

DULUTH FIRE DEPARTMENT
FIRE ENGINE
TRIPLE COMBINATION PUMPER

ISSUED FEBRUARY 19, 2016

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The City of Duluth is requesting bids for the manufacture, construction, fabrication, equipping, supplying, and delivery of a Fire Engine, triple combination pumper, 1500 gallon per minute Waterous mid-ship mounted fire pump, stainless steel compartmented hosebody, fiberglass booster tank, and all other appurtenances in accordance with the following:

1.0 LETTER OF EXCEPTIONS

The terms, conditions and specifications included in this Invitation for Bids and Specifications describe the Apparatus which the City seeks to purchase. The specifications and performance standards included herein describe an Apparatus which meets the City's minimum standards of performance for the subject Apparatus. However, nothing herein shall be deemed, construed or interpreted as prohibiting any Bidder from bidding substitute component parts, equipment, sub-assemblies, and/or other materials for those specifically specified herein ("Substitution(s)") so long as each and every Substitution shall be of equal or superior grade, quality, and/or function.

To the extent a Bidder's response to this Invitation for Bids and Specifications includes any Substitution(s), Bidder shall include a detailed "Letter of Exception(s)" setting forth for each Substitution the following information:

- a. The number of the specification for which a Substitution is proposed;
- b. A full and complete description of the proposed Substitution, including manufacturer and model number if applicable;
- c. Complete and detailed information regarding all materials including specifications related thereto, means and methods of manufacture, fabrication and assembly, finish and other information as applicable and relevant to the City's determination of whether the Substitution is of equal or better grade, quality, and/or function as compared to the specified specification contained herein.

Failure to include any of this information for any Substitution proposed shall be grounds to disqualify the bid at the sole discretion of the City.

The City reserves the sole and exclusive right to determine whether any proposed Substitution is of equal or superior grade, quality, and/or function to the specification contained in this Invitation for Bids and Specifications and the City's determination shall be final.

To the extent a Bidder does not propose a substitution for any particular specification, the Bidder shall be deemed to have accepted that particular specification as contained herein and have represented that it will comply with that particular specification in the event a Purchase Order is awarded to that Bidder.

2.0 GENERAL REQUIREMENTS

It is the intent of these specifications to cover the furnishing and delivering to the City, a complete apparatus equipped as specified. Minor details of construction and materials where not otherwise specified are left to the discretion of Contractor who shall be solely responsible for the design and construction of all features. Such details and other construction not specifically covered herein or not at variance with these specifications should conform to the intent of the specifications as outlined in National Fire Protection Association (NFPA) Booklet No. 1901 dated 2009. Any test equipment required or expense incurred for the Certification Tests shall be borne by Contractor supplying this equipment.

The following additional design criteria shall be applicable to this specification as appropriate:

- a. American Society for Testing and Materials (ASTM) A-36 specification for structural steel
- b. Society of Automotive Engineers, Inc. (SAE) Handbook
- c. American Society of Non-Destructive Testing (ASNT)
- d. ASNT Guidelines; Procedure SNT-TC_IA
- e. American Welding Society (AWS) AWS014.4-77 Classification and Application of Welded Joints for Machinery and Equipment

3.0 RELIABILITY OF CONTRACTOR:

Contractor shall furnish satisfactory evidence of the ability to design, engineer, construct, equip, and deliver the apparatus specified and shall state the location of the factory where the apparatus is to be manufactured and tested. The apparatus design shall be an "original" generated by Bidder and not reproductions of fire/rescue apparatus designs previously engineered by other Contractors/Manufacturers.

The City reserves the right to determine the competence and financial and operational capacity of any Bidder. Bidder shall furnish information necessary to make this evaluation upon the request of the City.

4.0 DESIGN:

The design of the equipment shall be in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance, and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements which might cause injury to personnel or equipment. NOTE: Where "nibbled" or non-continuous cutting methods are used to machine the body material, all edges shall be reworked/machine smoothed for injury prevention and appearance reasons.

All oil, hydraulic, and air tubing lines and electrical wiring shall be located in protective positions, properly attached to the frame or body structure and shall have protective loom and grommets at each point where they pass through structural members. All air lines and electrical wiring shall remain above the chassis frame rails as much as possible to protect them from damage.

Parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for the best accessibility.

Cover plates which must be removed for component adjustment or part removal will be equipped with disconnect fastenings or hinged panels.

Drains, filler plugs, grease fittings, hydraulic lines, bleeders and check points for all components will be located so that they are readily accessible and do not require special tools for proper servicing. Design practices shall minimize the number of tools required for maintenance.

All components shall be designed and protected so that heavy rain or other adverse weather conditions will not interfere with normal servicing or operation.

All specified stainless steel shall be type 304, 2-B on exterior painted panels and #4-brushed where specified for pump panel overlays and unpainted compartment panels. All specified .125" or heavier smooth painted or swirl finish aluminum shall be 5052-H32 alloy. All specified 4-way aluminum treadplate shall be "polished" treadbrite or equal type 3003 of specified thickness. All specified bolted fasteners shall be coated stainless steel "low profile" button socket head cap screws. All nut fasteners to be Ny-Lok or approved equal, designed to prevent loosening.

Aluminum cannot be substituted for any specified stainless fabrications.

NOTE: Lighter gauges of specified materials will not be substituted, stainless steel body fabrications shall be minimum 12-gauge nominal thickness - all basic requirements must be complied with.

Each bidder shall be prepared, if so requested by purchaser, to present evidence of their design experience/capabilities and manufacturing ability to carry out the terms of the contract.

5.0 SERVICEABILITY:

To insure the Purchaser a source of service and parts over a 20 year anticipated life of the apparatus, the bidder shall provide factory service, fabrication/manufacturing, and testing facilities within a reasonable distance of the Duluth Fire Department Fleet Maintenance facility. This same facility must stock a complete line of all firefighting equipment and parts for this apparatus.

The bidder must also be equipped to offer prompt service on the product at the purchaser's facility if required.

Records as to the purchase source for all auxiliary components of the specified apparatus shall be available to Purchaser upon request. This purchase information shall include manufacturer name, model number, authorized distributor, current part number, and special installation instructions.

6.0 GENERAL WARRANTY

To the extent a Bidder provides any warranty or warranties regarding the Apparatus, any component part and/or sub-assembly thereof, or any equipment supplied therewith, copies of any and all such warranties shall be included with the Bidder's bid at the time such bid is submitted to the City.

The Bidder shall warrant the apparatus and effective materials and workmanship for a period of not less than ONE (1) YEAR, BEGINNING ON THE DATE OF ACCEPTANCE. The Bidder's warranty shall conform to those specified herein.

Under this warranty, Bidder shall furnish any parts to replace those that have failed due to defective material or workmanship.

OPTIONS: Bidders may submit pricing based on extending this warranty period to three (3) years and to five (5) years.

20-YEAR WARRANTY ON STAINLESS STEEL BODY FABRICATIONS

The fire apparatus manufacturer (body builder) shall warrant that the stainless steel body components are structurally sound and shall remain free from corrosion perforation for a period of TWENTY (20) years.

The body builder shall replace, without charge, repair at the factory, or make a fair allowance for any defect in material or workmanship.

10-YEAR APPARATUS PAINT WARRANTY

A TEN (10) year, non-pro-rated paint warranty shall be included with the Apparatus.

7.0 PRINTED PROPOSALS/BIDS

All proposals/documents are submitted in typed format. The only handwriting on the proposal forms will be on the signature lines. Each bid proposal must disclose the legal business address of the bidding Partnership/Corporate Entity, and the address of the factory where the proposed apparatus body is to be manufactured, assembled, and tested/certified.

8.0 PROPOSAL SIGNATURES REQUIRED

All pertinent bid documents must signed by an official authorized to bind the manufacturer/distributor to its provisions.

9.0 CHASSIS PREPAYMENT DISCOUNT

The bid shall list any discount that will be provided for prepayment of the chassis or complete apparatus upon delivery to the Bidder's factory location.

10.0 DETAILED PROPOSAL SPECIFICATIONS

All bidders shall furnish complete "Detailed Proposal Specifications", describing methods and materials of apparatus manufacture. Each and every specification page shall be printed on "Corporate/LLC Letter Head", with same pages numbered in sequence.

Proposal Specifications shall be in the "same sequence" (category and individual feature) as these attached Advertised Specifications, for ease of comparison and evaluation, by the City.

11.0 PROPOSAL PRINT/DRAWING

A complete detailed print of the apparatus as is specified shall be provided. The print shall be to scale, 1" = 15", of the exact apparatus being proposed, and not a stock print of a similar unit. All dimensions are subject to a +/- 1/4 inch tolerance. The print shall have complete views of the driver side with chassis cab, passenger side with chassis cab, rear of the body, top view, and front view, and the layout of the chassis frame and substructure.

11.1 COMPLIANCE:

The drawing as described is part of the Bid Proposal.

12.0 AWARD OF CONTRACT

The contract will be awarded, as soon as possible to the most “responsible bidder”, provided their bid is reasonable and it is in the best interest of the City of Duluth. The City of Duluth reserves the right to waive informalities and to reject any and all bids. The City also reserves the right to accept any item in the bid found to be of superior quality or otherwise preferred by the purchaser.

Price will not be the only basis for award. The competency and responsibility of bidder along with the content of bid specification, accuracy/quality of bid drawing(s), prior experience with specified construction methods and materials will also be considered. The City does not, in any way, obligate itself to accept the lowest or any bid.

Prior to award, the bidder representative will meet with purchasing officials (at Purchasers location) to personally discuss all facets of these specifications to insure a complete and satisfactory understanding of the City of Duluth specifications and the bid

12.1 SCORING MATRIX

The following criteria will be used to evaluate the competency and responsibility of the Bidder:

Bid Specification Criteria Matrix	
Criteria	Maximum Weight
1. Respondent Profile * General Capabilities * Customer Service and commitment to customer needs * Details of service ability * References * ISO and other Certifications	20%
2. Specification Compliance * Areas in excess of specification * Areas not meeting specification * Completeness of proposal * General commitment to RFP	30%
3. General * Delivery time * Terms and conditions of payment * Warranties * Details of warranties * Cost * Past performance (if applicable)	50%

13.0 INSPECTION TRIPS

The City of Duluth Truck Committee members will be advised as to the date of the following phases of construction: Pre-Construction (prior to bending of metal), Pre-Paint (final design/equipment layout), and Pre-Delivery. Truck Committee members reserve the right to travel to the factory during these or any other stages of construction.

Bidder shall arrange for the above specified "Pre-Construction Conference", to be held at the manufacturer's factory, at which time all final designs and equipment mounting locations will be approved. Any changes to original proposal specifications, as approved at the Pre-Construction Conference, will be noted on a "revised specification", and distributed to Truck Committee members within five working days after Pre-Construction Conference.

14.0 ACCEPTANCE TESTS AND REQUIREMENTS

Acceptance tests on behalf of the purchaser shall be prescribed and conducted prior to delivery by the manufacturer's representative in the presence of such person or persons as the purchaser may designate in the requirements for delivery.

15.0 ALTITUDE REQUIREMENTS:

The apparatus shall be designed to meet the specified rating at 2000 feet altitude above sea level.

16.0 ROADABILITY:

PER NFPA 1901.

17.0 MANUALS/CERTS:

A Certificate of Testing shall be furnished to the City, both for the Manufacturer's Preliminary Tests and the third party Certification Tests.

The Manufacturer must supply at the time of delivery, at least **THREE COPIES** of:

1. Engine manufacturer's certified brake horsepower curve showing the maximum no-load governed speed.
2. Manufacturer's record of pumper construction details, per NFPA 1901.
3. Manufacturer's Run-In Certification with preliminary test results.
4. Pump Manufacturer's Certification of Hydrostatic Tests.
5. Pump Manufacturer's Certification of Pump Test Results.
6. The Certification of Inspection/Test of Fire Department Pumper by an Independent Third Party per NFPA 1901 standards.
7. Weight documents from four (4) individual certified scales showing actual loading on the sides of front axle, sides of rear axle(s), and overall (four total) vehicle (with the water tank full but without personnel, equipment, and hose) shall be supplied with the completed vehicle to determine compliance with NFPA section 10-1. Weights shall be for each tire or dual set of tires, so as to verify side-to-side loading, to be in compliance with NFPA section 4.12.2.3.3
8. At least **THREE COPIES** of the complete operation and maintenance manual covering the completed apparatus as delivered including the pump, emergency lighting and siren, generator, or other furnished accessories.
9. Wiring diagrams of 12-volt electrical systems, installed by apparatus body manufacturer (prime contractor). Diagrams must be "vehicle specific", describing all 12-volt electrical functions as furnished on this **and only this** apparatus.
10. A finalized drawing of apparatus as completed.
11. A "Delivery Manual", consisting of a 3-ring notebook type binder with reference tabs for each section, shall be furnished to include the following items: invoice copy(ies), proof of insurance, Manufacturer's Statement of Origin, acceptance forms, certifications, specifications, individual component manufacturer instructions and parts manuals, warranty forms for body, warranty forms for all major components, warranty instructions and format to be used for compliance with warranty obligations, routine service forms/publications, technical publications or training guide for major components, and apparatus body print "as built".
12. Paint numbers of all color coatings.
13. Certifications of water tank capacity.
14. Written load analysis of 12-volt electrical system as installed by body builder.

A test data plate will be provided at the pump operator's position which gives the rated discharges and pressures together with the speed of the engine as is determined by the manufacturer's test for this particular unit. Plate shall also include delivery date, pump serial number(s), original Customer, and the apparatus manufacturer's serial number.

The contractor shall affix a permanent plate in the driver's compartment specifying the quantity and type of fluids used in the vehicle.

All nameplates and instruction plates shall be metal or plastic with the information permanently engraved, stamped, or etched thereon. Metal nameplates to be installed with plated screws. All nameplates are to be mounted in a conspicuous place.

18.0 FAILURE TO MEET TESTS:

In the event that the apparatus fails to meet the test requirements on first trials, a second trial may be made at the option of the Contractor, within thirty 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. Failure to make such changes as the Chief of the Fire Department and/or the purchaser may consider necessary to conform to any clause of the specifications within thirty days after notice is given to make such changes shall also be cause for rejection of the apparatus.

19.0 DELIVERY/CONSTRUCTION:

The period for construction of the vehicle shall be clearly stated, not to exceed 300 working days, and shall include the time required for delivery of the chassis to the bidder's factory.

The completed unit shall be delivered to the purchaser at the Fleet Services Facility, 4825 Mike Colalillo Drive, Duluth, MN 55807 with full instructions provided to Fleet Services on operation, care, and maintenance of apparatus.

20.0 DELIVERY ENGINEER:

Delivery training shall be performed by a factory Delivery Engineer who shall remain with the acceptance committee for up to three (3) days for training and making normal adjustments.

Delivery shall be considered to include, but not be limited to: conducting day or evening classes for instruction of Fire Department personnel and Drivers for operation.

The Delivery Engineer shall be factory trained, fully capable of conducting informative classes on the complete operation of the vehicle. This means familiarity with engine, running gear, transmission, driving skill, as well as handling of pump equipment and all controls.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by City, recognizing the need for either daytime or evening classes. Advance notice of at least one (1) week will be given, advising the specific day on which the new apparatus will be ready.

21.0 APPARATUS SIZE - CAPACITY – SEATING

Total overall length of apparatus shall not exceed 30 ft., highest point of apparatus shall not exceed approximately 120 inches, total overall width of apparatus shall not exceed 101 inches, chassis wheelbase shall not exceed 180 inches (cab to axle of approximately 70") , and GVWR shall be a minimum of 42,000 lbs.

A total of four (three with SCBA) seating positions to be provided, "Fully Enclosed", with approved seat belts. Two seating positions to be located inside forward chassis cab and two (2) inside the rear crew area.

The GAWR, and GCWR or GVWR of the chassis shall be adequate to carry the fully equipped apparatus including full water and other tanks, the specified hose load, unequipped personnel weight (The unequipped personnel weight shall be calculated at 200 lb. per person times the maximum number of persons to ride the apparatus as specified.), ground ladders, and a miscellaneous equipment allowance of 2500 lbs. (2000 lbs. for apparatus with less than 250 cu. ft. of compartment space).

22.0 CUSTOM STYLE CHASSIS

The chassis provided shall be a new, tilt-type custom fire apparatus produced by a single source manufacturer.

