GREENWICH
Fire Department

REQUEST FOR PROPOSALS PUMPER-TANKER

The Greenwich Volunteer Fire Department is seeking proposals from qualified apparatus manufacturers for the construction of one (1) new, 2025 model year or newer, side mount Pumper-Tanker.

FORM OF SUBMISSION

Proposal submissions shall be made in writing either electronically via email or sent via letter mail in a sealed envelope. All proposals should be addressed to:

Greenwich Volunteer Fire Department
P.O. Box 2315
Wolfville, NS
B4P 2N5
chief@greenwichfire.ca

All proposals must include a complete copy of Appendix A- general proposal information & price form and Appendix B- specification compliance checklist.

Proposals which include goods not fully compliant with specifications within this request for proposals may include proposed alternatives, however the Greenwich Volunteer Fire Department reserves the right to reject any proposal which does not materially comply with the specifications contained within this document.

Incomplete proposals or those received following the deadline for submissions will not be considered.

CONTACT PERSON

Questions of clarification should be directed to Chief Jason Ripley via email to jripley@greenwichfire.ca. The deadline for questions of clarification shall be August 14th, 2025.

SUBMISSION DEADLINE

The deadline for submissions to be received shall be August 28th, 2025, at 4:30pm.

DISCLAIMER

The Greenwich Volunteer Fire Department reserves the right to accept or reject any proposal and will not necessarily accept the lowest bid. The department also reserves the right not to award a contract to any of the proponents if they believe in their sole discretion doing so would not be in the interests of the Greenwich Volunteer Fire Department.

PROPSOAL SCORING

All proposals will be scored by the Greenwich Volunteer Fire Department truck committee in accordance with the following matrix:

Scoring Criteria	Weight	Score /10
Compliance with specification criteria	30%	
Price	30%	
Warranty Coverage	20%	
Local warranty repair/service capability	10%	
Proponent's Experience/Reputation	10%	

GENERAL CONDITIONS

1. The completed apparatus shall be designed, built, and tested to conform to SAE, NFPA, ULC, or other appropriate standards or requirements for this type of vehicle.

2. The completed apparatus shall not require the department to obtain overweight permits and shall be compliant with the requirements of the Nova Scotia Motor Vehicle Act.

3. Prior to delivery the completed apparatus is to be tested and labeled in accordance with CAN/ULC S-515-13 as a Pumper firefighting apparatus.

4. Proposals must demonstrate that the vendor has a demonstrated history for constructing a similar apparatus and all bids must include trade references with contact information for at least three (3) similar projects with their submission.

5. The successful vendor shall provide for a final inspection visit to the vendors' manufacturing facility for two (2) members of the Greenwich Volunteer Fire Department prior to delivery/acceptance of the completed apparatus.

6. The successful vendor shall provide progress photos weekly throughout the build process to keep members of the department informed as to the progress of construction.

7. Defects/deviations from specifications in the final apparatus may result in the department rejecting delivery until such time the apparatus meets the specifications contained within this document or any subsequent purchase agreement.

8. All proposals must include an anticipated delivery date for the completed apparatus.

9. The successful vendor shall provide with the apparatus one (1) hard copy manual for the operation of the apparatus, as well as an electronic copy.

10. The successful vendor shall, upon delivery, provide sufficient onsite training for members of the Greenwich Volunteer Fire Department to ensure they are capable of safely operating the apparatus.

11. All proposals must include information on the warranty provided with the completed apparatus. In the event the body and chassis are manufactured separately, warranty information shall be provided for both.

12. All proposals must include information on where warranty repairs are to be carried out or completed, with the successful vendor being able to demonstrate that warranty repair service can be completed within 100km from the Greenwich Volunteer Fire Department's station.

13. The successful vendor agrees to deliver the completed apparatus to the Greenwich Volunteer Fire Department (9798 Highway 1, Greenwich, NS)

14. All proposals should include the total purchase price in Canadian Dollars (CAD), inclusive of HST and any other fees and must be valid for a minimum of sixty (60) days following the closing date of this RFP.

CHASSIS CONFIGURATION

15. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit, and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

16. The chassis shall be put in service in the country of Canada (CAN).

17. The chassis will meet applicable Canadian Technical Standards Document per Canadian Motor Vehicle Safety Regulations.

18. The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in both English and French.

19. The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab.

20. The angle of approach of the apparatus shall be a minimum of 8 degrees.

21. The chassis shall feature a 6 x 4 axle configuration consisting of a tandem rear drive axle set with a single front steer axle.

22. The front gross axle weight rating (GAWR) of the chassis shall be 21,500 pounds. This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

23. The rear gross axle weight rating (GAWR) of the chassis shall be 48,000 pounds. This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

24. The chassis shall include a carrying capacity of 2201 gallons to 3000 gallons.

DIMENSIONS

25. The maximum length of the completed apparatus shall be no more thirty-six feet, six inches inclusive of all extensions/extrusions.

26. The maximum height of the completed apparatus shall be ten feet, four inches inclusive of all extensions and extrusions.

27. The maximum width of the completed apparatus shall be eight feet, six inches.

CAB CONSTRUCTION/SAFETY

28. The cab shall be a custom, fully enclosed model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle.

29. The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

30. The chassis shall have a Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901 and shall be integrated with the Multiplex electrical system. The following information shall be recorded:
    - Vehicle Speed
    - Acceleration
    - Deceleration
    - Engine Speed
    - Engine Throttle Position
    - ABS Event
    - Seat Occupied Status
    - Seat Belt Status
    - Master Optical Warning Device Switch Position
    - Time
    - Date

    Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system. The laptop connection shall be a panel mounted female type B USB connection point, remotely mounted in the left side foot well.

31. An occupant protection system shall be installed in the vehicle's cab. The system shall inflate three (3) air bags in the following locations:
    - Steering wheel air bag to protect the head and neck of the driver.
    - Knee bolster air bag to protect the driver's legs .
    - Knee bolster air bag to protect the officer's legs.

    The air bags shall use a combination of high-pressure stored argon and oxygen with a pyrotechnic charge for initiation to inflate the bags remain inflated for several seconds. The

system shall be connected to the crash detection sensor that will also activate the driver and first officer integrated belt pretensioners if it detects a frontal crash.

32. The seating configuration of the truck shall be a driver's seat and officers' seat in the front of the cab, and seating for four (4) firefighters in the rear of the cab for a total of six (6) seats.

33. A seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall activate a digital seat position indicator with a seat position legend and integrated audible alarm in the switch panel.

34. The warning system shall activate when any seat is occupied with a minimum of 60 pounds and the corresponding seat belt remains unfastened. The warning system shall also activate when any seat is occupied, and the corresponding seat belt was fastened in an incorrect sequence. Once activated, the visual indicators and applicable audible alarm shall remain active until all occupied seats have the seat belts fastened.

35. The driver's position shall be equipped with the which shall secure belted occupants and increase the survivable space within the cab. The system shall deploy integrated systems to protect against injuries in rollover events.

36. The driver's seating area protection shall include Integrated Belt Pretension (IBP) device for mechanical or electrical seats. Device tightens the seat belt, securing driver in seat and positions driver for contact with airbags.

37. The officer's position shall be equipped with an occupant protection system which shall secure belted occupants and increase the survivable space within the cab. The System shall deploy integrated systems to protect against injuries in rollover events.

38. The officer's seating area protection shall include Integrated Belt Pretension (IBP) device for mechanical or electrical seats. Device tightens the seat belt, securing officer in seat and positions officer for contact with airbags.

39. The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

40. The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

41. All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

42. The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13- & 0.19-inch-thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the “A” pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls, and lower roof skin shall be a minimum of 0.13 inches thick; the rear wall and raised roof skins shall be a minimum of 0.09 inch thick; the front cab structure shall be a minimum of 0.19 inch thick.

43. The exterior width of the cab shall be no more than 94 inches wide with a minimum interior width of 88 inches. The overall cab length shall be a maximum of 132 inches with a minimum of 54 inches from the centerline of the front of the axle to the back of the cab.

44. The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

45. The cab shall offer an interior height of 57 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65 inches in the raised roof area, at a minimum. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

46. The cab ceiling and walls shall include a nonwoven polyester fiber insulation. The insulation shall function as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

47. The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

48. The insulation shall function as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations.

49. The engine tunnel insulation shall measure approximately 0.30 inch thick including a multi-layer foil faced glass cloth and polyester fiber layer. The foil surface acts as protection against heat, moisture, and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

50. The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by acrylic pressure sensitive adhesive.

51. The cab shall include a driver and officer’s area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of a minimum of 40 inches wide X 53 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with two (2) cab doors, also large enough for personnel in full firefighting gear.

52. The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

CAB PAINT

53. The cab exterior shall be painted two tone per customers specified paint colors following the RFG-SR-001 paint standards.

54. The lower paint color shall be PPG FBCH 71663 Red.

55. The secondary/upper paint color shall be PPG FBCH 9000 black.

56. The visible interior cab structure surfaces shall be painted with a multi-tone silver gray texture finish.

CAB TILT SYSTEM

57. The entire cab shall be capable of tilting 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis forward of the front axle behind the officer's door area.

58. The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

59. It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

60. Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

61. Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90-inch ball and be anchored to frame brackets with 1.25-inch diameter studs.

62. A steel safety channel assembly, painted safety yellow shall be installed on the right-side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

63. The cab tilt control cable shall include a receptacle which shall be temporarily located on the right-hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant.

64. The cab dash shall include a message located within the dual air pressure gauge which shall alert the driver when the cab is unlocked and ajar. The alert message shall cease to be displayed when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mounts.

65. In addition to the alert message, an audible alarm shall sound when the cab is unlocked and ajar with the parking brake released.

CAB GLASS

66. The cab windshield shall have a minimum surface area of 2825 square inches and be of a two (2) piece wraparound design for maximum visibility.

67. The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

68. Each windshield shall be bonded to the cab using a high strength commercial grade automotive adhesive.

69. The front cab doors shall include a window which is a minimum of 27 inches in width X 26 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished using electric actuation. The left and right front door windows shall be controlled using a switch on each respective side inner door panel. The driver's door shall include a switch for each powered door window in the cab.

70. The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

71. The windows located on the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

72. The rear right hand side crew door shall include a window which is a minimum of 27 inches in width X 26 inches in height. The window shall be a powered type and shall be controlled by a switch on the door panel ledge and on the driver's control panel.

73. The window located in the right-hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

74. The rear left hand side crew door shall include a window which is a minimum of 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the door panel ledge and on the driver's control panel.

75. The window located in the left-hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

76. The cab shall include a window on the right side behind the front door and ahead of the crew door and above the wheel well which shall measure approximately 15 inches wide X 27 inches high and rectangular in shape. This window shall be fixed and bonded to the cab using a high strength commercial grade automative adhesive.

77. The window located on the right-hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

78. The cab shall include a window on the left side behind the front door and ahead of the crew door and above the wheel well which shall measure approximately 15.50 inches wide X 27.00 inches high and rectangular in shape. This window shall be fixed and bonded to the cab using a high strength commercial grade automative adhesive.

79. The window located on the left-hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

CAB CLIMATE CONTROL

80. The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster which shall be provided and installed above the windshield between the sun visors.

