CITY OF SAN ANTONIO

PURCHASING AND GENERAL SERVICES DEPARTMENT

REQUEST FOR OFFER ("RFO") NO.: 6100009506

SAFD-LADDER AND PLATFORM TRUCKS

Date Issued: OCTOBER 2, 2017

RESPONSES MUST BE RECEIVED **NO LATER** THAN: OCTOBER 16, 2017
10:00 AM CENTRAL TIME

Responses may be submitted by any of the following means:
Electronic submission through the Portal
Hard copy in person or by mail

Address for hard copy responses:

Physical Address:
Purchasing & General Services
Riverview Tower
111 Soledad, Suite 1100
San Antonio, Texas 78205

Mailing Address:
Purchasing & General Services
P.O. Box 839966
San Antonio, Texas 78283-3966

For Hard Copy Submissions, Mark Envelope

"SAFD-LADDER AND PLATFORM TRUCKS"

Offer Due Date: 10:00 A.M., OCTOBER 16, 2017

RFO No.: 6100009506

Offeror's Name and Address

Bid Bond: NO Performance Bond: NO Payment Bond: NO Other: NO

See Supplemental Terms & Conditions for information on these requirements.

Affirmative Procurement Initiative: NO DBE / ACDBE Requirements: NO

See Instructions for Offerors and Attachments sections for more information on these requirements.

Pre-Submittal Conference * NO

Staff Contact Person: STEPHANIE CRIOLLO, PROCUREMENT SPECIALIST III, P.O. Box 839966, San Antonio, TX 78283-3966
Email: STEPHANIE.CRIOLLO@SANANTONIO.GOV

SBEDA Contact Information: , 210-207-3900,

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003 - INSTRUCTIONS FOR OFFERORS

Submission of Offers.

Submission of Hard Copy Offers. Submit one original offer, signed in ink, and two copies of the offer enclosed in a sealed envelope addressed to the Purchasing and General Services Department at the address and by the due date provided on the Cover Page. The name and address of offeror, the offer due date and RFO number and title shall be marked on the outside of the envelope(s). All times stated herein are Central Time. Any offer or modification received after the time and date stated on the Cover Page shall be rejected.

Submission of Electronic Offers. Submit one offer electronically by the due date provided on the Cover Page. All times stated herein are Central Time. Any offer or modification received after the time and date stated on the Cover Page shall be rejected. All forms in this solicitation which require a signature must have a signature affixed thereto, either by manually signing the document, prior to scanning it and uploading it with your submission, or affixing it electronically.

Offers sent to City by facsimile or email shall be rejected.

Modified Offers. Offers may be modified provided such modifications are received prior to the time and date set for submission of offers, and submitted in the same manner as original offers. For hard copy offers, provide a cover letter with the offer, indicating it is a modified offer and that the Original offer is being withdrawn. For electronic offers, a modified offer will automatically replace a prior offer submission. See below for information on submitting Alternate Offers.

City shall not be responsible for lost or misdirected offers or modifications.

Offerors must sign the Signature Page on hard copy offers and return the RFO document to City. For electronic offers, Offeror's electronic submission, with accompanying affirmations, constitutes a binding signature for all purposes.

Offerors are cautioned that they are responsible for the security of their log on ID and password, since unauthorized use could result in Offeror's being held liable for the submission.

Certified Vendor Registration Form. If Offeror has not completed the City's Certified Vendor Registration (CVR) Form, Offeror is required to do so prior to the due date for submission of offers. The CVR form may be accessed at http://www.sanantonio.gov/purchasing/. Offerors must identify the correct name of the entity that will be providing the goods and/or services under the contract. No nicknames, abbreviations (unless part of the legal title), shortened or short-hand names will be accepted in place of the full, true and correct legal name of the entity.

Alternate Offers. Alternate offers may be allowed at the sole discretion of City.

Hard Copy Alternate Offers. Hard copy alternate offers must be submitted in separate sealed envelopes in the same manner as submission of other offers. Alternate offers must be marked consecutively on the envelope as Alternate Offer No. 1, 2, etc. Failure to submit alternate offers in separate envelopes may result in rejection of an offer.

Electronic Alternate Offers Submitted Through the Portal. All alternate offers are recorded with original offers when submitted electronically.

Catalog Pricing. (This section applies to offers using catalog pricing, unless this is a cooperative purchase.)

The offer will be based on manufacturer's latest dated price list(s). Said price list(s) must denote the manufacturer, latest effective date and price schedule.

Offerors shall be responsible for providing one copy of the manufacturer's catalog for each manufacturer for which an offer is submitted. Offeror shall provide said catalog at the time of submission of its offer. Manufacturers' catalogs may be submitted in any of the following formats: paper copy or CD ROM for bids submitted on paper, or PDF file for offers submitted electronically.

Offerors may submit price lists other than the manufacturer's price list. Said price list(s) must denote the company name, effective date and price schedule. These price lists are subject to approval of the City Purchasing & General Services Department.

Specified items identified herein, if any, are for overall offer evaluation and represent the commonly and most used items. Net prices entered for those specified items must reflect the actual price derived from quoted price list less all discounts offered.

Restrictions on Communication.

Offerors are prohibited from communicating with: 1) elected City officials and their staff regarding the RFO or offers from the time the RFO has been released until the contract is posted as a City Council agenda item; and 2) City employees from the time the RFO has been released until the contract is awarded. These restrictions extend to "thank you" letters, phone calls, emails and any contact that results in the direct or indirect discussion of the RFO and/or offer submitted by Offeror. Violation of this provision by Offeror and/or its agent may lead to disqualification of the offer from consideration.

Exceptions to the restrictions on communication with City employees include:

Offerors may ask verbal questions concerning this RFO at the Pre-Submittal Conference.

Offerors may submit written questions, or objections to specifications, concerning this RFO to the Staff Contact Person listed on the Cover Page on or before 3 calendar days prior to the date offers are due. Questions received after the stated deadline will not be answered. Questions submitted and the City's responses will be posted with this solicitation. All questions shall be sent by e-mail or through the portal.

Offerors may provide responses to questions asked of them by the Staff Contact Person after responses are received. The Staff Contact Person may request clarification to assist in evaluating the Offeror's response. The information provided is not intended to change the offer response in any fashion. Such additional information must be provided within two business days from City's request.

Offerors and/or their agents are encouraged to contact the Small Business Office of the International and Economic Development Department for assistance or clarification with issues specifically related to the City's Small Business Economic Development Advocacy (SBEDA) Program policy and/or completion of the SBEDA form (s), if any. The point of contact is identified on the Cover Page. Contacting the Small Business Office regarding this RFO after the due date is not permitted. If this solicitation contains Affirmative Procurement Initiatives, it will be noted on the Cover Page.

If this solicitation contains DBE/ACDBE requirements, respondents and/or their agents may contact the Aviation Department's DBE/ACDBE Liaison Officer for assistance or clarification with issues specifically related to the DBE/ ACDBE policy and/or completion of the required form(s). Point of contact is Ms. Lisa Brice, who may be reached via telephone at (210) 207-3505 or through e-mail at lisa.brice@sanantonio.gov. Respondents and/or their agents may contact Ms. Brice at any time prior to the due date for submission of bids. Contacting her or her office regarding this RFO after the due date is not permitted. If this solicitation contains DBE/ACDBE requirements, it will be noted on the Cover Page.

Pre-Submittal Conference.

If a Pre-Submittal Conference is scheduled, it will be held at the time and place noted on the Cover Page. Offerors are encouraged to prepare and submit their questions in writing in advance of the Pre-Submittal Conference in order to expedite the proceedings. City's responses to questions received prior to the conference may be distributed at the Pre-Submittal Conference and posted with this solicitation. Attendance at the Pre-Submittal Conference is optional, but highly encouraged.

This meeting place is accessible to disabled persons. Call the Staff Contact Person for information on the location of the wheelchair accessible entrance, or to request an interpreter for the deaf. Interpreters for the deaf must be requested at least 48 hours prior to the meeting. For other assistance, call (210) 207-7245 Voice/TTY.

Any oral response given at the Pre-Submittal Conference that is not confirmed in writing and posted with this solicitation shall not be official or binding on City.

Changes to RFO.

Changes to this RFO made prior to the offer due date shall be made directly to the original RFO. Changes are captured by creating a replacement version each time the RFO is changed. It is Offeror's responsibility to check for

new versions until the offer due date. City will assume that all offers received are based on the final version of the RFO as it exists on the day offers are due.

No oral statement of any person shall modify or otherwise change or affect the terms, conditions or specifications stated in the RFO.

Preparation of Offers.

All information required by the RFO must be furnished or the offer may be deemed non-responsive and rejected. Any ambiguity in the offer as a result of omission, error, unintelligible or illegible wording shall be construed in the favor of City.

Correct Legal Name. If an Offeror is found to have incorrectly or incompletely stated the name of the entity that will provide goods and/or services, the offer may be rejected.

Line Item Offers. Any offer that is considered for award by each unit or line item, must include a price for each unit or line item for which Offeror wishes to be considered. All offers are awarded on the basis of low line item, low total line items, or in any other combination that serves the best interest of City, unless City designates this solicitation as an "all or none" offer in the Supplemental Terms & Conditions.

All or None Offers. Any offer that is considered for award on an "all or none" basis must include a price for all units or line items. In an "All or None" offer, a unit price left blank shall result in the offer being deemed nonresponsive and disqualified from consideration. An "All or None" offer is one in which City will award the entire contract to one offeror only.

Delivery Dates. Proposed delivery dates must be shown in the offer form where required and shall include weekends and holidays, unless specified otherwise in this RFO. Proposed delivery times must be specific. Phrases such as "as required", "as soon as possible" or "prompt" may result in disqualification of the offer. Special delivery instructions, if any, may be found in the Specifications / Scope of Services section of this document, or in the Purchase Order.

Tax Exemption. The City of San Antonio is exempt from payment of federal taxes, and State of Texas limited sales excise and use taxes. Offerors must not include such taxes in offer prices. An exemption certificate will be signed by City where applicable upon request by Offeror after contract award.

Samples, Demonstrations and Pre-award Testing. If requested by City, Offeror shall provide product samples, demonstrations, and/or testing of items offered to ensure compliance with specifications prior to award of the contract. Samples, demonstrations and/or testing must be provided within 7 calendar days of City's request. Failure to comply with City's request may result in rejection of an offer. All samples (including return thereof), demonstrations, and/or testing shall be at Offeror's expense. Samples will be returned upon written request. Requests for return of samples must be made in writing at the time the samples are provided. Otherwise, samples will become property of City at no cost to City. Samples that are consumed or destroyed during demonstrations or testing will not be returned.

Estimated Quantities for Annual Contracts.

Designation as an "annual" contract is found in the contract's title on the Cover Page of this document. The quantities stated are estimates only and are in no way binding upon City. Estimated quantities are used for the purpose of evaluation. City may increase or decrease quantities as needed. Where a contract is awarded on a unit price basis, payment shall be based on the actual quantities supplied.

Offerors shall thoroughly examine the drawings, specifications, schedule(s), instructions and all other contract documents.

Offerors shall make all investigations necessary to thoroughly inform themselves regarding plant and facilities for delivery of material and equipment, or conditions and sites/locations for providing goods and services as required by this RFO. No plea of ignorance by Offeror will be accepted as a basis for varying the requirements of City or the compensation to Offeror.

Confidential or Proprietary Information. All offers become the property of City upon receipt and will not be returned. Any information deemed to be confidential by Offeror should be clearly noted; however, City cannot guarantee that it will not be compelled to disclose all or part of any public record under the Texas Public Information Act, since information deemed to be confidential by Offeror may not be considered confidential under Texas law, or pursuant to a

Court order. Pricing may be tabulated and posted to City's website, so shall not be considered proprietary or confidential.

Costs of Preparation. Offeror shall bear any and all costs that are associated with the preparation of the Offer, attendance at the Pre-Submittal conference, if any, or during any phase of the selection process.

Rejection of Offers.

City may reject any and all offers, in whole or in part, cancel the RFO and reissue the solicitation. City may reject an offer if:

Offeror misstates or conceals any material fact in the offer; or

The offer does not strictly conform to law or the requirements of the offer;

The offer is conditional; or

Any other reason that would lead City to believe that the offer is non-responsive or Offeror is not responsible.

City, in its sole discretion, may also waive any minor informalities or irregularities in any offer, such as failure to submit sufficient offer copies, failure to submit literature or similar attachments, or business affiliation information.

Changes to Offer Form. Offers must be submitted on the forms furnished. Offers that change the format or content of City's RFO may be rejected.

Withdrawal of Offers. Offers may be withdrawn prior to the due date. Written notice of withdrawal shall be provided to the Staff Contact Person for offers submitted in hard copy. Offers submitted electronically may be withdrawn electronically.

Evaluation and Award of Contract.

City reserves the right to make an award on the basis of City's best interests. Award may also be made based on low line item, low total line items, or in any other combination that serves the best interest of City, unless City designates this solicitation as an "all or none" offer in the Supplemental Terms & Conditions.

A written award of acceptance, manifested by a City Ordinance, and a purchase order furnished to Offeror results in a binding contract without further action by either party. Offeror must have the Purchase Order before making any delivery.

City reserves the right to delete items prior to the awarding of the contract, and purchase said items by other means.

Inspection of Facilities/Equipment. Depending on the nature of the RFO, Offerors' facilities and equipment may be a determining factor in making the offer award. All Offerors may be subject to inspection of their facilities and equipment.

Prompt Payment Discount.

Provided Offeror meets the requirements stated herein, City shall take Offeror's offered prompt payment discount into consideration. The evaluation will not be based on the discount percentage alone, but rather the net price as determined by applying the discount to the offer price, either per line item or total offer amount. However, City reserves the right to reject a discount if the percentage is too low to be of value to City, all things considered. City may also reject a discount if the percentage is so high as to create an overly large disparity between the price City would pay if it is able to take advantage of the discount and the price City would pay if it were unable to pay within the discount period. City may always reject the discount and pay within the 30 day period, at City's sole option.

City will not consider discounts that provide fewer than 10 days to pay in order to receive the discount.

For example, payment terms of 2% 5, Net 30 will NOT be considered in offer evaluations or in the payment of invoices. However, payment terms of 2% 10, Net 30 will result in a two percent reduction in the offer price during offer evaluation, and City will take the 2% discount if the invoice is paid within the 10 day time period.