The chassis shall be designed and manufactured for heavy-duty service, with adequate strength and capacity for the intended load to be sustained and the type of service required.

22.1 ENGINE

The chassis engine shall be a Cummins ISL9 450 horse power engine.

The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

The engine shall be equipped with: engine mounted oil check and fill with one piece valve cover.

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. When automatically engaged the high idle shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral.

22.1.1 ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

GVG Fire and Emergency Service Vehicle Engine Warning System to be furnished.

22.2 EXHAUST

A single passenger side mounted horizontal muffler shall be furnished with horizontal under frame exhaust pipe. An insulation "blanket" wrap shall be provided on the exhaust delivery pipe for reduction of heat into the cab. Where the horizontal exhaust is provided, the last 18.00" of the tail pipe (outlet) shall be without any restriction of hangers or clamps to ensure an easy deployment of an exhaust extraction hose. Exhaust shall exit on passenger side of vehicle 16" ahead of the rear wheel and 4.00" beneath the rub rail, perpendicular with the body.

The exhaust pipe outlet shall be square cut at the end and be Neiderman compatible.

22.3 DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have an approximate capacity of five (5) to six (6) usable gallons and shall be mounted on the left hand side of the chassis frame. A system shall be in place to prevent freezing of the fluid due to cold weather and winter operations.

22.4 ENGINE COOLANT

Coolant to be Fleetguard, pre-charged SCA, with filter

A remote engine coolant overflow bottle shall be provided in the case of over filling the coolant system. The overflow bottle shall capture the expansion fluid or overfill rather than allow the fluid to drain on the ground. The overflow bottle provided on the cooling system shall only be a catch bottle and shall not return excess coolant back into the surge tank.

22.5 BOOSTER COOLANT PUMP

The specified pump compartment heater core shall be piped to the engine coolant system, installation to include: 12-volt in-line Groco "free-flow" centrifugal cast bronze bodied coolant "boost" pump, additional high grade coolant hose with stainless steel screw type hose clamps, and chassis cab dashboard mounted toggle switch control with engraved nameplate to read: "COOLANT PUMP." Installation of coolant pump shall provide increased rate of coolant flow to assure adequate auxiliary pump pressure gauge heater core temperature during extreme winter conditions.

22.6 GATED AUXILIARY HEATER COOLANT LINES

Engine cooling system chassis cab heater return line shall be equipped with 1/2" i.d. bronze NRS screw type gate valves and 5/8" i.d. neoprene rubber heater hoses extending to specified auxiliary heaters. An additional 1/2" bronze NRS gate valve to be provided on auxiliary heater-to-engine return line. Gate valves shall allow shut down of any or all of the remote auxiliary heating systems that are downstream of the chassis cab heater, should a leak develop.

22.7 ENGINE BLOCK HEATER

A Phillips-Temro 1500-watt, 115 volt block heater or approved equal shall be furnished and installed. It shall be wired to the shore power plug in on the drivers side of the apparatus.

23.0 TRANSMISSION

The transmission shall be a heavy duty Allison Gen IV model EVS 3000PR 6 speed or model suggested by builder.

A transmission temperature gauge, with red light and audible alarm, shall be installed on the cab instrument panel.

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth and sixth speed over drive shall be available with the activation of the mode button on the shifting pad. The transmission retarder control shall be activated by letting off of the throttle pedal. Percentage of activation shall be determined after bid award but prior to ordering of the chassis by the Bidder. The retarder shall be activated 100% @2 PSI by applying the brake pedal.

The transmission retarder shall have a master "On/Off" switch on the instrument panel. A red indicator light shall be provided to warn that the transmission is being over worked.

The retarder shall be wired to the brake lights so they are energized when the retarder is slowing the vehicle down.

If Chassis is equipped with ABS, the ABS system shall automatically disengage the auxiliary braking device when required.

The transmission shall have a five (5) year/unlimited mileage warranty covering 100% parts and labor. The warranty is to be provided by Allison Transmission and not by the apparatus builder.

23.1 TRANSMISSION ACCESSORIES

Transmission shall include a Fire/Emergency PTO provisions, mounting pads left and right sides, designed for (not factory equipped with) mounting of Chelsea 277 style of PTO.

Electronic Transmission Access Connector to be provided.

TranSynd synthetic automatic transmission fluid is to be furnished.

Transmission to include magnetic drain plug, Dash Mounted Push-Button Electronic shift controls, oil check/fill tube, and Electronic Oil Level Check feature.

An external transmission oil cooler shall be provided in addition to the bottom tank cooler in the radiator.

24.0 INDEPENDENT FRONT SUSPENSION AND EQUIPMENT

Independent Front Suspension shall be provided with a minimum weight rating suggested by manufacturer awarded bid. Front axle shall have all heavy duty parts for long life and shall have the largest brakes allowed on for that system. Camber at load shall be zero degrees for optimum tire life.

Front axle shall have brakes that activate with the parking brake of the vehicle. This parking brake system shall be in addition to the main parking brakes on the rear axle due to the excessive hills in the city.

Heavy duty disc brakes shall be used.

25.0 REAR AXLE, SUSPENSION AND EQUIPMENT

The rear axle shall be a Meritor brand "single" rated at suggestion of manufacturer.

Driver controlled traction differential, with differential lock control valve, will be furnished. Control will be on the dash and in easy reach of the driver. A dashboard mounted large red indicator light shall be furnished to indicate "Rear Axle Differential Lock Engaged".

The successful bidder shall review the ratio selection with representatives of the City of Duluth Fleet Services and Fire Department to assure the best selection for the best performance in the City of Duluth.

The rear suspension shall be an air ride system capable of handling the weight of a fully loaded apparatus.

25.1 TIRE CHAINS

Onspot brand six (6) strand automatic ice chains shall be installed on the rear axle of the chassis to provide instant traction while traveling on ice and snow at speeds below 35 MPH.

The tire chain system shall be activated by a locking switch on the dash to deter accidental activation. The light on the switch shall illuminate when the tire chains are engaged. The tire chains shall be interlocked with the transmission and shall engage only if the vehicle is traveling 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or re-engaged.

In addition 2 sets of 2 tire chains (total of 4 chains), one for each of the outside rear duals, built specifically for the size tires of this apparatus shall be supplied. Chain cross links to be "V" bar style.

26.0 FRONT AND REAR TIRES AND WHEELS

Front tires shall be Continental HSU2 315/80R 22.5 or equivalent. The front tire stamped load capacity shall be 17,640 pounds per axle with a speed rating of 75 miles per hour.

Rear tires shall be GOODYEAR 12R-22.5 16PR "H" tubeless radial G622 RSD mixed service tread or equivalent.

Front wheels to be correctly sized Alcoa (preferred) or Accuride, 10-stud-hole aluminum disc with outsides polished, tubeless type, hub piloted.

Rear wheels to be correctly sized Alcoa (preferred) or Accuride, 10-stud-hole aluminum disc, tubeless type, hub piloted with outsides of outer rear wheels polished. Rear inside duals to have air valve extensions provided and installed. Rear duals to also have air gauges that are clearly visible. Gauge type and brand to be provided by Fire Department.

Stainless Steel front and rear wheel hubs to be furnished with oil viewing window on front.

Front tires to be single (two each). Rear tires shall be dual (four each).

26.1 LUG NUT AND CENTER HUB COVERS, FOR CHASSIS' ALUMINUM WHEELS

The specified front and rear driver's and passenger's side aluminum wheels shall be equipped with chrome plated plastic or polished stainless steel (non-corrosive) friction fit lug nut covers and center hub cap covers. Covers to be installed after proper torque of wheel lug nuts has been reached.

27.0 AIR BRAKING SYSTEM

Brake systems shall comply with current regulations and NFPA 1901.

All brake rotors, drums, shoes, or pads shall be the largest possible on the chosen axle for maximum braking without driving or handling deficiencies.

Color-coded nylon brake lines shall be provided. The lines shall be wrapped in a heat protective loom where necessary in the chassis.

FMVSS-121 compliant brakes must be furnished.

27.1 AIR RESERVOIRS

Steel air reservoirs shall be furnished that are sized to handle the braking system. One (1) additional air tank with approximately 1400 cubic inch displacement shall be provided for the use of powering air tools.

27.2 BRAKING PERFORMANCE AND PARKING BRAKE

The apparatus parking brakes shall operate the FRONT and REAR wheels. Park-Release brake control to be furnished should control both front and rear. Placement of control should be easily accessible to a seated driver.

Neither a lock-up device, nor a "Park" position on an automatic transmission can be used to substitute for a separate parking brake system. Brake performance shall comply with all applicable regulations; IE: NFPA, MNDOT, ETC.

NOTE: NFPA requires at a minimum: "the service and parking brake system operating independently shall be capable of positively holding the fully loaded vehicle on all City of Duluth streets, or a maximum grade specified (Approx. 28 degree street) when the vehicle is performing any of its designed stationary functions.

28.0 FRAME AND WHEELBASE

Chassis outboard SINGLE frame rails, left and right sides, shall be clear of protrusions, from back of cab to rear suspension. Frame mounted chassis accessories must be located inside the frame rails, and removable.

The chassis wheelbase shall be approximately 175", with a minimum cab-to-axle distance of 65". Rear of axle frame rails shall be "square-end", extending at least 60" behind centerline of rear axle.

Bidders shall provide all options available for corrosion protection and warranty for frame rails.

29.0 BUMPER/TOW HOOKS

The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be 0.38 thick ASTM A36 steel which shall measure 12.00 inches high with a 3.05 inch flange and shall be 99.00 inches wide with angled front corners.

The bumper shall be primed and painted to match red of cab unless specified by Fire Department.

Front bumper extension shall extend approx. 16" from the front of the chassis to encompass the air horns, sirens, warning lights, and tray for 150' of 1 3/4" rubber jacket hose, couplings, and nozzle. Bumper extension shall be heavy duty built to resist sagging and fatigue.

A gravel pan, constructed of a minimum of .188" bright aluminum treadplate, shall be furnished between the bumper and cab face. The gravel pan shall be properly attached to the top bumper flange with stainless steel bolts to prevent flexing and vibration of the aluminum treadplate. Also, an aluminum treadplate cover with latch and D-ring handle, and stainless piano hinge shall be made for the hose tray with a slot cut in the edge for the hose to go through. Cover shall seal hose tray as much as possible and have a pneumatic hold open cylinder to keep cover in open position.

Two (2) tow eyes, front frame mounted shall be included.

30.0 FUEL TANK

One (1) minimum 50 gallon capacity stainless steel fuel tank shall be provided and mounted to fill on the driver's side of the vehicle at the rear of the chassis.

An Alliance Fuel/Water Separator or approved equal shall be furnished, with heated bowl.

31.0 CHASSIS AND CAB EQUIPMENT

A custom cab design with four doors and retractable safety glass windows shall be provided. The cab shall be specifically built for the fire service and have rubber or air suspension mounts. Chassis shall be equipped with a 10" raised cab for the rear section of the cab. The cab shall be full tilt style.

All cab and crew entry doors shall have electric windows controlled at the window and at the driver side instrument panel.

All cab glass shall be tinted, with front doors to have heated glass if available. A glove box with a drop-down door shall be installed in the front dash panel in the front of the officer's position.

Electric windshield wipers, Arctic Type, shall be furnished with delay and power integral blade windshield washers. The washer reservoir shall be able to be filled without raising the cab.

The engine cover (dog house) shall be insulated for protection from heat and sound. The noise insulation shall keep the DBA level within the limits stated in the current NFPA series 1900. There shall be an access cover at the side or rear that allows all engine fluids to be easily checked. The engine cover shall be as built to allow the most usable space possible in the cab area. The engine tunnel shall be modified on the passenger side to fit the turbo and related components.

There shall be double automotive type rubber seals around the perimeter of the door framing and the door edges to ensure a weather tight fit.

Two (2) window defrost fans shall be provided. Fans shall be mounted to the ceiling of the cab centered above the front dash area.

A single electric horn to be furnished, steering wheel button controlled.

Four (4) cup holders to be provided and installed. Two (2) in front and two (2) in rear.

32.0 CAB EXTERIOR

Four (4), exterior NFPA compliant tubular hand-grab rails shall be furnished. They shall be etched, without rubber inserts, and have a drain hole on the bottom. They shall be located on the left and right sides to the rear of the doors.

Handle type, placement, and options to match existing engine company. Handrail brackets shall have 3" standoff to allow for fire gloves and stainless scuff plates attached to cab.

A chromed front grille shall be provided. A custom red vinyl cold weather front shall be provided. The vinyl cover shall cover only the front cab grill and shall be firmly held in place to prevent it blowing off.

Bright aluminum treadplate shall be overlayed on the outside rear wall of the crew cab except for areas that are not typically visible when the cab is lowered.

32.1 PAINT

Paint schematic, single color, red, to match existing fleet. Paint numbers to be provided upon award. Chassis, including: frame rails, cross members, axles, and suspensions, to be painted black.

32.2 MIRRORS

Retrac Aerodynamic West Coast style dual vision mirror heads model 613315 shall be provided and installed each of the front cab doors. The adjustment control switches for both mirrors shall be mounted within easy reach of the driver. The flat and convex mirrors shall both be heated for defrosting in cold weather conditions. The mirror backs shall include an amber marker light. The heat for the rearview mirrors shall be controlled through a rocker switch on the dash in the switch panel.

32.2.1 AUXILIARY EXTERIOR MIRRORS

The cab exterior shall include three (3) Retrac convex mirrors. The mirrors shall measure 5.50 inches X 7.50 inches. Three (3), (1) passenger side down-view mirror shall be furnished above officer's door. Two (2), one on each side in front of rear passenger doors to allow for occupants to see oncoming traffic before exiting vehicle. Mirrors shall be placed high enough so as not to interfere with vision of the side rear view mirrors.

32.3 SIDE SCENE LIGHTS

The cab shall include two (2) Whelen model Pioneer PCPSM1C semi-recess mount lights installed one (1) on each side of the cab. Each lamp head shall have two (2) 12 volt high intensity LED panels. Each lamp head shall be mounted within a semi-recessed fifteen (15) degree housing featuring a chrome flange. The lamp heads shall be powder coated white.

32.3.1 SIDE SCENE LIGHT LOCATION

The scene lighting located on the left and right sides of the cab shall be mounted rearward of the cab "B" pillar in the 10.00 inch raised roof portion of the cab between the front and rear crew doors.

32.3.2 SIDE SCENE ACTIVATION

The scene lights shall be activated by two (2) rocker switches located in the switch panel, one (1) for each light the two door switches on each side of the cab and with setting the parking brake.

33.0 CAB INTERIOR AND SEATING

The cab and dash fascia shall be a flat faced design to provide for ease of maintenance. The engine tunnel shall be padded and covered with a material that is resistant to oil, grease, and mildew. It shall be as compact as possible to allow for the most room available for the driver and officer. The headliner shall be installed in both forward and rear cab sections. Headliner material shall be of an approved material. A sound barrier shall be part of its composition. Forward portion of the cab headliner shall provide easy access for servicing electrical wiring or for other maintenance needs without removing entire unit. Gray interior or approved color shall be furnished.

Heater, defroster and air conditioner to be furnished for cab. Air conditioner components shall be on cab roof.

Separate heater and A/C blower controls for the front and rear of cab if possible.

A separate rearward facing heater that is mounted on the floor in the rear of the cab under the specified interior cabinet shall be provided and installed with heat and fan controls on the unit.

Driver's seat shall be a H.O Bostrom Sierra Air or approved equal with 5" travel option, fore and aft adjustment, suspension cover, and Black Duracoat Vinyl seat covering. Space below seat shall incorporate the largest heater possible with an on/off switch on the dash within easy reach of the driver similar to current engine.

Officer's seat shall be a H.O. Bostrom Tanker 450 Air or approved equal with 5" travel option, fore and aft adjustment suspension cover, cavity cover, and Black Duracoat Vinyl seat covering or equivalent covering that will provide a durable and cleanable surface. SCBA bracket shall be Smartdock Gen 2 for Scott 4.5 SCBA. Space below seat shall incorporate the largest heater possible with an on/off switch on the dash within easy reach of the officer similar to current engine.

Rear outboard forward facing seats shall be two (2) H.O. Bostrom Tanker 400 Air or approved equal. They shall have cavities for Scott 4.5

SCBA, with cavity covers, and suspension covers. The seat covering shall be Black Duracoat Vinyl. SCBA bracket shall be Smartdock Gen 2 for Scott 4.5 SCBA.