81. The cab shall also include a combination heater air-conditioning unit mounted on the engine tunnel. This unit shall offer eight (8) adjustable louvers, four (4) forward facing and four (4) rearward facing, a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated as 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating.

82. All defrost/heating systems shall be plumbed with one (1) seasonal shut-off valve at the front corner on the right side of the cab.

83. The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

84. The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit.

85. A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

86. The air-conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The compressor shall utilize R-134A refrigerant and PAG oil.

CAB TRIM/INTERIOR

87. The floor of the cab shall be covered with a multi-layer mat consisting of a minimum of 0.25-inch-thick sound absorbing closed cell foam with a minimum of a 0.06-inch-thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and a cast aluminum trim piece at each cab door opening. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

88. The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

89. The rear wall of the cab shall be trimmed with vinyl.

90. The cab interior shall feature header trim over the driver and officer dash constructed of 5052-H32 Marine Grade Aluminum, with a minimum thickness of 0.13-inch.

91. The main center dash area shall be constructed of 5052-H32 Marine Grade, with a minimum thickness of 0.13-inch aluminum plate. There shall be four (4) holes located on the top of the dash near each outer edge of the electrical access cover for ventilation.

92. The left-hand dash shall be constructed of 5052-H32 Marine Grade aluminum plate, with a minimum thickness of 0.13-inches. For increased occupant protection the extreme duty left hand dash utilizes patent pending break away technology to reduce rigidity in the event of a frontal crash. The left-hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

93. The right-hand dash shall be constructed of 5052-H32 Marine Grade Aluminum, with a minimum thickness of 0.13 inches and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure approximately 14 inches wide X 4 inches high X 5 inches deep. MDT provision shall be provided above the glove compartment.

94. The cab engine tunnel shall be covered with a multi-layer mat consisting of a minimum of 0.25-inch closed cell foam with a 0.06-inch minimum thickness non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive.

95. Each cab entry door shall include a three-step entry. The first step closest to the ground shall be constructed of polished 5052 H32 aluminum Grip Strut® grating with angled outer corners. The grating shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step

shall be integral with the cab construction and shall be trimmed with a minimum of 0.08 inch thick 3003-H22 embossed aluminum tread plate.

96. The cab shall include an access door constructed of DA finish aluminum with a push and turn latch. The under-cab access door shall provide access to the diesel exhaust fluid fill.

97. The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 Aluminum with a minimum thickness of 0.13 inches. The door panels shall include a painted finish.

98. The interior of each door shall include high visibility reflective tape. A white reflective tape shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes. The chevron tape shall measure 6 inches in height.

99. There shall be two (2) rubber coverer grab handles installed inside the cab, one on each "A" post at the left and right door openings measuring at least 11 inches. The left handle shall be located approximately 7 inches above the bottom of the door window opening and the right handle shall be located approximately 2 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

100. Each front door shall include one (1) ergonomically contoured cast aluminum handle measuring approximately 9 inches mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

101. A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. An approximately 30-inch-long handle shall horizontally extend the width of the window just above the windowsill. The handle shall assist personnel in exiting and entering the cab.

102. The cab interior soft trim surfaces shall be gray in color.

103. The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded vinyl trim.

104. The cab interior floor mat shall be gray in color.

105. The inner door panel surfaces shall be painted with multi-tone silver gray texture finish.

106. The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of a fiber reinforced plastic composite with a black matt finish.

107. The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

108. All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

109. Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a key from the exterior. The door locks are designed to prevent accidental lock out.

110. The cab shall include one (1) approximately 18.00-inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of SAE 304 stainless steel and be 1.25-inch diameter to enable non-slip assistance with a gloved hand.

111. The metal surfaces in the header area shall be coated with multi-tone silver gray texture finish.

112. The entire center dash shall be coated with multi-tone silver gray texture finish. Any accessory pods attached to the dash shall also be painted this color.

113. The left-hand dash shall be painted with a multi-tone silver gray texture finish.

114. The right-hand dash shall be painted with multi-tone silver gray texture finish.

115. The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer's position. The center panel shall be within comfortable reach of both the driver and officer.

116. The center dash panel shall include twelve (12) rocker switch positions in a single row across the top of the panel.

117. A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

118. The left dash panel shall include twelve (12) switches. There shall be six (6) in a single row and six (6) additional switches in a separate row. One row shall be rocker type and the left three (3) switches shall be the windshield wiper/washer control switch, instrument lamp dimmer switch, and headlight switch. The additional row shall be all rocker switch type.

119. A rocker switch with a blank legend installed directly above shall be provided for any position not designated by a specific option. The non-designated switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

120. The cab shall include a triple arm linkage wiper system which shall clear the windshield of water, ice, and debris. There shall be two (2) windshield wipers; each shall be affixed to a radial arm. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

121. The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

122. The Bostrom Firefighter seats shall include a covering of extra high strength, wear resistant fabric made of ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids.

123. All seats supplied with the chassis shall be gray in color. All seats shall include red seat belts.

124. The driver's seat shall be an H.O. Bostrom 400 Series Firefighter model seat. The seat shall feature a two-way manual fore and aft adjustment with 5.00 inches of travel. The seat shall also feature integral springs to isolate shock.

125. The seat shall feature an all belts to seat (ABTS) safety restraint system. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor, and buckle as an integral part of the seat assembly. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant.

126. The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be approximately 35.00 inches.

127. This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity.

128. The materials used in construction of the seat shall also have successfully completed testing regarding the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

129. The driver's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

130. The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

131. The officer's seat shall be an H.O. Bostrom 300 Series Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be a non-adjustable type of seat.

132. The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

133. The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be approximately 35.00 inches.

134. This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

135. The officer’s seat shall feature a self-contained breathing apparatus (SCBA) locking system, designed as a single-bracket model compatible with most U.S. and international SCBA brands and sizes. The bracket shall allow tool-free adjustments to accommodate various cylinder diameters and lengths.

136. To modify the fit for different cylinder sizes, a simple lever mechanism shall enable vertical movement of the top clamp, eliminating the need for tools. The system shall be free of straps and clamps that might interfere with auxiliary SCBA equipment. Instead, the top clamp shall securely guide the SCBA tank into position within the seat back cavity.

137. The SCBA unit shall lock into place by pressing it against the pivot arm, activating the auto-locking mechanism. Once engaged, the top clamp shall provide a secure fit in all directions.

138. The SCBA locking system shall include a quick-release handle integrated into the seat cushion for easy access, along with a manual release located on the left side of the SCBA bracket. The locking mechanism shall eliminate the need for straps or pull cords, preventing interference with SCBA equipment.

139. The officer’s seat shall be installed in an ergonomic position in relation to the cab dash.

140. The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

141. The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right-side front seat.

142. The primary position designation, per NFPA 1900 2024 edition, shall only declare the positioning in the cab offers a minimum width of 27 inches of shoulder clearance without overlap of any other primary seating position and a minimum of 10 inches each side of seat center line. Clear width may be offset from center of seat cushion by up to 3.00 inches. It shall also offer a minimum of 22.00 inches of shoulder width clearance without any overlap of any position.

143. The crew area shall include a seat in the rear facing outer position which shall be an H.O. Bostrom 300 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

144. The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall be mounted on a rigid or semi-rigid stalk such that the buckle remains positioned within easy reach of the occupant.

145. The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be approximately 35.00 inches.

146. This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

147. Each rear facing outboard seat position shall feature a self-contained breathing apparatus (SCBA) locking system, designed as a single-bracket model compatible with most U.S. and international SCBA brands and sizes. The bracket shall allow tool-free adjustments to accommodate various cylinder diameters and lengths.

148. To modify the fit for different cylinder sizes, a simple lever mechanism shall enable vertical movement of the top clamp, eliminating the need for tools. The system shall be free of straps and clamps that might interfere with auxiliary SCBA equipment. Instead, the top clamp shall securely guide the SCBA tank into position within the seat back cavity.

149. The SCBA unit shall lock into place by pressing it against the pivot arm, activating the auto-locking mechanism. Once engaged, the top clamp shall provide a secure fit in all directions.

150. The SCBA locking system shall include a quick-release handle integrated into the seat cushion for easy access, along with a manual release located on the left side of the SCBA bracket. The locking mechanism shall eliminate the need for straps or pull cords, preventing interference with SCBA equipment.

151. The rear-facing outer seats shall offer special mounting positions which shall be 2.00 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.

152. The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

153. The crew area shall include a seat in the forward-facing center position which shall be a H.O. Bostrom 300 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

154. The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

155. The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be approximately 35.00 inches.

156. This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

157. Each forward-facing center seat position shall feature a self-contained breathing apparatus (SCBA) locking system, designed as a single-bracket model compatible with most U.S. and international SCBA brands and sizes. The bracket shall allow tool-free adjustments to accommodate various cylinder diameters and lengths.

158. To modify the fit for different cylinder sizes, a simple lever mechanism shall enable vertical movement of the top clamp, eliminating the need for tools. The system shall be free

of straps and clamps that might interfere with auxiliary SCBA equipment. Instead, the top clamp shall securely guide the SCBA tank into position within the seat back cavity.

159. The SCBA unit shall lock into place by pressing it against the pivot arm, activating the auto-locking mechanism. Once engaged, the top clamp shall provide a secure fit in all directions.

160. The SCBA locking system shall include a quick-release handle integrated into the seat cushion for easy access, along with a manual release located on the left side of the SCBA bracket. The locking mechanism shall eliminate the need for straps or pull cords, preventing interference with SCBA equipment.

161. The forward-facing center seating positions shall include an enclosed seat frame located and installed on the rear wall. The seat frame shall measure approximately 42 inches wide X 12 inches high X 22 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19-inch-thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

162. There shall be two (2) access points on the side of the storage area, one (1) on the driver's side and one (1) on the officer's side.

163. The forward-facing center seats shall be installed facing the front of the cab.

164. The department shall supply one (1) TMR mobile radio and one (1) VHF mobile radio to be installed by the manufacturer in a location approved by the department. The manufacturer shall be responsible for the installation of the power supply for the radios and the antennas, which shall be installed on the roof adjacent to the light bar.

CAB MIRRORS/EXTERIOR TRIM

165. West Coast style dual-vision mirror heads shall be provided and installed on each of the front cab doors.

166. The mirrors shall be mounted via tubular stainless-steel arms to provide a rigid mounting to reduce mirror vibration.

167. The mirrors shall measure approximately 8inches wide X 19 inches high and shall include an integrated convex mirrors installed in the mirror head below the flat glass to provide a wider field of vision. The flat and convex mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The flat and convex mirrors shall be heated for defrosting in severe cold weather conditions.

168. The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

169. The heat for the rearview mirrors shall be controlled through a rocker switch on the dash in the switch panel.

170. Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Fender shall consist of an inner liner approximately 16 inches wide made of ABS composite and an outer fenderette of approximately 5 inches wide made of polished aluminum.

ENGINE

171. The chassis engine shall be a Cummins heavy duty certified X10 engine. The X10 engine shall be an in-line six (6) cylinder, four-cycle diesel-powered engine. The engine shall offer a rating of 450 horsepower at 1432 RPM and shall be governed at 1800 RPM. The torque rating shall feature 1650-foot pounds of torque at 1100 RPM.