Prohibited Financial Interest. The Charter of the City of San Antonio and its Ethics Code prohibit a City officer or employee, as those terms are defined in the Ethics Code, from having a financial interest in any contract with City or any City agency such as City-owned utilities. An officer or employee has a "prohibited financial interest" in a contract with City

or in the sale to City of land materials, supplies or service, if any of the following individual(s) or entities is a party to the contract or sale: the City officer or employee; his parent, child or spouse; a business entity in which he or his parent, child or spouse owns ten (10) percent or more of the voting stock or shares of the business entity, or ten (10) percent or more of the fair market value of the business entity; or a business entity in which any individual or entity above listed is a subcontractor on a City contract, a partner or a parent or subsidiary business entity.

State of Texas Conflict of Interest Questionnaire (Form CIQ). Chapter 176 of the Texas Local Government Code requires that persons, or their agents, who seek to contract for the sale or purchase of property, goods, or services with the City, shall file a completed Form CIQ with the City Clerk if those persons meet the requirements under 176.006(a) of the statute.

By law this questionnaire must be filed with the City Clerk not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Texas Local Government Code.

Form CIQ is available from the Texas Ethics Commission by accessing the following web address:

https://www.ethics.state.tx.us/filinginfo/conflict_forms.htm

In addition, please complete the **City's Addendum to Form CIQ (Form CIQ-A)** and submit it with Form CIQ to the Office of the City Clerk. The Form CIQ-A can be found at:

http://www.sanantonio.gov/atty/ethics/pdf/OCC-CIQ-Addendum.pdf

When completed, the CIQ Form and the CIQ-A Form should be submitted together, either by mail or hand delivery, to the Office of the City Clerk. If mailing, mail to:

Office of the City Clerk, P.O. Box 839966, San Antonio, TX 78283-3966.

If delivering by hand, deliver to:

Office of the City Clerk, City Hall, 100 Military Plaza, San Antonio, TX 78205.

Do not include these forms with your sealed bid. The Purchasing Division will not deliver the forms to the City Clerk for you.

Certificate of Interested Parties (Form 1295)

The Texas Government Code §2252.908, and the rules issued by the Texas Ethics Commission found in Title 1, Sections 46.1, 46.3 and 46.5 of the Texas Administrative Code, require a business entity to submit a completed Form 1295 to the City before the City may enter into a contract with that business entity.

Form 1295 must be completed online. It is available from the Texas Ethics Commission by accessing the following web address: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm.

Print your completed Form 1295 and sign it in front of a notary. Submit your signed and notarized Form 1295 with your response to this solicitation. Where requested to provide the name of the public entity with whom you are contracting, insert "City of San Antonio". Where requested to provide the contract number, provide the solicitation number shown on the cover page of this solicitation (e.g. IFB 6100001234, RFO 6100001234 or RFCSP 6100001234).

The following definitions found in the statute and Texas Ethics Commission rules may be helpful in completing Form 1295.

"Business entity" includes an entity through which business is conducted with a governmental entity or state agency, regardless of whether the entity is a for-profit or nonprofit entity. The term does not include a governmental entity or state agency. (NOTE: The City of San Antonio should never be listed as the "Business entity".)

"Controlling interest" means: (1) an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent; (2) membership on the board of directors

or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or (3) service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers. Subsection (3) of this section does not apply to an officer of a publicly held business entity or its wholly owned subsidiaries.

“Interested party” means: (1) a person who has a controlling interest in a business entity with whom a governmental entity or state agency contracts; or (2) an intermediary.

“Intermediary,” for purposes of this rule, means a person who actively participates in the facilitation of the contract or negotiating the contract, including a broker, adviser, attorney, or representative of or agent for the business entity who:

(1) receives compensation from the business entity for the person’s participation;

(2) communicates directly with the governmental entity or state agency on behalf of the business entity regarding the contract; and

(3) is not an employee of the business entity or of an entity with a controlling interest in the business entity.

004 - SPECIFICATIONS / SCOPE OF SERVICES

4.1 **BACKGROUND:** The City of San Antonio is soliciting an offer with Siddons Martin Emergency Group to furnish an estimated fifteen Pierce Velocity Fire Trucks for fiscal years 2018 - 2019, consisting of: eight ladder trucks, six ladder trucks with platforms, and one fire engine. Trucks provided shall be the current model year chassis or newer. This contract will provide all ladder trucks required by the City of San Antonio Fire Department from October 12, 2017 until November 30, 2018, from the specifications identified herein; and in the following estimated quantities:

Item	Description	FY 2018	FY 2019 (until 11/30/2018)
1	Pierce Velocity® Ladder Truck	8	0
2	Pierce Velocity® Ladder Truck with Platform	2	4
3	Pierce Velocity® Engine Truck	1	0

4.2 **GENERAL CONDITIONS:** The following general conditions shall apply to all items within this bid unless specifically excluded within any item.

4.2.1 City of San Antonio reserves the right to increase or decrease quantity of units being purchased up to the production "cut-off" date submitted on the bid for the particular item, depending on availability of funds. Prices may not be increased during this period; however, the City should benefit from any price decrease. Additional units may be purchased on an "as needed" basis. Successful vendor is required to notify the City of all production "cut-off" dates necessary for order submission. Vehicles are to be year model 2017 or newer.

4.2.2 All components shall be installed new, unused, standard production model, and equipment is to be serviced in accordance with manufacturer's recommended pre-delivery check list, and ready for operation upon delivery, and shall include all manufacturers' standard equipment unless otherwise specified or replaced therein. Equipment offered under the below listed specifications will be considered unacceptable if for any reason its long term availability on the U.S. Market or in the local area is in doubt.

4.3 **WARRANTY**: All items bid shall include the standard manufacturer's warranty, including both parts and labor, for all components and attachments. All warranties must be for a minimum period of twelve months. The warranty shall begin on the date the vehicle is placed in service, not on the delivery date. **Vendor shall attach a copy of the manufacturer's warranty to Vendor's bid.** City will notify Vendor by letter of the in-service date for each item by serial number. Warranty service and parts must be available within a 50 mile radius of San Antonio City Hall from a factory authorized dealer. Included warranties are as follows:

4.3.1 ONE (1) YEAR MATERIAL AND WORKMANSHIP ON APPARATUS
4.3.2 THREE (3) YEAR MATERIAL AND WORKMANSHIP ON CHASSIS
4.3.3 FIVE (5) YEAR LIMITED ENGINE WARRANTY (WA0180)
4.3.4 THREE (3) YEAR STEERING GEAR WARRANTY (Sheppard)
4.3.5 FIFTY (50) YEAR STRUCTURAL INTEGRITY ON FRAME AND CROSS MEMEMBERS (WA0038)
4.3.6 FRONT AXLE THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY (WA0050)
4.3.7 REAR AXLE TWO (2) YEAR MATERIAL AND WORKMANSHIP WARRANTY (WA0046)
4.3.8 ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY (WA0232)
4.3.9 TEN (10) YEAR CUSTOM CAB LIMITED STRUCTURAL INTEGRITY (WA0012)
4.3.10 TEN (10) YEAR PRO-RATED PAINT AND CORROSION (WA0055)

4.3.11 FIVE (5) YEAR MATERIAL AND WORKMANSHIP PIERCE COMMAND ZONE ELECTRONICS LIMITED WARRANTY CERTIFICATE (WA0014)

4.3.12 FIFTY-FOUR MONTH WARRANTY CAMERA SYSTEM WARRANTY

4.3.13 COMPARTMENT LIGHT WARRANTY (WA0203)

4.3.14 FIVE (5) YEAR/UNLIMITED TRANSMISSION WARRANTY EXCLUDING TRANSMISSION COOLER - five (5) year/unlimited mileage warranty covering 100 percent parts and labor. The warranty will be provided by Allison Transmission.

4.3.15 TRANSMISSION COOLER - The transmission cooler will carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). Collateral damage warranty will also be in effect for the first three (3) years of the warranty coverage and will not exceed $10,000 per occurrence.

4.3.16 TEN (10) YEAR STRUCTURAL INTEGRITY ON APPARATUS BODY (WA0009)

4.3.17 ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY

4.3.18 A Gortite roll-up door limited warranty will be provided. The mechanical components of the roll-up door will be warranted against defects in material and workmanship for the lifetime of the vehicle. (WA0185)

4.3.19 TEN (10) YEAR PUMP PLUMBING WARRANTY (WA0035)

4.3.20 A six (6) year limited warranty will be provided on painted and satin roll up doors.

4.3.21 TWENTY (20) YEAR AERIAL DEVICE STRUCTURAL INTEGRITY WARRANTY (WA0052)

4.3.22 FIVE (5) YEAR AERIAL SWIVEL LIMITED WARRANTY

4.3.23 FIVE (5) YEAR HYDRAULIC SYSTEM COMPONENTS WARRANTY

4.3.24 THREE (3) YEAR HYDRAULIC SEAL WARRANTY

4.3.25 TEN (10) YEAR AERIAL WATERWAY LIMITED WARRANTY

4.3.26 FOUR (4) YEAR PRO-RATED PAINT AND CORROSION ON AERIAL DEVICE (WA0047)

4.3.27 FIVE (5) YE COMMAND ZONE ELECTRONIC WARRANTY (WA0014)

4.3.28 SIX (6) YEAR GENERATOR MATERIAL AND WORKMANSHIP WARRANTY(WA0285)AR

4.3.29 TEN (10) YEAR PRO-RATED PAINT AND CORROSION ON TRUCK BODY (WA0057)

4.3.30 ONE (1) YEAR MATERIAL AND WORKMANSHIP ON GRAPHICS FADING AND DETERIORATION (WA0168).

Authorized Warranty Provider:
Siddons-Martin Emergency Group

Warranty Provider Address:

5511 Binz-Englemann Road Kirby, Texas 78219

4.4 **DELIVERY:** The apparatus will be delivered under its own power to insure proper break-in of all components while the apparatus is still under warranty. All deliveries are to be made inside the City limits of San Antonio. Vendor must deliver equipment to a location specified by the Fleet Acquisitions Dept. at (210) 207-4603 or (210) 207-4601. **Delivery to a non-specified location will result in non-acceptance of the equipment by the City. All deliveries must be pre-arranged with a minimum 24-hour notification, NO EXCEPTIONS**. **Vehicles will not be accepted after 3:00 P.M. CST. All vehicles are required to have a full tank(s) of fuel when delivered to City specified location.**

4.5 **EQUIPMENT MANUALS:** Two operator's manuals will be provided per purchase order, which shall include a paper parts and maintenance manual or two USB drives detailing the equipment, accessories, and components as well as construction drawings complete with wiring diagrams.

4.6 **REQUIRED DOCUMENTS AT DELIVERY:** The Manufacturer's Statement of Origin (MSO), Dealer Temporary license plates/tags, proper Invoice, signed 130U form, Vehicle Inspection Report, and State Weight Certificate/slip

(for trucks over one ton) are required upon delivery of each unit and are required before payment can be processed. Any of these missing items will delay the payment process.

4.7 **MINIMUM VEHICLE ACCESSORIES:** All units to be equipped at the factory with maximum capacity cooling system offered by manufacturer, full headliner, fresh air heater and defroster units, minimum AM/FM OEM radio, power windows and power door locks and manual tilt steering wheel. All units to be equipped with steering column mounted gear selector unless otherwise specified. Each unit shall have a minimum three keys. All accessories and equipment will be OEM. The manufacturer will rate all equipment provided as low emission on all models available. Vehicles to be equipped with OEM tinted glass.

4.8 **INCOMPLETE VEHICLES:** All bodies and components in this bid will be installed in accordance with the appropriate Incomplete Vehicle Data Manual. Certification of compliance will be posted on the left door post of the vehicle. Except for manufacturer's data plates (maximum 4" x 6"), vendor or manufacturer's identifying markings (decals and plates) will not be applied to the vehicle or mounted components. Installation will be completed in compliance with Federal Motor Vehicle Department of Transportation Standards and Texas State Highway requirements. Installation of body and accessories on City furnished vehicles will be accomplished by drilling holes in the frame. Welding on or cutting of frame is not authorized forward of the rear spring hanger or support. Bidders will be responsible for the relocation of any truck components to facilitate installation of the body and equipment. Such relocation must be included as part of the basic bid.

4.9 **BUILD SHEET INSTRUCTIONS:** Upon contract award, vendor shall provide written acknowledgement of order placement. A copy of the finalized build sheet with a San Antonio Fire Department Representative signature confirming equipment build out shall be provided to the City prior to equipment delivery. The delivery date for the completed unit shall be communicated when the build sheet is finalized. Electrical wiring schematics that include lighting and air conditioning systems for body shall be provided at time of delivery. Electrical wiring schematics and finalized build sheet shall be provided in paper in Adobe PDF format.

4.10 **VEHICLE INSPECTION:** The vendor shall have each vehicle (except cab and chassis units delivered without bodies) properly inspected in compliance with Texas motor vehicle laws.

4.11 **CHECK-IN INSPECTION:** The City shall check the vehicle upon delivery to ensure compliance with this specification and any other specific requirements. The vendor shall deliver with the vehicle a manufacturer's invoice, and MSO or any official documentation to verify the fact that ordered options, GVWR rating, and other requirements have been met. Failure to provide required documentation as listed may cause the delay of payment. Payment will be made within 30 days after vehicle's acceptance or receipt of correct invoice, whichever is later. Acceptance will not be made, nor payment initiated on vehicles failing to meet specifications (unless they are brought into full compliance), and all necessary documents (i.e. MSO, odometer statement, etc.) are received by the City.

The City shall have a maximum of 20 working days to complete this inspection.

4.12 **NON COMPLIANT VEHICLES:** Vendor shall remove noncompliant vehicle(s) from City premises within 5 working days after receiving written notification from Fleet Acquisition staff. If vehicle is not removed by vendor within the specified time frame, the City may arrange for vehicle to be removed and secured by a local towing and storage facility. Vendor will be responsible for payment of all related towing and storage charges. The City will not be responsible or liable for damage or loss of noncompliant vehicles which remain on City premises, or which are removed by towing company, 5 working days after vendor notification.