In order to maximize leg room Officers and drivers seats shall be set back as far as practical.

Rear outboard rear facing seats shall be two (2) H.O. Bostrom firefighter series. The seat shall feature a tapered and padded seat and cushion. The seat and cushion shall be spring load hinged and compact in design for additional room and shall remain in the stored position until occupied.

Five (5), large 7" or approved equal 12-volt clear cab dome/red map lights with a switch on each side of the light to allow choice of the clear light, the red light, or both. Two light fixtures will be located in the front of the cab and three lights will be mounted in the rear of the cab. The lights will be activated by the door switch and can be turned on manually with the switches located on the lights.

Seat belts and/or safety straps shall be red and conform to all applicable regulations, all 3-point type.

Adjustable "tilt" and "telescope" steering wheel column is to be furnished with steering wheel.

33.1 CONTROLS, INSTRUMENTS, ELECTRICAL SYSTEMS

Diagnostic interface connector located below dash.

33.2 RADIO

One AM/FM/CD/WB cab mounted radio to be provided with four (4) radio speakers, two in front and two in rear, and an AM/FM antenna mounted on forward driver side roof. Isolated in-line fuse protected wiring shall be provided, extending direct from battery to chassis cab AM/FM/CD/Weatherband Radio so as to support preset stations and clock, if any.

34.0 NFPA MODIFICATIONS TO CHASSIS:

The following modifications shall be made by the apparatus body builder, to the furnished fire apparatus truck chassis. Each modification shall be described within the Manufacturers proposal specifications so as to prove compliance or non-compliance with the following:

34.1 AUDIBLE DEVICE INSTALLATION STANDARDS

Where furnished, air horns, electric siren, electronic siren speakers, and other audible emergency equipment will be mounted as low and as far forward on the apparatus as practical. Audible warning equipment will not be mounted on the roof of the chassis cab, or the roof of any crew cab.

34.2 GROUND CLEARANCE STANDARDS

Axle housings will clear the road surface by at least 8" and an angle of departure of at least 8 degrees will be maintained at rear of the vehicle, even when fully loaded.

34.3 NON-REMOVABLE IGNITION DEVICE

The chassis ignition actuation will be by a rotary/toggle keyless switch.

34.4 "OPEN DOOR" INDICATOR

An indicator light shall be furnished and installed within clear vision of the driver, wired to all compartment light automatic door switches so as to indicate "OPEN" apparatus body compartment door. Indicator light to be Red, minimum 2" diameter, visible to driver and officer, identified with permanent engraved nameplate to read; "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

34.5 OVERALL HEIGHT/WIDTH/LENGTH/WEIGHT DATA PLATE

There shall be a high-visibility placard located in direct view of the seated Driver, which shall indicate, in feet-and-inches; the overall height of the vehicle (to the highest permanent point-except antennas), the overall width (at steps, fenders, and rubrails-not retractable mirrors), and overall length of vehicle (bumper to tailboard). The data plate shall also indicate, in pounds, the vehicle's total "as delivered" weight.

35.0 CHASSIS MODIFICATIONS SPECIFIC FOR PUMPER APPLICATION:

35.1 SPEED GOVERNOR TEST

Engine limiting speed governor will be tested, upon arrival to the apparatus body builder's factory for compliance with the maximum no-load engine operating speed, as determined on appropriate engine power curve sheet.

35.2 SUSPENSION AND FRAME CORROSION PROTECTION

Rear axle suspension brackets, left and right sides, front and rear, will be caulked with silicone sealant preventing build-up of road salts and moisture that may cause future corrosion of bracket-to-frame-rail attachment points.

35.3 SUSPENSION LUBRICATION ACCESS

Rear suspension grease zerks will be replaced with 90 degree zerks allowing lubrication from beneath the apparatus body.

35.4 CHASSIS CAB STEP RUNNINGBOARDS

The driver, officer and crew cab steps shall be as wide as possible and shall be at least 8.00" of depth.

A large slip resistant handrail shall be provided adjacent to all door openings to assist entrance and exit of the cab.

A handrail shall be provided inside each cab door for ease of entry.

35.5 MASTER BATTERY CUT-OFF SWITCH

A master battery switch, to activate the battery system, shall be provided inside the cab within easy reach of the driver

36.0 CHASSIS MODIFICATIONS

36.1 LIGHT PACKAGE ACTUATION CONTROLS

The entire warning light package shall be actuated with a single master warning switch in the cab switch panel. The wiring for the warning light package will engage all of the lights required for "Clearing Right of Way" mode when the vehicle parking brake is not engaged. An automatic control system will be provided to switch the warning lights to the "Blocking the Right of Way" mode when the vehicle parking brake is engaged.

36.2 SWITCH PANEL WITH POWER CONTROL

Specified emergency lighting fixtures, non-emergency lighting fixtures, and electrical components shall be individually activated following specified illuminated switches. Emergency lighting switches to be illuminated RED, non-emergency switches to be illuminated GREEN. An illuminated "MASTER EMERGENCY SWITCH", shall be furnished, providing power for individual emergency lighting switches. Back-lit nametags, describing function of each individual switch, to be located centerline of each switch. Switches to be mounted on a removable electrical panel, raised and sloped rearward to prevent windshield glare.

Controls and switches, which are expected to be operated by the driver while the apparatus is in motion, are to be within convenient reach of the driver. The controls to operate the siren to be within convenient reach of both driver and front passenger (officer). Final layout and location to be approved by fire department at preconstruction.

36.3 SOLDERED AND HEAT SHRINK PROTECTED EMERGENCY FIXTURE WIRING

The following specified emergency lighting fixtures shall have their wiring leads "soldered" (crimp or disconnect connectors are not acceptable), with all soldered joints covered with heat-shrink vinyl protection material.

36.4 GRILLE WARNING LIGHTS

FOUR (4), Whelen model 600 Series, 4" x 6" rectangular LED lightheads and four(4) chrome plated surrounds to be furnished, surface mounted located independent of each other on the front of the cab. Light lenses to be 6" wide x 4" high, driver's Red, passenger's side Red. Lights to be activated by a separate illuminated rocker switch identified by function. Lights to be completely sealed for weather resistance.

There shall also be TWO (2) Whelen 500 series TIR6 rectangular flush mounted emergency LED lights complete with associated 5E chrome surround flanges to be furnished and installed on radiator grille guard. Lights to be activated by the same switch as above.

Final location to be determined at preconstruction meeting.

36.5 WIG-WAG HEADLIGHTS

The chassis headlights shall alternately flash between high and low beam left and right when emergency lights are activated. There shall be a switch in the master warning light bank to activate this function.

Note: This function must be disabled with application of chassis parking brake per NFPA 1901.

36.6 EMERGENCY LED WARNING LIGHTS

Two (2), Whelen model 600 series, 4" x 6" rectangular LED lighthoods and two (2) chrome plated surrounds to be furnished, surface mounted located driver and passenger front bumper sides. Light lenses to be 6" wide x 4" high, driver's Red, passenger's side Red. Lights to be activated by a separate illuminated rocker switch, identified by function.

Four (4), Whelen model 600 series, 4" x 6" rectangular LED lighthoods and four (4) chrome plated surrounds to be furnished, surface mounted located driver and passenger side at rear edge of cab near roof and runningboard. Lights to be activated by a same illuminated rocker switch as above lights.

36.7 LIGHTBAR

One (1) Whelen FN72VLED 72" lightbar with permanent mounting brackets installed on the forward portion of the cab roof complete with back-lit rocker style switch at the 12V emergency light console. The lightbar shall be equipped with forward facing and side facing lights only due to the raised roof. . The lightbar shall be equipped with red lenses. Final approval of lightbar shall be made at preconstruction.

If any clear sections in the lightbar, the same shall be deactivated in the Blocking Right of Way mode.

One (1) Opticom Emitter shall be provided and installed in the center of the above light bar for intersection traffic light control. Emitter shall be controlled by an illuminated switch on the cab dash in conjunction with the other emergency lights. The emitter shall be wired to shut off when the vehicle parking brake is set.

36.8 ELECTRONIC SIREN

One (1), Code 3 model 3692, electronic siren amplifier to be furnished, surface mounted to the specified electrical console. A built-in microphone to be furnished with coil cord and mounting clip. Siren amplifier to be wired to the specified electronic siren speaker(s).

36.9 DUAL SPEAKERS

Two (2), Whelen model SA314P, 100-watt rectangular concealed speakers to be furnished, one (1) each located recessed behind driver side and passenger front bumper facing straight forward. Back side of speakers to have boxed aluminum protective enclosure. Vertical surface of front bumper to be "cut-out" to fit speaker.

36.10 MECHANICAL SIREN

One (1), Federal model Q2B chrome plated mechanical siren to be furnished, mounted on top of front bumper horizontal surface, driver side. Siren brake to be furnished, activated by separate momentary push-button switch, identified as: "SIREN BRAKE". Power to siren shall be available only when Master Emergency switch is turned on.

Above specified Federal Q2B siren to be operated by driver's side floor mounted foot switch as well as the following specified console switch.

36.11 SIREN ACTIVATION

Above specified Federal Q2B mechanical siren to be activated by electrical console mounted momentary push-button switch on captains side with nametag to read: "SIREN".

36.12 UNDER CAB LIGHTING

Six (6), 12" LED strip light under chassis cab 12-volt ground lights to be furnished, located two (2) driver's side and two (2) passenger's side, beneath cab doors, and two (2) toward the front of the bumper. Lights to be completely sealed for weather resistance. Lights to be activated by setting of the parking brake.

36.13 ENGINE COMPARTMENT LIGHTING

Two (2), surface mount 12-volt engine compartment interior lights to be furnished, located driver's side and passenger's side overhead the engine. Lens to be 5" diameter, clear.

Lights to be activated by individual light lens mounted switch.

36.14 CORNERING LIGHTS

Two Whelen Model 600 "constant on" cornering lamps with clear lenses shall be provided and mounted ahead of the intersection warning lights on the front bumper. A light shall be provided above the rear wheel also to aid in visibility. The lights shall turn on with activation of the turn signal switch.

36.15 HAND HELD SPOTLIGHT

One (1) handheld spotlight with mounting bracket shall be furnished. Duluth Fire Department shall choose mounting location after pre-construction conference.

36.16 800 MHz RADIO, ANTENNA & CABLE

One (1) each, radio quarterway whip style antenna shall be furnished, along with appropriate cable, both to be compatible with the furnished radio. Antenna to be roof mounted (exact location to be determined at Pre-Build), with cable ran to the prescribed radio location. Exact location of radio location to be decided at pre-construction. Furnish and install the following Motorola:

Model#	Description
M21URM9PW1AN	XTL 2500 "MANTAREY" Main Model
G442	ADD: XTL 2500 Control Head, (4-line, 16 character alphanumeric display)
G444	ADD: XTL 2500 Control Head Software
G806	Astro Digital CAI Operation Software
G51	Smartzone/Singlezone System Software
G361	Astro 25 Software
G67	ADD: REMOTE MOUNT
W22	Standard Palm Microphone
B18	Auxiliary 5 Watt Speaker(2)Two
G335	Antenna ¼ Wave (764-870MHZ)
G114	Enhanced Digital ID Display
G24	2 Year E.S.P. (3-year total warranty)

36.17 MOBILE DATA COMPUTER MOUNT

Gamber Johnson Docking Station, Internal Power Supply (Dual RF) 7160-0318-06

Placer Gold APU including power cable 62850-00

Antenna Bundle for APU/DRU (including p/n 70288-70-TMS & 62474)

Associated mounting hardware to mount as specified

36.18 HEADSET SYSTEM

A Firecom cordless headset system for four (4) seating positions shall be furnished and installed. Equipment to include a 3010 R Intercom, MR Cable, two (2) combo packs including a wireless headset, charger, and base station for the Officer and Driver. Officer and Driver headsets shall be capable of talking through the radio to dispatch.

One (1) multichannel base station and two (2) headsets with chargers for the firefighter positions will also be included. The firefighter positions do not need to talk to dispatch they shall be intercom only. Final mounting and locations shall be decided at preconstruction. Headsets shall be the UHW (Under the Helmet) model.

Headset system shall be direct connected to the battery system so as to have minimal delay connecting when turning on headsets.

36.19 INTERIOR COMPARTMENTS

One (1) interior compartment shall be furnished and installed. The approximate size shall be determined at the pre bid meeting. Compartment shall be located between rear facing seats. It shall have mesh fronts with non-snapping fasteners. One (1) shelf shall be provided for each compartment.

37.0 ON-BOARD BATTERY CHARGER - 40 AMP

One (1), Kussmaul, required size by manufacturer, fully automatic battery charger shall be furnished. Battery charger shall be located inside forward chassis cab, with Remote Bar Graph Display visible from ground level.

The above battery charger, shall be powered by the following specified 120-volt "shore power receptacle".

37.1 120 VOLT SHORE PLUG – MANUAL

Two (2) manual recessed shoreplug with gray weatherproof spring loaded covers shall be furnished and installed so as to be conveniently accessible from ground level. Back side of shoreplug shall be equipped with protective cover, wiring to be enclosed inside coated fabric loom extending into chassis cab interior to power the specified 110-volt powered accessories (including the engine block heater). Shore power receptacle to be convenient for removal by Driver upon entering cab, adjacent to air coupler. Two engraved nameplates above plugs shall read "BATT CHARGER" and "BLOCK HEATER".

37.2 CHASSIS CAB/P1 COMPARTMENT 120-VOLT SHOREPOWER

Two (2), 120-volt duplex plug-in receptacle boxes shall be furnished, inside the chassis cab, on the rear interior wall, between forward facing seats, with: surface mounted cast aluminum receptacle box, duplex 120-volt 3-wire household plug-in receptacle, metal duplex cover plate, protected wiring to the specified shoreplug, and engraved nameplate to read: "120-VOLT SHOREPOWER." There shall also be one (1) 120-volt duplex power outlet in the passenger side #1 compartment with an engraved nameplate to read "120-VOLT SHOREPOWER".

38.0 DUAL AIR HORNS

Two (2), Grover model 1512 stuttertone single base chrome plated air horns shall be furnished. Air horns shall be mounted one (1) driver's side and one (1) passenger's side of chassis front bumper, recessed.

38.1 ACTIVATION OF AIR HORNS

Air horns shall be activated by the steering wheel horn button. An electrical switch console mounted two-position horn selector rocker switch shall be furnished top position of rocker switch shall select chassis electric horn, and bottom position shall select air horns. NOTE: Air lines must both be same length and same size to assure loud and balanced horn tones.

38.2 OFFICER'S AIR HORN SWITCH

An additional "Air Horn Only" momentary push-button switch shall be furnished, accessible to Officer, properly identified.

38.3 AIR COUPLER/SHORELINE

An air coupler "shoreline" shall be furnished, consisting of: an Aeroquip FD-45 exterior male coupler with built-in check valve and matching female coupler with built-in check valve (for use with station air line). Air coupler to be convenient for removal by Driver upon entering cab, adjacent to shore power receptacle.

39.0 FIRE PUMP SYSTEM:

39.1 PUMP MOUNTING

The following midship pump system is independently mounted on a "pump house" subframe which itself is bolted to and easily removable from the chassis frame rails. The pump mounting brackets are: solid mounted one side, casting opposite side, (as recommended by Waterous), so as to prevent torque/twisting loads on pump castings. Pump house design provides a rigid module, separate of body and chassis cab, its side running boards always remaining in alignment with apparatus body rubrails.

39.2 PLUMBING

The fire pump shall be configured with cast iron discharge manifolds, suction intake adapters, and suction inlet fittings as provided by Waterous.

Flexible discharge lines shall be reinforced high pressure hose assemblies with stainless steel or brass end fittings.

Any welded discharge manifolds, 3" or smaller, to be stainless steel, pressure tested after installation. Heavy wall threaded stainless steel pipe and fittings are preferred and shall be used wherever possible.

Tubing lines shall be polypropylene with brass fittings.

39.3 PUMP FITTINGS & "ROUND TUBULAR" HIGH-FLOW DISCHARGE MANIFOLD

The below specified fire pump shall be provided with high-tensile closed grain cast iron "bolt-on" left and/or right side discharge fittings (upstream of discharge valves only) and cast iron "bolt-on" left side, right side, and/or rear large diameter suction intake adapters, as provided and flow/pressure tested by the fire pump manufacturer.