172. The engine shall feature a VGT™ Turbocharger, a high-pressure common rail fuel system, fully integrated electronic controls with an electronic governor. 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.

173. The vehicle shall be equipped with an automatic high-idle speed control which shall be pre-set to operate the engine at a specified RPM to increase alternator output if the system voltage drops to 12.5 volts with multiplex wired chassis and 12.8 volts using load manager with conventional wiring. This device shall automatically operate only when the engine is running, the transmission is in neutral, and with the parking brake set. The automatic high idle will stay engaged for a minimum of ten (10) minutes and until the system, voltage has reached 13.0 volts. Application of the service brake will override the automatic high idle and reset timer.

174. The vehicle shall be equipped with a high-idle speed rocker switch. It shall be pre-set so when activated, it will operate the engine at the specified RPM to increase alternator output. This device shall operate only when the engine is running, the transmission is in neutral, and 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 pedal is released, or when the transmission is placed in neutral. Switch shall not override automatic high idle between voltage parameters during timed cycle.

175. The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location. Chassis driveline pump provisions shall include an interlock feature for automatic setting of the park brake when the vehicle is shifted into pump mode while the transmission is in neutral and the transmission output speed translates to less than 1 mph. When the conditions are met the driver side parking brake valve shall activate. Once shifted to road mode the condition for

electric automatic brake engagement is no longer present and the driver's parking brake control valve shall function normally.

176. An apparatus interface wiring harness for the engine and transmission pump interlocks shall be supplied with the chassis. The harness shall include a connector for connection to a chassis pump panel harness supplied by the body builder and shall terminate in the left frame rail behind the cab for connection by the body builder. The harness shall include circuits deemed for a pump panel and shall contain circuits for a hand throttle, and a multiplexed gauge.

177. Separate circuits shall also be included for a pump control switch, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, clean power, customer ignition, air horn solenoid switch, high idle switch and high idle indicator light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than 1 mph and the transmission is in neutral. The shift to pump mode shall also require the park brake be set.

178. The engine air intake system shall include an ember separator. This ember separator shall be designed to protect the downstream air filter from embers using a combination of unique flat and crimped metal screens packaged in a heavy-duty galvanized steel frame. This multilayered screen shall trap embers and allow them to burn out before passing through the pack.

179. The engine air intake system shall also include an air cleaner mounted above the radiator. This air cleaner shall utilize a replaceable dry type of filter element designed to prevent dust and debris from being ingested into the engine. A service cover shall be provided on the housing, reducing the chance of contaminating the air intake system during air filter service.

180. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

ENGINE COOLING SYSTEM

181. There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

182. The cooling system shall be comprised of a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, a charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

183. The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

184. The cooling system shall be equipped with a surge tank that can remove entrained air from the system. The surge tank shall be equipped with a low coolant probe and rearward oriented sight glass to observe coolant in the system. A cold fill and observation line shall be included within the frame mounted translucent recovery bottle to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements and allows for expansion and recovery of coolant into a separate integral expansion chamber.

185. All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

186. The charge air cooler shall be a crossflow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel “constant torque” style clamps meeting the engine manufacturer's requirements.

187. The radiator and charge air cooler shall be removable through the bottom of the chassis.

188. The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris.

189. The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

190. Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

191. The instrument panel shall feature a low engine coolant indicator light which shall be located in the centre of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

EXHAUST SYSTEM

192. The exhaust system shall include an end-in end-out horizontally mounted dual module after treatment device, and downpipe from the charge air cooled turbo. The dual module shall include a diesel particulate filter (DPF), urea dosing module (UL2), and a selective catalytic reduction (SCR) catalyst to meet current EPA standards.

193. The system shall utilize 0.07-inch-thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

194. The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

195. The exhaust system after treatment modules shall be mounted below the frame, with the DPF in the outboard position and the SCR rearward in the inboard position.

196. The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of five (5) usable gallons and shall be mounted on the left-hand side of the chassis frame.

197. The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

198. The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

199. The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

200. The exhaust flex joint shall not include the thermal exhaust wrap.

COMPRESSION BRAKE

201. A compression brake, for the six (6) cylinder engine shall be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights. The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable

rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.

202. An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:
    - A valid gear ratio is detected.
    - The driver has requested or enabled engine compression brake operation.
    - The throttle is at a minimum engine speed position.
    - The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

203. The compression brake shall be controlled through an on/off switch and a low/medium/high selector switch.

DRIVELINE

204. The drive train shall include an Allison model EVS 4000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

205. The transmission shall include two (2) internal oil filters which shall offer Allison formulated Castrol TranSynd™ synthetic transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

206. The transmission gear ratios shall be:
- 1st 3.51:1
- 2nd 1.91:1
- 3rd 1.43:1
- 4th 1.00:1
- 5th 0.74:1
- 6th 0.64:1
- Rev 4.80:1

207. The Allison Gen V/VI-E transmission EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

208. This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output

can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

209. A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V/VI-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

210. An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

211. The transmission fluid shall be monitored electronically.

212. The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

213. The transmission shall include an original equipment manufacturer installed magnetic transmission fluid drain plug.

214. The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 1:00 o'clock position.
215. All drive lines shall be heavy duty metal tube and equipped with MSI 1810 series universal joints for the main drivelines, and 1710 series for the inter-axle shaft. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®. The drivelines shall include Meritor brand u-joints with thrust washers.

216. A temporary jackshaft driveline shall be installed by the chassis manufacturer to accommodate the mid-ship split shaft pump as specified by the apparatus manufacturer.

217. The midship pump/gearbox provisions shall be for a Hale QMAX-XS pump.

218. The Hale pump gearbox shall have an "L" (long) drop length.

219. The ratio for the midship pump shall be 2.28:1 (23).

220. One (1) air pump shift control panel shall be located on the left-hand side of the engine tunnel, integrated with the shifter pod. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the

transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position per NFPA 16.10.1.3. The road mode shall be selected when the control lever is in the forward position and pump mode shall be selected when the control lever is in the rearward position.

221. The control lever center position shall exhaust air from both pump and roadsides of the pump gear box shift cylinder.

222. Air connections shall be provided from the air supply tank to the pump shift control valve and from the pump shift control valve to the frame mounted bracket. The frame mounted bracket shall include labeling identifying the pump and road connection points with threaded 0.25-inch NPT fittings on the solenoid for attaching the customer installed pump. The air supply shall be pressure protected from service brake system.

FUEL SYSTEM

223. The fuel system shall have a fuel filter/water separator with a thermostatically controlled integral heater as a primary filter. The fuel filter shall have a drain valve.

224. An instrument panel lamp and audible alarm which indicates when water is present in the fuel-water separator shall also be included.

225. A secondary fuel filter shall be included as approved by the engine manufacturer.

226. The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

227. Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

228. The fuel tank shall have a capacity of fifty (50) gallons and shall measure approximately 35 inches in width X 15 inches in height X 24 inches in length.

229. The baffled tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

230. The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

231. The fuel tank shall be constructed of 12-gauge aluminized steel. The exterior of the tank shall be powder coated black and then painted to match the frame components.

232. All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The crosshatch adhesion test per ASTM D3359 Method B, results to be 5B minimum. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 results to be 5B minimum.

233. The fuel tank fill ports shall be offset with the left fill port located in the rearward position and the right fill port located in the middle position on the fuel tank.

234. A 0.5-inch NPT magnetic drain plug shall be centered in the bottom of the fuel tank.

SUSPENSION/TIRES

235. The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74-inch drop and a 71.00-inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated at 21,500 pounds FAWR.

236. The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

237. Two (2) inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance, and maintaining consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

238. The front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and “road sensing” shock designs and shall contribute to the durability and long life of the shock absorbers.

239. The front suspension shall include a ten (10) leaf spring pack in which the longest leaf measures 54 inches long and 4 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case-hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

240. The cab shall include a steering column which shall include a seven (7) position tilt, a 2.25-inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver’s position. The steering wheel shall be covered with black polyurethane foam padding.

241. The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

242. The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

243. The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type. The power steering system shall include an oil to air passive cooler.

244. The chassis shall have a front axle cramp angle of 48 degrees to the left and 44-degrees to the right.

245. The power steering gear shall be a TRW model TAS 65 with an assist cylinder.

246. The chassis frame rails shall be measured to ensure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

247. The rear axle shall be a Meritor model RT-46-160 tandem drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 48,000 pounds.

248. The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.50 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

249. The axle shall have heavy-duty Hypoid gearing for longer life, greater strength, and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

250. The rear axle differential shall be lubricated with oil.

251. The rear axle wheel bearings shall be lubricated with oil.

252. The tandem axle chassis shall include an inter-axle differential lock, which shall allow both axles to be engaged as drive axles. The inter-axle differential lock shall be controlled by a locking rocker switch on the switch panel. The light on the switch shall illuminate with positive engagement of the inter-axle differential lock.

253. The tandem rear axle shall feature a Hendrickson Firemaax™ air suspension. Each axle will be independently suspended for optimum performance. The suspension shall include four optimized air springs mounted to cast structural trailing arms, transverse cross beams for

increased roll stability and four heavy duty shock absorbers. Dual air height control valves shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. Axle alignment is maintained using four eccentric bushings at each frame bracket. The rear tandem suspension shall have 54-inch axle centers.

254. The rear suspension capacity shall be rated at 40,000 to 48,000 pounds.

255. Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

256. The front tires shall be Michelin 425/65R-22.5 20PR "L" tubeless radial XZY3 mixed service tread.

257. The rear tires shall be Michelin 11R-22.5 16PR "H" tubeless radial XDN2 all-weather tread designed for exceptional traction and mileage.

258. The rear axle ratio shall be 5.63:1.

259. There shall be electronic chrome LED valve caps shipped loose for installation by the OEM which shall illuminate with a red LED when tire pressure drops 8psi provided. The valve caps are self-calibrating and set to the pressure of the tire upon installation.

260. The front wheels shall be Alcoa, or a comparable product, hub piloted, 22.50-inch X 12.25-inch aluminum wheels featuring a mirror polish on the outer face. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

261. The outer rear wheels shall be Alcoa, or a comparable product, hub piloted, 22.50-inch X 8.25-inch aluminum wheels with a mirror polished outer surface. The inner rear wheels shall be Alcoa hub piloted, 22.50-inch X 8.25-inch aluminum wheels with bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

AIR BRAKE SYSTEM

262. A rapid build-up air brake system shall be provided. The air brake system shall include, at a minimum, a three (3) air tank, four (4) reservoir system with a total of 6236 cubic inches of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

263. The tandem rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

264. A six (6) sensor, six (6) modulator Anti-lock Braking System (ABS) shall be installed on the front and tandem rear axles in order to prevent the brakes from locking or skidding while

braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

265. Additional safety shall be accommodated through Automatic Traction Control (ATC), which shall be installed on the tandem rear axle. The ATC system shall apply the ABS when the drive wheels lose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

266. A momentary rocker style switch shall be provided and properly labeled “mud/snow.” When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition, the ATC light and the light on the rocker switch shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

267. The front brakes shall be16.5-inch x 6-inch S-cam drum type.

268. The rear brakes shall be 16.5-inch X 7-inch S-cam drum type.

269. Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

270. A manual hand control push-pull style valve shall operate the parking brake.

271. The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver.

272. The front brakes shall include automatic slack adjusters installed on the chassis which feature a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

273. The rear brakes shall include automatic slack adjusters installed on the axle which feature a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

274. The front axle shall be equipped with brake dust shields.

275. The rear brakes shall be equipped with brake dust shields.

276. The brake system shall include an air dryer with an integral 100-watt heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be located on the right-hand frame rail forward of the front wheel behind the right-hand cab step.