4.13 **ELECTRICAL:** Heavy duty battery and alternator offered by manufacturer for models being bid. All units to be equipped with oil pressure, water temperature, and volt or amp gauges.

4.14 **No dealership nameplates, markings or decals will be permitted on the vehicles.**

4.15 **BRAND NAMES:** Manufacturer names, trade names, brand names, and product numbers used herein are for the purpose of describing and establishing tested, compatible, approved and acceptable products that are of the type and quality required by the City. The use of pre-approved brand names are not intended to limit competition; therefore the phrase “or equal” is added. For purposes of this contract, the proposed “or equal” products shall require close adherence to the established standards of performance and quality inherently derived and reasonably expected from the brand named products specified herein. The City shall be the sole judge of equality and suitability.

4.16 **INFORMATION:** a permanent plate will be mounted in the driver's compartment specifying the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

4.17 **SAFETY VIDEO:** At the time of delivery Pierce will also provide one (1) 39-minute, professionally produced apparatus safety video, in DVD format. This video will address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus, including the following: vehicle pre-trip inspection, chassis operation, aerial operation, and safety during maintenance.

4.18 **PERFORMANCE TESTS:** A road test will be conducted with the apparatus fully loaded and a continuous run of no less than ten (10) miles. During that time the apparatus will show no loss of power nor will it overheat. The transmission drive shaft or shafts and the axles will run quietly and be free of abnormal vibration or noise. The apparatus will meet NFPA 1901 acceleration requirements and NFPA 1901 braking requirements. The apparatus when fully loaded will not have less than 25 percent or more than 50 percent on the front axle and not less than 50 percent or more than 75 percent on the rear axle.

4.19 **NFPA 2016 STANDARDS:** Apparatus proposed by the bidder will meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department's specifications that differ from NFPA specifications will be indicated in the proposal as "non-NFPA".

4.19.1 All vehicles this unit will comply with the NFPA standards effective January 1, 2016, except for fire department directed exceptions. These exceptions will be set forth in the statement of exceptions.

4.19.2 To assure the vehicle is built to current NFPA standards, the apparatus, in its entirety, will be third-party, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition of NFPA 1901. The certification will include: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus.

4.20 **MARKINGS:** All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and designated access paths to destination points will be identified on the customer approval print and are shown as approximate. Actual location(s) will be determined based on materials used and actual conditions at final build. Access paths may pass through hose storage areas and opening or removal of covers or restraints may be required. Access paths may require the operation of devices and equipment such as the aerial device or ladder rack.

4.20.1 A plate that is highly visible to the driver while seated will be provided. This plate will show the overall height, length, and gross vehicle weight rating.

4.20.2 A placard will be affixed in the driver's side area stating the third party agency, the date, the standard and the certificate number of the whole vehicle audit.

4.21 **INSPECTION CERTIFICATE:** a third party inspection certificate for the aerial device will be furnished upon delivery of the aerial device. The certificate will be underwriters laboratories inc. Type 1 and will indicate that the aerial device has been inspected on the production line and after final assembly.

4.21.1 Visual structural inspections will be performed on all welds on both aluminum and steel ladders.

4.21.2 On critical weld areas, or on any suspected defective area, the following tests will be conducted:

1. Magnetic particle inspection will be conducted on steel aerials to assure the integrity of the weldments and to detect any flaws or weaknesses. Magnets will be placed on each side of the weld while iron powder is placed on the weld itself. The powder will detect any crack that may exist. This test will conform to ASTM E709 and be performed prior to assembly of the aerial device.
2. A liquid penetrant test will be conducted on aluminum aerials to assure the integrity of the weldments and to detect any flaws or weaknesses. This test will conform to ASTM E165 and be performed prior to assembly of the aerial device.
3. Ultrasonic inspection will conducted on all aerials to detect any flaws in pins, bolts and other critical mounting components.

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

4.22 **GENERATOR TEST:** If the unit has a generator, the generator will be tested, approved, and certified by underwriters laboratories at the manufacturer's expense. The test results will be provided to the fire department at the time of delivery.

4.23 **BREATHING AIR TEST:** if the unit has breathing air, pierce manufacturing will draw an air sample from the air system and certify that the air quality meets the requirements of NFPA 1989, *standard on breathing air quality for fire and emergency services respiratory protection.*

4.24 **INSPECTION TRIP(S):** the bidder will provide three (3) factory inspection trip(s) for preconstruction mid-point and final inspection customer representative(s). The inspection trip(s) will be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals will be the responsibility of the bidder.

4.25 **PRODUCT CHANGES AND IMPROVEMENTS:** our components and processes, as described in this proposal document, are as accurate as known at the time of bid submission, but are subject to change for the purpose of product or process improvements, or changes in industry standards providing the change does not affect the meaning or definition of the bid specifications.

4.26 **AFTERMARKET SUPPORT WEBSITE:** pierceparts.com will provide pierce authorized dealer access to comprehensive information pertaining to the maintenance and service of their customer's apparatus. This tool will provide the pierce authorized dealer the ability to service and support their customers to the best of their ability with factory support at their fingertips.

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

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

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

4.28 **ELECTRICAL WIRING DIAGRAMS:** One (1) USB drive copy and one (1) paper copy of the electrical wiring diagrams, prepared for the model of chassis and body, will be provided.

4.29

ITEM	Quantity	Description
1	9	Pierce Velocity Ladder Truck

4.29.1 VELOCITY CHASSIS- Chassis provided will be a new, tilt-type custom fire apparatus. The chassis will be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis will be designed and manufactured for heavy-duty service, with adequate strength and capacity for the intended load to be sustained and the type of service required. The chassis will be the manufacturer's first line tilt cab.

4.29.2 WHEELBASE – Minimum 248.50”

4.29.3 GVW RATING – Minimum 70,800.

4.29.4 FRAME - The chassis frame will be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails will have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle. Each rail will have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle. The frame rails will be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

4.29.5 FRAME REINFORCEMENT - A mainframe inverted "I" liner will be provided. It will be heat-treated steel measuring 12.00" x 3.00" x 0.25". Each liner will have a section modulus of 7.795 cubic inches, yield strength of 110,000 psi, and rbm of 857,462 in-lb. Total rbm at wheelbase center will be 3,976,502 in-lb.

4.29.6 The frame liner will be mounted inside of the chassis frame rail and extend the full length of the frame.

4.29.7 FRONT NON DRIVE AXLE - The Oshkosh TAK-4® front axle will be of the independent suspension design with a ground rating of 22,800 lb.

1. Upper and lower control arms will be used on each side of the axle. Upper control arm castings will be made of 100,000-psi yield strength 8630 steel and the lower control arm casting will be made of 55,000-psi yield ductile iron.

2. The center cross members and side plates will be constructed out of 80,000-psi yield strength steel.

3. Each control arm will be mounted to the center section using elastomer bushings. These rubber bushings will rotate on low friction plain bearings and be lubricated for life. Each bushing will also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

4. There will be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

5. The upper control arm will be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

6. Camber at load will be 0 degrees for optimum tire life.

7. The ball joint bearing will be of low friction design and be maintenance free.

8. Toe links that are adjustable for alignment of the wheel to the center of the chassis will be provided.

9. The wheel ends will have little to no bump steer when the chassis encounters a hole or obstacle.

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

11. The axle will have a third party certified turning angle of 45 degrees. Front discharge, front suction, or aluminum wheels will not infringe on this cramp angle.

4.29.8 **FRONT SUSPENSION -** Front Oshkosh TAK-4™ independent suspension will be provided with a minimum ground rating of 22,800 lb.

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

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

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

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

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

4.29.14 FRONT SHOCK ABSORBERS - KONI heavy-duty telescoping shock absorbers will be provided on the front suspension.

4.29.15 FRONT OIL SEALS - oil seals with viewing window will be provided on the front axle.

4.29.16 FRONT TIRES -front tires will be Michelin 425/65R22.50 radials, 20 ply XFE wide base tread, rated for 22,800 lb maximum axle load and 65 mph maximum speed. The tires will be mounted on 22.50" x 12.25" steel disc type wheels with a ten (10)-stud, 11.25" bolt circle.

4.29.17 REAR AXLE - The rear axle will be a Meritor™, Model RT-50-160, tandem axle assembly with a capacity of 52,000 lb. An inter-axle differential, which divides torque evenly between axles, will be provided with an indicator light mounted on the cab instrument panel.

4.29.18 TOP SPEED OF VEHICLE - A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 60 mph.

4.29.19 REAR SUSPENSION - Rear suspension will be a Hendrickson Model FMX 542 EX, air ride with a ground rating of 54,000 pounds. The suspension will have the following features:

1. Outboard vertical mounted heavy-duty shock absorbers
2. Utilizes track bars and torque rods to restrict lateral axle movement and maintain constant pinion angles
3. Super heavy-duty transverse beam to help reduce axle stress while increasing roll stability or resistance to lean
4. Low spring rate air springs for excellent ride quality
5. Dual height control valves to maintain level vehicle from side to side

4.29.20 REAR OIL SEALS- Oil seals will be provided on the rear axle(s).

4.29.21 REAR TIRES - Rear tires shall be eight (8) Michelin 315/80R22.50 radials, load range L, X® WORKS™ Z, rated for 66,160 lb maximum axle load and 65 mph maximum speed. The tires will be mounted on 22.50" x 9.00" steel disc type wheels with a ten (10) stud, 11.25" bolt circle.

4.29.22 TIRE BALANCE - All tires will be balanced with Counteract balancing beads. The beads will be inserted into the tire and eliminate the need for wheel weights.

4.29.23 TIRE PRESSURE MANAGEMENT - There will be a tire pressure management system provided that will monitor each tires pressure and temperature. A 7.00" resistive Control Zone™ touch screen located in the cab instrument panel will indicate each tires position, pressure and temperature. A wireless sensor will be mounted to each wheel for a total of 10 sensors. The system will have three (3) alert levels:

1. Critical Low Pressure Alert
2. Pressure Deviation Alert
3. High Temperature Alert

Each alert will trigger an audible alarm and an indicator light within the gauge to signal the driver of the problem

The system will be covered by a five (5) year parts and labor warranty. Please see warranty document for details.

4.29.24 FRONT HUB COVERS - Stainless steel hub covers will be provided on the front axle. An oil level viewing window will be provided.

4.29.25 REAR HUB COVERS - Stainless steel, high hat, hub covers will be provided on the rear axle hubs.

4.29.26 CHROME LUG NUT COVERS- Chrome lug nut covers will be supplied on front and rear wheels.

4.29.27 MUD FLAPS - Mud flaps with a Pierce logo will be installed behind the front and rear wheels.

4.29.28 WHEEL CHOCKS - There will be one (1) pair of Ziamatic AC-32, aluminum alloy, Quick-Choc wheel blocks provided.

4.29.29 WHEEL CHOCK BRACKETS - There will be one (1) pair of Ziamatic QCH-32-H horizontal mounting wheel chock brackets provided for the Ziamatic AC-32 wheel chocks. The brackets will be mounted under driver side front compartments, use nylon locking nuts to install the brackets.

4.29.30 ELECTRONIC STABILITY CONTROL - A vehicle control system will be provided as an integral part of the ABS brake system from Meritor Wabco.

The system will monitor and update the lateral acceleration of the vehicle and compare it to a critical threshold where a side roll event may occur. If the critical threshold is met, the vehicle control system will automatically reduce engine RPM, engage the engine retarder (if equipped), and selectively apply brakes to the individual wheel ends of the front and rear axles to reduce the possibility of a side roll event.

The system will monitor directional stability through a lateral accelerometer, steer angle sensor and yaw rate sensor. If spinout or drift out is detected, the vehicle control system will selectively apply brakes to the individual wheel ends of the front and rear axles to bring the vehicle back to its intended direction.

4.29.31 ANTI-LOCK BRAKE SYSTEM - The vehicle will be equipped with a Wabco 6S6M, anti-lock braking system. The ABS will provide a six (6) channel anti-lock braking control on both the front and rear wheels. A digitally controlled system that utilizes microprocessor technology will control the anti-lock braking system. Each wheel will be monitored by the system. When any wheel begins to lockup, a signal will be sent to the control unit. This control unit will then reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system will eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

4.29.32 AUTOMATIC TRACTION CONTROL - An anti-slip feature will be included with the ABS. The Automatic Traction Control will be used for traction in poor road and weather conditions. The Automatic Traction Control will act as an electronic differential lock that will not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) will work with the engine ECU, sharing information concerning wheel slip. Engine ECU will use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. A "mud/snow" switch will be provided on the instrument panel. Activation of the switch will allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

4.29.33 BRAKES- The service brake system will be full air type. The front brakes will be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance. The brake system will be certified, third party inspected, for improved stopping distance. The rear brakes will be Meritor™ 16.50" x 7.00" cam operated with automatic slack adjusters. Dust shields will be provided.

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

4.29.35 BRAKE SYSTEM - The brake system will include:

1. Bendix dual brake treadle valve with vinyl covered foot surface.
2. Heated automatic moisture ejector on air dryer.
3. Total air system capacity of 6,653 cubic inches.
4. Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi.
5. Spring set parking brake system.
6. Parking brake operated by a push-pull style control valve.
7. A parking "brake on" indicator light on instrument panel.
8. Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, will be provided with an automatic spring brake application at 40 psi.
9. A pressure protection valve will be provided to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa).
10. 1/4 turn drain valves on each air tank.
11. The air tank will be primed and painted to meet a minimum 750 hour salt spray test.
12. To reduce the effects of corrosion, the air tank will be mounted with stainless steel brackets.

4.29.36 BRAKE SYSTEM AIR DRYER - The air dryer will be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

4.29.37 BRAKE LINES - Color-coded nylon brake lines will be provided. The lines will be wrapped in a heat protective loom in the chassis areas that are subject to excessive heat.

4.29.38 AIR INLET/OUTLET - One (1) air inlet/outlet will be installed with the female coupling located in the driver side lower step well of cab. This system will tie into the "wet" tank of the brake system and include a check valve in the inlet line and an 85 psi pressure protection valve in the outlet line. The air outlet will be controlled by a needle valve.

A mating male fitting will be provided with the loose equipment.

The air inlet will allow a shoreline air hose to be connected to the vehicle. This will allow station air to be supplied to the brake system of the vehicle to insure constant air pressure.