A stainless steel "round tubular" discharge manifold or approved equal shall be furnished, bolted to and easily removable from, the fire pump's dual (two each) 8-bolt large flow capacity discharge outlet taps. The discharge manifold itself shall contain a minimum of the following outlets:

Four (4), 8-bolt flanged large flow capacity outlets

Two (2), 4-inch Victaulic mechanical pipe joint outlets

One (1), 3" TIPT threaded riser outlet

Seven (7), 2-1/2" TIPT threaded riser outlets

One (1), 2" TIPT threaded riser outlet

NOTE: Due to the likelihood of high pressure deformation, manifolds fabricated of square or rectangular tubings are not acceptable.

Heavy wall threaded stainless steel pipe and pipe fittings shall be used, wherever possible, downstream of the discharge valves, and upstream of 2-1/2" suction valves.

All flexible discharge lines and bleeder lines, downstream of respective valves, shall be reinforced high pressure hose assemblies with stainless steel or brass end fittings.

Pressure gauge tubing lines shall be clear polypropylene with brass fittings, manifold drain lines (that are not high pressure hose assemblies) shall be copper tubing or approved equal.

All discharge manifolds and fittings, suction manifolds and fittings, discharge and suction valves, tubings, and hoseline assemblies shall be pressure tested after installation.

40.0 WATEROUS TWO-STAGE 1500 GPM CMU MODEL PUMP

A 1500 gallon per minute, Waterous 2-stage Model CMU-C10-1500, Class A, two-stage centrifugal iron body - rear drive fire truck pump shall be furnished, mounted "mid-ship" of the vehicle immediately ahead of the compartments and water tank. Pump transmission to be "chain-drive" style to provide smooth quiet transmission of power.

40.1 PUMP INSTRUCTION MANUALS/CD/PAPER

Two (2), Waterous instruction manuals, in CD and paper format, to be provided upon delivery of the apparatus.

40.2 TANK-TO-PUMP VALVE

Bronze tank-to-pump suction check valve to be furnished. A 3-1/2" full-flow Waterous tank-to-pump 1/4-turn valve to be furnished with chrome plated bronze ball, spring loaded seal assembly, and 4" inlet hose connection. The gated suction line from specified tank sump to the tank-to-pump valve shall be furnished with a double T-bolt banded flexible "hump hose" connection and minimum 3-1/2" i.d. piping within the fire pump compartment.

40.3 TANK-TO-PUMP OPERATION

Specified tank-to-pump suction valve to be operated, using a manual push-pull control. The control rod shall be installed so that the "IN" position is "OPEN".

40.4 PUMP DRIVELINE

Extra heavy duty 2.35" x 46 involute spline pump driveline to be furnished for high torque engine applications.

40.5 PUMP SEALS

"Mechanical" pump seal assemblies to be furnished, for specified two-stage pump, self-adjusting type, maintenance free.

40.6 SUCTION PIPING ANODE

A replaceable threaded anode plug shall be installed in the suction piping of the fire pump to help protect the pump and piping from electrolysis.

40.7 DISCHARGE PIPING ANODE

A replaceable threaded anode plug shall be installed in the discharge piping of the fire pump to help protect the pump and piping from electrolysis.

40.8 STAINLESS STEEL SCHEDULE-40 HEAVY DUTY THREADED PIPING

All of the following specified suction and discharge lines of 2", 2-1/2", 3", or 3-1/2" size, which are not cast iron or cast bronze, shall have heavy duty STAINLESS STEEL thread pipe and fittings. Where vibration or chassis flexing may damage or loosen piping, the pipe shall be equipped with Victaulic fittings. The entire discharge and intake piping system, valves, drain cocks, and lines, intake and outlet closures, excluding the tank fill and tank-to-pump lines on the tank side of the valves shall be designed for 500 PSI.

40.9 PNEUMATIC PUMP SHIFT

The pump shift shall be pneumatically operated and incorporate a Waterous built cylinder with double action piston to shift from road to pump and back, designed so that the pump shift remains in its latest position in the event of loss of air pressure.

40.10 PUMP SHIFT MANUAL OVERRIDE

The above pneumatic pump shift assembly shall be provided with a mechanical pump shift override with single override control located in the lower right hand corner of the driver's side exterior pump panel. Pump pneumatic shift override control shall allow for manual shifting of the air cylinder, allowing the pump to be shifted manually.

40.11 O.K. TO PUMP "THROTTLE READY" INDICATOR

An additional indicator light to be furnished on pump control panel, adjacent to engine throttle controller, to indicate that the vehicle transmission is in the proper gear and driveline is rotating: Light to be labeled "O.K. TO PUMP".

40.12 PUMP PANEL LIGHT WIRING

The driver side pump panel lights shall be wired to the pump shift to provide pump panel illumination when the pump is placed into gear.

40.13 WATEROUS VPES LUBRICATED PUMP PRIMER

A high capacity positive displacement priming system shall be furnished, consisting of: a Waterous VPOS rotary vane priming pump with 12-volt electric motor drive, and a manual/electric priming valve assembly with remote pump operator's panel mounted pull/spring-return control.

40.14 PUMP OVERHEAT PROTECTION

One (1), Waterous Overheat Protection Manager (OPM) model #82516-1A, thermal relief style valve to be furnished, installed on the two 1/2" tapped holes located near the center discharge area of the pump.

40.15 SUCTION VALVE STANDARDS

Following specified 3" or larger gated intakes (except the tank-to-pump intake) shall include a valve mechanism that shall not permit changing the position of the flow regulating element of the valve from full close to full open, or vice versa, in less than 3 seconds. These same air type actuators shall include dual (2-each) adjustable needle valve restrictors, bench set/tested, so as to facilitate the slow movement.

40.16 SUCTION INTAKE BLEEDER VALVES

Each side gated intake shall be equipped with a bleeder valve located inside mid-ship pump compartment, piped to "upstream" suction gate valve, with remote bleeder control in close proximity to the intake. The specified gated suction bleeders shall consist of: 3/4" cast bronze quarter-turn drain/bleeder valves, panel mounted with exterior chrome plated control handle and recessed 1" x 3" i.d. label.

Intake bleeder valve controls to be positioned in a single row immediately above running board riser, driver and/or passenger side (above tailboard, with bleeder valve inboard rear body panel, when at rear of body), identified with inlet color matching permanently engraved identification label.

40.17 INTAKE CAPS

All intakes shall be provided with suitable closures capable of withstanding 500 psi.

40.18 INTAKE STRAINERS

Removable Zinc strainers as provided by Waterous with each gated intake.

40.19 SELF BLEEDING SUCTION CAPS

The suction caps shall be the type which incorporates a thread and vented lug design to automatically relieve stored pressure in the line during un-capping.

40.20 PUMP INTAKE RELIEF VALVE

A Waterous Pilot Valve Controlled intake relief valve system shall be furnished, installed inside pump compartment, bolted to suction cavity of the specified fire pump. Valve to be of the pre-set adjustable bypass design, to dump, below the vehicle, excessive inlet water pressure. Relief valve to have a hand adjustment knob on driver's side pump panel for adjustment of bypass pressure.

41.0 PUMP INTAKES

41.1 PASSENGER SIDE 6"MANUAL GATED SUCTION, 6" NST x 4" STORZ

The fire pump shall be provided with a flange style suction arm fitting so the butterfly valve may be located IN THE PUMP COMPARTMENT keeping the valve and end fittings within running board width

A passenger side gated 6" pump suction intake to be provided with: 4" storz cap with chain, 6" NST long handled swivel female x 4" storz adapter, 6" removable zinc strainer, 6" NST male threaded flanged extension nipple (extending through pump panel), bronze air bleeder valve located inboard pump panel with remote control handle, 6" Monarch butterfly style gate valve with crank actuator located inboard pump panel, spoke type hand wheel valve control with revolving handle located adjacent to inlet, and appropriate interior pump compartment 6" flanged pump intake fitting. Inlet shall have minimum extension outboard the pump panel to allow for pre-connected inlet adapter.

41.2 PASSENGER SIDE 2-1/2" GATED AUXILIARY SUCTION

An Waterous passenger's side gated 2-1/2" pump suction intake to be provided with: 2-1/2" NST male chrome plated rocker lug plug type cap with chain, 2-1/2" NST chrome plated rocker lug swivel female with internal strainer, bronze bleeder valve with outboard control knob, 2-1/2" full flow Waterous 1/4-turn ball style bronze suction valve with 2-1/2" FULL FLOW Waterous 1/4-turn ball style bronze suction valve with chrome plated ball and spring loaded self-adjusting seal assembly (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" intake control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump intake fitting. A minimum 2-1/2" i.d. stainless steel pipe and elbows between valve and pump intake fitting,

41.3 DRIVER SIDE 6" MANUAL GATED SUCTION, 6" NST x 4" STORZ

The fire pump shall be provided with a flange style suction arm fitting so the butterfly valve may be located IN THE PUMP COMPARTMENT keeping the valve and end fittings within running board width

A driver's side gated 6" pump suction intake to be provided with: 4" storz cap with chain, 6" NST long handled swivel female x 4" storz adapter, 6" removable zinc strainer, 6" NST male threaded flanged extension nipple

(extending through pump panel), bronze air bleeder valve located inboard pump panel with remote control handle, 6" Monarch butterfly style gate valve with crank actuator located inboard pump panel, spoke type hand wheel valve control with revolving handle located adjacent to inlet, and appropriate interior pump compartment 6" flanged pump intake fitting. Inlet shall have minimum extension outboard the pump panel to allow for pre-connected inlet adapter.

42.0 PUMP DISCHARGES:

42.1 DISCHARGE INSTALLATION STANDARDS

The specified Waterous pump discharge fittings, located interior pump compartment, will be "angle compensated" if required to facilitate mid-ship pump-to-engine/transmission sloped mounting.

42.2 DISCHARGE OUTLET BLEEDER VALVES

The specified discharge outlet bleeders will consist of: 3/4" high pressure flexible hose assemblies extending between discharge valve and bleeder valve, 3/4" cast bronze 1/4-turn drain/bleeder valve mounted interior pump compartment, exterior pump panel chrome plated bleeder valve control handle, and recessed 1" x 3" color coded (to match corresponding discharge outlet) permanently engraved identification label.

Discharge outlet bleeder valve controls, for side discharges or hosebody pre-connect discharges, to be located in a single row immediately above left or right side pump panel running board riser. Rear body discharge outlets, where specified, will have bleeder valves inboard rear body panel, and control exterior above tailboard.

42.3 PRESSURE GAUGE DISCHARGE CONTROL ALIGNMENT

The following specified exterior side pump panel mounted discharge controls shall be located adjacent to or immediately below and inline with corresponding individual discharge pressure gauge.

42.4 SELF-BLEEDING DISCHARGE CAPS

The rocker lug discharge caps shall of the type which incorporates a thread and vented lug design to automatically relief stored pressure in the line during uncapping.

42.5 PASSENGER SIDE 2-1/2" DISCHARGE - 2-1/2" NST OUTLET

One (1), passenger's side 2-1/2" gated discharge to be provided with: 2-1/2" to 1-3/4" NST chrome plated brass reducer with rocker lug cap with chain, 2-1/2" NST male x 2-1/2" NST rocker lug swivel female 45 degree chrome plated brass extension elbow, 2-1/2" NST male x 2-1/2" iron pipe female chrome plated brass outlet adapter, 2-1/2" threaded pipe extension nipple (extending through pump panel), 3/4" bronze bleeder valve located inboard pump panel with remote control knob adjacent to discharge outlet, 2-1/2" Waterous FULL FLOW 1/4-turn discharge valve with chrome plated ball and spring loaded self-adjusting seal assembly (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" discharge control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump discharge fitting.

42.6 PASSENGER SIDE LDH DISCHARGE, 2-1/2" NST X 4" STORZ OUTLET

One (1), passenger's side 3-1/2" gated discharge to be provided with: 2-1/2" NST chrome plated brass rocker lug cap with chain, 2-1/2" NST male x 4" storz lightweight adapter, 4" storz x 4" SIPT swivel female lightweight outlet adapter, 4" i.d. outlet extension nipple (extending through pump panel), 3/4" bronze bleeder valve located inboard pump panel with remote control knob adjacent to discharge outlet, 3-1/2" Waterous "ELECTRIC ACTUATOR OPERATED" 1/4-turn discharge valve with chrome plated ball and spring loaded self-adjusting seal assembly (located inside pump compartment), operator's panel mounted valve control console with spring loaded open/close rocker switch and OPEN/MULTIPLE- TRANSITION/CLOSED indicator lights, and appropriate cast iron pump discharge fitting.

42.7 REAR 2 1/2" DISCHARGE, PASSENGER SIDE OUTBOARD, 2-1/2" NST OUTLET

One (1), rear outboard (passenger's side) 2-1/2" discharge to be provided with: 2-1/2" x 1-1/2" NST chrome plated brass reducer, rocker lug cap with chain, 2-1/2" NST male x 2-1/2" NST rocker lug swivel female 45 degree chrome plated brass elbow extension, 2-1/2" NST male x 2-1/2" iron pipe female chrome plated brass outlet adapter, 2-1/2" stainless steel plumbing assembly (extending through tank and rear body panel), 3/4" bronze bleeder valve located inboard rear body panel with control knob and with bleeder discharge exterior below body, 2-1/2" Waterous FULL

FLOW 1/4-turn discharge valve with chrome plated ball and spring loaded self-adjusting seal assembly (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" discharge control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump discharge fitting.

42.8 REAR 2 1/2" DISCHARGE, DRIVER SIDE INBOARD, 1-1/2" NST OUTLET

One (1), rear (inboard driver's side) 2 1/2" discharge to be provided with: 2-1/2" x 1-1/2" NST chrome plated brass reducer, rocker lug cap with chain, 2-1/2" NST male x 2-1/2" NST rocker lug swivel female 45 degree chrome plated brass elbow extension, 2-1/2" NST male x 2-1/2" NST rocker lug swivel female 45 degree chrome plated brass elbow extension, 2-1/2" NST male x 2 1/2" iron pipe female chrome plated brass outlet adapter, 2 1/2" stainless steel plumbing (extending through tank and rear body panel), 3/4" bronze bleeder valve located inboard rear body panel with control knob and with bleeder discharge exterior below body, 2 1/2" Waterous FULL FLOW 1/4-turn discharge valve with chrome plated ball (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" discharge control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump discharge fitting.

42.9 REAR 2 1/2" DISCHARGE, DRIVER SIDE OUTBOARD, 1-1/2" NST OUTLET

One (1), rear (outboard driver's side) 2 1/2" discharge to be provided with: 2-1/2" x 1-1/2" NST chrome plated brass reducer, rocker lug cap with chain, 2-1/2" NST male x 2-1/2" NST rocker lug swivel female 45 degree chrome plated brass elbow extension, 2-1/2" NST male x 2 1/2" iron pipe female chrome plated brass outlet adapter, 2 1/2" stainless steel plumbing (extending through tank and rear body panel), 3/4" bronze bleeder valve located inboard rear body panel with control knob and with bleeder discharge exterior below body, 2 1/2" Waterous FULL FLOW 1/4-turn discharge valve with chrome plated ball (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" discharge control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump discharge fitting.

42.10 REAR COMPARTMENT 2-1/2" DISCHARGE FOR "RAM" DEVICE

One (1), inside rear compartment 2-1/2" discharge shall be provided with: 2-1/2" NST male x 2-1/2" iron pipe female chrome plated brass outlet adapter, 2-1/2" stainless steel plumbing assembly, 3/4" bronze bleeder valve located inboard rear body panel with control knob and with bleeder discharge exterior below body, 2-1/2" Waterous FULL FLOW 1/4-turn discharge valve with chrome plated ball and spring loaded self-adjusting seal assembly (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" discharge control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump discharge fitting. Rear compartment shall have a slide out tray with three sides that is capable of holding approximately 200 feet of 2-1/2" fire hose with couplings. Design shall be discussed and finalized with fire department.