277. The front brakes shall be provided with MGM type 30 brake chambers.

278. The rear axle shall include TSE 30/30 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 30 brake chamber shall offer a 30.00 square inch effective area.

279. The air compressor provided for the engine shall be a single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight, and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increase the system component life.

280. An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket.

281. Manual pet-cock type drain valves shall be installed on all reservoirs of the air supply system.

282. The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

283. Push to connect type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

284. An air connection for the shoreline air inlet shall be supplied.

285. The air inlet shall be installed on the left-hand side, lower front step in the forward position.

286. The air connector supplied shall be a 0.25-inch size Interchange style manual connection which is compatible with Milton ‘T’ style, Myers 0.25-inch Automotive style and Parker 0.25-inch 10 Series connectors.

CHASSIS FRAME

287. The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring approximately 10 inches high X 3.5 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of approximately 9 inches high X 3 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100-inch pounds and have a minimum section modulus of approximately 29 cubic inches. The frame shall measure 35 inches in width.

288. Proposals including heat-treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

289. A minimum of seven (7) fully gusseted 0.25-inch-thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25-inch-thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

290. Any proposals not including additional reinforcement for each cross member shall not be considered.

291. The frame shall be powder coated black prior to any attachment of components.

292. All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The crosshatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

293. Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of the vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

FRONT BUMPER EXTENSION

294. A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10-gauge 304 stainless steel, 12 inches high and 99.00 inches wide.

295. The front bumper shall be extended approximately 24 inches ahead of the cab.

296. The 24-inch extended front bumper shall include an apron constructed of a 0.19-inch-thick embossed aluminum tread plate.

297. The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.

298. The chassis shall include a frame mounted 2-inch diameter plumbed pipe intended for use as a discharge trash line. The discharge pipe shall be routed from the left-hand front splay rail area behind the bumper to the area rear of the front axle, ahead of the battery box.

299. The discharge pipe shall be a 2-inch stainless steel schedule ten tube.

300. The discharge shall include a Victaulic groove for connecting to the pump and discharge hose plumbing on each end of the tube.

301. In the event the cab and body manufacturer are separate entities, the body manufacturer shall plumb the discharge pipe to the pump and shall provide all valves as required.

302. The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well. The compartment shall be constructed of a minimum of 0.13 inch 5052-H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall be the full size of available space in the apron from the cab fascia to the bumper and 38 inches wide X 12 inches deep. The clear opening shall be at least 37 inches wide. The front edge of the compartment shall include a rolled edge and angled deflector to prevent hose and couplings from catching along the front edge of the compartment. The compartment shall also include a cover constructed of 0.19-inch-thick bright embossed aluminum tread plate.

303. The front bumper compartment cover(s) shall include gas cylinder stays which shall hold the cover open. Each cover shall be held in the closed position via a D-ring style latch.

304. Two (2) heavy duty tow hooks, painted to match the frame components, shall be installed below the front bumper in the forward position, bolted directly to the underside of each chassis frame rail with grade 8 bolts.

ELECTRICAL SYSTEM

305. The chassis shall include a single starting electrical system which shall include a 12-volt direct current multiplexing system, suppressed by SAE J551. The wiring shall be an appropriate gauge cross link with 311-degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275-degree Fahrenheit minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

306. The apparatus load management shall be performed by the included multiplex system. The multiplex system shall also feature the priority of sequences and shall shed electrical loads based on the priority list specifically programmed.

307. A master battery system with a keyless start ignition system shall be provided. There shall be a three-position rocker switch with off, battery, and ignition positions as well as a

stainless-steel etched engine start push-button. The engine start button shall include an illuminated LED halo ring. Both switches shall be mounted to the left of the steering wheel on the dash.

308. The engine start switch shall only operate when the master battery and ignition switch is in the “ignition” position.

309. The single start electrical system shall include three (3) 925 CCA batteries with a 210-minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

310. The batteries shall be installed on a steel battery tray located on the right side of the chassis, securely bolted to the frame rails. The battery tray shall be coated with the same material as the frame.

311. The battery tray shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat shall be installed at the bottom of the tray to allow for air flow and help prevent moisture build up.

312. The battery box shall include a cover which protects the top of the batteries on the right-hand side of the vehicle.

313. The starting system shall include cables which shall be protected by 275-degree F. minimum high temperature flame retardant loom, sealed at the ends with heat shrink and sealant.

314. The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step, approximately 8 inches apart. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

315. The charging system shall include a 320-amp 12-volt alternator. The alternator shall include a self-exciting integral regulator.

316. The single start electrical system shall include a Delco brand starter motor.

317. An auto charge battery conditioner shall be supplied. The battery conditioner shall provide a circuit protected 40-amp output for the chassis batteries and a 20-amp output circuit for accessory loads. The conditioner shall also include a battery temperature sensor.

318. The battery conditioner shall be mounted in the cab in the left-hand rear facing outer seating position.

319. A battery conditioner display with a Digital Status Center shall be integrated into the electrical inlet.

320. An electrical inlet shall be installed on the left-hand side of the cab over the wheel well.

321. A 20 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

322. The electrical inlet shall be connected to the battery conditioner.

323. The electrical inlet connection shall include a yellow cover.

CAB LIGHTING

324. The cab front shall include four (4) rectangular LED headlamps with separate high and low beams mounted in bright chrome bezels. Each lamp shall include a heating system that de-ices the headlight.

325. The front fascia shall include two (2) Whelen model 600 4-inch X 6-inch programmable amber LED turn signals which shall be installed in an outboard position within the front fascia chrome bezel.

326. The headlights shall be located on the front fascia of the cab directly below the front warning lights. The sides of the cab shall include two (2) LED side marker lights which shall be provided just behind the front cab radius corners. The lights shall be amber with chrome bezels.

327. In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level. The lights shall be amber with chrome bezels.

328. The headlights and marker lights shall be controlled through a rocker switch within easy reach of the driver. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights when the ignition switch is in the "On" position and the parking brake is released.

329. The cab shall include an LED dome lamp located over each door. The lights shall include push switches on each lamp to activate both the clear and red portions of the light individually.

330. The clear portion of each lamp shall be activated by opening the respective door.

331. There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by the chassis manufacturer. The light bar installation shall include a lowered mounting that shall place the light bar just above the junction box and wiring to a control switch on the cab dash.

332. The lightbar provisions shall be for one (1) Whelen brand Freedom IV LED lightbar mounted centered on the front of the cab roof. The lightbar shall be 72 inches in length. The lightbar shall feature twelve (12) red LED light modules and two (2) clear LED light modules.

The entire lightbar shall feature a clear lens. The clear lights shall be disabled with park brake engaged. The cable shall exit the lightbar on the right side of the cab.

333. The light bar shall be controlled by a rocker switch located on the switch panel. This switch shall be clearly labeled for identification.

334. The side of the cab shall include two (2) Whelen 900 EZ scene lights, one (1) each side which shall be surface mounted with a chrome bezel.

335. 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-inch raised roof portion of the cab between the front and rear crew doors.

336. The scene lights shall be activated by two (2) rocker switches located in the switch panel, one (1) for each light, and by opening the respective side cab doors.

337. Scene light on the front of the cab shall be provided using a 69” Whalen Field Series Brow Light mounted below the light bar on the roof of the cab in a forward-facing position activated by a rocker switch within the cab.

338. The ground lighting shall be activated when the parking brake is set.

339. The middle step located at each door shall include an LED light which shall activate with the opening of the respective door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life.

340. The intermediate step well area at the front doors shall include an LED light within a chrome housing. The front egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The Egress step lights shall activate with entry step lighting.

341. Each door shall include an LED ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life.

342. There shall be a LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall activate automatically when the cab is tilted.

343. The front headliner of the cab shall include a flashing red LED light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

344. The flashing red light shall be located centered left to right for greatest visibility.

345. The light and alarm shall be interlocked for activation when either a cab door is not firmly closed, or an apparatus compartment door is not closed, and the parking brake is released.

346. A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled “Master” for identification. The switch shall feature

control over all devices wired through it. Any warning device switch left in the “ON” position shall automatically power up when the master switch is activated.

347. The headlights of the apparatus shall be turned off automatically when the apparatus comes to a stop and the park brake is applied.

348. The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

349. The warning lights mounted on the cab front fascia in the inboard positions shall be red.

350. The front warning lights shall be controlled via rocker switch on the panel. This switch shall be clearly labeled for identification.

351. The chassis shall include two (2) Whelen 600 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

352. The intersection lights shall be red.

353. The intersection lights shall be mounted on the side of the bumper in the rearward position.

354. The cab sides shall include two (2) Whelen 600 series Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

355. The warning lights located on the side of the cab shall be red.

356. The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

357. The side and intersection warning lights shall be controlled by a rocker switch on the switch panel. This switch shall be clearly labeled for identification.

SIRENS/AUDIBLE ALERTING

358. The front bumper shall include an electromechanical Federal Q2B™ siren, which shall be chrome plated. The siren shall include a pedestal mount to surface mount on a horizontal surface.

359. The siren shall be pedestal mounted on the bumper apron on the furthest outboard section of the bumper on the driver’s side.

360. The mechanical siren shall be controlled using two (2) foot switches. One (1) mechanical siren foot switch shall be located on the left-hand side accessible to the driver between the steering column and the door and one (1) shall be located on the right-hand side of the cab on the floor between the dash and the door.

361. The siren shall only be active when the master warning switch is on to prevent accidental engagement.

362. A rocker switch shall be provided in the switch panel better the driver and the officer to activate a brake on the mechanical siren and labelled accordingly.

363. The front bumper shall include two (2) air horns. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

364. The air horns shall be recess mounted in the front bumper face, one (1) on the right side of the bumper in the inboard position relative to the right-hand frame rail and one (1) on the left side of the bumper in the inboard position relative to the left-hand frame rail.

365. One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to function as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

366. A rocker switch shall be installed in the switch panel between the driver and officer to allow control of the electric horn, the air horn, or the electronic siren from the steering wheel horn button.

367. The air horn activation shall be accomplished using two (2) black momentary back lit push buttons on the switch panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

368. There shall be one (1) 100-watt electric siren speaker provided.

369. The electronic siren speaker shall be located on the front bumper face on the right side outboard of the frame rail in the far outboard position.

370. A Federal PA300 electronic siren control head shall be provided. The siren head shall be a model 690010 and shall feature 200-watt output, high-low tone, and a built-in noise cancelling microphone. The siren shall to be mounted to protrude through the center panel of the cab dash in the lower section of the panel just left of the center of the panel.

371. A backup alarm shall be installed at the rear of the chassis with an output level of 107 db. I The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

372. A Digital Instrument Cluster (DIC) shall be provided that combines gauges, telltales, warning messages, and advanced diagnostic capabilities into a single 12-inch digital

display. The display screen shall have an anti-reflective coating and include touch screen and mechanical button user interaction with the display as well as video and audio interfaces.