4.29.39 ALL WHEEL LOCK-UP - An additional all wheel lock-up system will be installed which applies air to the front brakes only. The standard spring brake control valve system will be used for the rear.

4.29.40 AUXILLARY BRAKING SYSTEMS - When two (2) separate auxiliary braking systems are installed on a unit they will be programmed or wired to provide separate or simultaneous operation. In this case, it will be the transmission retarder and the Jake Brake. They will be set up so when the retarder comes on, the Jake will activate at the same time.

The Jake will start on deceleration and the transmission retarder will also start on brake application.

4.29.41 U-BOLT GUARD OVER PARKING BRAKE KNOB - There will be one (1) U-bolt type protective guard(s) installed over the "Parking Brake" knob to prevent accidental activation of the brake. The guard will be located on the driver's side.

4.29.42 COLOR CODE RESERVOIRS - The chassis air reservoirs will be painted for easy identification. The supply tank will be black, primary tank will be green, secondary tank will be blue and auxiliary tank (s) will be yellow.

4.29.43 COMPRESSION FITTINGS ONLY - Any nylon tube on the apparatus that is pneumatic will be plumbed with compression type fittings where applicable. Push lock fittings will not be acceptable for any pneumatic nylon tube plumbing.

4.29.44 ENGINE - The chassis will be powered by an electronically controlled engine as described below:
Make - Detroit™

1. Model - DD13®
2. Power - 525 hp at 1625 rpm
3. Torque - 1850 lb-ft at 1075 rpm
4. Governed Speed - Full Load - 1900 rpm Road/2080 rpm Parked PTO
5. Emissions Certification - EPA 2016 (GHG17)
6. Fuel - Diesel
7. Cylinders - Six (6)
8. Displacement - 781 cubic inches (12.8L)
9. Starter - Delco Remy 39MT™

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

4.29.45 HIGH IDLE - A high idle switch will be provided, inside the cab, on the instrument panel, that will automatically maintain a preset engine rpm. The high idle will automatically engage when the parking brake is set and the engine has been idling for 5 minutes. A switch will be installed, at the cab instrument panel, for activation/deactivation override.

The high idle will be operational only when the parking brake is on, the truck transmission is in neutral, and the engine has been idling for 5 minutes. A green indicator light will be provided adjacent to the switch. The light will illuminate when the above conditions are met. The light will be labeled "OK to Engage High Idle".

The high idle circuit will be programmed to allow high idle with the parking brake applied, transmission in neutral and pump in gear.

When the truck transmission is shifted into gear with the high idle on, the high idle will drop out for a safe shift condition.

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

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

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

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

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

4.29.48 ROCKER COVER BOLTS - The rear most bolts on the engine rocker cover will be flat head style. This is in place of the "stud" style provided as standard.

4.29.49 HEAVY DUTY OIL LINE - A heavy duty oil line and fittings will be provided between the engine oil pan and the oil level manifold.

4.29.50 ENGINE AIR INTAKE - An air intake with an ember separator (to prevent road dirt, burning embers, and recirculating hot air from entering the engine) will be mounted at the front of the apparatus, on the passenger side of the engine. The ember separator will be mounted in the air intake with flame retardant, roto-molded polyethylene housing. It will be easily accessible by the hinged access panel at the front of the vehicle.

4.29.51 EXHAUST SYSTEM - The exhaust system will include a diesel particulate filter (DPF) and a selective catalytic reduction (SCR) device to meet current EPA standards. The exhaust system will be stainless steel from the turbo to the inlet of the SCR device and will be 5.00" in diameter.

An insulation wrap will be provided on all exhaust pipe between the turbo and SCR to minimize the transfer of heat to the cab.

The exhaust will terminate horizontally ahead of the right side rear wheels, flush with the body rubrail. Tailpipe will be angled 35 degrees to the rear. A tailpipe diffuser will be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields will be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

4.29.52 RADIATOR - The radiator and the complete cooling system will meet or exceed NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core will be constructed using long life aluminum alloy. The core will be made of aluminum fins, having a serpentine design, brazed to aluminum tubes. The tubes will be brazed to aluminum headers. No solder joints or leaded material of any kind will be acceptable in the core assembly. The radiator core will have a minimum frontal area of 1434 square inches. Supply tank made of glass-reinforced nylon and a return tank of cast aluminum alloy shall be crimped on to the core assembly using header tabs and a compression gasket to complete the radiator core assembly. The radiator will be compatible with commercial antifreeze solutions.

There will be a full steel frame around the entire radiator core assembly. The radiator core assembly will be isolated within the steel frame by rubber inserts to enhance cooling system durability and reliability. The radiator will be mounted in such a manner as to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. The radiator assembly will be isolated from the chassis frame rails with rubber isolators.

The radiator assembly will include an integral deaeration tank permanently mounted to the top of the radiator framework, with a readily accessible remote-mounted overflow tank. For visual coolant level inspection, the radiator will have a built-in sight glass. The radiator will be equipped with a 15 psi pressure relief cap.

A drain port will be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

A heavy-duty fan will draw in fresh, cool air through the radiator. Shields or baffles will be provided to prevent recirculation of hot air to the inlet side of the radiator.

4.29.53 COOLANT LINES - Gates® silicone hoses will be used for all engine/heater coolant lines installed by the chassis manufacturer.

The chassis manufacturer will also use Gates brand hose on other heater, defroster and auxiliary coolant circuits. There will be some areas in which an appropriate Gates product is not available. In those instances, a comparable silicone hose from another manufacturer will be used.

Hose clamps will be stainless steel "constant torque type" to prevent coolant leakage. They will react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

4.29.54 INSULATION WRAP - The lower radiator hose will be wrapped with orange heat resistant insulation to prevent damage to electrical harness.

4.29.55 FUEL TANK - A 75 gallon fuel tank will be provided and mounted at the rear of the chassis. The tank will be constructed of 12-gauge, hot rolled steel. It will be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank will be mounted with stainless steel straps.

A .75" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be located on the left hand and right hand side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Ultra Low Sulfur - Diesel Fuel Only."

A .50" diameter vent will be provided running from top of tank to just below fuel fill inlet.

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

All fuel lines will be of the wire braided type. Reusable fittings will be provided.

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

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

A fill inlet will be provided and marked "Diesel Exhaust Fluid Only". The fill inlet will be located below the air bottle storage behind a common door on the driver side of the vehicle.

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

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

4.29.57 AUXILIARY FUEL PUMP - An auxiliary electric fuel pump will be added to the fuel line for priming the engine. A switch located on the cab instrument panel will be provided to operate the pump.

4.29.58 FUEL COOLER - An air to fuel cooler will be installed in the engine fuel return line. The fuel filler cap will have a retaining chain and holder provided on the fuel fill door.

4.29.59 TRANSMISSION -An Allison 5th generation, Model EVS 4500PR, electronic, torque converting, automatic transmission with retarder will be provided. The transmission will be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display will indicate when service is due.

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

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

The transmission retarder control will be activated 33 percent by release of the accelerator pedal or 66 percent by slight application of the brake pedal, or 100 percent by heavy application of brake pedal. A second on/off switch is provided to activate and deactivate the auto apply portion.

The transmission will have the 1600 ft. lb. torque (medium) spring setting for retardation force.

The transmission retarder will have a master "on/off" switch on the instrument panel. A red indicator light will be provided to warn that the transmission is being overworked.

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

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

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

The transmission ratio will be: 1st - 4.70 to 1.00, 2nd - 2.21 to 1.00, 3rd - 1.53 to 1.00, 4th - 1.00 to 1.00, 5th - 0.76 to 1.00, 6th - 0.67 to 1.00, R - 5.55 to 1.00.

4.29.61 TRANSMISSION COOLER -An externally mounted Modine bar plate transmission oil cooler will be provided using engine coolant to control the transmission oil temperature. The internal bar plates will be constructed of stainless steel. The cooler's housing will be constructed of 1020 steel, coated to protect from corrosion. The cooler will be tagged with information including OEM part number, vendor serial number and date / lot code.

An externally mounted Modine bar plate transmission oil cooler will be provided using engine coolant to control the transmission retarder oil temperature. The internal bar plates will be constructed of stainless steel. The cooler's housing will be constructed of 1020 steel, coated to protect from corrosion. The cooler will be tagged with information including OEM part number, vendor serial number and date / lot code.

4.29.62 DOWNSHIFT MODE (w/engine brake) - The transmission will be provided with an aggressive downshift mode. This will provide earlier transmission downshifts to 2nd gear from 6th gear, resulting in improved engine braking performance.

4.29.63 DRIVELINE - Drivelines will be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints. The shafts will be dynamically balanced before installation. A splined slip joint will be provided in each driveshaft. The slip joint will be coated with Glidecoat® or equivalent.

4.29.64 GREASE SHIELD - The drive shaft slip joint requires a grease shield to prevent grease from being thrown against the frame wiring harness.

4.29.65 PAINT PUMP TRANSMISSION AND DRIVE TRANSMISSION OUTPUT YOKES - The pump transmission and drive transmission output yokes will be brush painted the same color as the driveshafts. The yokes will be brush painted, not spray painted. Paint color is job color.

4.29.66 STEERING - Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

A tilt and telescopic steering column will be provided to improve fit for a broader range of driver configurations.

Standard steering gear oil to be replaced with 15W40 CJ-4 motor oil.

4.29.67 STEERING WHEEL - The steering wheel will be 18.00" in diameter, have tilting and telescoping capabilities, and a 4-spoke design.

4.29.68 LOGO AND CUSTOMER DESIGNATION ON DASH - The dash panel will have an emblem containing the Pierce logo and customer name. The emblem will have three (3) rows of text for the customer's department name. There will be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

The first row of text will be: San Antonio

The second row of text will be: Fire

The third row of text will be: Department

4.29.69 TAG/LABEL - The following one (1) tags or labels will be provided DS in nose cone on the chassis or cab. The tag/label will be configured and read “STEERING FLUID 15W40 CJ-4 OIL MOTOR OIL.”

4.29.70 BUMPER - A one (1)-piece, 0.25" thick steel channel bumper, a minimum 12.00" high will be attached to the front of the chassis frame. The bumper will be painted job color.

A 9.00" formed steel channel will be mounted directly behind bumper for additional strength.

The bumper will be extended 10.00" from front face of cab.

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

4.29.72 LIFT AND TOW MOUNTS WITH TOW EYES - Mounted to the frame extension will be lift and tow mounts. Incorporated in the mounts will be two (2) painted steel tow eyes. The lift and tow mounts will be designed and positioned to adapt to certain tow truck lift systems. The tow eyes will not be used for lifting of the apparatus.

The inner and outer edges of the tow eyes will have a 0.25" radius.

The lift and tow mounts with eyes will be painted orange.

4.29.73 TOW EYES - Two (2) cutouts will be provided in the front face of the bumper to allow two (2) Chicago style tow eyes to extend out the front. The inner and outer edges of the utility eyes will have a 0.25 radius.

The tow eyes will be designed and positioned to allow up to a 6,000 pound straight horizontal pull in line with the centerline of the vehicle. The tow eyes will not be used for lifting of the apparatus.

The utility eyes will be painted red.

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

4.29.75 CAB - The Velocity cab will be designed specifically for the fire service and will be manufactured by Pierce Manufacturing. To provide quality at the source and single source customer support, the cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

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

2. The cab will have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts) and rear wall areas. The A-pillar will be constructed of 0.25" heavy wall extrusions joined by a solid A356-T6 aluminum joint casting. The B-pillar and C-pillar will also be constructed from 0.25" heavy wall extrusions. The rear wall will be constructed of two (2) 4.00" x 2.00" outer aluminum extrusions and two (2) 3.00" x 2.00" inner aluminum extrusions. All main vertical structural members will run from the floor to 7.50" x 3.50" x 0.125" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.75" thick corner casting at each of the front corners of the roof assembly.

3. The front of the cab will be constructed of a 0.25" thick firewall, covered with a 0.125" front skin (for a total thickness of 0.38"), and reinforced with 24.50" wide x 10.00" deep x 0.50" thick supports on each side of the engine tunnel. The cross-cab support will be welded to the A-pillar, 0.25" firewall, and engine tunnel, on the left and right sides.

4. The cab floors will be constructed of 0.1875" thick aluminum plate and reinforced at the firewall with an additional 0.25" thick cross-floor support providing a total thickness of 0.44" of structural material at the front floor area. The front floor area will also be supported with three (3) 0.50" plates bolted together that also provides the mounting point for the cab lift. This tubing will run from the front of the cab to the 0.1875" thick engine tunnel, creating the structure to support the forces created when lifting the cab.

5. The cab will be a full-tilt style. A 3-point cab mount system with rubber isolators will improve ride quality by isolating chassis vibrations from the cab.

6. The crew cab will be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

7. The forward cab section will have an overall height (from the cab roof to the ground) of approximately 102.00". The crew cab section will have a 10.00" raised roof, with an overall cab height of approximately 112.00". The raised portion will start at the most forward point of the B-pillar and continue rearward to the back of the cab. The overall height listed will be calculated based on a truck configuration with the lowest suspension weight ratings, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension will increase the overall height listed.

8. The raised roof section of the crew cab will have a 58.00" wide x 10.00" high square notch in the center section of the roof. This will allow the aerial device to be bedded in the same location as a non-raised roof.

9. The cab will have an interior width of not less than 93.50". The driver and passenger seating positions will have a minimum 24.00" clear width at knee level.

10. To reduce injuries to occupants in the seated positions, proper head clearance will be provided. The floor-to-ceiling height inside the forward cab will be no less than 60.25". The floor-to-ceiling height inside the crew cab will be no less than 52.95" in the center position and 68.75" in the outboard positions.

11. The crew cab will measure a minimum of 57.50" from the rear wall to the backside of the engine tunnel (knee level) for optimal occupant legroom.

4.29.76 INTERIOR CAB INSULATION - The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab will be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling.

4.29.77 FENDER LINERS - Full-circular, aluminum inner fender liners in the wheel wells will be provided.

4.29.78 PANORAMIC WINDSHIELD - A one (1)-piece, safety glass windshield with more than 2,802 square inches of clear viewing area will be provided. The windshield will be full width and will provide the occupants with a panoramic view. The windshield will consist of three (3) layers: the outer light, the middle safety laminate, and the inner light. The 0.114" thick outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage. The inner light will provide yet another chip resistant layer. The cab windshield will be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

4.29.79 WINDSHIELD WIPERS - Three (3) electric windshield wipers with a washer, in conformance with FMVSS and SAE requirements, will be provided. The wiper blades will be 21.65" long and together will clear a minimum of 1,783 square inches of the windshield for maximum visibility in inclement weather.