42.11 TOP DELUGE DISCHARGE, 3-1/2" ELECTRIC VALVE, 3" PIPE OUTLET

One (1), center top (above pump) gated deluge discharge to be provided with: 3" threaded outlet, 3" i.d. threaded pipe riser, 3/4" bronze "auto-drain" valve located inboard pump panel with discharge below pump compartment, 3-1/2" Waterous "ELECTRIC ACTUATOR OPERATED" 1/4-turn discharge valve with chrome plated ball spring loaded self-adjusting seal assembly (located inside pump compartment), operator's panel mounted valve control console with spring loaded open/close toggle switch and "OPEN/MULTIPLE-TRANSITION/CLOSE" indicator lights, and appropriate identification nameplate. Where the "optional" extendible deluge riser pipe is not purchased (see following option), the exposed deluge riser piping and base of monitor shall be covered with a polished 4-way aluminum treadplate cylindrical shroud.

42.12 ELKHART COBRA RF - REMOTE WIRELESS CONTROLLED MONITOR

One (1) Elkhart Cobra wireless remote deluge monitor shall be furnished and installed. Monitor package shall be equipped with standard duty monitor, 7010 panel controller, 7015 hand held controller, stacked tips, and stream shaper. Monitor shall be equipped with 3" flange.

One (1), Elkhart 12-volt electric actuator operated "Extender" telescoping deluge riser mount to be furnished, with Victaulic inlet and side wall clamp kit. Extender to be installed on specified deluge riser piping, designed to vertically elevate the specified deluge monitor, 18" above the retracted position. Flow capacity of the Extender shall be up to 1250 GPM.

42.13 DRIVER SIDE DISCHARGE, 2-1/2" VALVE, 2-1/2" NST OUTLET

One (1), driver's side 2-1/2" discharge to be provided with: 2-1/2" x 1-1/2" NST chrome plated brass reducer, rocker lug cap with chain, 2-1/2" NST male x 2-1/2" NST rocker lug swivel female 45 degree chrome plated brass elbow extension, 2-1/2" NST male x 2-1/2" iron pipe female chrome plated brass outlet adapter, 2-1/2" threaded pipe extension nipple (extending through pump panel), 3/4" bronze bleeder valve located inboard pump panel with remote control knob adjacent to discharge outlet, 2-1/2" FULL FLOW Waterous 1/4-turn discharge valve with chrome plated ball and spring loaded self-adjusting seal assembly (located inside pump compartment), push-pull chrome T-handled "twist-to-lock" discharge control handle with recessed color coded nameplate located on driver's side operator's panel and appropriate cast iron pump discharge fitting.

42.14 FRONT BUMPER DISCHARGE

One (1) bumper crosslay discharge with lid located at front bumper, plumbed using 2 1/2" I.D. wire reinforced, high pressure hose coupled with stainless steel fittings, provided with a 2-1/2" NPT X 2-1/2" NST male brass 90 degree chrome swivel and 2-1/2" x 1-1/2" NST chrome plated brass reducer. Final design of the front bumper adaptation, hose well, and manual valve location shall be approved by fire department before construction begins.

42.15 HOSE REEL DISCHARGE(S)

42.15.1 HOSE REEL 1" DISCHARGE

One (1) booster hose reel(s) 1" gated discharge to be provided, each with: 1" i.d. high pressure wire reinforced discharge hose extending from hose reel inlet to hose reel discharge valve, one (1), 1" ball style 1/4-turn full flow bronze bodied self-locking discharge valve (located inside pump compartment), and push-pull chrome "twist-to-lock" discharge control handle with recessed color coded nameplate located on the pump operator's control panel.

42.15.2 HOSE REEL AIR BLOW-OUT LINE

One (1), 1/4" i.d. hose reel "blow-out" air line(s) to be furnished, each to include: pump panel mounted Class One 3/8" 1/4-turn blow-out valve, and necessary 1/4" nylon air line piping to a point immediately down stream of specified booster hose reel discharge valve. Hose reel blowout system to be piped to chassis air system, with a manual emergency shut-off valve located inside pump compartment, a one-way check valve located upstream blow-out valve, and second one-way check valve at booster discharge valve.

42.15.3 HANNAY REEL

One (1), Hannay electric rewind type 1" i.d. booster hose reel to be furnished. Reel is to be steel construction with 12-volt electric motor rewind and friction brake. Electric rewind push button switch to be furnished, located adjacent to hose reel per Customer approval.

42.15.4 MOUNTING LOCATION

Reel is to be permanently mounted interior of the passenger side upper pump enclosure. Hose reel is to be positioned above the fire pump system, with deployment available to the passenger side of vehicle.

42.15.5 HOSE

150 ft. of 1" i.d. Fire Department 800 psi booster hose, coupled in one (1) 100-ft. length and one (1) 50 ft. length, with 1" CHT couplings to be furnished.

42.15.6 NOZZLE

One (1) Elkhart model SM-3FG 1" pistol grip nozzle to be furnished.

42.15.7 HOSE REEL INBOARD A HINGED DOOR PANEL

The specified booster hose reel is to be located inboard of a horizontally hinged reel access door.

Door is to have a horizontal slotted opening, in horizontal and vertical alignment with the top layer of booster hose, so that hose may be deployed and be rewound without difficulty.

42.15.8 HOSE REEL ACCESS DOOR

The booster hose reel is to be accessed through an overlapping horizontally hinged hose reel cavity access door. Reel door is to remain closed during hose deployment to the left, right, and downward away from the apparatus.

Door is to be provided with positive stainless steel latch assembly, and stainless steel piano hinge.

42.15.9 HOSE ROLLERS & NOZZLE BRACKET

A polished stainless steel 4-way "encapsulated" hose roller assembly is to be furnished, surrounding the slotted opening on the exterior surface of the reel access door. Roller assembly is to provide guidance for booster hose deployment. A fabricated stainless steel nozzle mounting bracket is to be provided, located adjacent to the hose reel access door, conveniently positioned so as to positively retain the nozzle and attached booster hose, accessible while standing at ground level.

42.15.10 4-WAY HOSE ROLLER GUIDES

Each roller assembly shall consist of four (4) chrome corner brackets, two (2) vertical, and two (2) horizontal 1-1/4" diameter stainless steel roller tubes with end bearings. Width of encapsulated opening shall be the same as or greater than the width between hose reel discs.

42.16 1-1/2" GATED TANK FILL/PUMP COOLING LINE

One (1), gated 1-1/2" tank fill discharge line, from pressure side of fire pump to water tank to be provided with: tank fill spud located at top front of water tank, high pressure wire reinforced 1-1/2" hose with reusable threaded end couplings, 1-1/2" NRS bronze screw-type valve and pump operator's panel mounted screw type control knob. Tank fill valve to be of the screw-type so that it can be throttled and used as a bypass or pump cooling line.

42.17 GATED PUMP COOLER LINE, 1/4-TURN CONTROL

One (1), gated 3/8" pump recirculating/cooling line, from pressure side of fire pump to water tank top to be provided with: 3/8" female TIPT spud located at top front of water tank, high pressure tubing, and 3/8" bronze body 1/4-turn ball style valve with chrome handle located on operator's control panel. Valve to be identified as pump cooling line.

42.18 MIDSHIP PUMP MASTER MANIFOLD DRAIN

Waterous manifold drain valve, with bronze body and stainless plunger shall be furnished mounted on pump transmission and operated by a push-pull cable with chrome plated T-handle control on operator's panel. Drain valve shall be piped, with copper tubing, to low points of pump suction and discharge cavities to allow simultaneous draining through a single drain valve.

43.0 PUMP CONTROLS/ACCESS/LIGHTS

43.1 CAPTAIN ELECTRONIC PRESSURE GOVERNOR

The apparatus shall be equipped with a Class 1 "Captain" model #105244 engine/pump governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the specified diesel engine.

The Captain shall operate as a Pressure Sensor Governor (PSG) eliminating any need for a relief valve on the discharge side of the pump.

The unit shall include a special preset function, which allows a predetermined pressure to be set and easily adjustable.

43.2 PUMP CONTROL INSTALLATION STANDARDS

All side mechanical pump control rods, rotating and push-pull, will be heavily cadmium plated solid cold roll steel, equipped with adjustable clevis joints or swivel ball joints and chrome plated brass or black phenolic control handles/knobs. All discharge controls and outlets, suction controls and inlets, drain valve controls, bleeder valve controls, and all other pump related controls shall be properly identified with permanent engraved or cast nameplates describing function and operation of each control. Nameplates for discharge controls, discharge outlets,

and respective pressure gauges will be color coded and indicate: numerical sequence, location of outlet, type of discharge, and size of hose to be used.

43.3 PUMP ENCLOSURE – DRIVERS/PASSENGER SIDE CONTROLS

The pump compartment/enclosure shall be located "midship" of the vehicle, approximately 1" ahead of and totally separate from specified compartmented apparatus body and water tank. Pump compartment to be fully enclosed, with front panel, back panel, and both side panels fabricated of 12-gauge type 304 stainless steel. Pump compartment length (front-to-rear) to be approximately 44", width "side-to-side" 82", and height (above running boards) 80". Access to interior pump compartment is provided by specified hinged driver's side gauge panel, removable top cross-lay flooring, removable front/back stainless and top pump compartment 4-way aluminum cover plate, and passenger's side access door.

Pump controls shall be covered by a full height roll up door enclosure. Door shall be ROM Robinson roll up shutter and match other doors on the apparatus.

All pump discharge and suction controls are to be mounted on this side pump operator's control panel, so as to permit operation of the pump from one central location style door that matches other doors.

The passenger side of the pump enclosure shall be covered by a full height roll up door enclosure. Door shall be ROM Robinson roll up shutter and match other doors on apparatus including door bundle enclosure. Enclosure shall consider access and use of cord reel and booster line.

43.4 PUMP PANEL OVERLAYS - DRIVER SIDE AND PASSENGER SIDE

Driver's and passenger's side pump panels to be stainless steel overlaid with black Line-X style coating, extending from running board level (beneath riser scuffplate) to immediately below specified driver's side hinged gauge panel and passenger's side hinged pump compartment interior access door. All mounting holes and control holes drilled prior to finish painting and final installation. All discharge outlet and suction inlet holes to be concentric/custom-fit around extension fittings, trimmed with extruded rubber channel.

43.5 REMOVABLE OVERLAY INSERTS

The passenger's and driver's side brushed stainless steel pump panel overlays shall be equipped with removable overlay inserts, of maximum size to allow access to interior pump compartment mounted suction and discharge valves and piping. Overlay inserts shall be of the same material as background overlay surface, flush mounted and equipped with a minimum of ten (10) polished stainless steel 1/4-turn slotted screw fasteners each. **Specified suction and discharge fittings and adapters to be threaded to allow disassembly for removal of overlay inserts.**

43.6 PUMP ACCESS DOOR

A vertically hinged passenger's side pump compartment interior access door to be furnished, at least 24" wide x 22" high, "flush" U-formed with: polished stainless steel piano hinged bolted to door and door jamb, large polished stainless steel bent ring D-handle latch, rotary-slam latch hardware, vinyl coated chain door stop, polished aluminum treadplate removable full inner door liner, and polished stainless steel perimeter door jamb with removable hollow core rubber weatherstripping.

43.7 PUMP ENCLOSURE RUNNINGBOARDS

Pump panel running boards to be provided, driver's and passenger's side, fabricated of polished stainless, bolted in position and removable. Running boards to be in line with rear tailboard and body rubrails, at least 10" deep, and include an integral 3" vertical riser scuffplate covering bottom portion of exterior side pump panels.

For the above specified driver's and passenger's side pump panel running boards to be fabricated of 12-gauge non slip stainless steel or equivalent corrosion resistant materials.

43.8 RECESSED OPEN DUNNAGE AREA

A recessed dunnage (open well) compartment to be furnished, top of pump compartment ahead of hosebody between pump compartment side panels. Dunnage compartment to be of maximum size, equipped with removable sectional fabricated/reinforced floor sections. Removal of floor sections will allow top access to pump and its piping.

43.9 PUMP COMPARTMENT LIGHT

Two (2), 6" round surface mount 12-volt LED interior pump compartment light to be furnished, mounted ceiling of interior pump compartment. Lights to be clear. Light to be activated by light lens mounted push-button switch.

43.10 DRIVER AND PASSENGER SIDE PUMP PANEL LED STRIP LIGHTS

Lighting shall be LED lighting. It shall full height and run down the entire inside edge of the compartment door on both sides. Lighting shall be activated by a switch when door is opened.

The driver side light fixture shall be activated by shifting the pump into gear or pump panel door switch, the specified passenger side pump panel lights shall be activated by a pump panel door switch.

Provided lighting will be capable of clearly illuminating all pump panel controls in total darkness.

43.11 QUICK COUPLE AIR CONNECTION - PUMP PANEL

An air coupler shall be furnished located driver's and passenger's side exterior pump panel, consisting of: exterior brass female coupler, to match Milton #S-790 (shop style), with built-in check valve, appropriate high pressure vinyl air line tubing with brass fittings, pump panel mounted 3/8" 1/4-turn gate valve with exterior control knob, and matching male coupler (for use with Customer's air accessory). Air coupler shall be piped to chassis secondary air reservoir.

44.0 PUMP PANEL GAUGES/LABELING

44.1 PUMP GAUGE PANEL

The specified pump pressure gauges, discharge pressure gauges, and engine monitors/ instruments shall be installed on a brushed stainless steel hinged gauge panel, located in top portion of driver's side exterior pump control panel. The gauge panel is to be equipped with a polished stainless steel piano hinge on the bottom and two adjustable-grip chrome plated lift-and-turn latches, located in upper corners. Gauge panel to be of the "tilt-out" style, to allow access to back of gauges and interior fire pump compartment. Top integral light housing to be furnished with full length multiple-bulb enclosed fixture.

44.2 PUMP HOUR METER - PUMP PANEL

A Hobbs fire pump hour meter to be furnished, installed on pump operator's gauge panel, grouped with specified engine gauges. Hour meter to be of the electrical type, equipped with appropriate remote oil pressure sender installed on pump transmission. A permanently engraved nameplate shall read: "PUMP HOURS."

44.3 ENGINE INFORMATION/WARNING CENTER

A CLASS 1 ENFO III engine information/warning center shall be furnished for the pump panel.

44.4 PUMP MASTER GAUGES AND TEST GAUGE PANEL

Master pump intake and pump discharge pressure indicating devices shall be located within 8" of each other, edge to edge, with the intake (suction) pressure indicating device to the left of the pump discharge pressure indicating device.

44.5 MASTER DISCHARGE GAUGE

A 4" diameter NoShok compound style pressure gauge to be furnished, registering -30 x 600 psi, black numerals on white background. Gauge needle shall have a "bright orange" tip for improved visibility. Gauge to be piped to discharge volute of fire pump, equipped with a black permanently engraved identification nameplate installed below the gauge, to read: "DISCHARGE."

44.6 MASTER SUCTION GAUGE

A 4" diameter NoShok compound style pressure gauge to be furnished, registering -30 x 600 psi, black numerals on white background. Gauge needle shall have a "bright orange" tip for improved visibility. Gauge to be piped to suction volute of fire pump, equipped with a black permanently engraved identification nameplate installed below the gauge, to read: "SUCTION."

44.7 TEST GAUGE PANEL

One (1), dual test plug assembly to be furnished, installed on specified gauge panel adjacent to respective pump suction and pump discharge gauge. Test plugs to be piped to pump suction cavity and discharge cavity using high pressure clear nylon tubing with brass fittings.

44.8 INDIVIDUAL DISCHARGE OUTLET GAUGES

Nine (9), 2-1/2" diameter NoShok compound style discharge pressure gauges to be furnished, registering -30 x 600 psi, black numerals on white background. Gauge needle shall have a "bright orange" tip for improved visibility. Gauges to be located in a uniform manner no more than 6" from its respective discharge valve control. Each gauge and respective discharge valve control to be equipped with color coded permanently engraved identification nameplate to describe numerical sequence, location, type and size of outlet.

All above specified pressure gauges to be analog style, liquid filled, vibration dampened, and capable of operations to -40 degrees F.

44.9 GAUGE LINES - TUBING

The specified engine monitors, pump suction and discharge gauges, and individual gated discharge pressure gauges shall be installed on the specified gauge panel. Pressure gauges to be piped to the individual discharge valves and pump suction and discharge volutes using high pressure clear nylon tubing with brass fittings.

44.10 WATER LEVEL INDICATOR - TANK VISION

One (1), FRC, "Tankvision" water tank level indicator to be furnished and installed. Water tank level indicator to be mounted on pump control panel. Tank level sensing probe to be located front of specified water tank to properly sense water capacity.