373. The DIC shall include a vehicle odometer which displays the total vehicle distance traveled. The DIC shall also include two vehicle trip odometers (TRIP A and TRIP B) which indicate the distance traveled and average fuel economy for each respective trip. The operator may select which odometer is displayed and may reset either trip odometer through the on-screen display. The DIC shall include an engine hour meter which displays the total engine hours of operation.

374. The gauges shall have high-contrast white scales with orange pointers. The following gauges shall be included on the display:
    - Speedometer that indicates vehicle speed. The scale on the speedometer shall read from 0 to 160 KPH. A numerical display of vehicle speed shall also be shown on the gauge.
    - Tachometer that indicates engine speed. The scale of the tachometer shall read from 0 to 3000 RPM.
    - Primary and secondary air pressure gauges shall indicate the pressure in the primary and secondary air systems. The scale of the air pressure gauges shall read from 0 to 1030 kilopascals (Kpa). The gauge icon and scale shall turn amber when the system pressure drops below warning levels. The icon and scale shall turn red when the system pressure drops below critical levels. An audible alarm shall also sound when air pressure is low.
    - Fuel gauge. The fuel gauge shall read from empty to full as a fraction of full tank capacity. The gauge icon and scale shall turn amber when the fuel level is below 1/8th tank capacity (1/4th tank in pump mode). An audible alarm shall also sound with low fuel level.
    - Diesel exhaust fluid (DEF) gauge. The DEF gauge shall read from empty to full as a fraction of full tank capacity. The gauge icon and scale shall turn amber, and an audible alarm shall sound to indicate low-DEF level.
    - Engine oil pressure gauge. The scale of the engine oil pressure gauge shall read from 0 to 830 kilopascals (Kpa). The gauge icon and scale shall turn red, and an audible alarm shall sound to indicate low oil pressure.
    - Engine coolant temperature gauge. The scale of the coolant temperature shall read from 40 to 120 degrees Celsius (°C). The gauge icon and scale shall turn red, and an audible alarm shall sound to indicate high coolant temperature.
    - Voltmeter indicating chassis system voltage. The scale of the voltmeter shall be from 10 to 18 volts. The gauge icon and scale shall turn red, and an audible alarm shall sound when the system voltage drops below 11.8 volts for more than 120 seconds in accordance with the requirements of NFPA 1901. The gauge icon and scale shall turn red, and an audible alarm shall sound when the system voltage rises above 15.5 volts for more than 5 seconds.
    - Transmission temperature gauge. The scale of the transmission temperature shall read from 40 to 150 degrees Celsius (°C). The gauge icon and scale shall turn amber, and an audible alarm shall sound to indicate high transmission temperature.

375. The DIC shall include thirty-six (36) colored telltales to indicate vehicle operating conditions. The DIC shall provide text-based warning messages to accompany all telltales. The DIC shall contain an audible alarm capable of providing different alert sounds based on the type of warning. The audible alarm shall be capable of being heard from all seating positions in the cab. The operator shall be able to silence active alarms that are permitted to be silenced by applicable regulations. The DIC shall contain the following indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

RED TELLTALES

- Air Filter Restriction - indicates restriction of the engine air intake filter.
- Air Pressure (Primary) – indicates critically low primary system air pressure.
- Air Pressure (Secondary) – indicates critically low secondary system air pressure.
- Cab Tilt Warning - indicates the cab tilt system locks are not engaged.
- Coolant Temperature – indicates high engine coolant temperature.
- Low Coolant - indicates critically low engine coolant.
- Oil Pressure – indicates critically low engine oil pressure.
- Park Brake - indicates parking brake is set.
- Seat Belt - indicates a seat belt violation.
- Stop Engine - indicates critical engine fault.
- Voltage – indicates critically low or high system voltage.

AMBER TELLTALES

- Advanced Protection System (APS) - indicates an Advanced Protection System fault.
- Anti-Lock Brake System (ABS) - indicates anti-lock brake system fault.
- Check Engine - indicates engine fault.
- Check Transmission - indicates transmission fault.
- Diesel Exhaust Fluid (DEF) level – indicates low-DEF level.
- Diesel Particulate Filter (DPF) - indicates restriction of the diesel particulate filter.
- Electronic Stability Control (ESC) – indicates active electronic stability control system.
- Fuel Level – indicates low fuel.
- High Exhaust System Temperature (HEST) – indicates elevated exhaust temperature.
- Malfunction Indicator Lamp (MIL) - indicates an engine emissions system fault.
- Regen Inhibit - indicates regeneration of the DPF has been inhibited by the operator.
- Transmission Temperature – indicates high transmission or transmission retarder temperature.
- Transmission Range Inhibit - indicates a transmission operation is prevented and requested shift into gear may not occur.
- Wait to Start - indicates active engine air preheat cycle.
- Water in Fuel - indicates presence of water in fuel filter.
- Windshield Washer Fluid – indicates low washer fluid.

GREEN TELLTALES

- Automatic Traction Control (ATC) - indicates low wheel traction for automatic traction control equipped vehicles. Also indicates mud/snow mode is active for ATC system.
- Auxiliary Brake - indicates secondary braking device is active.
- Cruise Control - indicates cruise control is enabled.
- High Idle - indicates engine high idle is active.
- OK to Pump - indicates that conditions have been met for pump operations.
- Left and Right Turn Signal – indicates active turn signal.
- Pump Engaged - indicates the pump transmission is currently in pump gear.

BLUE TELLTALES

- High Beam indicator

AUDIBLE ALARMS

- ABS System Fault
- Air Filter Restriction
- APS System Fault
- Cab Tilt Warning
- Check Engine
- Check Transmission
- Do Not Move Apparatus (open door/compartment)
- DPF Restriction
- High Coolant Temperature
- High or Low System Voltage
- High Transmission Temperature
- Idle Shutdown
- Low Air Pressure
- Low Coolant Level
- Low-DEF Level
- Low Engine Oil Pressure
- Low Fuel
- Seatbelt Warning
- Stop Engine
- Turn Signal On
- Water in Fuel

376. The DIC shall allow the user to configure settings through an on-screen menu. The following settings shall be adjustable by the user:
    - Distance/Speed Units – English (miles/MPH) or metric (kilometers/KPH)
    - Temperature Units – degrees Fahrenheit (°F) or degrees Celsius (°C)
    - Pressure Units – pounds per square inch (PSI) or kilopascals (Kpa)
    - Odometer/Trip odometer–chose which odometer is displayed and reset trip odometers.
    - Display Brightness – adjust brightness levels for both day and night settings.

- Volume – adjust volume of display speaker.
- Auxiliary Gauges – configure location of auxiliary gauges.

377. The DIC shall include on-screen control of the diesel particulate filter (DPF). The DIC shall be capable of initiating and halting a manual DPF regeneration cycle. Also, the DIC shall be capable of inhibiting DPF regeneration when not desired by the operator.

378. The DIC shall be capable of displaying detailed diagnostic information. Diagnostic information screens shall only be accessible when the park brake is set to prevent unsafe operation of the vehicle. The following information shall be available through the on-screen menu:
    - On-Board Diagnostics (OBD) faults – display of all active OBD faults, including the system reporting the fault, the suspect parameter number (SPN), and the failure mode identifier (FMI)
    - Messages– display a list of all active warning messages and the status of alarms.
    - Vehicle Info – display of broadcast chassis information, including Vehicle Identification Number (VIN).
    - Pump Interlocks – display pump interlocks status, engine speed, and transmission output speed.
    - Input/Output Diagnostics – display the state of all wired inputs and outputs to the DIC.
    - Symbol Legend – display a glossary of all symbols and icons used on the DIC.
    - J1939 Databus Info – display a list of all electronic control units (ECUs) communicating on the vehicle J1939 databus and display a list of all current message data on J1939.

379. The digital dash instrumentation gauges shall display in white and the switch panel legends shall be backlit using red LED backlighting.

380. An hour meter for the engine and the pump hours shall be included within the digital dash display which shall measure the number of hours the engine and the driveline pump has been operated.

381. One (1) heavy duty box shaped HD camera shall be provided to afford the driver a clear view to the rear of the vehicle.

382. The camera system shall include a one-way communication device that shall be an integral part of the rear camera for the use of voice commands directly to the driver. The rear camera display shall activate when the vehicle's transmission is placed in reverse.

383. The camera system shall display on the digital dash. The digital dash control shall include a manual activation of the camera system display.

CAB OTHER

384. A 2.50-pound D.O.T approved fire extinguisher with BC rating shall be installed in the cab.

385. The cab and chassis shall include a total of four (4) door keys for the manual door locks.

PUMP ASSEMBLY

386. The pump on the apparatus shall be a side mount pump module configuration.

387. The pump shall be of a size and design to mount on the chassis rails of the specified chassis and have a capacity of 1750 imperial gallons per minute, NFPA-1901 rated performance.

388. The entire pump shall be assembled and tested at the pump manufacturer's factory.

389. The pump shall be driven by a drive line from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable the pump to meet and exceed its rated performance.

390. The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.

391. The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI. All metal moving parts in contact with water shall be of high-quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron will not be accepted.

392. Pump body shall be horizontally split on a single plane in two sections for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis.

393. The pump body shall extend as one piece across the truck chassis from side mounting to side mounting and incorporate the discharge manifolding system with a minimum of (2) 4-inch ports and (7) 3-inch ports.

394. The pump shall have one double-succession impeller. The pump body shall have two opposed discharge volute cutwaters to eliminate radial imbalance.

395. Pump shaft to be rigidly supported by three bearings for minimum deflection. One high lead bronze sleeve bearing to be located immediately adjacent to the impeller (on side opposite the gearbox). The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

396. The pump shaft shall have only one packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland must be a full-circle threaded design to exert uniform pressure on packing and to prevent "cocking" and uneven packing load when it is tightened. It shall be easily adjusted by hand with rod or screwdriver

without special tools or wrenches required. The packing rings shall be of a unique, permanently lubricated, long-life graphic composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

397. Pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

398. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency.

399. The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel to be super-finished under for longer shaft life. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

PUMP GEARBOX

400. The pump gearbox shall be of sufficient size to withstand up to 16,000 lb/ft of drive through torque of the engine system. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

401. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-¾" in diameter, on both the input and output drive shafts. The driveshaft shall withstand the full torque of the engine.

402. All drive and pump gears shall be manufactured of the highest quality electric furnace chrome nickel steel. All bores shall be ground to size, teeth integrated and hardened, to create an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust. (There will be no exceptions.)

403. The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

404. If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard anodized aluminum power cylinder, with stainless steel shaft.

405. An in-cab control for rapid shift shall be provided that locks in road or pump.

PUMP CERTIFICATION

406. The pump will perform and meet the following tests:
- 100% of rated capacity @150 PSI net pump press.
- 100% of rated capacity @ 165 PSI net pumps press.
- 70% of rated capacity @ 200 PSI net pump press.
- 50% of rated capacity @ 250 PSI net pump press.
- Pump shall be tested at manufacturer under full NFPA suction conditions.

PUMP PIPING AND MANIFOLDS

407. All the plumbing and/or piping in the pump module shall be of 304 stainless steel or flexible piping for long life. All stainless-steel castings shall be a minimum of schedule 40.