The windshield washer fluid reservoir will be located at the front of the vehicle and be accessible through the access hood for simple maintenance.

4.29.80 FAST SERVICE ACCESS FRONT TILT HOOD - A full-width access hood will be provided for convenient access to engine coolant, steering fluid, wiper fluid, cab lift controls, headlight power modules, and ember separator. The hood will also provide complete access to the windshield wiper motor and components. The hood will be contoured to provide a sleek, automotive appearance. The hood will be constructed of two (2) fiberglass panels bonded together and will include reinforcing ribs for structural integrity. The hood will include air cylinders to hold the hood in open and closed positions, and a heavy duty latch system that will meet FMVSS 113 (Hood Latch System). The spring-loaded hood latch will be located at the center of the hood with a double-action release lever located behind the Pierce logo. The two (2)-step release requires the lever first be pulled to the driver side until the hood releases from the first latch (primary latch) then to the passenger side to fully release the hood (secondary latch).

4.29.81 ENGINE TUNNEL - To provide structural strength, the engine tunnel sidewalls will be constructed of 0.50" aluminum plate that is welded to both the 0.25" firewall and 0.38" heavy wall extrusion under the crew cab floor. To maximize occupant space, the top edges will be tapered.

The back of the engine tunnel will be no higher than 16.25" off the crew cab floor.

The engine tunnel will be insulated on both sides for thermal and acoustic absorption. The underside of the tunnel will be covered with 1.00" thick polyether foam that is reinforced with an aluminized face. Thermal rating for this insulation will be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The insulation will keep noise (dBA) levels at or lower than the specifications in the current edition of the NFPA 1901 standards.

4.29.82 CAB REAR WALL EXTERIOR COVERING - The exterior surface of the rear wall of the cab will be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cab is lowered.

4.29.83 CAB LIFT - A hydraulic cab lift system will be provided, consisting of an electric-powered hydraulic pump, fluid reservoir, dual lift cylinders, remote cab lift controls and all necessary hoses and valves. The hydraulic pump will have a backup manual override, for use in the event of an electrical failure.

1. The cab lift controls will be located at the driver side front of the cab, easily accessible under the full width front access hood. The controls will include a permanently mounted raise/lower switch. For enhanced visibility during cab tilt operations, a remote control tether with on/off switch will be supplied on a coiled cord that will extend from 2.00' (coiled) to 6.00' (extended).

2. The cab will be capable of tilting 42 degrees and 80 degrees with crane assist to accommodate engine maintenance and removal. The cab pivots will be located 46.00" apart to provide stability while tilting the cab.

3. The rear of the cab will be locked down by a two (2)-point, automatic, hydraulic, double hook mechanism that fully engages after the cab has been lowered (self-locking). The dual 2.25" diameter hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the cab is in the tilt position.

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

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

4.29.85 GRILLE - A bright finished aluminum mesh grille screen, inserted behind a formed bright finished grille surround, will be provided on the front center of the cab, and will serve as an air intake to the radiator.

4.29.86 SCUFFPLATE - A treadplate scuffplate will be installed on the top edge of both rear facing seat risers. The scuffplate will be flanged to the front to protect the painted edge of the seat riser.

4.29.87 FRONT CAB TRIM - Bright finished wrap-around housings will be provided on each side of the front cab face for mounting of the headlights and front directional lights. The housings will mate up to the side edge of the forward grille, and then extend around the front corners of the cab rearward, providing for a streamlined automotive appearance.

4.29.88 MIRRORS - Ramco, Model 6001FFHR-750HR, polished aluminum 9.25" wide x 13.50" high mirrors, with full flat glass section, will be mounted on each side of the front cab corner. A convex section will be bolted to the top of each mirror.

The flat glass in each mirror will be heated and adjustable with remote controls that are convenient to the driver.

The convex section in each mirror will be heated and adjustable with remote controls.

4.29.89 MIRROR (SIDE VIEW) - Exterior officer's side view mirror will be provided on the cab. Mirror will allow passenger to view the side cab blind spot and the area to the rear of the truck.

Mirror will be located on the cab door, mounted on an adjustable arm. Mirror head will be an 8.00" convex mirror.

4.29.90 FRONT CROSS VIEW MIRROR - There will be one (1) 8.00" diameter eyeball mirror provided on the passenger side front corner of the cab. It will be mounted high, above the windshield. The mirror will provide the driver with a view of the front bumper and the front of the truck.

The mirror housing, tubing, clamps and hardware will be constructed of corrosion resistant stainless steel.

Mirror head will be K-10, EB50S-S, 8.00" stainless steel housing with three (3) arms.

A 4.00" riser will be provided between the mirror body and support arm on passenger side only.

4.29.91 CAB DOORS - The forward cab and crew cab doors will be the half-height style door. To enhance entry and egress to the cab, the forward cab doors will be a minimum of 43.59" wide x 64.71" high. The crew cab doors will measure a minimum of 37.87" wide x 73.75" high.

1. The forward cab and crew cab doors will be constructed of extruded aluminum with a nominal material thickness of 0.125". The exterior door skins will be constructed from 0.090" aluminum.

2. The forward cab door windows will include a 7.50" high x 10.00" wide drop area at the front to enhance visibility.

3. A customized, vertical, pull-down type door handle will be provided on the exterior of each cab door. The exterior handle will be designed specifically for the fire service to prevent accidental activation, and will provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands. Each door will also be provided with an interior flush, open style paddle handle that will be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles will provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

4. The cab doors will be provided with both interior (rotary knob) and exterior (keyed) locks exceeding FMVSS standards. The keys will be Model 751. The locks will be capable of activating when the doors are open or closed. The doors will remain locked if locks are activated when the doors are opened, then closed.

5. A full length, heavy duty, stainless steel, piano-type hinge with a 0.38" pin and 11 gauge leaf will be provided on all cab doors. There will be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

6. A chrome grab handle will be provided on the inside of each cab and crew cab door.

7. The cab steps at each cab door location will be located below the cab doors and will be exposed to the exterior of the cab.

4.29.92 CAB DOOR PANELS - The inner cab door panels will be constructed out of brushed stainless steel. The cab door panels will be removable.

4.29.93 RECESSED POCKET WITH ELASTIC COVER - To provide organized storage (clutter control) in the cab for miscellaneous equipment, the cab interior will be provided with a recessed storage pocket. The pocket will be 5.63" wide x 2.00" high x 6.00" deep. The pocket will be provided with a perforated elastic material cover to secure the equipment in the pocket. The pocket will be installed in location 7 on the driver side console.

4.29.94 ELECTRIC WINDOW CONTROLS - Each cab entry door will be equipped with an electrically operated tempered glass window. A window control panel will be located on the door panel within easy reach of the respective occupant. Each switch will allow intermittent or auto down operation for ease of use. Auto down operation will be actuated by holding the window down switch for approximately 1 second. The driver control panel will contain a control switch for each cab door's window. All other door control panels will contain a single switch to operate the window within that door.

The window switches will be connected directly to the battery power. This allows the windows to be raised and lowered when the battery switch is in the off position.

4.29.95 ELECTRIC CAB DOOR LOCKS - The front driver and passenger doors will have a door lock master switch (custom designed rotary lock knob) built into the interior door latch that will control all front and rear side exit door locks. Each rear cab door will have its own lock control. Each door will have a keyed exterior lock mechanism built into the door handle assembly.

1. There will be one (1) concealed switch on the exterior of the cab, located under the front full width service access panel, that operates the cab door locks.

2. The lock system will include two (2) key FOBs that allow for keyless entry into the vehicle. The key FOB system will use code hopping technology for high security and be FCC part 15 compliant.

4.29.96 DUAL STEPS - A dual step will be provided below each cab and crew cab door. The steps will be designed with a grip pattern punched into bright aluminum treadplate material providing support, slip resistance, and drainage. The steps will be a bolt-on design and provide a 24.00" wide x 7.00" deep stepping surface. The step design raises the middle step higher and closer to the cab floor, resulting in a 12.00" distance from the step to cab floor in the cab and a 13.50" distance from the step to cab floor in the crew cab. Stepping distances from the ground to first step will be 16.50" and from first step to middle step will be 12.00".

The first step will be lit by a white 12 volt DC LED light provided on the step.

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

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

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

4.29.98 FENDER CROWNS - Rubber fender crowns will be provided around the cab wheel openings. Crowns will be black.

4.29.99 CREW CAB WINDOWS - One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the front cab door. The windows will be sized to enhance light penetration into the cab interior. The windows will measure 20.00" wide x 20.50" high.

4.29.100 WINDOWS INTERIOR TRIM - For improved aesthetics, the cab side windows will include a vacuum formed ABS interior trim panel.

4.29.101 STORAGE COMPARTMENT - Provided under the forward facing crew cab seats will be a transverse compartment.

1. The compartment will be open top to bottom. There will be no dividers. The upper section will be 9.50" wide x 13.12" high x 26.25" deep (driver side) and 24.00" deep (passenger side). The top 7.38" of the upper compartment will be full width (transverse) of the crew cab. The lower section on both sides will be 9.50" wide x 16.50" high x 22.00" deep. The compartment will extend from the bottom of the cab to top of the seat riser.

2. There will be an access door on both sides of the cab with double pan doors.

3. Doors will be latched with recessed, polished stainless steel D-ring handles and Eberhard 106 locks. The doors will include gas shock style positive door holders. A magnetic style switch will be provided to activate the door open warning system.

4. There will be one (1) drop down door, single pan construction, on the forward face of the seat riser.

5. The drop down door will include two (2) flush quarter turn latches.

6. The cab side access doors will be painted to match the cab exterior and the drop down door inside the cab will be constructed of polished stainless steel.

7. The compartment interior will be [Finish, Exterior Cab Compt].

8. Compartment Light - There shall be four (4) white LED strip lights, one (1) each left side of lower and upper exterior compartment door opening. The lights shall be controlled by an automatic door switch.

4.29.102 SPECIAL FASTENERS (under side of cab insulation) - All insulation in the cab engine tunnel and under the cab and crew cab floor will be held in place by mechanical fasteners and large washers.

4.29.103 CAB INSULATION - The cab insulation in the engine compartment will have all open edges sealed with caulk.

4.29.104 MOUNTING PLATE ON ENGINE TUNNEL - Equipment installation provisions will be installed on the engine tunnel.

A .188" smooth aluminum plate will be bolted to the top surface of the engine tunnel. The plate will extend from behind the instrument panel console, down the taper in the tunnel and terminate at the rear of the storage compartment mounted to the rear of the engine tunnel. The rear horizontal surface of the tunnel will not be covered. The front of the plate will be flanged 45 degrees downward to prevent items from rolling underneath it. The front horizontal surface will be 10.00" from the front flange to the taper down the engine tunnel. This front surface will not follow the profile of the engine tunnel. The plate will be spaced off the engine tunnel .75" to allow for wire routing below the plate.

The mounting surface will be painted to match the cab interior.

4.29.105 MOUNTING PLATE(S) - There will be three (3)Full size of the EMS compt. 0.188" aluminum mounting plate(s) provided and installed All rear EMS Compts.. The mounting surface will be painted to match the cab interior. The plates(s) will be mounted on .50" spacer stand-offs.

4.29.106 CAB INTERIOR - With safety as the primary objective, the wrap-around style cab instrument panel will be designed with unobstructed visibility to instrumentation. The dash layout will provide the driver with a quick reference to gauges that allows more time to focus on the road. Interior Cab shall be equipped with the following:

1. The center console will be a high impact ABS polymer and will be easily removable for access to the defroster. The center console will include louvers strategically located for optimal air flow and defrost capability to the windshield.

2. The passenger side dashboard will be constructed of painted aluminum for durability and low maintenance. For enhanced versatility, the passenger side dash will include a flat working surface.

3. To provide optional (service friendly) control panels, switches and storage modules, a painted aluminum overhead console will also be provided.

4. To complete the cab front interior design, painted aluminum modesty panels will be provided under the dash on both sides of the cab. The driver side modesty panel will provide mounting for the battery switch and diagnostic connectors, while the passenger side modesty panel provides a glove box, and ground access to the main electrical distribution panel via quick quarter turn fasteners.

5. To provide a deluxe automotive interior, the engine tunnel, side walls and rear wall will be covered by a leather grain vinyl that is resistant to oil, grease, and mildew.

6. The headliner will be installed in both forward and rear cab sections. The headliner panel will be a composition of an aluminum panel covered with a sound barrier and upholstery.

7. The cab structure will include designated raceways for electrical harness routing from the front of the cab to the rear upper portion of the cab. Raceways will be extruded in the forward door frame, floor, walls and overhead in the area where the walls meet the ceiling. The raceways located in the floor will be covered by aluminum extrusion, while the vertical and overhead raceways will be covered by painted aluminum covers. The raceways will improve harness integrity by providing a continuous harness path that eliminates wire chafing and abrasion associated with exposed wiring or routing through drilled metal holes. Harnesses will be laid in place.

4.29.107 CAB INTERIOR UPHOLSTERY - The cab interior upholstery will be dark silver gray. All cab interior materials will meet FMVSS 302 (flammability of interior materials).

4.29.108 CAB INTERIOR PAINT - A rich looking interior will be provided by painting all the metal surfaces inside the cab fire smoke gray, vinyl texture paint.

4.29.109 CAB FLOOR - The cab and crew cab floor areas will be covered with Polydamp™ acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a 0.25" thick closed cell foam (no water absorption) which offers a sound dampening material for reducing sound levels.

4.29.110 CAB DEFROSTER - To provide maximum defrost and heating performance, a 54,961 BTU heater-defroster unit with 558 SCFM of air flow will be provided inside the cab. The defroster unit will be strategically located under the center forward portion of the instrument panel. For easy access, a removable metal cover will be installed over the defroster unit. The defroster will include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the 1-piece windshield. The defroster ventilation will be built into the design of the cab dash instrument panel and will be easily removable for maintenance. The defroster will be capable of clearing 98 percent of the windshield and side glass when tested under conditions where the cab has been cold soaked at 0 degrees Fahrenheit for 10 hours, and a 2 ounce per square inch layer of frost/ice has been able to build up on the exterior windshield. The defroster system will meet or exceed SAE J382 requirements.

