ONE: _____CORPORATION _____ PARTNERSHIP
_____INDIVIDUAL _____OTHER (SPECIFY: _____)

INDICATE OWNERSHIP STATUS OF BIDDER
(CHECK ONE):
_____ NON-MINORITY OWNED
_____ AFRICAN AMERICAN
_____ HISPANIC
_____ WOMAN (non-minority)
_____ ASIAN AMERICAN
_____ AMERICAN INDIAN
_____ OTHER MINORITY (describe) _____

Do you plan to subcontract any portion of this project? Yes_____ No _____
If yes, please complete the attached schedule of M/WBE participation. Also complete the schedule if you shall be using any M/WBE suppliers.

THE UNDERSIGNED PROPOSES TO FURNISH THE FOLLOWING ITEMS IN STRICT CONFORMANCE TO THE BID SPECIFICATIONS AND BID INVITATION ISSUED BY THE CITY OF SAVANNAH FOR THIS BID. ANY EXCEPTIONS ARE CLEARLY MARKED IN THE ATTACHED COPY OF BID SPECIFICATIONS.

ITEM NO	DESCRIPTION	ESTIMATED QUANTITY	UNIT PRICE	TOTAL
1	FIRE PUMPER PER SPECIFICATIONS INCLUDING DELIVERY	2 EA		

ITEM NO	DESCRIPTION	ORIGINAL UNIT PRICE	PERCENTAGE INCREASE	TOTAL (ORIGINAL UNIT PRICE x PERCENTAGE INCREASE)
2	UNIT PRICING FOR FIRE PUMPER PER SPECIFICATIONS INCLUDING DELIVERY DURING DAY 91 – 275 FOLLOWING BID CLOSING		1.5%	
3	UNIT PRICING FOR FIRE PUMPER PER SPECIFICATIONS INCLUDING DELIVERY DURING YEAR 2 FOLLOWING BID CLOSING		4.5%	
4	UNIT PRICING FOR FIRE PUMPER PER SPECIFICATIONS INCLUDING DELIVERY DURING YEAR 3 FOLLOWING BID CLOSING		7.5%	

TOTAL EXTENDED PRICING FOR LINE ITEMS 1-4 _____

PAYMENT TERMS: PLEASE CHECK ONE AND FILL IN BLANKS
(Minimum of 10 working days must be allowed for discount to be considered in bid award)

____ Less ____ % ____Days Prompt Payment Discount (if offered)
(_____)

____ Net - 30 Days (no discount offered) - 0 -

TOTAL NET BID $

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TIME REQUIRED FOR DELIVERY AFTER RECEIPT OF ORDER: _____DAYS

HAVE YOU INCLUDED A SET OF CONTRACTOR'S SPECIFICATIONS? _____

HAVE YOU INCLUDED CORPORATE PAPERWORK INDICATING 30 YEARS IN BUSINESS AND 15 YEARS OF SINGLE OWNERSHIP PER SECTION 4.11? _____

HAVE YOU INCLUDED PROOF OF BONDING CAPACITY PER SECTION 4.21? _____

HAVE YOU INCLUDED CERTIFICATION LETTER PER SECTION 4.37.2? _____

HAVE YOU INCLUDED THE REQUIRED DOCUMENTATION PER SECTION 6.49.1? _____

HAVE YOU INCLUDED THE REQUIRED DOCUMENTATION PER SECTION 6.49.2? _____

HAVE YOU INCLUDED THE REQUIRED DOCUMENTATION PER SECTION 6.50? _____

HAVE YOU INCLUDED THE REQUIRED BID BOND? _____

CONFIRM RECEIPT OF ANY ADDENDA ISSUED FOR THIS BID:
ADDENDUM _____#
DATE _____

I certify this bid complies with the General and Specific Specifications and Conditions issued by the City except as clearly marked in the attached copy.