There shall be two (2) Whelen PSTANK water level light strips surface mounted vertically, one (1) on each side of the cab behind the front cab doors.

The light strips shall feature four (4) colors of LED lights to indicate the fluid level of a tank. The colors from top to bottom shall be green, blue, amber, and red.

44.11 FOAM LEVEL - INDICATOR – TANKVISION

One (1), FRC, "Tankvision" foam tank level indicator to be furnished and installed. Foam tank level indicator to be mounted on pump control panel. Tank level sensing probe to be located in front of specified foam tank.

44.12 DISCHARGE NAMEPLATES

Discharge nameplates shall be provided at control, pressure gauge, outlet, and bleeder. Discharge nameplates to be individually color coded and permanently engraved.

#1 Front Bumper	1-1/2" Discharge/Foam	Orange with White Letters
#2 Driver Side	2-1/2" Discharge	Red with White Letters
#3 Passenger Side	4" Discharge	Yellow with Black Letters
#4 Deck Gun		Silver with Black Letters
#5 Passenger Side	2-1/2" Discharge/Foam	Tan with Black Letters
#6 Rear Passenger	2-1/2" Preconnect/Foam	Blue with White Letters
#7 Rear Drivers	1-1/2" Preconnect/Foam	Black with White Letters
#8 Rear Drivers	1-1/2" Preconnect/Foam	Green with White Letters
#9 Rear Compartment	2-1/2" Preconnect	Silver with Black Letters

All Intakes Burgundy with White Letters:

- Passenger Master Intake
- Driver Master Intake
- Passenger 2-1/2" Aux. Intake
- Tank to Pump

All others to be Black with White Letters.

45.0 PUMP HEAT PACKAGE:

Pump compartment shall be constructed and insulated to keep pump from freezing during cold weather operations.

45.1 HEATER CASING, STAINLESS STEEL CONSTRUCTION

A removable swirled stainless steel heater casing, completely enclosing the underside of the pump compartment to be provided. The casing shall bolt to the bottom perimeter of the compartment and be easily removable. A slide-out center bottom panel to be provided, allowing inspection and access of normal maintenance items.

45.2 AUXILIARY COOLANT TYPE PUMP ENCLOSURE & COMPARTMENT HEATERS

Two (2) 36,000 BTU hot water type automotive heaters or approved equal type to be furnished, installed inside pump compartment, plumbed to engine cooling system or electrical system. A lighted rocker style fan switch located on pump control panel, indicator "ON" light in cab, and one (1) set of flexible air ducts extending from heater core to back side of specified pump pressure gauges and other pump instruments or controls which are susceptible to freezing. A separate small heater will be placed in the passenger side front compartment on the body to keep medical gear and oxygen warm during winter months. Heater will be activated by the same switch as the pump compartment heater.

Placement of all heaters to be determined at the Pre-Construction Conference.

46.0 PUMP FOAM SYSTEM:

46.1 FOAM MANIFOLD

A flanged bolt-on or victaulic grooved stainless steel or cast iron pump discharge manifold shall be furnished, for use with the specified Class A direct discharge injection foam system. Discharge manifold shall include a bronze or stainless steel spring loaded swing-check valve, fitting tap for foam injection line, fitting tap for flow sensor, bottom fitting tap with remote manifold drain valve, and multiple taps for use with discharge valves designated as foam lines. Discharge foam manifold shall be of adequate size/capacity to handle flows not exceeding 1000 gallons per minute.

46.2 FOAMPRO 2001 SINGLE AGENT FOAM SYSTEM

The apparatus shall be equipped with a "single agent" FoamPro 2001, electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrates. The system shall be equipped with a digital electronic control display, suitable for installation on the pump panel.

A paddle wheel type flowmeter shall be installed in the discharge line to the specified "foam capable" discharges.

The foam injection system shall be plumbed to the specified onboard Class A foam concentrate tank, using: minimum 3/4" i.d. brass piping, bronze 1/4-turn shutoff valve, bronze wye with removable strainer, and 3/4" i.d. clear vinyl foam liquid hose.

46.3 FOAM CELL

One (1), 30-gallon capacity foam cell to be furnished, located "notched-into" the specified non-metallic water tank, totally separate from water cavities and equipped with exterior top fill tower with removable cover and interior screen. Bottom foam liquid drain, means for venting of foam cell, and appropriate foam liquid outlet for use with specified foam system. A "low level" tank sensor switch to be furnished as provided by foam system manufacturer.

46.4 CLASS - A FOAM CAPABLE DISCHARGE OUTLETS

The following discharges to be Class A foam capable are: Rear Driver Side Outboard 1-1/2" discharge, Rear Driver Side Inboard 1-1/2" discharge, Rear Passenger Side 2-1/2" discharge, passenger side 2-1/2" discharge and front bumper discharge .

47.0 APPARATUS BODY AND COMPARTMENTATION:

47.1 APPARATUS BODY CONFIGURATION:

A custom engineered and fabricated fire apparatus compartmented body shall be furnished, designed to be located immediately to rear of a midship fire pump compartment, totally separate of pump compartment, supported by and

mounted to the specified apparatus body sub-frame. The design of apparatus body shall provide for maximum compartments ahead of, above, and back of rear wheelwell housing, driver's side and passenger's side of vehicle. So as to provide maximum depth compartments, the apparatus body overall width shall be approximately 100" (not to exceed 101" at running boards / rub rails).

47.2 PASSENGER'S SIDE COMPARTMENTATION:

Passenger's side compartments shall be provided full height ahead of, upper level above, and full height behind rear wheel well housing.

The passenger's front side compartment segment (ahead of rear wheels) shall be approximately 22" interior width x 69" interior height x 13" upper level interior depth/27" lower level interior depth. Compartment segment to be fully enclosed and weather sealed, equipped with one (1) roll-up compartment door, approximate size of 22" wide x 65" high, (clear opening size of 19" wide x 61" high).

The passenger's side over-the-wheels upper level compartment segment shall be approximately 62" interior width x 42" interior height x 13" upper level interior depth. Compartment to be fully enclosed and weather sealed, equipped with one (1) roll-up compartment door, approximate size of 56" wide x 37" high, (clear opening size of 53" wide x 33" high).

The passenger's rear side compartment segment shall be approximately 42" interior width x 69" interior height x 13" upper level interior depth/27" lower level interior depth. Compartment to be fully enclosed and weather sealed, equipped with one (1) roll-up compartment door, approximate size of 42" wide x 65" high, (clear opening size of 39" wide x 61" high).

47.3 REAR BODY COMPARTMENTATION:

A rear body compartment shall be furnished, located running board level ahead of tailboard, to rear of water tank, between back wall of driver's and passenger's rear side compartment segments. Compartment to be approximately 42" interior width x 38" interior height x 28" interior depth, or larger if possible, fully enclosed and weather sealed, equipped with one (1) compartment door, approximate size of 42" wide x 26" high. Door shall be hinged lap style with double panel construction and be a minimum 1.50" thick. Door shall be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy duty automotive rubber molding with a hollow core shall be installed on the door framing that seals into the interior panel, to ensure a weather resisting compartment. Compartment shall have a polished stainless steel continuous hinge with a pin diameter of .25" that is bolted or screwed on with stainless steel fasteners. A strip of dielectric isolation tape shall be provided between the hinge and door jamb.

All double lock mechanisms shall be fully enclosed within the door panels to prevent fowling of the lock in the event equipment inside shifts into the lock area. Door shall be latched with recessed, polished stainless steel "D" ring handles. A rubber gasket shall be provided between the "D" ring handle and the door.

Exterior rear face of body, including: passenger's side rear door jamb, driver's side rear door jamb, rear top header, and inboard vertical rear corners shall be fabricated of brushed stainless steel, bolted in position and removable.

47.4 DRIVER'S SIDE COMPARTMENTATION:

Driver's side compartments shall be provided full height ahead of, upper level above, and full height behind rear wheelwell housing.

The driver's front side compartment segment (ahead of rear wheels) shall be approximately 22" interior width x 69" interior height x 13" upper level interior depth/27" lower level interior depth. Compartment segment to be fully enclosed and weather sealed, equipped with one (1) roll-up compartment door, approximate size of 22" wide x 65" high, (clear opening size of 19" wide x 61" high).

The driver's side over-the-wheels upper level compartment segment shall be approximately 62" interior width x 42" interior height x 13" upper level interior depth/27" lower level interior depth. Compartment to be fully enclosed and weather sealed, equipped with one (1) roll-up compartment door, approximate size of 56" wide x 37" high, (clear opening size of 53" wide x 33" high).

The driver's rear side compartment segment shall be approximately 42" interior width x 69" interior height x 13" upper level interior depth/27" lower level interior depth. Compartment to be fully enclosed and weather sealed,

equipped with one (1) roll-up compartment door, approximate size of 42" wide x 65" high, (clear opening size of 39" wide x 61" high).

47.5 COMPARTMENT SHELVING

Perimeter double broke infinitely adjustable full length compartment shelves shall be furnished, where specified, mounted to and removable from front and rear bulkhead mounted vertical track assemblies. Ten (10) each, compartment pan style shelves shall be furnished, constructed of .125" thick 5052 aluminum sheet. Shelf perimeter flanges (4 each) shall be broke up 3". Each shelf shall have a load capacity of no less than 100 lbs. and shall be infinitely adjustable.

Each compartment shelf shall have two (2) angular clamp brackets bolted to under side shelf floor, a minimum four (4) aluminum heavy flat bar track clamps with threaded stainless steel carriage bolts and self-locking nuts, easily accessible for shelf height adjustment. Compartment shelves, shelf angular clamp brackets, and track assemblies shall be unpainted "swirl-finish". Entire front edge of shelves shall have reflective Red and White alternating striping.

Shelf locations to be Two each: D1 (driver forward side), D3 (driver back side), P1 (passenger side forward), P3 (passenger side back), and One each: D2 (driver side upper) P2 (passenger side upper).

Shelves shall be built to accommodate PAC TRAC mounting boards on rear wall while keeping infinite adjustability.

47.6 DEEP COMPARTMENT SHELVING

One (1) each, aluminum compartment pan style shelves shall be furnished, constructed of .188" thick 5052 Aluminum sheet. Shelf perimeter flanges (4 each) shall be broke up 3". Each shelf shall have a load capacity of no less than 200 lbs. and shall be infinitely adjustable along vertical tracks.

Each compartment shelf shall have three (3) angular clamp brackets bolted to under side shelf floor, six (6) aluminum heavy flat bar track clamps with threaded stainless steel carriage bolts and self-locking nuts. Compartment shelves, shelf angular clamp brackets, and Quad-Rail track assemblies shall be unpainted "swirl-finish". Entire front edge of shelves shall have reflective Red and White alternating striping.

Each shelf shall be furnished with adjustable tracks on both sides and rear (inboard) of shelf for total of three (3) attachment points.

Shelf to be located in lower level of D1, P1 compartment. (Driver/Passenger side forward).

47.7 COMPARTMENT SHELVING TURTLE TILES

Black section vinyl tiles shall be furnished, installed on top surface of all interior compartment horizontal shelves and compartment floors. Tiles shall be cut to size and shape of all shelves. Polished stainless steel channel type shelf tile retainers to be provided, full length of each horizontal shelf, bolted to and removable from outboard shelf flange. The specified black sectional floor tiles shall include leading edge sloped ramps at all compartment door openings.

47.8 FIRE EXTINGUISHER MOUNTING:

Three individual sleeve style brackets shall be provided and mounted in P3 compartment for three (3) fire extinguishers. Fire extinguishers shall be a one (1) 2 ½ gallon water, two (2) 10 lb ABC. Final design and OK will be decided at pre-construction with pictures of other apparatus shelves provided.

47.9 PAC TRAC EQUIPMENT PANELING

The upper portions of the D1, D2, and P2 compartments shall have PAC TRAC mounting boards on the rear and sides (between shelf rails) of the compartments for tool mounting.

The upper portions of the D3 and P3 compartments shall have PAC TRAC mounting boards on the rear wall of the compartment only.

47.10 SCBA BOTTLE RACK - DRIVER WHEELWELL

Driver's side bottom portion of over-the-wheel compartment shall be recessed into a minimum of 27" deep x 8" high x full width of compartment (approximately 62"), and equipped with a Polypropylene rack of individual sleeves to accommodate as many Scott 4.5 SCBA cylinders as possible. Rear wall of rack to be enclosed with same Polypropylene material as the rack to prevent damage to tank bottoms during loading and under all road conditions. Cylinder rack (sleeves) shall be down sloped at rear to prevent cylinders from sliding outboard. A full width permanent shelf shall be furnished above SCBA sleeves, lined with brushed stainless steel.

47.11 COMPARTMENT DOORS AND DOOR ACCESSORIES:

The following specified roll-up style compartment door tracks/extrusions to be "flush" with exterior body panels/door jambs. NOTE: Specified compartment doors shall be manufactured in the United States of America.

Specified compartment door jambs, integral with front and rear body corners, removable above wheelwell housings shall be fabricated with inboard flanges which are machined for screw type fasteners and mounting of specified roll-up compartment door aluminum side track extrusions.

All side compartment doors shall be **ROM Robinson** roll-up shutter style. Each individual roll-up extruded aluminum door shall be of maximum size for the available door opening. Front and rear extruded aluminum door tracks shall be furnished, bolted to vertical door jambs and interior compartment bulkheads so as to be easily removable for repairs or modifications. All roll-up style compartment doors shall be installed and adjusted during body construction. NOTE: Roll-up door tracks which are riveted or welded in position are not acceptable.

The following specified door opening sizes may be reduced by no more than 3" total width (1-1/2" per side) and 4" total height. Decrease in compartment opening sizes is caused by profile of side track extrusions with weatherstripping and bottom door slat which remains in door opening.

Weatherproof magnetic reed style proximity switches, as provided by the door's manufacturer (for ease of future parts availability) shall be used, on all roll-up compartment doors.

47.12 ENCAPSULATED ROLL-UP DOOR PROTECTION

The above specified roll-up door "bundles" will be encapsulated within custom fabricated swirl finish aluminum shrouds, protecting "bundled" door slats from interior compartment damage. Fabricated shrouds to be of minimum size necessary, to accommodate largest diameter door bundle, and will span the full width of compartment. Shrouds will be easily removable, from within the compartment interior.

NOTE: The above specified door bundle encapsulators shall be removable, from within the compartment interior, so as to allow for door slat and rewind mechanism maintenance/cleaning, without having to remove exterior treadplate overlapping body panels.

47.13 COMPARTMENT LIGHTS

Lighting for compartments shall be LED lighting. It shall be full height and run down the entire inside edge of the compartment door on both sides. Lighting shall be activated by a switch when door is opened. All compartments shall have this lighting.

48.0 APPARATUS PUMPER BODY SUBFRAME:

The apparatus body shall be constructed of stainless steel. The apparatus pumper body sub-frame shall be constructed of stainless steel, and designed to support the anticipated weight of the apparatus body. Structural components used between the sub-frame and the chassis frame shall be of stainless steel or other material which Bidder can verify will support the subframe for the expected life of the Apparatus, and said components shall be warranted for the expected life of the Apparatus. Rubber cushion vibration isolators to be furnished as necessary, so as to allow flexing of chassis frame rails independent of apparatus body subframe.

Bidder shall depict, in the specified proposal drawings, both the subframe and water tank sump designs.

All body subframe mounting components shall be attached to the chassis frame with hardened steel bolts, bolt holes machined through subframe support and chassis frame side webs. Body subframe supports shall be positioned so as to provide approximately 22" (with truck fully loaded) from ground to top of body rubrails and rear tailboard. The apparatus body subframe materials, and construction methods, shall allow for a "lifetime" warranty, of the entire subframe structure.

49.0 APPARATUS BODY CONSTRUCTION MATERIALS:

The following specified accessory components shall be fabricated of .125" 5052-H32 smooth sheet aluminum: interior compartment adjustable shelves, interior compartment adjustable shelf brackets, interior compartment vertical front and rear corner bulkheads, and any specified vertically or horizontally hinged exterior compartment door panels.

All specified interior compartment adjustable shelving, trays, and shelving tracks have a machined "swirl" finish.

Exterior rear body horizontal header, exterior rear body vertical door jambs, exterior rear body inboard vertical side overlays, and top of pump house.