408. NPT pipe thread connections larger than ¾" connections shall be avoided in the construction of the plumbing system.

409. The following valves shall have a groove connection:
- Rear discharge.
- Tank fill.
- All 2 inch and 2-½ inch pre-connect valves.

410. The flexible piping shall be black SBR synthetic rubber hose with 300 PSI working and 1200 PSI burst pressure rating for sizes 1.5 inch through 4 inch. Sizes ¾ inch, 1 inch and 5 inch are shall be rated at 250 PSI working and 1000 PSI burst pressure. All sizes of piping shall be rated for -30 HG vacuum.

VALVE CONTROLS -MANUAL

411. Innovative controls side mount valve control levers with control rods shall be provided for the manual valve actuation of the non-electric valves. The chrome plated zinc handles shall have a recessed area for identification tags. The controls shall have the ability to be locked in any position.

RELIEF VALVE

412. There shall be one (1) suction side relief pump valve provided on the pump system.

INDIVIDUAL DRAINS

413. Where not otherwise mentioned, all 2 inch or larger discharge outlets shall be equipped with a ¾ inch ball valve drain valve or larger.

6 INCH STEAMER INLETS

414. Two (2) 6-inch steamer inlets will be provided, one (1) on the left side, and one (1) on the right side of the apparatus. These inlets shall have long handle chrome vented caps and a screen. Each of these side inlets will have a Hale MIV 2 Electric master intake valve. This will have a pre-priming ability that will be controlled form the pump operator's panel.

AUXILIARY INLETS

415. One (1) 2-½ inch intake valve shall be located on the left side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The valve shall come equipped with a chrome plug, chain, inlet strainer, 2-½ inch NSZ1

chrome inlet swivel and ¾” inch drain valve. This valve will be controlled at the side pump panel with a swing type handle.

416. One (1) 2-½ inch intake valve shall be located on the right-side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The valve shall come equipped with a chrome plug, chain, inlet strainer, 2-½ inch NSZ1 chrome inlet swivel and ¾ inch drain valve. This valve will be controlled at the side pump panel with a swing type handle.

DISCHARGE VALVES 2 INCH & 2.5 INCH

417. The valves shall be of a floating ball design with a flow pressure rating exceeding NFPA standards and reaching a pressure rating of 500 psi.

DISCHARGE VALVES HIGH VOLUME

418. All high-volume discharge valves will comply with NFPA requirements for slow -close operation.

DISCHARGE GAUGES

419. Where not otherwise mentioned, Individual 2-½ inch line gauges for each 2 inch or larger discharge shall be provided and mounted adjacent to the discharge valve control handle. The gauges shall indicate pressure from 0 to 400 PSI.

DISCHARGES

420. Two (2) 2-½ inch discharge valves shall be located on the left side panel, one oriented towards the front of the apparatus and the other towards the rear. The valves shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½ inch outlets shall be equipped with a chrome 30-degree elbow terminating with 2-½ inch NSZ1 threads, and cap. There shall be a 2 ½ inch pressure gauge mounted on the panel near the control to indicate pressure for each discharge. Each discharge shall also come equipped with a quarter-turn ¾" drain valve.

421. Two (2) high volume discharges with 3.0 inch slow-close valves shall be located on the right-side panel, one oriented towards the front of the apparatus and the other towards the rear. The valves shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The outlets shall be equipped with an integral, stainless steel, straight flange terminating with 4-inch MNH threads. There shall be a 2 ½ inch pressure gauge mounted on the panel near each discharge control to indicate pressure. The discharges shall also come equipped with a quarter-turn ¾" drain valve. An NFPA color coded anodized 4-inch MNST x 5-inch Storz 30-degree elbow and cap will be installed on each discharge outlet.

422. Two (2) 2-½ inch discharges valves shall be plumbed to the rear of the body on the left side. The valves shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½ inch valve outlet terminates with 2-½ inch NSZ1. There shall be a 2 ½ inch pressure gauge mounted on the panel near the control to indicate pressure on each discharge. The discharge shall also come equipped with a quarter-turn ¾ inch drain valve. The discharges will be routed to the front of the hose bay to the left side of the main hose bed. One (1) of these discharges will be foam capable.

DECKGUN DISCHARGE

423. One (1) 3-inch discharge with a TFT Stainless steel valve shall be located on the top of the pump. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The valve shall be equipped with a TFT electric actuator. A control point will be installed into the pump operators panel to control the valve. There shall be a 2 ½ inch pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a ¾ inch automatic drain valve.

424. One (1) TFT FLEX RC 1250 GPM monitor will be supplied and installed onto a TFT RC Extend-a-gun, telescoping waterway. The monitor will come equipped with quad attack smooth bore tips.

425. A remote handheld controller will control the deck gun.

SPEED LAYS 1 ¾" – FOAM CAPABLE

426. One double speedlay shall be installed on apparatus. Each section of the speedlay shall hold approximately 200' of 1-3/4-inch double jacket fire hose. A 1-1/2-inch mechanical swivel hose
connector shall be used in each crosslay to provide access of hose in either direction. Each crosslay shall have one (1) 2-inch valve. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures.

427. The speedlay shall be installed through the pump panel to allow easy.

428. The discharge shall be plumbed to the speedlay using a 2-inch schedule 10 stainless steel pipe. The pipe shall terminate in a stainless-steel swivel with 1 ½ inch NPSH thread. The swivel shall allow the hose to be pulled from either side of the apparatus. The pipe shall be held in place by a 2-piece stainless steel bracket.

429. There shall be a 2 ½ inch pressure gauge mounted on the panel near each control to indicate pressure. Each discharge shall also come equipped with a quarter-turn ¾ inch drain valve. Each discharge shall be foam capable.

430. Each speedlay will have a removable poly tray installed to house the hose.

TRASH LINE

431. The trash line discharge shall be plumbed to the existing plumbing provided on the apparatus cab for the provision of a trash line in the front bumper extension using 2 inch schedule 10 stainless steel pipe. The pipe within the compartment in the front bumper extension shall terminate in a stainless-steel swivel with 1 ½ inch NPSH thread. The swivel shall allow the hose to be pulled 180 degrees.

432. There shall be a 2 ½ inch pressure gauge mounted on the panel near each control to indicate pressure. Each discharge shall also come equipped with a quarter-turn ¾ inch drain valve. The trash line discharge shall be foam capable.

TANK FILL

433. One (1) 2-inch discharge valve shall be plumbed to the tank. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-inch valve outlet terminates with a 2-inch grooved connection.

434. The tank fill valve shall be operated from the pump operator's panel.

TANK TO PUMP

435. One (1) 4" Electric Actuated valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type. The valve shall include an integrated check valve to prevent accidental backfilling.

436. The tank to pump valve shall be operated from the pump operator's panel.

TANK LEVEL GAUGES FOR WATER

437. The apparatus shall be equipped with a tank level gauge for indicating water level. The Tank level gauge shall indicate the liquid level or volume on an easy-to-read LED display and show increments of 1/8 of a tank.

438. Three Whelen PSTANK2 remote tank volume indicators will be installed in the following locations. One per side on the front side facing edges of pump house and one to the back of the unit. A Class 1 remote light driver will control this to show full, 3/4, 1/2, and 1/4 tank.

439. The tank level gauge system shall include:
    - A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
    - A super bright LED display viewable from 180 degrees with a visual indication at nine accurate levels.
    - A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power. Additional (slave) displays (if requested) are to be easily integrated and will receive data from the same source as the Master Display.

- The system shall include the ability to display “text messages.”
- The system shall include built-in diagnostic capabilities.

FOAM PROPORTIONING SYSYEM

440. The apparatus shall be equipped with an automatic foam concentrate proportioning system.

441. The foam system shall be equipped with a foam controller and a foam induction pump.

442. The foam induction pump will be a rotary gear style foam induction pump (12VDC | 24VDC) for use with Class A and Class B foam concentrates at a rated output of up to 3.3gpm and a maximum operating pressure of 400 psi.

443. The foam system controller will show the water flow per minute, foam percentage, total water flowed, and total foam flowed on the main screen without having to press any buttons.

444. The foam system controller will maintain a running total of the amount of water and foam used during the current power cycle.

445. The foam system controller will allow push-button modification of the foam proportioning rate from 0.1% to 10.0% in 0.1% increments.

446. The foam system controller will always begin operation at the preset foam proportioning rate which is configured with a password protected set-up screen.

447. The foam concentrate pump discharge line shall be equipped with a bubble tight check valve, rated at 500 psi to prevent water flow into the concentrate pump from the apparatus fire pump. This valve shall be made from brass or 300 series stainless steel. This valve shall have a cracking pressure of 4-6 psi to prevent flowing concentrate through the pump due to head pressure from the concentrate reservoir.

448. The foam controller will protect the foam pump from being run “dry” by showing a “low foam” warning when the low-level tank switch is activated and only allowing the foam pump to run for another sixty (60) seconds before turning off the foam pump and showing a “no foam” warning.

449. An In-line, field serviceable foam concentrate strainer(s) shall be installed in the foam concentrate suction line(s).

TANK LEVEL GAUGE FOR FOAM

450. The apparatus shall be equipped with a tank level gauge for indicating foam level. The Tank Level Gauge shall indicate the liquid level or volume on an easy-to-read LED display and show increments of 1/8 of a tank.

451. The tank level gauge system shall include:
    - A pressure transducer that is mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
    - A super bright LED display viewable from 180 degrees with a visual indication at nine accurate levels. A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power. Additional (slave) displays (if requested) are to be easily integrated and will receive data from the same source as the Master Display.
    - The system shall include the ability to display "text messages."
    - The system shall include built-in diagnostic capabilities.

FIRE PUMP PRIMER SYSTEM

452. A Trident model #31.001.22 air operated, 12-volt automatic operation, 3-location primer system shall be installed.

453. The primer body assembly shall be of all brass construction, compact and super quiet (less than 70dBA) with a three (3) barrel design, with .750-inch female NPT connection.

454. The system shall include one 3-position pump panel rocker switch control with placard, two (2) push to prime switches and placards (for 2nd, and 3rd priming locations), a wiring harness, a discharge pressure sensor, and a separate primer with electric over air solenoid attached.

455. The panel rocker switch shall have a "PRIME" position, "OFF," and an "AUTO" position. When pushed and held in the "PRIME" position, air will be supplied to the primer causing sufficient vacuum to prime the fire pump. Once a prime is achieved, the operator can move the rocker switch to the "AUTO" position which will automatically restart the primer if the discharge pressure drops below 20-psig. An indicator light built into the rocker switch will be lit when the "AUTO" mode is engaged. An interlock on the wiring harness shall be wired to allow for AUTOMATIC operation only when the "OK to pump indicator" light is ON.

456. The system shall not require any more than 0.1-amp draw using a 12-volt power source.

457. The primer shall be powered with air from the chassis air-brake system and shall not require any belts or lubricant reservoir. The system shall meet all requirements and applicable sections of NFPA standards.

MASTER PUMP DRAIN

458. The pump shall be equipped with a 12 port Master Pump drain to allow draining of the lower pump cavities, volute and selected water carrying lines and accessories.