The heater-defroster will be controlled by an integral electronic control panel. The defroster control panel will allow the driver to control heat flow to the windshield. The control panel will include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel will include highly visible, progressive LED indicators for both fan speed and temperature.

4.29.111 AIR CONDITIONING - Due to the large space inside the cab, a high-performance, customized air conditioning system will be furnished. A 19.10 cubic inch compressor will be installed on the engine. Air Conditioning shall be equipped with the following:

1. The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 64 degrees Fahrenheit in the forward section of the cab, and 69 degrees Fahrenheit in the rear section of the cab, at 50 percent relative humidity within 30 minutes. The cooling performance test will be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

2. A roof-mounted condenser with a 63,000 BTU output that meets and exceeds the performance specification will be installed on the cab roof. The condenser cover and mounting legs to be painted white as provided by manufacturer.

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

4. The evaporator unit will have a 49,000 BTU (4.08 tons) rating that meets and exceeds the performance specifications.

5. Adjustable air outlets will be strategically located on the evaporator cover per the following:

    - Four (4) will be directed towards the drivers location
    - Four (4) will be directed towards the officers location
    - Eight (8) will be directed towards crew cab area

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

7. The air conditioner will be controlled by dual zone integral electronic control panels for the heater, defroster and air conditioner. The cab control panel will be located in the center console. For ease of operation, the control panels will include variable adjustment for temperature and fan control.

4.29.112 INTERIOR CAB INSULATION - The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab will be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling. Headliners will be constructed from a 0.20" high density polyethylene corrugated material. Each headliner will be wrapped with a 0.25" thick foil faced poly damp low emissivity foam insulation barrier for acoustic and thermal control.

Designed for maximum sound absorption and thermal insulation, the rear cab wall will be insulated with a 1.50" thick open cell acoustical foam. The thermal protection of the foam will provide and R-value of 4 per 1.00" thickness.

4.29.113 SPECIAL DRAIN TUBES - Two (2) condensate drain tubes will be provided for the air conditioning evaporator. The drip pan will have two (2) drain tubes plumbed separately to allow for the condensate to exit the drip pan.

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

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

4.29.115 GRAB HANDLE - A black rubber covered grab handle will be mounted on the door post of the driver side cab and passenger door to assist in entering the cab. The grab handle will be securely mounted to the post area between the door and windshield. A long rubber grab handle will be mounted on the dash board in front of the officer.

4.29.116 ENGINE COMPARTMENT LIGHTS - There will be one (1) Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEC, chrome flange kit(s) installed under the cab to be used as engine compartment illumination. These light(s) will be activated automatically when the cab is raised.

4.29.117 ACCESS TO ENGINE DIPSTICKS - For access to the engine oil and transmission fluid dipsticks, there will be a door on the engine tunnel, inside the crew cab. The door will be on the rear wall of the engine tunnel, on the vertical surface. The door will be 17.75" wide x 12.75" high and be flush with the wall of the engine tunnel.

The engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling. An additional port will be provided for filling the engine oil.

The door will have a rubber seal for thermal and acoustic insulation. One (1) flush latch will be provided on the access door.

4.29.118 MAP BOX - One (1) long map box with two (2) partitions will be installed to create a three (3) bin box open from top. The overall map box size will be 4 wide x 45 long x 8 deep and will then be divided into three (3) equal bins by use of permanent partitions.

1. The map box will be constructed of .125" aluminum and will be painted to match the cab interior.

2. There will be a quantity of one (1).

3. The map box will Mounted on forward wall of center EMS cabinet between driver and officer above the engine tunnel. Locate the top of the map box 3" down from the top of the cabinet, centered L/R.

4.29.119 CAB SAFETY SYSTEM - The cab will be provided with a safety system designed to protect occupants in the event of a side roll or frontal impact, and will include the following:

1. A supplemental restraint system (SRS) sensor will be installed on a structural cab member behind the instrument panel. The SRS sensor will perform real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a side roll or frontal impact event.

2. A slave SRS sensor will be installed in the cab to provide capacity for eight (8) crew cab seating positions.

3. A fault-indicating light will be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.

4. A driver side front air bag will be mounted in the steering wheel and will be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt.

5. A passenger side knee bolster air bag will be mounted in the modesty panel below the dash panel and will be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt.

6. Air curtains will be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.

7. Suspension seats will be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.

8. Seat belts will be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

4.29.120 FRONTAL IMPACT PROTECTION - The SRS system will provide protection during a frontal or oblique impact event. The system will activate when the vehicle decelerates at a predetermined G force known to cause injury to the occupants. The cab and chassis will have been subjected, via third party test facility, to a crash impact during frontal and oblique impact testing. Testing included all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspensions components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing provided configuration specific information used to optimize the timing for firing the safety restraint system. The sensor will activate the pyrotechnic devices when the correct crash algorithm, wave form, is detected.

1. The SRS system will deploy the following components in the event of a frontal or oblique impact event:

2. Driver side front air bag

3. Passenger side knee bolster air bag

4. Air curtains mounted in the outboard bolster of outboard seat backs

5. Suspension seats will be retracted to the lowest travel position

6. Seat belts will be pre-tensioned to firmly hold the occupant in place

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

1. The SRS system will deploy the following components in the event of a side roll:
2. Air curtains mounted in the outboard bolster of outboard seat backs
3. Suspension seats will be retracted to the lowest travel position
4. Seat belts will be pre-tensioned to firmly hold the occupant in place

4.29.122 SEATING CAPACITY - The seating capacity in the cab will be five (5).

4.29.123 DRIVER SEAT - A Pierce PS6® seat will be provided in the cab for the driver. The seat design will be a cam action type with air suspension. For increased convenience, the seat will include electric controls to adjust the rake (15 degrees), height (1.12" travel) and horizontal (7.75" travel) position. Electric controls will be located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have a reclining back, adjustable from 20 degrees back to 45 degrees forward. Providing for maximum comfort, the seat back will be a high back style with manual lumbar adjustment lever, for lower back support, and will include minimum 7.50" deep side bolster pads for maximum support. The lumbar adjustment lever will be easily located at the lower outboard position of the seat cushion. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control).

1. The seat will include the following features incorporated into the side roll protection system:
2. Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
3. A suspension seat safety system will be included. When activated in the event of a side roll, this system will pretension the seat belt and retract the seat to its lowest travel position.
4. The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

4.29.124 OFFICER SEAT - A Pierce PS6® seat will be provided in the cab for the passenger. The seat will be a cam action type with air suspension. For increased convenience, the seat will include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not belted.

1. The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.
2. The seat will include the following features incorporated into the side roll protection system:
3. Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
4. A suspension seat safety system will be included. When activated, this system will pretension the seat belt and then retract the seat to its lowest travel position.
5. The seat will be furnished with a 3-point, shoulder type seat belt. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

4.29.125 REAR FACING DRIVER SIDE EMS COMPARTMENT - A rear facing EMS compartment will be provided in the crew cab at the driver side outboard position. The compartment will be mounted 4.50" off the edge of the seat riser.

1. The compartment will be 20.00" wide x 30.00" high x 25.00" deep with one (1) Amdor roll up door, non-locking, with white finish, radius track style. That is, it will travel over the top and down the back of the compartment. Front top corners of the compartment will be radiused. This will allow access through the front and top section of the compartment.

2. The compartment will be constructed of smooth aluminum and painted to match the cab interior. A shield will be installed to keep items in this compartment from falling into the door tracking area and jamming the door.

3. Compartment Light - There will be one (1) white LED strip light installed on the left side of the compartment opening. The lights will be controlled by an automatic door switch.

4.29.126 STORAGE COMPARTMENT - A rear facing compartment will be provided in the crew cab on the rear of the engine tunnel. The compartment will mount flush with the rear edge of the tunnel.

1. The compartment will be approximately 47.50" wide x 20.50" high. The compartment will be approximately 17.00" deep at the bottom and 20.00" deep at the top. In place of a door, the compartment will have a heavy black nylon webbing made of 1.00" nylon strap with a 2.00" box pattern. Side-release buckles will be used to fasten all sides of the opening.

2. A permanent vertical partition will be provided on the left side of the compartment. The partition will be mounted to provide an 18.00" wide clear opening on the left side of the compartment. An adjustable shelf will be provided on the right side of the partition. Each shelf will be constructed of 0.090" aluminum with a 1.25" up-turned lip. Shelving will be infinitely adjustable by means of a threaded tightener sliding in a track.

3. The compartment will be constructed of smooth aluminum and painted to match the cab interior.

4. Compartment Light - There will be two (2) white LED strip lights installed, one (1) each side of the compartment opening. The lights will be controlled by a switch on the exterior of the compartment.

4.29.127 STORAGE COMPARTMENT - A rear facing radio storage compartment will be provided in the crew cab at the passenger side outboard position. The compartment will be mounted 4.50" off the edge of the seat riser.

1. The compartment will be 20.00" wide x 30.00" high x 23.00" deep and will be provided with an access panel that screws into place. There will be ventilation holes provided in the access panel.

2. The compartment will be constructed of smooth aluminum, and painted to match the cab interior.

4.29.128 FORWARD FACING DRIVER SIDE OUTBOARD SEAT - There will be one (1) forward facing Pierce PS6® foldup seat provided at the driver side outboard position in the crew cab. To provide improved ride comfort, and maximize accessibility to the crew cab, the seat will be provided with 17.00" deep foam cushions, and the seat back will be provided with 0 degree fixed recline angle. To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle, that will activate an alarm indicating a seat is occupied but not buckled.

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

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

3. Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.

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

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

6. The seat will be moved approximately 3.00" inboard from the standard location.

4.29.129 FORWARD FACING CENTER SEAT - There will be one (1) forward facing, Pierce PS6® seat provided at the center position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

1. The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

2. The seat will include the following feature incorporated into the side roll protection system:

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

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

4.29.130 FORWARD FACING PASSENGER SIDE OUTBOARD SEAT - There will be one (1) forward facing Pierce PS6® foldup seat provided at the passenger side outboard position in the crew cab. To provide improved ride comfort, and maximize accessibility to the crew cab, the seat will be provided with 17.00" deep foam cushions, and the seat back will be provided with 0 degree fixed recline angle. To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle, that will activate an alarm indicating a seat is occupied but not buckled.

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

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

3. Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.

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

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

6. The seat will be moved approximately 3.00" inboard from the standard location.

4.29.131 SHELVING - There will be one (1) shelf provided. Each shelf will be constructed of 0.090" aluminum with a 1.25" up-turned lip. Shelving will be infinitely adjustable by means of a threaded tightener sliding in a track.

The location will be one (1) shelf in the center rear facing EMS cabinet.

4.29.132 CAB COMPARTMENT LIGHTING - There will be one (1) Pierce 20.00" LED compartment light strip(s) provided in passenger side rear facing EMS compartment. Mount the switch like 29674.

Opening the compartment door shall automatically turn compartment lighting on.

4.29.133 SEAT UPHOLSTERY - All seat upholstery will be black Turnout Tuff material.

4.29.134 AIR BOTTLE HOLDERS - All SCBA type seats in the cab will have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket will include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp will constrain the SCBA bottle in the seat and will exceed the NFPA standard of 9G. Bracket designs with manual restraints (belts, straps, buckles) that could be inadvertently left unlocked and allow the SCBA to move freely within the cab during an accident, will not be acceptable.

There will be a quantity of four (4) SCBA brackets.

4.29.135 SEAT BELTS - All seating positions in the cab and crew cab will have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length will meet or exceed the current edition of NFPA 1901 and CAN/ULC - S515 standards.

The 3-point shoulder type seat belts will also include the ReadyReach D-loop assembly to the shoulder belt system. The ReadyReach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

4.29.136 SHOULDER HARNESS HEIGHT ADJUSTMENT - All seating positions furnished with 3-point shoulder type seat belts will include a height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter.

A total of five (5) seating positions will have the adjustable shoulder harness.

4.29.137 HELMET STORAGE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 14.1.7.4.1 requires a location for helmet storage be provided. There is no helmet storage on the apparatus as manufactured. The fire department will provide a location for storage of helmets.

4.29.138 CAB DOME LIGHTS - There will be four (4) Whelen, Model 60C*EGCS, 6.00" round dual LED dome lights provided. Two (2) lights will be mounted above the inside shoulder of the driver and officer and two (2) lights will be installed and located, one (1) on each side of the crew cab.

1. The color of the LED's will be red and white.
2. The white LED's will be controlled by the lens switch.
3. The color LED's will be controlled by the lens switch.

4.29.139 ADDITIONAL DOME LIGHTS - There will be one (1) 6.00" round Whelen, Model 60CREGCS white and red LED dome light installed in the cab located drivers side light centered in the ceiling panel in front of the 2 forward facing seats.

1. The white light will be controlled by the door switch and a switch on the light.
2. The red light will be controlled by the switch on the light.

4.29.140 OVERHEAD MAP LIGHTS - There will be two (2) Peterson, Model M371S, rectangular LED adjustable map lights installed in the cab:

1. One (1) overhead in front of the driving position.

2. One (1) overhead in front of the passenger's position.

3. Each light will include a switch on the light housing.

4. The light switches will be energized when the spare wire cut off switch is on.

4.29.141 HAND HELD SPOTLIGHT - There will be four (4) Streamlight, Model Survivor 90503, LED flashlights with chargers and AC/DC chords provided and installed one each side in the front of the cab to the rear of the cab door on the angled portion (nuts on the outside) and two in the rear crew cab area on the wire cover at the ceiling, match 29756 EXACTLY.

4.29.142 POWER TO HAND HELD SPOTLIGHT - The 12 volt DC power to recharge the hand lights will be from the spare wire fuse panel located in the in service out of service switch, match 29756.

4.29.143 HAND HELD LIGHT - There will be two (2) lights Streamlight E-Spot, LiteBox Vehicle Mount Systems, Model 45855, LED hand held flashlights with an orange thermoplastic body provided.