Rear body steps shall be stainless steel.

The specified compartment roof top overlays, and any specified hinged door interior liners shall be fabricated of .100" polished aluminum treadplate.

The following apparatus body components shall be fabricated of minimum 16-gauge "polished" type 304 stainless steel: driver's and passenger's front and rear side rubrails (where specified).

49.1 FASTENERS

All apparatus body screw type fasteners shall be stainless steel.

Driver's side, passenger's side, and rear compartments shall be equipped with "sweep-out" floor, raised at least 1" above compartment bottom door opening. Side compartment floors shall extend out below compartment doors, with 3" flange down and 1" return in, providing rigid mounting surface for specified rubrails.

Passenger's side and driver's side front and rear interior compartment corners to include vertical full height bulkheads (wiring harness covers) rigidly mounted, to provide mounting for specified adjustable shelf tracks, and easily removable.

All compartment door sill edges shall be overlaid with stainless steel to protect the paint.

50.0 APPARATUS BODY FEATURES:

50.1 POLISHED STAINLESS RUBRAILS

Driver's and passenger's forward and rear bottom side compartments shall be furnished with fabricated polished stainless steel rubrails, extending from front compartment corners to rear wheelwell cut-out, and from rear wheelwell cut-out to rear compartment corners. Rubrails shall be "in-line" with pump panel runningboards and rear tailboard corner steps, 3" high, protruding 1/2" from body sides. Rubrails shall be channel shape, extending into compartment interior (below compartment doors), flanged up to facilitate installation of specified removable hollow core door weatherstripping. Polished stainless steel rubrails shall be bolted in position and easily removable, fasteners concealed below body and inside compartment.

50.2 POLISHED WHEEL WELL TRIM

Polished stainless 25" radius wheelwell moldings shall be furnished, bolted in position surrounding driver's side and passenger's side rear body wheelwell cut-outs. Fasteners shall be concealed beneath the extrusion. Wheelwell moldings shall be flush with specified body rubrails.

50.3 STAINLESS STEEL WHEEL WELL LINER

A circular interior wheelwell liner shall be furnished, driver and passenger side wheelwell housings, bolted to and removable from a radius ring flange, designed to provide ease of cleaning and repairs. Wheelwell liners to be fabricated of stainless steel. There shall be sufficient room in this area for the use of rear tire chains.

50.4 POLISHED DRIP CAP

Compartment roof top liner fabricated "polished treadplate aluminum" drip caps flange shall cover the roll-up door top overhead extruded moulding.

50.5 TREAD-BRITE COMPARTMENT ROOF TOPS

Driver's and passenger's side compartment roof tops shall be lined/plated with polished 4-way aluminum treadplate, flanged down on front, rear, and full length outboard side to meet extruded aluminum drip molding. Aluminum

treadplate liners shall be "single piece" to eliminate mis-matched seams, extending full length and full width of compartment roof top. Treadplate aluminum liners shall be bolted in position, after finish painting of compartment roofs, underside seal coated prior to final installation.

50.6 TUBULAR BODY RAILINGS

Apparatus body tubular railings shall be furnished, consisting of: 1-1/4" o.d. etched non-slip tubes, chrome plated double bolt type 3" stand-off end type and center rail brackets, stainless screws to prevent rotation of tubular railings within bracket, and neoprene rubber surface mounting gaskets furnished between rail bracket and painted body surface. Rubber insert railings shall not be accepted.

Tubular railings shall be provided: passenger's side and driver's side vertically rear body corners, and horizontally full width of hosebody below hosebed gratings.

50.7 RUNNINGBOARDS AND TAILBOARD:

The specified pump panel running board shall be in-line with body rubrails.

A full width 101" rear step/tailboard shall be furnished, at least 16" deep (between rear compartment corners), constructed of stainless steel or equivalent corrosion resistant materials. Rear step shall be single piece fabrication, spaced 1/2" away from rear face of body and 1" below specified rear corner beavertails.

50.8 LED REAR STEP LIGHTS

Three (3) each, 12-volt LED courtesy step lights are to be furnished, located to illuminate step surfaces at the rear of the body, where individual steps are specified. Light fixture to have polished stainless bezel and shielded clear polycarbonate lens. Lights to be activated by parking brake set.

NOTE: One (1) of above specified lights shall be installed under driver dash to illuminate area of regen switches and diagnostic port. Light to be activated with ignition switch.

Each outboard rear corner to be 45-degree angle flanged bevel with back side 12-volt marker light. Center rear flange of tailboard shall have three (3) diamond cut-outs, exposing under flange mounted center marker light cluster. All aluminum treadplate to be fitted, removed, undercoated with rustproofing material, non-aluminum areas properly lined with 3M dielectric tape, and bolted in position.

Pattern cut/puncture fabricated non-slip foot grip surfaces shall be provided, integral with tailboard material, at appropriate step locations.

50.9 DEPLOYED HOSE RESTRAINT

The tailboard shall be equipped with a full width black nylon restraint for deployed hose, consisting of strap netting with quick-release draw-tight clips. Tailboard shall be equipped with flush mounted loops or eyes to allow latching of restraint. Final configuration to be determined at prebuild.

50.10 MAIN HOSEBED AREA

The apparatus body hosebed area, located between passenger's body side and driver's body side, to rear of front body cross-panel, and above water tank, shall be approximately 54" wide x 90" long x at least 36" deep. The floor of hosebed shall be no more than 60" from ground level.

A forward hosebed cross divider shall be furnished, located immediately to rear of specified water tank fill stack, full width of main hosebed area, providing full hosebed width travel of specified adjustable hosebed dividers. Cross divider to be perimeter flanged (triple broke top), full depth of hosebed sides, bolted in position and easily removable.

Dunnage shall be covered with .125" treadbrite, bolted into position with blind fasteners. Generator well shall remain open to the driver's side dunnage above pump compartment.

Extruded aluminum slatted hosebed gratings shall be furnished, running longitudinal full length of hosebed with underside crosswise reinforcement slats running full width of hosebed area. Longitudinal aluminum hosebed gratings to be spaced at least 1/2" apart for proper hose ventilation. Top longitudinal and bottom crosswise slats shall be assembled with aluminum clamp type tabs and stainless steel threaded fasteners, so as to allow complete disassembly and rearrangement for future hosebed modifications. Longitudinal gratings shall be "cut-out" around

specified water tank stack(s). Fabricated polished stainless steel grating retainers/hosebed adjustable divider slide tracks to be furnished at rear of hosebed, designed to prevent snagging of hose or couplings during unloading and loading operations.

50.11 HOSEBED CAPACITY

The main hosebed shall be designed to accommodate: passenger side outboard 200 ft. of 2-1/2" double jacket fire hose pre-connected, 500 ft. of 2-1/2" double jacket fire hose dead-lay, 1000 ft. of 4" large diameter hose dead-lay, driver side inboard 200 ft. of 1-3/4" double jacket fire hose pre-connected, and driver side outboard 200 ft. of 1-3/4" double jacket fire hose pre-connected.

50.12 HOSEBED DIVIDERS

Three (3), full length infinitely adjustable hosebed divider(s) shall be furnished, fabricated of .250" unpainted "swirl finish" smooth aluminum with integral front vertical flange and bottom horizontal base flange. **Height of hosebed dividers shall be determined by Fire Department and cut to that height.** Top rear corner of divider panel to be 3" radius, sanded and deburred to prevent hose damage. Upper and lower polished stainless steel horizontal channel tracks shall be furnished, bolted to specified forward cross divider. An additional polished stainless steel channel track to be provided at rear bottom of hosebed. Forward and bottom stainless channel tracks to be provided with sliding clamps and threaded studs with acorn nuts allowing infinite adjustment of hosebed divider location.

50.13 HOSEBED COVERS -- ALUMINUM 4-WAY

One (1), full length/full depth main hosebed divider shall be furnished, bolted in position and easily removable. Divider shall be located center line of vehicle, fabricated with triple formed top horizontal breaks providing rigid mounting surface for both specified hinged aluminum hosebed covers. A full depth forward hosebed cross divider shall be furnished, immediately to rear of water tank fill stack, with triple top flange, bolted in position and removable. NOTE: Two (2) additional hosebed cover handrails shall be provided.

Two (2), individual polished 4-way aluminum treadplate hosebed covers to be furnished, extending from front hosebed cross divider to rear of body. Hosebed covers to be triple fabricated construction for maximum strength, equipped with polished stainless steel full length piano hinges bolted to top flange of specified hosebed divider and hosebed covers. Back end plates of hosebed covers to be equipped with horizontal 1-1/4" diameter knurled railings with chrome plated bolted brackets. Driver's side hosebed cover railing to include Velcro strap design to hold adjacent cover in the opened position. Polished stainless steel fabricated rear coupling guides to be furnished horizontally at rear under cover areas and vertically rear divider flange, designed to prevent snagging of hose and couplings.

Two (2) individual **RED** vinyl coated nylon hosebed cover end flaps (tarps) shall be furnished with weighted bottom seams, permanently attached to bottom rear flange of hosebed covers. NOTE: There shall be a way to secure this flap to the rear of the apparatus body to help secure fire nozzles in bedded position.

Center fixed hosebed divider shall be positioned to put hose in following order, from drivers side to passengers side.

- 200' of 1-3/4"preconnected
- 200' of 1-3/4"preconnected
- 500' of 2 1/2"deadlay
- 1000' of 4"
- 200' 2-1/2" preconnected

Hosebed risers shall be notched directly rear of tank to make hinged hosebed covers flush with forward portion of risers. "Spare hosebed" over suction hose compartment shall be eliminated and capped with treadbrite to match compartment roof overlays.

50.14 HOSEBED RISERS

Driver's side and passenger's side full length hosebed risers shall be furnished, with triple-formed top horizontal flange, forward sloping rear triple-formed flange, and mitered top rear corner. A forward transverse hosebed riser shall be furnished, with triple-formed top flange, extending between and flush with driver's side and passenger's side hosebed risers. Front transverse hosebed riser shall be bolted to front body cross panels, easily removable.

Driver's and passenger's side hosebed risers shall be bolted to compartment roof tops, flush with hosebed side, easily removable. Transverse and side hosebed risers shall be designed to provide additional hosebed depth, easily removable for future adjustments to hosebed depth. Hosebed risers shall be flush with top of pump compartment.

50.15 SLIDE-IN STORAGE FOR LADDERS, PIKE POLES, AND BACK BOARD

A completely sealed storage compartments to be furnished, passenger's side outboard water tank side, full length of body. Storage compartment shall accommodate: sleeve and tray mountings for specified extension ladder/roof ladder/folding ladder/two (2) pike poles and one (1) roof hook. The 2-section and roof ladder trays shall be bottom lined with nylon, for "free-slide" surface. Compartment to be approximately 38" above rear tailboard equipped with vertically hinged access door with large D-ring stainless steel 1/4-turn latch and stainless piano hinge. There shall also be a slot for back board storage as well.

50.16 HARD SUCTION HOSE STORAGE

One (1) completely sealed hard suction hose compartment/storage cavity area shall be furnished, located in the far right (passenger side) portion of the main hosebed area, above the ladders. Compartment shall be minimum 12" wide x 20" high x 130" long, designed to accommodate two (2) hose troughs for the specified suction hose. Suction hose compartment shall be enclosed on sides, front, and top. Top to be same height as the main hosebed treadbrite covers. Side-swing door shall be furnished with large D-ring ¼ turn polished stainless single point latch assembly and full length polished stainless piano hinge.

Polished aluminum drip rail shall be provided across top of suction hose compartment.

50.17 REAR BODY STEPS - NO SLIP GRIP

Six (6), individual stainless steel rear body steps shall be furnished, mounted three (3) on each side, evenly spaced, up rear body corners. Steps to include integral riser toe-stop to protect rear corner finish. Fabricated steps to be of maximum width to allow for mounting of specified tail, turn and back-up lights underneath step areas. The steps which are located above the tailboard, and located above the intermediate steps, are to be provided with multiple element LED 12-volt light fixtures. Six (6) light fixtures are to be provided, positioned to illuminate the step surface below.

50.18 REAR OBSERVATION SYSTEM

A rear observation system shall be provided, consisting of a rear apparatus mounted high resolution (270K pixels) completely waterproof camera with adjustable viewing angles, and a Slimline flat panel display with a 5-1/4" viewing screen mounted on the interior chassis cab driver side visor or approved location.

Camera eye shall be located above rear center compartment.

50.19 TRAFFIC DIRECTING LIGHT BAR - REAR OF BODY

A traffic bar, Whelen 500 Series TIR 6 consisting of eight (8) recessed (6 Amber & 2 Red) led lights shall be furnished with traffic bar sequencer for left, right, spread, and random flash patterns. The light bar is to be installed at center rear of body, between hand rail and compartment door. The 2 red lights shall come on with the master warning switch on dash. Control head is to be installed inside driver's compartment, location as designated by Customer.

50.20 REAR BODY TRAFFIC BAR PROTECTION

The specified rear body mounted traffic light bar is to be surface mounted to rear face of the apparatus body, beneath a tubular rear horizontal handrail which is located so as to protect the light bar and lenses.

51.0 NFPA EQUIPMENT:

The following loose equipment shall be provided and mounted.

51.1 TWO SECTION LADDER

One (1), Duo-Safety 24 ft. model 900-A 2-section aluminum ladder shall be furnished, with rope hoist.

51.2 ROOF LADDER

One (1), Duo-Safety 14 ft. model 775-A aluminum roof ladder shall be furnished with folding roof hooks.

51.3 ATTIC LADDER

One (1), Duo-Safety 10 ft. model 585-A aluminum folding attic ladder shall be furnished.

51.4 PIKE POLE (S)

One (1) six (6) foot Fire Hooks Unlimited Ash Handle National Hook (Hook #3) Style with iron end pike pole shall be furnished.

51.5 PIKE POLE (S)

One (1), eight (8) foot Fire Hooks Unlimited Ash Handle National Hook (Hook #3) Style with iron end pike pole shall be furnished.

51.6 SUCTION HOSE - 6"

Two (2), 10 ft. length(s) of 6" i.d. Maxi-Flex or equivalent flexible suction hose shall be furnished, complete with 6" NST lightweight rocker lug couplings, swivel female one end, rigid male opposite end, and strainer.

51.7 WHEEL CHOCKS

Two (2), each Ziamatic model AC-44 NFPA compliant cast aluminum "single-piece" wheel chocks shall be furnished. Chocks to be stored in the D1 compartment. Brackets to be constructed per Fire Department Instructions.

51.8 HAND LANTERNS - WITH CHARGERS

Three (3), Streamlight model 45107 LiteBox rechargeable hand lanterns to be furnished, complete with 12-volt "clip-in" charge rack.

Lanterns/chargers to be mounted interior of the chassis cab and wired, location to be determined, by customer.

51.9 ROOF HOOK

One (1), six (6) foot Fire Hooks Unlimited New York Style roof Hook with Pry End shall be furnished

52.0 BOOSTER TANK:

52.1 500 GALLON WATER TANK/ 30 GALLON FOAM RESERVOIR

The apparatus shall be equipped with a 500 gallon capacity water/30-gallon (separate tank) foam capacity polypropylene thermoplastic water tank. The foam reservoir shall be "notched" into the front corner of the specified booster tank. The foam reservoir shall include foam feed and taps, a fill stack with lift up cover and locking latch assembly. A 30 gallon capacity (matching tank material) foam cell/tank shall be furnished, complete with: top fill stack, vented fill cover, bottom drain spud, bottom foam suction spud, and accommodation for a Class-A direct discharge foam system low level sensor device.

The water fill tower shall be designed, sized and located as required by the needs of the tank. The polypropylene fill and overflow tower shall be equipped with a hinged lid, latch, and a removable polypropylene screen. The overflow tube shall be installed in fill tower and piped with schedule 40 PVC pipe through the tank, exiting out tank bottom.

The water tank sump shall be a minimum of 8" x 8" x 3" deep and located in the forward area of the booster tank. There shall be schedule 40 minimum 3-1/2" diameter polypropylene tank suction pipe from the front of the tank to the tank sump. The tank drain and clean out shall be 3" NPT schedule 80 female flange with plug, located in the bottom of the tank sump.