_____	_____	_____
Please Print Name	**Authorization Signature**	**Date**

NON-DISCRIMINATION STATEMENT

The bidder certifies that:

(1) No person shall be excluded from participation in, denied the benefit of, or otherwise discriminated against on the basis of race, color, national origin, or gender in connection with any bid submitted to the City of Savannah or the performance of any contract resulting therefrom;

(2) That it is and shall be the policy of this company to provide equal opportunity to all business persons seeking to contract or otherwise interested in contracting with this company, including those companies owned and controlled by racial minorities, cultural minorities, and women;

(3) In connection herewith, we acknowledge and warrant that this company has been made aware of, understands and agrees to take affirmative action to provide such companies with the maximum practicable opportunities to do business with this company;

(4) That this promise of non-discrimination as made and set forth herein shall be continuing in nature and shall remain in full force and effect without interruption;

(5) That the promises of non-discrimination as made and set forth herein shall be and are hereby deemed to be made as part of and incorporated by reference into any contract or portion thereof which this company may hereafter obtain and;

(6) That the failure of this company to satisfactorily discharge any of the promises of non-discrimination as made and set forth herein shall constitute a material breach of contract entitling the City of Savannah to declare the contract in default and to exercise any and all applicable rights and remedies including but not limited to cancellation of the contract, termination of the contract, suspension and debarment from future contracting opportunities, and withholding and/or forfeiture of compensation due and owing on a contract.

_____ _____

Signature **Title**

PROPOSED SCHEDULE OF M/WBE PARTICIPATION

All M/WBEs listed **must be certified as a minority-owned or women-owned business** by the City of Savannah or a federally-recognized or state-level certifying agency (such as USDOT, State DOT, SBA 8(a) or GMSDC) that utilizes certification standards comparable to the City of Savannah **prior** to the due date of this bid. **Other business certifications that do not specify majority woman or minority ownership may not be substituted**. **Proof of M/WBE certification from the certifying agency is required to accompany the bid.** A firm that has submitted an application for M/WBE certification but has not been certified is not qualified as a certified M/WBE and shall not be recognized as such during the City's evaluation process. To expedite verification, please provide accurate phone numbers for all M/WBEs listed and ensure firms understand contact shall be made following bid submittal.

Name of Proposer:_____ Event No. _____

Project Title: _____

NOTE: Unless certified through the City of Savannah M/WBE Program, proof of M/WBE certification must be attached for all firms listed.

Name of M/WBE Participant	Name of Majority Owner	Telephone	Address (City, State)	Type of Work Sub-Contracted	Estimated Sub-contract Value	MBE or WBE	Certified ? (Y or N)	Certifying Agency? (City of Sav. or Other)
					%			
					%			
					%			
					%			
					%			
					%			

MBE Participation Value: _____ % WBE Participation Value: _____ % M/WBE Participation Value:_____ %

The undersigned shall enter into a formal agreement with the M/WBE Subcontractors/Proposers identified herein for work listed in this schedule, conditioned upon executing a contract with the Mayor and Aldermen of the City of Savannah. The Prime's subcontractor that subcontracts work must enter into a formal agreement with the tier subcontractor identified herein for work listed in this schedule. The Prime may count toward the goal any tier of M/WBE subcontractors and/or suppliers that shall be utilized in the contract work. However, when an M/WBE subcontracts part of the work, the value of the subcontracted work may **only** be counted toward the goal **if the tier subcontractor is an M/WBE**. Any work an M/WBE firm subcontracts to a non-M/WBE firm **shall not count toward the M/WBE goal**. It is the responsibility of the Prime contractor to advise all M/WBEs of this requirement and to ensure compliance by subcontractors.

Joint Venture Disclosure

If the prime bidder is a joint venture, please describe the nature of the joint venture, the level of work and the financial participation to be provided by the Minority/Female joint venture firm in the space provided below.

Joint Venture Firms	Level of Work	Financial Participation

Printed name (company officer or representative): _____

Signature: _____ Date_____

Title: _____ Email: _____

Telephone: _____ Fax: _____

The Minority/Women Owned Business Office is available to assist with identifying certified M/WBEs. Please contact the M/WBE Office at (912) 652-3582. The City of Savannah's certified M/WBE registry is posted on its website @ www.savannahga.gov.