1. The location will be mounted on top of the DS EMS compartment, match 29756 as close as possible.

2. The system will include the hand light, a charger and the vehicle mount system and strap.

4.29.144 CAB INSTRUMENTATION - The cab instrument panel will consist of gauges, an LCD display, telltale indicator lights, alarms, control switches, and a diagnostic panel. The function of instrument panel controls and switches will be identified by a label adjacent to each item. Actuation of the headlight switch will illuminate the labels in low light conditions. Telltale indicator lamps will not be illuminated unless necessary. The cab instruments and controls will be conveniently located within the forward cab section directly forward of the driver. Gauge and switch panels will be designed to be removable for ease of service and low cost of ownership.

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

1. Voltmeter gauge (Volts)
- Low volts (11.8 VDC) - Amber indicator on gauge assembly with alarm
- High volts (15 VDC) - Amber indicator on gauge assembly with alarm
- Very low volts (11.3 VDC) - Amber indicator on gauge assembly with alarm
- Very high volts (16 VDC) - Amber indicator on gauge assembly with alarm

2. Tachometer (RPM)

3. Speedometer (Primary (outside) MPH, Secondary (inside) Km/H)

4. Fuel level gauge (Empty - Full in fractions)
- Low fuel (1/8 full) - Amber indicator on gauge assembly with alarm
- Very low fuel (1/32) fuel - Amber indicator on gauge assembly with alarm
- Engine oil pressure gauge (PSI) - Low oil pressure to activate engine warning lights and alarms - Red indicator on gauge assembly with alarm

5. Front air pressure gauge (PSI) - Low air pressure to activate warning lights and alarm = Red indicator on gauge assembly with alarm

6. Rear air pressure gauge (PSI) - Low air pressure to activate warning lights and alarm - Red indicator on gauge assembly with alarm

7. Transmission oil temperature gauge (Fahrenheit) - High transmission oil temperature activates warning lights and alarm ; Amber indicator on gauge assembly with alarm

8. Engine coolant temperature gauge (Fahrenheit) - High engine temperature activates an engine warning light and alarm; Red indicator on gauge assembly with alarm

9. Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions)

- Low fluid (1/8 full) - Amber indicator on gauge assembly with alarm

10. All gauges and gauge indicators will perform prove out at initial power-up to ensure proper performance.

4.29.146 INDICATOR LAMPS - To promote safety, the following telltale indicator lamps will be integral to the gauge assembly and are located above and below the center gauges. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols.

1. The following amber telltale lamps will be present:
    a. Low coolant
    b. Trac cntl (traction control) (where applicable)
    c. Check engine
    d. Check trans (check transmission)
    e. Aux brake overheat (Auxiliary brake overheat)
    f. Air rest (air restriction)
    g. Caution (triangle symbol)
    h. Water in fuel
    i. DPF (engine diesel particulate filter regeneration)
    j. Trailer ABS (where applicable)
    k. Wait to start (where applicable)
    l. HET (engine high exhaust temperature) (where applicable)
    m. ABS (antilock brake system)
    n. MIL (engine emissions system malfunction indicator lamp) (where applicable)
    o. SRS (supplemental restraint system) fault (where applicable)
    p. DEF (low diesel exhaust fluid level)
    q. The following red telltale lamps will be present:
    r. Warning (stop sign symbol)
    s. Seat belt
    t. Parking brake
    u. Stop engine
    v. Rack down
2. The following green telltale lamps will be provided:
    a. Left turn
    b. Right turn
    c. Battery on
3. The following blue telltale lamp will be provided:
    a. High beam

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

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

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

4.29.148 INDICATOR LAMP AND ALARM PROVE-OUT - Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

4.29.149 CONTROL SWITCHES - For ease of use, the following controls will be provided immediately adjacent to the cab instrument panel within easy reach of the driver.

1. Emergency master switch: A molded plastic push button switch with integral indicator lamp will be provided. Pressing the switch will activate emergency response lights and siren control. A green lamp on the switch provides indication that the emergency master mode is active. Pressing the switch again disables the emergency master mode.

2. Headlight / Parking light switch: A three (3)-position maintained rocker switch will be provided. The first switch position will deactivate all parking lights and the headlights. The second switch position will activate the parking lights. The third switch position will activate the headlights.

3. Panel backlighting intensity control switch: A three (3)-position momentary rocker switch will be provided. The first switch position decreases the panel backlighting intensity to a minimum level as the switch is held. The second switch position is the default position that does not affect the backlighting intensity. The third switch position increases the panel backlighting intensity to a maximum level as the switch is held.

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

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

2. "Ok To Engage High Idle" indicator lamp: A green indicator light will be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

4.29.151 The following standard controls will be provided adjacent to the cab gauge assembly within easy reach of the driver. All switches will have backlit labels for low light applications.

1. Ignition switch: A three (3)-position maintained/momentary rocker switch will be provided. The first switch position will deactivate vehicle ignition. The second switch position will activate vehicle ignition. The third momentary position will disable the Command Zone audible alarm if held for three (3) to five (5) seconds. A green indicator lamp will be activated with vehicle ignition.

2. Engine start switch: A two (2)-position momentary rocker switch will be provided. The first switch position is the default switch position. The second switch position will activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

3. 4-way hazard switch: A two (2)-position maintained rocker switch will be provided. The first switch position will deactivate the 4-way hazard switch function. The second switch position will activate the 4-way hazard function. The switch actuator will be red and includes the international 4-way hazard symbol.

4. Heater, defroster, and optional air conditioning control panel: A control panel with membrane switches will be provided to control heater/defroster temperature and heater, defroster, and air conditioning fan speeds. A green LED status bar will indicate the relative temperature and fan speed settings.

5. Turn signal arm: A self-canceling turn signal with high beam headlight and windshield wiper/washer controls will be provided. The windshield wiper control will have high, low, and intermittent modes.

6. Parking brake control: An air actuated push/pull park brake control valve will be provided.

7. Chassis horn control: Activation of the chassis horn control will be provided through the center of the steering wheel.

4.29.152 CUSTOM SWITCH PANELS - The design of cab instrumentation will allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There will be positions for up to four (4) switch panels in the overhead console on the driver's side, up to four (4) switch panels in the engine tunnel console facing the driver, up to four (4) switch panels in the overhead console on the officer's side and up to two (2) switch panels in the engine tunnel console facing the officer. All switches will have backlit labels for low light applications.

4.29.153 DIAGNOSTIC PANEL - A diagnostic panel will be accessible while standing on the ground and located inside the driver's side door left of the steering column. The diagnostic panel will allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches will allow ABS systems to provide blink codes should a problem exist.

1. The diagnostic panel will include the following:
2. Engine diagnostic port
3. Transmission diagnostic port
4. ABS diagnostic port
5. SRS diagnostic port (where applicable)
6. Command Zone USB diagnostic port
7. ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
8. Diesel particulate filter regeneration switch (where applicable)
9. Diesel particulate filter regeneration inhibit switch (where applicable)

4.29.154 CAB LCD DISPLAY -A digital four (4)-row by 20-character dot matrix display will be integral to the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into three (3) sections. Each section will have a dedicated function. The upper left section will display the outside ambient temperature.

4.29.155 The upper right section will display, along with other configuration specific information:

1. Odometer
2. Trip mileage
3. PTO hours
4. Fuel consumption
5. Engine hours

4.29.156 The bottom section will display INFO, CAUTION, and WARNING messages. Text messages will automatically activate to describe the cause of an audible caution or warning alarm. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist.

4.29.157 AIR RESTRICTION INDICATOR - A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm shall be provided.

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

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

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

- The following messages will be displayed (where applicable):
- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- DS Ladder Rack Down (Driver Side Ladder Rack Down)
- PS Ladder Rack Down (Passenger Side Ladder Rack Down)
- Deck Gun Not Stowed
- Lt Tower Not Stowed (Light Tower Not Stowed)
- Hatch Door Open
- Fold Tank Not Stowed (Fold-A-Tank Not Stowed)
- Aerial Not Stowed (Aerial Device Not Stowed)
- Stabilizer Not Stowed
- Steps Not Stowed
- Handrail Not Stowed
- Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause major damage to the apparatus if the apparatus is moved will be displayed as a caution message after the parking brake is disengaged.

4.29.160 SWITCH PANELS - The emergency light switch panel will have a master switch for ease of use plus individual switches for selective control. Each switch panel will contain eight (8) membrane-type switches each rated for one million (1,000,000) cycles. Panels containing less than eight (8) switch assignments will include non-functioning black appliqués. Documentation will be provided by the manufacturer indicating the rated cycle life of the switches. The switch panel(s) will be located in the overhead position above the windshield on the driver side overhead to allow for easy access.

Additional switch panel(s) will be located in the overhead position(s) above the windshield or in designated locations on the lower instrument panel layout.

The switches will be membrane-type and also act as an integral indicator light. For quick, visual indication the entire surface of the switch will be illuminated white whenever back lighting is activated and illuminated green whenever the switch is active. An active illuminated switch will flash when interlock requirements are not met or device is actively being load managed. For ease of use, a two (2)-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch will be placed in the center of the switch. The label will allow light to pass through the letters for ease of use in low light conditions.

4.29.161 WIPER CONTROL - For simple operation and easy reach, the windshield wiper control will be an integral part of the directional light lever located on the steering column. The wiper control will include high and low wiper speed settings, a one (1)-speed intermittent wiper control and windshield washer switch. The control will have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

4.29.162 HOURMETER (AERIAL DEVICE) - An hourmeter for the aerial device will be provided and located within the cab display or instrument panel.

4.29.163 AERIAL MASTER - There will be a master switch for the aerial operating electrical system provided.

4.29.164 AERIAL PTO SWITCH - A PTO switch for the aerial with indicator light will be provided.

4.29.165 SPARE CIRCUIT - There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be protected to 15 amps at 12 volts DC.
- Power and ground will terminate in the overhead switch panel centered above officer, wiring to be connected to the in service / out of service switch.
- Termination will be with heat shrinkable butt splicing.
- Wires will be sized to 125 percent of the protection.
- This circuit(s) may be load managed when the parking brake is set.

4.29.166 SPARE CIRCUIT - There will be three (3) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

- The positive wire will be connected to the auxiliary switch located on the instrument panel to the right of the steering wheel, option 614250.
- The negative wire will be connected to ground.
- Wires will be protected to 60 amps at 12 volts DC.
- Power and ground will terminate in the passenger side radio compartment in the crew cab, all flashlights, power points, radios and charger, rocket modem to be connected to these terminal strips.
- Termination will be to a Blue Sea System, model 5026, 12 circuit with negative bus bar, straight blade fuse block. The terminal block will include a cover with circuit labels.
- Wires to the fuse block will be sized to 125% of the protection.
- This circuit(s) may be load managed when the parking brake is applied.

4.29.167 SPARE CIRCUIT - There will be a Cole Hersee part number 75908 disconnect switch installed in the spare wire circuit(s) to connect or disconnect the power to the spare wire(s) located the in service / out of service circuits. The label and switch will be installed in the panel below the dash where the back-up camera speaker would fit..

4.29.168 SPARE CIRCUIT - There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

- The positive wire will be connected directly to the battery power.

- The negative wire will be connected to ground.
- Wires will be protected to 15 amps at 12 volts DC.
- Power and ground will terminate One in DS rear facing EMS compt. mounted at the top, and one in the center rear facing EMS box to be mounted PS rear shelf track . All must be wired to the in/out service breaker panels in the PS rear facing radio compartment-.
- Termination will be with 15 amp, power point plug with rubber cover.
- Wires will be sized to 125% of the protection.
- This circuit(s) may be load managed when the parking brake is set.

4.29.169 SPARE CIRCUIT -There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be protected to 15 amps at 12 volts DC
- Power and ground will terminate officer side dash area and Switch Panel # 9
- Termination will be with 15 amp, power point plug with rubber cover
- Wires will be sized to 125 percent of the protection
- The circuit(s) may be load managed when the parking brake is set.

4.29.170 SPARE CIRCUIT - There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

- The above wires will have the following features:
- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be protected to 40 amps at 12 volts DC.
- Power and ground will terminate PS EMS rear facing cabinet..
- Termination will be with 3/8" studs and plastic covers.
- Wires will be sized to 125% of the protection.
- This circuit(s) may be load managed when the parking brake is set.

4.29.171 SPARE CIRCUIT There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be protected to 15 amps at 12 volts DC.
- Power and ground will terminate one each side under the open top, 3 slot map box, mounted to the center EMS compartment. Make sure these are connected to the Blue Sea junction boxes thru the in service / out of service switch..
- Termination will be with 15 amp, power point plug with rubber cover.
- Wires will be sized to 125% of the protection.
- This circuit(s) may be load managed when the parking brake is set.

4.29.172 EMERGENCY LIGHT SWITCHES - The emergency light switching will work as follows: The emergency master switch must be activated for all emergency lighting to function.

1. The emergency master "saved states" feature will not be activated. This means that if the emergency master switch is on and individual switch is turned off. Then the emergency master is turned off, upon turning the emergency master switch back on the individual switch which was previously turn off will turn back on.

2. All emergency lighting will be turned on whenever the emergency master switch is turned on.

3. Individual emergency light switches may be deactivated and/or reactivated after the emergency master switch is turned on.

4. Switches will be per the following: Emergency Master, Lightbar, Front Warning, Side Warning, Rear Warning, High Beam Flash will be combined with Front Warning, Upper & Lower Rear Warning will be combined under Rear Warning.

4.29.173 STEREO RADIO - A Jensen, heavy duty AM/FM/CD/Weatherband stereo radio, with front auxiliary input will be installed per switch panel layout . There will be 5.25" speakers installed one (1) pair of 5.25" speakers in the cab and one (1) pair of 5.25" speakers in the crew cab. The antenna will be a roof-mounted rubber antenna located in an open space, on the cab roof. The following features will be included:

1. CD Player with Electronic Skip Protection (ESP)
2. Full 7-Channel NOAA Weatherband Tuner with SAME technology
3. Built-in Clock
4. Audio CD, CD-R, R/W, MP3 CD compatible
5. Radio Broadcast Data System Text Display
6. Front panel USB input
7. Front and Rear Auxiliary Audio Input
8. Receives audio (A2DP/AVRCP) from Bluetooth enabled device
9. Supports Bluetooth HFP to receive phone calls from BT-enabled phones
10. Low battery alert (Alt;10.8Vdc)
11. Heavy Duty design with Conformal Coated Circuit Boards for maximum durability under all conditions
12. SWITCH, MASTER, AM/FM RADIO
13. A remote switch will be provided inside the cab to control turning off the AM/FM radio. The switch will be installed drivers side switch panel. The radio will automatically turn on with truck.