52.2 TANK NOTCHED FOR RECESSED FOAM CELL

The passenger (right) side front corner of the water tank shall be "notched" to accommodate the specified isolated foam cell/tank. The notch shall be sized, such that the foam cell/tank fits down into the tank top corner, flush with top lid of water tank, so as to not conflict with the specified hosebed area.

52.3 FOAM TANK DRAIN VALVE

One (1), 3/4" Class One 1/4-turn drain valve shall be furnished to allow drainage of the foam tank/cell. Valve to be mounted in the pump compartment connected to a discharge port on the foam tank with clear plastic hose and accessible through the specified pump panel removable overlays or access door.

52.4 LIFETIME WARRANTY

The water tank, and its installed accessories, shall be covered by a "Lifetime" Warranty, against cracks, corrosion, or other failures caused by the tanks design and normal use of the same. The warranty shall be between the tank manufacturer, and the customer.

52.5 WATER TANK CAPACITY CERTIFICATION

The water tank capacity shall be documented, with a written Certification, from the Water Tank Manufacturer. This certification shall be included with the specified delivery documents.

The tank cradle shall have a lifetime warranty, as provided by body builder.

53.0 12-VOLT ELECTRICAL EQUIPMENT

53.1 WIRING HARNESES

All wiring to be identified and "imprinted" with number and function. Auto-reset circuit breakers to be furnished, of various amperage capacity, sized for intended load.

53.2 POWER DISTRIBUTION CENTER

The power distribution center shall be located interior of driver's forward side compartment, and shall contain following specified engineered electrical components and waterproof pin/socket bulkhead connectors:

53.3 12-VOLT ELECTRICAL PANEL

A main electrical panel shall be located in a highly weather resistant compartment. A minimum of ten (10), spare circuit breaker sockets shall be supplied. All sockets and equipment shall be clearly labeled.

53.4 BATTERY CABLE UPGRADE

A minimum 2-0 multi-stranded copper insulated battery cable shall run from specified battery switch to chassis frame mounted threaded stud terminal block, providing power to high amperage items such as: primer motor, electrical discharge valves, reel rewind motors, generator starter motor, etc.

53.5 VEHICLE SPECIFIC WIRING INFORMATION

"Vehicle Specific" wiring information shall be provided for this particular apparatus "as built" upon completed delivery of the same.

53.6 LOAD MANAGEMENT

A Load Management System (LMS) shall be furnished for performing electrical load management. The LMS shall have eight (8) programmable outputs to supply warning and load switching requirements. The load management system shall provide eight (8) output load shedding, low voltage warning, scene mode operation and response mode operation.

Outputs shall be independently programmable to activate during the scene mode, the response mode or both. These outputs can also be programmed to activate with the master warning switch and battery switch, or to sequence and shed along with priority.

When the emergency master switch is toggled to the "ON" position, the warning light loads will activate immediately.

The load management system shall automatically activate upon activation of the apparatus parking brakes. Predetermined load shall shed upon activation of load management thereby reducing the electrical demand of the apparatus to the preprogrammed "ON-SCENE" mode. **LOAD MANAGEMENT DURING APPARATUS RESPONSE WILL NOT BE ACCEPTABLE.**

Load management shall be prioritized according to least critical systems.

A system override switch shall be placed on the electrical console to allow total manual operation of ALL warning light switched electrical loads.

54.0 APPARATUS NON-EMERGENCY LIGHTING:

All specified 12-volt to be in accordance with D.O.T. regulations.

All specified light fixtures to be located/fitted prior to and re-installed after finish painting. Where fixture wiring passes through metal body panel, the pass-thru hole to be equipped with a rubber grommet. All specified light fixtures shall be installed, using stainless steel screws with non-metallic "replaceable" threaded inserts (nuts), to allow removal of light fixture, from exterior of body. Where light fixtures are to be installed on a painted panel, all light fixture mounting holes, grommet holes, and fastener holes shall be machined/cut-out prior to prime and finish painting, so that all metal surfaces receive the same protective coating.

The following specified rear body tail/stop, turn and back up lights to be positioned: Red (tail/stop) TOP, Amber (turn) MIDDLE, and Clear (back up) BOTTOM, driver's and passenger's side rear of body.

Two (2), round or rectangular surface mount midship LED, marker lights & turn lights, to be furnished; located one (1) driver's side midship vehicle and one (1) passenger's side midship vehicle. Lights to have Amber lens. Turn light (flashing element) to be activated by vehicle turn signals.

Two (2) additional flexible rubber arm surface mount 12-volt Model VS-L31RW LED bulb marker lights with acrylic lenses to be furnished, location to be designated by purchaser. Lenses to be Red. Marker lights to be activated by headlamp switch. Marker lights are to be in addition to previously specified vehicle marker lights.

Lights to be mounted per FMVSS 108 and CMVSS 108 requirements.

54.1 D.O.T. MARKER LIGHTS

Five (5), Truck-Lite 4" x 2" rectangular surface mount 12-volt LED marker lights with snap-on reflective lenses to be furnished, located: two (2) recessed into specified rear tailboard corner castings and three (3) recessed behind center rear tailboard flange diamond shape cut outs. Lenses to be Red. Marker lights to be activated by headlamp switch. Three (3) center light cutouts shall read DFD copying existing engine.

54.2 TAIL LIGHTING - SIX (6) EACH

Two (2), Whelen model 6OROOXRR, 5" x 8" rectangular chrome plated flange surface mount "LED" combination stop/tail lights to be furnished, mounted each side at rear of body. Lighting to exceed the SAE requirements. Lenses to be 4" x 6", Red. Lights to be wired for activation by service brake and headlamp switch.

Two (2), Whelen model 6OA00TAR 5" x 8" rectangular chrome plated flange surface mount LED turn signal lights with populated arrow shape and multiple flash patterns to be furnished, mounted one each side at rear of body. Lenses to be 4" x 6" Amber. Lights to be wired for activation by left or right turn signal (not by brake lights).

Two (2), Whelen model 6OJOOOCU, 5" x 8" rectangular chrome plated flange surface mount halogen back up lights to be furnished, mounted one each side at rear of body. Lenses to be 4" x 6", Clear. Lights to be wired for activation by reverse gear of truck transmission.

Above specified lights to include appropriate 6EFLANGE(s) and be bolted in position, evenly spaced, driver's side and passenger's side rear body corners.

54.3 BACK-UP ALARM

One (1), 12-volt electronic 97db back-up alarm to be furnished, mounted at rear below body, activated by reverse gear of truck transmission.

54.4 LED REAR STEP LIGHTS

Three (3)each, 12-volt LED courtesy step lights are to be furnished, located to illuminate step surfaces at the rear of the body, where individual steps are specified. Light fixture to have polished stainless bezel and shielded clear polycarbonate lens. Lights to be activated by parking brake set.

54.5 UNDER BODY LIGHTING

Six (6), 12" LED under body 12-volt ground lights to be furnished, located: two (2) each driver's side ahead of and behind rear wheels, two (2) each passenger's side ahead of and behind rear wheels, two (2) each rear underside

tailboard. Lights to be completely sealed for weather resistance. Lights to be wired for activation by setting of the parking brake.

55.0 APPARATUS BODY OPTICAL WARNING DEVICES

The entire warning light package shall be actuated with a single master warning switch in the cab switch panel. The wiring for the warning light package will engage all of the lights required for "Clearing Right of Way" mode when the vehicle parking brake is not engaged. An automatic control system will be provided to switch the warning lights to the "Blocking the Right of Way" mode when the vehicle parking brake is engaged.

55.1 LOWER LEVEL EMERGENCY BODY LIGHTING

Six (6), Whelen model LED 600 series 4" x 6" rectangular flush mounted emergency LED lights complete with associated 6E flanges to be furnished, located one (1) driver's side midsection in front of wheel well, one (1) passenger's side midsection in front of wheel well, one (1) driver's side rear side and one (1) passenger's side rear side behind wheel well, and two (2) rear of body; one (1) driver's side and one (1) passenger's side, (as close to rear lower corners as practical). Light lens to be 4" x 6" (all Red) and activated by a single illuminated rocker switch, identified as "**LOWER LEVEL EMERGENCY LIGHTS**".

55.2 REAR & REAR SIDE FLASHERS – UPPER

Six (6), Whelen 500 series TIR6 rectangular flush mounted emergency LED lights complete with associated 5E chrome surround flanges to be furnished, located one (1) driver's side upper rear body corner side, one (1) passenger's side upper rear body corner side, and four (4) on rear surface of body corners; two (2) driver's side and two (2) passenger's side, (as close to top as practical). Lights to be all Red and activated by a single illuminated rocker switch, identified as "**UPPER LEVEL FLASHERS**".

The rear facing upper level lights shall be programmed to flash randomly from each other.

56.0 120V/240V ELECTRICAL SYSTEM AND ACCESSORIES

The following specified 120/240 volt alternating current system shall meet the requirements of NFPA 1901.

56.1 HYDRAULIC GENERATOR

One (1), Smart Power Systems model 1700008 hydraulic pump driven generator shall be furnished, rated at 8000-watt, 120/240-volt single phase, complete with: appropriate chassis transmission mounted "hot-shift" PTO. The system will generate power as standard 120VAC and/or 240VAC, 60 hertz, and handle loads up to 8,000 watts.

56.2 GENERATOR LOCATION

The above specified hydraulic generator shall be located in the driver's side dunnage area above the pump panel with allowances made for proper venting.

56.3 ELECTRIC CORD REEL/LOCATION

One (1), push button rewind 4-conductor electric cord reel assembly to be furnished, consisting of: Hannay model ECR1618-17-18 electric 4-conductor cord reel, 200 ft. of 10-4 S. O. insulated multi-stranded copper electric cord, bright orange ball type cord stop, water-proof conduit and appropriate multi-stranded copper wiring from reel to specified generator circuit breaker panel, 12-volt insulated battery cable from reel rewind to battery disconnect switch, and the specified cord end mounted receptacle box. Cord reel to be equipped with a 4-way polished stainless steel cord roller assembly. Reel to be mounted, passenger side, inside the pump compartment module, with roller fairlead located exterior the compartment, above the specified pump interior access door.

56.4 GENERATOR / CORD REEL COVER

A brushed stainless steel hinged protective cover shall be provided over the generator and cord reel mounted in the pan above the pump compartment. The cover shall be constructed of aluminum tread brite. A hinged, louvered side access panel shall be provided on the driver's side of the dunnage area. A hinged side access panel shall be provided for access to the cord reel.

56.5 GENERATOR CIRCUIT BREAKER PANEL

One (1), Square-D 100-amp circuit breaker panel to be furnished, with at least four (4) individual switch type manual-reset circuit breakers, (20-amp for 120-volt receptacle/10-amp for lighting). Panel to be located inside a weatherproof apparatus body compartment passenger side front corner. All circuits shall be identified with permanently engraved nameplates describing controlled function.

56.6 INTERIOR COMPARTMENT 20-AMP TWIST-LOCK RECEPTACLES, TWO (2)

Two (2) single 120-volt 3-wire Non-NEMA #7310B twist-lock weatherproof plug-in receptacles to be furnished, mounted inside circuit breaker panel compartment, accessible through open compartment door. Receptacles to include: metal duplex cover plate, cast aluminum electrical receptacle box, #7310B twist-lock receptacle, screw type conduit connector, and flexible non-metallic electrical conduit with appropriate size multi-stranded THHN insulated copper wiring extending from receptacle to specified generator circuit breaker panel. Receptacles to be provided with individual manual reset circuit breakers. Receptacle outlets to be labeled with permanently engraved nameplate, to read: "120-VOLT/20-AMP GENERATOR POWER"

56.7 BODY COMPARTMENT INTERIOR - 120-VOLT/20-AMP RECEPTACLES

One (1), 120-volt, 20-amp household plug-in receptacles shall be furnished, interior of compartment P1, with: surface mounted cast aluminum receptacle box, duplex 120-volt 3-wire household plug-in receptacle, metal duplex cover plate, wired from battery and shore power to be labeled; "SHORE POWER RECEPTACLE"

56.8 RECEPTACLE BOXES

One (1), Duluth Fire compatible cast aluminum electrical receptacle boxes to be furnished, mounted on end of specified reel cords, equipped with: two (2) individual single Non-NEMA #7310B 3-wire 20-amp, twist-lock female receptacles, cord clamp, metal receptacle box plates with spring loaded receptacle covers. One (1) receptacle to be wired to each 120-volt circuit (2 circuits) for use with specified 4-conductor cord.

A receptacle box bracket shall be furnished, on passenger side exterior pump panel.

56.9 FLOODLIGHTS

Four (4) each, Fire Research "Optimum" model OPA530-S75, Focus 750-watt 120-volt quartz floodlights to be furnished. Insulated 120-volt coil cord to be permanently wired to recessed body mounted electrical junction box. Light/coil cord to be wired and powered by generator circuit breaker panel mounted 12-volt/120-volt relay with remote illuminated 12-volt rocker switch located on chassis console. Lights to be mounted: on front body corners and rear body corners if practiceable, driver and passenger sides with fixed top mount brackets.

56.10 BROW LIGHT - 120V

One (1), Fire Research Optimum Series 750W/120V Contour Mount Brow Light shall be furnished, designed for mounting on radius surface. Light to be mounted: centerline, above windshield, with remote illuminated 12-volt rocker switch located on chassis console. Light shall be mounted as to not block the chassis lightbar.

56.11 CAB INTERIOR 12VOLT POWER SOURCE

Three (3) 12-volt power sources shall be furnished, exact location to be determined at pre-build meeting. Power to originate from the battery and specified battery conditioner, hot when shorepower is plugged-in to 120-volt source.

56.12 PAINT PROCESS

The paint applied to the apparatus shall be PPG Industries Delfleet® Evolution brand or equivalent, applied throughout a multi-step process including at least two coats of each color and clear coat finish.

The coating system, as supplied and recommended for application, shall meet all applicable federal, state and local laws and regulations now in force or at any time during the courses of the bid.

The specified painted surfaces (excluding roll-up doors) shall receive the primer coats and the finish coats. The apparatus body painted surfaces shall have a finish with no runs, sags, craters, pinholes or other defects.

56.13 PAINT COLOR

Finish color to match major chassis cab exterior color.

56.14 DISSIMILAR METALS

During assembly all 4-way aluminum treadplate components, shall be seal coated where mated to non-aluminum components. 4-way aluminum fabrications to be installed using stainless steel button socket head cap screw fasteners. Edges of 4-way aluminum, where meeting exterior body painted fabrications, shall be properly caulked with G.E. or equal silver metallic body sealant to prevent moisture accumulation between metal layers.

56.15 TOUCH-UP PAINT

One (1), full quart of original finish color top coat paint material shall be provided for use as future touch-up paint.

56.16 ADDITIONAL APPARATUS BODY AREAS TO BE PAINTED

In addition to the above specified painted surfaces, the apparatus body forward full height, and upper level vertical door jambs shall be painted to match the roll-up doors and chassis cab.

The exterior surface of apparatus body wheelwell housings shall be painted to match the chassis cab.

56.17 REFLECTIVE STRIPING/LETTERING

At minimum a 4" wide horizontal White ScotchLite reflective stripe with a 1" stripe above and below shall be affixed to the perimeter of the vehicle, placed approximately 3" above running board/rubrail level, to conform with NFPA 1901 reflectivity requirement. Striping shall continue around to front of apparatus and shall be full width under grille with 1" striping being cut out where needed

The lettering and stripping package shall be coordinated with the Duluth Fire Department and existing apparatus.

57.0 DELIVERY:

Final delivery of the completed apparatus shall be made via drive-away F.O.B. City of Duluth Fleet Services, at which time Fleet and Fire Department personnel shall be instructed as to the proper use of the fire pump systems, as well as component systems by a Factory Representative. Factory training shall include intensive fire pump training session by a delivery engineer with extensive experience giving such sessions.

58.0 CHANGE ORDERS

All Change Orders will be documented in writing and will be accompanied by either a City of Duluth Purchase Order number of a properly signed requisition. Change Orders must be approved by the Fleet manager and the Duluth Fire Department Project Manager (Deputy Fire Chief).

59.0 ADD ON PRICES/ADDITIONAL APPARATUS

Bidders shall provide guaranteed pricing for a period of at least one (1) year for the purpose of additional apparatus purchases of the same vehicle.

Bidders shall provide optional pricing and complete terms of the following (if able):

1. Municipal Lease Purchase Program
2. Municipal Turn Back Lease Program

END OF SPECIFICATION