Developing a Strong M/WBE Participation Plan

Key facts every bidder/proposer needs to know prior to developing their M/WBE Participation Plan:

1. All bidders/proposers must submit a "Proposed Schedule of M/WBE Participation" which identifies the minority and/or woman-owned companies that have agreed to participate in the project if awarded. All companies listed on the form must be certified as either **minority**-owned and controlled or **woman**-owned and controlled. The City does not accept a company's "self-identification" as minority or woman-owned.
2. **Proof** of M/WBE certification from the certifying agency is required to accompany the bid; and certification must have been completed by the City of Savannah, a federally-recognized or a state-level certifying agency (USDOT, State DOT, SBA 8(a) or GMSDC) utilizing certification standards comparable to the City of Savannah.
3. The certification must have been approved **prior** to the due date of this bid. A firm that has submitted an application for certification but has **not** been certified shall not be counted toward the M/WBE goal.
4. The M/WBE Office **shall be contacting all M/WBE firms** included in the bidder's M/WBE Plan to confirm each: a) was contacted by the bidder/proposer; b) performs the type of work listed; and c) agreed to participate.
5. To expedite the verification process, bidders/proposers need to: provide accurate phone numbers for all M/WBEs listed; ensure M/WBEs know to expect to be contacted by phone and email; request M/WBEs be accessible during the critical period before bid-opening; and advise M/WBEs that City staff **must** receive the M/WBE's confirmation that the firm agreed to participate in the bid/proposal in order for the prime contractor to receive credit toward their proposed M/WBE participation goals.
6. If a proposed M/WBE cannot be confirmed as certified, performing the type of work described or agreeing to participate, the bidder/proposer shall be notified and given a pre-determined period to submit a correction. If an M/WBE still cannot be confirmed or replaced, the proposed percentage of participation associated with the unverified M/WBE firm shall **not be counted** and **shall be deducted** from the overall proposed M/WBE goal.
7. Any tier of M/WBE subcontractors or suppliers that shall be utilized in the contract work may count toward the MBE and WBE goal **as long as the tier subcontractors/suppliers are certified M/WBEs**. Work that an M/WBE subcontracts to a non-M/WBE firm does **not** count toward the M/WBE goal.
8. M/WBEs must perform a **"commercially useful function"** which is the provision of **real and actual work or products**, or performing a distinct element of work for which the business has the skills, qualifications and expertise, and the responsibility for the actual management and supervision of the work contracted.
9. Per the *Proposed Schedule of M/WBE Participation* "the undersigned (bidder/proposer) shall enter into a formal agreement with the M/WBE Subcontractors/Proposers identified herein for work listed in this schedule, conditioned upon executing a contract with the Mayor and Aldermen of the City of Savannah." **This signed commitment is taken seriously by the City**, so do not list M/WBEs you do not plan to utilize. Any proposed changes must be pre-approved by the M/WBE Office, be based on legitimate business-related reasons, and still meet the M/WBE participation goals per the City's contract.
10. A bidder who is a certified M/WBE may count toward the goal the portion of work or services on a City contract that is actually performed by the M/WBE, including: the cost of supplies/materials purchased or equipment leased for contract work, fees for bona fide services such as professional or technical services, or for providing bonds or insurance specifically required for the performance of a City contract.
11. If awarded the contract, the MWBE Office **shall be reviewing your company's subcontracts, invoices and payment records** to substantiate the completion of work and payment of M/WBEs. If the prime contractor is an M/WBE that is being included in its M/WBE goal, the prime contractor must maintain records **that shall be inspected** to prove the portion of work performed, cost of work, and payments to the prime company.
12. Most bids for goods and materials do not have specific MWBE goals established for the contract. If no goals are include in the scope of work or General Specifications, you are not required to submit MWBE participation but encouraged to do so when the opportunity is available. The City maintains this information for statistical purposes only and it is not reflected in the award decision.