PUMP COOLER & ENGINE COOLER VALVES

459. An engine cooler and pump cooler valve shall be installed in the instrument panel.

460. The valves shall be a 3/8 inch - 1/4 turn valve installed through the instrument panel and labeled.

U.L. TEST POINTS

461. One (1) U.L. test point shall be mounted on the pump panel for testing of the vacuum and pressures. The test point shall have individual ports for suction and discharge.

PUMP PANEL

462. The pump module panels shall be 14 gauge brushed stainless steel.

463. The pump house will be designed so that each side pump panel will be enclosed behind a rollup door. The roll up door shall be painted to match the apparatus.

464. A permanently affixed plate shall be installed at the pump operators position that will provide the rated discharge and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump used and the no load governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve.

465. A remote mic and speaker will be installed in the pump operator panel area connected to the radios installed inside the cab.

466. Two (2) 4-½ inch gauges shall be provided. The master discharge gauge shall indicate pressure from 0 to 400 PSI. The master intake gauge shall indicate pressure from -30hg to 400 PSI.

467. One pull-out step will be installed at each side pump panel to assist with repacking the crosslay hose bays and reaching the pump control panel. These steps will be 24” wide and will meet NFPA requirements for static load bearing and slip resistance.

468. An LED display screen shall be affixed to the pump operators panel attached to a camera system that allows the pump operator to view the master intake valve & pump panel on the passenger’s side of the apparatus. This camera will allow the operator to view the intake during drafting or water supply operations.

469. A remote switch panel utilizing rocker style switches shall be installed at the pump panel at the operator’s position capable of activating all of the scene lights on the apparatus. One (1) of the switches shall be a master switch capable of activating all scene lighting simultaneously.

PRESSURE CONTROL GOVERNOR

470. An automatic pressure control governor shall be installed with controls located at the left side pump panel at the operator’s position. The preferred make and model is Class 1

471. The pressure governor shall operate in two control modes, pressure, and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes.

472. A throttle ready and Ok to Pump LED shall light when the interlock signal is recognized. The pressure governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the pressure governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The pressure governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi.

473. The pressure governor and display shall be programmed to interface with a Cummins engine.

474. The following continuous displays shall be provided:
- Engine RPM; shown on LCD screen.
- Check engine and stop engine warning; shown on LCD screen.
- Engine oil pressure; shown on LCD screen.
- Engine coolant temperature; shown on LCD screen.
- Transmission Temperature; shown on LCD screen.
- Battery voltage; shown on LCD screen.
- Pressure and RPM operating mode LEDs.
- Pressure / RPM setting; shown on LCD screen.
- Throttle ready / Ok to Pump LEDs.

475. On screen (LCD) message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. LCD Screen and LED's intensity shall be automatically adjusted or day and nighttime operation. The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:
- High Battery Voltage
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Transmission Temperature
- Low Engine Oil Pressure
- High Engine Coolant Temperature
- Out of Water (visual alarm only)
- No Engine Response (visual alarm only).

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

477. Other safety features of the pressure control governor shall include recognition of low water and no water conditions with an automatic programmed response and a push button to return the engine to idle.

PUMP HOUSE HEATER

478. A 40,000 btu pump house heater will be installed that will be plumbed into the cooling system of the chassis.

479. The heater will be controlled by a switch at the pump operator's panel.

480. Removable aluminum heat pans will be installed under the pump.

PUMP ACCESS

481. Pump access will be provided at each side pump panel with a hinged door, and a large removable passenger side panel.

WATER TANK

482. A T shaped copolymer polypropylene tank shall be installed onto an aluminum sub frame assembly.

483. There will be a fill tower located at the front of the tank. The fill tower will have a hinged lid with a screen installed inside the fill tower. The vent pipe will be plumbed from the fill tower to an area under the tank behind the rear wheels.

484. The tank will have a foam cell integrated into the tank.

485. Tank specifications shall be as follows:
- The capacity of a minimum of 2000 imperial gallons of water
- The capacity of the integrated foam tank shall be a minimum of15 imperial gallons.
- 6-inch vent/overflow
- Sump with 3-inch drain
- Tank shall have provision for 4-inch tank to pump plumbing.
- Tank shall have provision for 2-inch pump to tank plumbing.
- Tank shall have provisions for a dump valve at the rear.
- Tank shall have provision for a rear direct tank fill.

DUMP VALVE

486. An electrically operated 10-inch Dump Valve dump valve will be installed to the back of the unit, with the ability to rotate 180 degrees.

487. The actuator for the dump valve is to be mounted on the top.

488. Also included with the electric operated dump valve is an unattached back-up, two position handle.

489. The dump valve will feature stainless steel construction.

490. The dump valve will be controlled with a DC motor control and rear bezel mounted illuminated rocker switch. The switch will consist of a master switch that will power the

dump activation switch to prevent unintentional opening of the dump valve. This switch assembly will be located in 2 places. One per side on the
back of the body.

491. The dump valve will have a manual extensions chutes installed to allow the chute to reach beyond each side of the apparatus when rotated to either side.

DIRECT TANK FILL

492. One (1) 4-inch check valve type fast fill valve will be installed into the back of the tank. This will terminate with a black anodized 5-inch Storz 30 deg elbow with cap.

493. 4" 304 stainless steel plumbing will connect the elbow to the fast fill valve.

494. A strainer will be installed to prevent debris from entering the water tank.

495. A ¾ inch Bleeder valve will be installed to assist in draining pressure from the connected hose.

REAR BODY

496. The body of the truck shall be a "Rescue-Pumper Body" style.

497. The side compartments shall be constructed of 1/8 inch and 3/16-inch aluminum and be fastened to the internal tubular structure of the sub frame in such a way that they create a strong box section.

498. The compartments will be a sweep out design.

499. The lower edge of the body will be provided with an anodized aluminum rub rail.

500. The rear wheel wells will be constructed of 3/16" painted aluminum and have polished stainless steel arches.

501. One tow loop will be provided at the rear of the body.

502. There will be Amdor roll up doors installed in all exterior compartments. All roll up doors will be painted to match the apparatus.

503. There will be turtle tile and vents installed in all of the compartments, as necessary.

504. The compartment joints will be completely sealed to restrict the entry of dust and water.

505. Compartment lighting will be two (2) LED tube lights per compartment to suit the lighting requirements of each compartment.

506. Each compartment door will come with a heavy duty pull strap, connected to both the bottom panel of your roll-up door and the side wall of the compartment, for ease of access while remaining unobtrusive during operation.

507. All surfaces of each compartment will be sprayed with silver/grey Zolatone 20 series coating.

508. Handrails will be provided where required by NFPA/ULC standards and will have a slip resistant anodized aluminum finish.

SIDE COMPARTMENTS/STORAGE

509. The driver's side 1 compartment will have an opening size which is a minimum of 47 inches wide x 67 inches high x 27 inches deep (13 inches deep in the upper area). One 100% extension 500lb capacity Aluminum roll out tray will be installed on the floor of this compartment. The tray top will be constructed of .188-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the tray. Reflective tape will be installed to the perimeter of the tray. The tray will lock in both the in and out position with the help of a mechanical latch. Two (2) adjustable shelves will be installed in the 13-inch-deep space above the roll out tray. The shelf will be constructed of .125-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the shelf.

510. The driver's side 2 compartment will have an opening size which is a minimum of 48 inches wide x 33 inches high x 13 inches deep. One (1) adjustable shelf will be installed. The shelf will be constructed of .125-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the shelf.

511. The driver's side 3 compartment will have an opening size which is a minimum of 48 inches wide x 33 inches high x 13 inches deep. One (1) adjustable shelf will be installed. The shelf will be constructed of .125-inch 5052 marine grade aluminum with a 2" lip bent up around the perimeter of the shelf.

512. The driver's side 4 compartment. This compartment will have an opening size which is a minimum of 38 inches wide x 67 inches high x 27 inches deep (13 inches deep in the upper area). One 100% extension 500lb capacity Aluminum roll out tray will be installed on the floor of this compartment. The tray top will be constructed of .188-inch 5052 marine grade aluminum with a 2" lip bent up around the perimeter of the tray. Reflective tape will be installed to the perimeter of the tray. The tray will lock in both the in and out position with the help of a mechanical latch. Two (2) adjustable shelves will be installed in the space above the roll out tray. The shelf will be constructed of .125-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the shelf.

513. The passenger's side 1 compartment will have an opening size which is a minimum of 47inches wide x 67 inches high x 27 inches deep (13 inches deep in the upper area). One 100% extension 500lb capacity Aluminum roll out tray will be installed on the floor of this compartment. The tray top will be constructed of .188-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the tray. Reflective tape will be installed to the perimeter of the tray. The tray will lock in both the in and out position with the help of a

mechanical latch. This roll out tray will also include a rotating style upright storage unit to stow a Holmatro Pentheon Combi-tool & Ram. Two (2) adjustable shelves will be installed in the 13" deep space above the roll out tray. The shelf will be constructed of .125-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the shelf.

514. The passenger's side 2 compartment will have an opening size which is a minimum of 49 inches wide x 33 inches high x 13 inches deep. One (1) swing out tool board will be installed in this compartment. This will be constructed of .25-inch aluminum and will be latched in place with a self-locking spring bolt. An allowance to include eight (8) handle lock tool holders will be made.

515. The passenger's side 3 compartment will have an opening size which is a minimum of 49 inches wide x 33 inches high x 13 inches deep. One (1) swing out tool board will be installed in this compartment. This will be constructed of .25-inch aluminum and will be latched in place with a self-locking spring bolt. An allowance to include eight (8) handle lock tool holders will be made.

516. The passenger's side 4 compartment will have an opening size which is a minimum of 38 inches wide x 67 inches high x 27 inches deep (13 inches deep in the upper area). One 100% extension 500lb capacity Aluminum roll out tray will be installed on the floor of this compartment. The tray top will be constructed of .188-inch 5052 marine grade aluminum with a 2-inch lip bent up around the perimeter of the tray. Reflective tape will be installed to the perimeter of the tray. The tray will lock in both the in and out position with the help of a mechanical latch. Two (2) adjustable shelves will be installed in the space above the roll out tray. The shelf will be constructed of .125-inch 5052 marine grade aluminum with a 2" lip bent up around the perimeter of the shelf.

517. SCBA cylinder storage shall be provided on each side of the apparatus over the wheel wheels. The storage area will have four (4) single access doors installed. These will be from Cast Products and will feature Stainless Steel doors with rotomolded storage tubes. Each tube will have a drain and a nylon safety strap.

518. The centre wheel well storage access door on each side will also provide access to a custom fabricated cross hitch. This will be fabricated from stainless steel tubing and will have an 8000-pound straight line pull rating.

519. An access panel will be provided next to the dump valve to provide access to the manual over-ride handle on the dump valve.

520. Illuminated flip-down steps will be installed to the back of the body to provide access to the hose bed. Three (3) steps will provide access to a platform step. One (1) additional step installed above the platform will provide access to hose bed. Illumination to meet NFPA and ULC requirements will be provided. The platform will be constructed from an aluminum deck span and will be a minimum of 54 inches wide x 12 inches deep.

521. The deck area above the compartments will be a non-walking surface covered with an aluminum checker plate.

TOP SIDE HOSE STORAGE

522. The main covered portion of the hose bed in the center will be approximately 144 inches long x 66 inches wide x 1 inches deep. The bottom section of the main hose bed will have extruded aluminum hose bed slats installed on top of the tank.

523. Three (3) dividers will be installed with the center divider being permanently installed.

524. The left-hand dividers will be adjusted to provide room for two (2) single stack preconnected lays of 2.5-inch hose.

525. A vinyl hose-bed cover will be provided by the manufacturer which protects both the top and rear of the hose bed. The top of the hose bed cover will affix to the apparatus with cam style tie downs. The rear of the hose bed cover will affix to the apparatus using Velcro straps.

TOP SIDE FRONT STORAGE

526. The dunnage area ahead of the hose bed will provide space for the following items:
    - Foam and water fill towers.

527. This space will also provide access to the dunnage storage area above the pump house. LED surface lighting will be provided for this area.

STORAGE ABOVE THE PUMP MODULE

528. The area above the pump house will be built to store a customer supplied stokes basket stretcher.

HARD SUCTION STORAGE

529. Two (2) storage slots to stow two (2) 10’ lengths of 6-inch hard suction will be provided with access at the back of the body.

530. The storage slots shall be located in a manner so that the hard suction can be removed from storage from standing height at ground level.

531. A latched door will be provided to cover each storage slot.

PIKE POLE STORAGE

532. A storage pocket will be installed within the ladder storage tunnel. This will be sized to store three (3) pike poles, 12’, 8’ and 6’ in length.

LADDER STORAGE

533. One ladder storage tunnel will be integrated into the tank design. This will provide a covered storage space for a 24’ 2 section ladder, a 14’ roof ladder, and an 8’ folding ladder.

534. A latch door will be provided to cover the ladder storage tunnel.

BODY ELECTRICAL

535. All 12v circuits shall be arranged for maximum reliability with divided functions such that the failure of one circuit does not unduly affect vehicle function.

536. All circuits will be controlled through a multiplexed electrical system.

537. All 12v wiring and circuits will be clearly identified to assist in diagnostics.

538. Each body compartment shall include a standard 120v ground fault protected, power outlet for charging of devices/tools.

539. Certification from the warning light manufacturer will be provided to confirm that the lighting system meets the current NFPA 1901 standards.

540. The following 12v lighting will be provided on the body:
- Compartment lighting; LED bar lights activated by individual compartment door switches.
- Zone A upper; Light bar to come installed on Chassis.
- Zone A lower; 2- Supplied with Chassis.
- Zone B/D lower; 6 – Whelen 600 series Super LED Red flashing lights will be mounted in the following areas, 2 per side in the rear wheel wells, and one per side on the front bumper sides.
- Zone C upper; Two (2) Whelen Mini Freedom Beacons, One (1) Red on the driver and one (1) Amber on the passenger side of the apparatus.
- Zone C lower; 2 – Whelen 600 series super LED Red flashing lights will be mounted in the following areas, 1 per side on the back of the body in the taillight clusters.
- Zone C upper; 2 – Whelen 600 series super LED Red flashing lights will be mounted in the following areas, 1 per side on the back of the body at mid height.
- 13 - LED ground lights installed underneath the apparatus. Ground lighting will be installed in the following locations, 1 per side under each compartment, and 3 across the back of the body. All areas where crew enters the body will have ground lighting.
- 2 - Whelen 600 series super LED Red stop/ tail / turn LED lights.
- 2 - Whelen 600 series super LED Red reverse lights
- All Whelen lights will have chrome bezels.
- License plate light
- All required clearance lights to meet Nova Scotia legal requirements.
- Flashing “DO NOT MOVE APPARATUS” light will be mounted in the cab.
- LED Lighting will be provided for all stepping surfaces on the body steps.
- Pump compartment light; LED strip lighting.

541. Surface mounted scene lighting shall be installed in the following locations:
- 2 – Side facing Fire Research Radiant LUX Lumens LED Scene Light model SPA260-Q20 surface mount lights shall be installed on each side of the apparatus, one at the front of

the body and one at the rear. The lights shall operate at 12 VDC at 16.24 A and generate 22,000 lumens of light, these lights shall be activated by switch.

- 2 – Rear facing Fire Research Spectra LED Perimeter Light model SPA900-Q70 surface mount lights shall be installed at top of the body on each side of the rear of the apparatus activated with by switch or automatically when the reverse gear is engaged.

542. All scene lights will be surrounded by a chrome-colored bezel.

543. One Whelen Workside LED scene light will be installed under the rear fixed step.

544. An 8 head traffic advisor recess mounted into the rear of the body. The recess mount housing will also incorporate a mounting location for the rear-view camera.

WINCH/HITCH POINTS

545. In addition to the custom fabricated cross hitches located above the wheel wells. There will be hitches fabricated from stainless steel tubing with an 8000-pound straight line pull rating located under the front and rear bumpers of the apparatus.

546. A Warn VR12 12,000-lb Truck Winch, shall be provided with the apparatus. The winch shall be affixed to a stainless-steel frame with a compatible receiver to be mounted on the hitches on all sides of the apparatus and secured with a cotter pin. When not in use the winch shall be stowed in the passenger's side 4 compartment with provisions made to ensure it is secure while the apparatus is in motion.

BODY PAINT

547. The Body will be finished in a high gloss red color scheme to match the cab. The paint will be RM high quality high solids polyurethane using a paint system designed for aluminum.

548. The entire body will be wet sanded and polished.

GRAPHICS

549. High-quality lettering and graphics to match the department's current fleet will be applied by the manufacturer.

550. A 6-inch-wide night light reflective stripe will be provided where possible along each side of the completed vehicle to match the department's current fleet to be applied by manufacturer.

551. The rear of the body will be painted red but will be completely covered with 3M Diamond grade red and yellow gradient style high reflective 6"chevrons to match the department's current fleet to be applied by the manufacturer.

UNDERCOATING

552. The underside of the apparatus will be undercoated prior to delivery.

EQUIPMENT TO BE SUPPLIED WITH APPARATUS

553. The following list of equipment will be supplied with the completed apparatus:

- Two (2) 10’ length of Kochek 6” HD lightweight suction hose.
- One (1) 24’ two section extension ladder.
- One (1) 14’ roof ladder.
- One (1) 8’ collapsible “attic” ladder.
- One (1) 12’ pike pole with composite handle.
- One (1) 8’ pike pole with composite handle.
- One (1) 6’ pike pole with composite handle
- Two (2) Kochek double spanner wrench sets K46-2
- Two (2) Kochek Hydrant wrench/spanner combo set K45-3
- One (1) Kochek Storz wrench set KS34.

APPENDIX A
GENERAL PROPOSAL INFORMATION & PRICE FORM

VENDOR INFORMATION	
Vendor Name:	
Vendor Address:	
Vendor Contact Person:	
Vendor Contact Number:	
Vendor Email:	
Vendor Signature:	
INFORMATION ON PROPOSED GOODS	
Proposed Cab/Chassis Year:	
Proposed Cab/Chassis Manufacturer:	
Proposed Cab/Chassis Model:	
Proposed Body Manufacturer: (If different from cab/chassis manufacturer)	
Powertrain Warranty Included:	
Cab/Chassis Warranty Included:	
Body Warranty Included: (If different from cab/chassis manufacturer)	
Warranty Provided on Paint:	
Warranty Provided for Water Tank:	
Warranty Provided for Fire Pump:	
Proposed Delivery Date of Goods:	

PRICING PROPOSAL	
Price of Proposed goods including HST/Fees:	
If Progress payments or other installment payments are proposed as part of this bid please provide detailed specifics:	

APPENDIX B
SPECIFICATION COMPLIANCE CHECKLIST

RFP SECTION	COMPLIANT		NOTES/PROPOSED ALTERNATIVES
	Yes	No	
GENERAL CONDITIONS			
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CHASSIS CONFIGURATION			
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DIMENSIONS			
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CAB CONSTRUCTION/SAFETY			
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CAB PAINT			
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57.			
CAB TILT SYSTEM			
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CAB GLASS			
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CAB CLIMATE CONTROL			
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CAB TRIM/INTERIOR			
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CAB MIRRORS/EXTERIOR TRIM			
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ENGINE			
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ENGINE COOLING SYSTEM			
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EXHAUST SYSTEM			
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COMPRESSION BRAKE			
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DRIVELINE			
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FUEL SYSTEM			
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SUSPENSION/TIRES			
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AIR BRAKE SYSTEM			
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CHASSIS FRAME			
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293.			
FRONT BUMPER EXTENSION			
294.			
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ELECTRICAL SYSTEM			
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CAB LIGHTING			
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SIRENS/AUDIBLE ALERTING			
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INSTRUMENTATION			
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383.			
CAB OTHER			
384.			
385.			
PUMP ASSEMBLY			
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PUMP GEARBOX			
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401.			
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404.			
405.			
PUMP CERTIFICATION			
406.			
PUMP PIPING AND MANIFOLDS			
407.			
408.			
409.			
410.			
VALVE CONTROLS -MANUAL			
411.			
RELIEF VALVE			
412.			
INDIVIDUAL DRAINS			
413.			
6 INCH STEAMER INLETS			
414.			
AUXILIARY INLETS			
415.			
416.			
DISCHARGE VALVES 2 INCH & 2.5 INCH			

417.			
DISCHARGE VALVES HIGH VOLUME			
418.			
DISCHARGE GAUGES			
419.			
DISCHARGES			
420.			
421.			
422.			
DECKGUN DISCHARGE			
423.			
424.			
425.			
SPEED LAYS 1 ¾" – FOAM CAPABLE			
426.			
427.			
428.			
429.			
430.			
TRASH LINE			
431.			
432.			
TANK FILL			
433.			
434.			
TANK TO PUMP			
435.			

436.			
TANK LEVEL GAUGES FOR WATER			
437.			
438.			
439.			
FOAM PROPORTIONING SYSYEM			
440.			
441.			
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449.			
TANK LEVEL GAUGE FOR FOAM			
450.			
451.			
FIRE PUMP PRIMER SYSTEM			
452.			
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454.			
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457.			
MASTER PUMP DRAIN			
458.			
PUMP COOLER & ENGINE COOLER VALVES			
459.			
460.			
U.L. TEST POINTS			
461.			
PUMP PANEL			
462.			
463.			
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469.			
PRESSURE CONTROL GOVERNOR			
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PUMP HOUSE HEATER			
478.			
479.			
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PUMP ACCESS			
481.			
WATER TANK			
482.			
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485.			
DUMP VALVE			
486.			
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491.			
DIRECT TANK FILL			
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REAR BODY			
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SIDE COMPARTMENTS/STORAGE			
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521.			
TOP SIDE HOSE STORAGE			
522.			
523.			
524.			
525.			
TOP SIDE FRONT STORAGE			
526.			
527.			
STORAGE ABOVE THE PUMP MODULE			
528.			
HARD SUCTION STORAGE			
529.			
530.			
531.			
PIKE POLE STORAGE			
532.			
LADDER STORAGE			
533.			
534.			
BODY ELECTRICAL			
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544.			
WINCH/HITCH POINTS			
545.			
546.			
BODY PAINT			
547.			
548.			
GRAPHICS			
549.			
550.			
551.			
UNDERCOATING			
552.			
EQUIPMENT TO BE SUPPLIED WITH APPARATUS			
553.			