4.29.174 PUSH BUTTON MOUNTING BRACKET - A mounting bracket will be provided chrome buttons will be in the wedge bracket near the officer. DO NOT MOUNT UNTIL PICKUP. Match to job 29756 and see pictures. They will locate near with wiring coming form below the engine tunnel mount plate for the mounting of push button controls. The mounting bracket will be large enough for three (3) push buttons. The controls and labels will be mounted horizontally, next to each other. The bracket will be fabricated from smooth aluminum and painted to match work surface.

4.29.175 INFORMATION CENTER - An information center employing a 7.00" diagonal touch screen color LCD display will be encased in an ABS plastic housing. The information center will have the following specifications:

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

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

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

2. An amber background/text color will indicate a caution condition

3. A red background/text color will indicate a warning condition

4. The information center will utilize an "Alert Center" to display text messages for audible alarm tones. The text messages will be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages will cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" will change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color will be shown for all alert center messages.

5. A label for each button will exist. The label will indicate the function for each active button for each screen. Buttons that are not utilized on specific screens will have a button label with no text or symbol.

4.29.177 HOME/TRANSIT SCREEN- This screen will display the following:

- Vehicle Mitigation (if equipped)
- Water Level (if equipped)
- Foam Level (if equipped)
- Seat Belt Monitoring Screen
- Tire Pressure Monitoring (if equipped)
- Digital Speedometer
- Active Alarms

4.29.178 ON SCENE SCREEN - This screen will display the following and will be auto activated with pump engaged (if equipped):

- Battery Voltage
- Fuel
- Oil Pressure
- Coolant Temperature
- RPM
- Water Level (if equipped)
- Foam Level (if equipped)
- Foam Concentration (if equipped)
- Water Flow Rate (if equipped)
- Water Used (if equipped)
- Active Alarms

4.29.179 VIRTUAL BUTTONS - There will be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

4.29.180 PAGE SCREEN - The page screen will display the following and allow the user to progress into other screens for further functionality:

- Diagnostics
- Faults
- Listed by order of occurrence
- Allows to sort by system
- Interlock
- Throttle Interlocks
- Pump Interlocks (if equipped)
- Aerial Interlocks (if equipped)
- PTO Interlocks (if equipped)

4.29.181 Load Manager - A list of items to be load managed will be provided. The list will provide a description of the load. The lower the priority numbers the earlier the device will be shed should a low voltage condition occur. The screen will indicate if a load has been shed (disabled) or not shed. "At a glance" color features are utilized on this screen:

- Systems
- Command Zone
- Module type and ID number
- Module Version
- Input or output number
- Circuit number connected to that input or output
- Status of the input or output
- Power and Constant Current module diagnostic information
- Foam (if equipped)
- Pressure Controller (if equipped)
- Generator Frequency (if equipped)
- Live Data
- General Truck Data
- Maintenance
- Engine oil and filter
- Transmission oil and filter
- Pump oil (if equipped)
- Foam (if equipped)
- Aerial (if equipped)

4.29.182 Setup availability for the following:

- Clock Setup
- Date & Time
- 12 or 24 hour format
- Set time and date
- Backlight
- Daytime
- Night time
- Sensitivity
- Unit Selection
- Home Screen
- Virtual Button Setup
- On Scene Screen Setup
- Configure Video Mode
- Set Video Contrast
- Set Video Color
- Set Video Tint

4.29.183 Do Not Move - The screen will indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices will be indicate:

- Driver Side Cab Door
- Passenger's Side Cab Door
- Driver Side Crew Cab Door
- Passenger's Side Crew Cab Door
- Driver Side Body Doors

- Passenger's Side Body Doors
- Rear Body Door(s)
- Ladder Rack (if applicable)
- Deck Gun (if applicable)
- Light Tower (if applicable)
- Hatch Door (if applicable)
- Stabilizers (if applicable)
- Steps (if applicable)
- Notifications

4.29.184 View Active Alarms - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm

- Silence Alarms - All alarms are silenced
- Timer Screen
- HVAC (if equipped)
- Tire Information (if equipped)
- Ascendant Set Up Confirmation (if equipped)
- Button functions and button labels may change with each screen.

4.29.185 VEHICLE DATA RECORDER - There will be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided. The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

The vehicle data recorder will be capable of recording the following data via hardwired and/or CAN inputs:

- Vehicle Speed - MPH
- Acceleration - MPH/sec
- Deceleration - MPH/sec
- Engine Speed - RPM
- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

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

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm
- The seat belt monitoring screen will become active on the Command Zone color display when:

a. The home screen is active:
b. and there is any occupant seated but not buckled or any belt buckled with an occupant.
c. and there are no other Do Not Move Apparatus conditions present.

As soon as all Do Not Move Apparatus conditions are cleared, the SBMS will be activated.

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

4.29.187 INTERCOM SYSTEM - There will be digital, dual radio interface, intercom located in the cab. The front panel will have master volume, and squelch controls with illuminated indicators, allowing for independent level setting of radio and auxiliary audio devices.

1. There will be two (2) radio listen only / transmit controls, allowing for simulcast interoperability with select, monitor, receive, and transmit indicators. There will be two (2) auxiliary audio inputs with select, and receive indicators.

2. There will be one (1) wireless base station for up to five (1-5) headset users provided.

3. The wireless base station will have a 100' to 1100' range, line of sight. Objects between the transmitter and receiver affect range.

4. The following Firecom components will be provided:

5. One (1) 5200D Intercom

6. One (1) WB505R wireless base station (1-5 wireless positions)

7. All necessary power and station cabling

4.29.188 WIRELESS UNDER HELMET, RADIO TRANSMIT ONLY HEADSET - There will be four (4) Firecom™, Model UHW-505, wireless under the helmet, radio transmit headset(s) provided. A heavy duty, coiled 12 volt charging pigtail with plug will be provided driver's seat, officer seat, driver's side outboard forward facing seat and passenger's side outboard forward facing seat. Each headset will feature:

- Noise cancelling electric microphone
- Flexible microphone boom
- Ear seals with 20 dB noise reduction
- Stereo Listen-Through Ear dome microphones
- Radio Push To Transmit button (Left or Right Side)
- Rechargeable battery operates for 24 hours on a full charge
- IP-66 when worn

4.29.189 HEADSET HANGERS - There will be four (4) headset hanger(s) installed driver's seat, officer's seat, driver's side outboard forward facing seat and passenger's side inboard forward facing seat. The hanger(s) will meet NFPA 1901, Section 14.1.11, requirement for equipment mounting.

4.29.190 AUXILIARY AUDIO CABLE - An auxiliary 3.5mm stereo male to 2 RCA male audio cable will be provided from the intercom aux inlet to the AM/FM radio. Auxiliary audio will be mixed with the two-way radio and intercom traffic at exactly one half the strength of the signal in the headsets.

4.29.191 REMOTE ON/OFF SWITCH FOR AM/FM RADIO - a remote on/off switch will be supplied in a location to be determined. The switch power will be directly tied to the ignition switch power.

4.29.192 COMPLETE MDT INSTALLATION - There will be one (1) Mobile Data Terminal (MDT), Docking station, mounting bracket, power supply, antenna, GPS, modem, and all cabling installed on the officers side of the engine tunnel plate. Please run wiring under the plate so the mount can be near the officer's side forward. Specific shipping requirements will be followed.

4.29.193 PORTABLE RADIO CHARGER INSTALLATION - There will be four (4) customer supplied portable two-way radio chargers(s) sent to the apparatus manufacturers preferred radio installer to be installed two near the driver as located on attached drawing, one on the center crew box and one on the PS crew box as indicated in the supplied photo. Specific shipping requirements will be followed.

4.29.194 GPS ANTENNA INSTALLATION - There will be one (1) GPS antenna(s) installed on the roof. The antenna coax cable(s) will be run from the antenna to PASSENGER SIDE JUST BEHIND THE LIGHT BAR. Cable routed to cab electronics cabinet behind the officer position. This needs to have at least 2' of cable to extended outside the box. and a connector provided, if necessary. Specific shipping requirements will be followed.

4.29.195 RADIO ANTENNA MOUNT – There will be two (2) standard 1.125", 18 thread antenna-mounting base(s) installed One to the rear of driver side A/C routed to the radio box behind the officer. Make sure at least 2' of cable is able to get outside the box. on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the radio box. A weatherproof cap will be installed on the mount. At least one will have a STiCO model MABVT8 antenna attached and the other will have a cap placed to make the connection weather tight.

4.29.196 RADIO INSTALLED - There will be one Unity XM-100M Mobile radio (or comparable as approved by Fire Department Apparatus Committee) with handheld controller installed in radio compartment. The control head will be installed in the overhead compartment above officers seat. This radio will be capable of broadcasting on VHF/700MHZ and 800MHZ.

4.29.197 VEHICLE CAMERA SYSTEM - There will be a color vehicle camera system provided with the following:

- One (1) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse
- The camera images will be displayed on the driver's Command Zone™, color display. Audio from the microphone on the active camera will be not provided.

4.29.198 The following components will be included:

- One (1) SV-CW134639CAI, camera
- One (1) amplified speaker (if applicable)
- All necessary cables

4.29.199 VEHICLE CAMERA GUARD - There will be one (1) aluminum treadplate guard(s) fastened over the vehicle camera(s) located Centered on the rear .

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

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

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers will be Type-I automatic reset (continuously resetting). When required, automotive type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

4.29.201 SOLID-STATE CONTROL SYSTEM - A solid-state electronics based control system will be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network will consist of electronic modules located near their point of use to reduce harness lengths and improve reliability. The control system will comply with SAE J1939-11 recommended practices.

The control system will operate as a master-slave system whereas the main control module instructs all other system components. The system will contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system will utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX™ specifications providing a lower cost of ownership.

For increased reliability and simplified use the control system modules will include the following attributes:

- Green LED indicator light for module power
- Red LED indicator light for network communication stability status
- Control system self test at activation and continually throughout vehicle operation
- No moving parts due to transistor logic
- Software logic control for NFPA mandated safety interlocks and indicators
- Integrated electrical system load management without additional components
- Integrated electrical load sequencing system without additional components
- Customized control software to the vehicle's configuration
- Factory and field re programmable to accommodate changes to the vehicle's operating parameters
- Complete operating and troubleshooting manuals
- USB connection to the main control module for advanced troubleshooting
- To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules will meet the following specifications:
    - Module circuit board will meet SAE J771 specifications
    - Operating temperature from -40C to +70C
    - Storage temperature from -40C to +70C
    - Vibration to 50g
    - IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)
    - Operating voltage from eight (8) volts to 16 volts DC

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

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

4.29.203 ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS - Advanced on-board diagnostic messages will be provided to support rapid troubleshooting of the electrical power and control system. The diagnostic messages will be displayed on the information center located at the driver's position. The on-board information center will include the following diagnostic information:

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

4.29.204 TECH MODULE WITH WIFI - An in cab module will provide WiFi wireless interface and data logging capability. (No Exception) The WiFi interface will comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module will provide an external antenna connection allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

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

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

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

4.29.205 PROGNOSTICS - A software based vehicle tool will be provided to predict remaining life of the vehicles critical fluid and events (no exceptions). The system will send automatic indications to the Command Zone, color display and/or wireless enabled device to proactively alert of upcoming service intervals. Prognostics will include:

- Engine oil and filter
- Transmission oil and filter
- Pump oil (if equipped)
- Foam oil (if equipped)
- Aerial oil and filter (if equipped)

4.29.206 ADVANCED DIAGNOSTICS - An advanced, Windows-based, diagnostic software program will be provided for this control system. The software will provide troubleshooting tools to service technicians equipped with a Windows-based computer or wireless enabled device. The service and maintenance software will be easy to understand and use and have the ability to view system input/output (I/O) information.

4.29.207 INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM - A system will be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

4.29.208 VOLTAGE MONITOR SYSTEM - A voltage monitoring system will be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system will provide visual and audible warning when the system voltage is below or above optimum levels. The alarm will activate if the system falls below 11.8 volts DC for more than two (2) minutes.

4.29.209 DEDICATED RADIO EQUIPMENT CONNECTION POINTS - There will be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment. The studs will consist of the following:

- 12-volt 40-amp battery switched power

- 12-volt 60-amp ignition switched power
- 12-volt 60-amp direct battery power
- There will also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

4.29.210 ENHANCED SOFTWARE - The solid-state control system will include the following software enhancements:

4.29.211 All perimeter lights and scene lights (where applicable) will be deactivated when the parking brake is released.

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

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

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

1. The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10Khz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10Khz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

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

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

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

2. All holes made in the roof will be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.

3. Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.

4. Electrical components designed to be removed for maintenance will not be fastened with nuts and bolts. Metal screws will be used in mounting these devices. Also a coil of wire will be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

5. Corrosion preventative compound will be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation (of the plug).

6. All lights that have their sockets in a weather exposed area will have corrosion preventative compound added to the socket terminal area.

7. All electrical terminals in exposed areas will have silicon (1890) applied completely over the metal portion of the terminal.

8. All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, will be furnished. Rear identification lights will be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads will be protected from damage by installing a false bulkhead inside the rear compartments.

9. An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

10. The results of the tests will be recorded and provided to the purchaser at time of delivery.

4.29.216 BATTERY SYSTEM - Six (6) 12 volt, Exide, Model 31A950X1W, group 31 batteries that include the following features will be provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Rating of 5700 CCA at 0 degrees Fahrenheit
- 1140 minutes of reserve capacity
- SAE Posts

1. Each battery case will be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover will be manifold vented with a central venting location to allow a 45 degree tilt capacity.

2. The inside of each battery will consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

4.29.217 BATTERY SYSTEM - A single starting system will be provided.

4.29.218 An ignition switch and starter button will be located on the instrument panel.

4.29.219 MASTER BATTERY SWITCH - There will be a Cole Hersee, Model 75908, master battery switch to activate the battery system, provided inside the cab within easy reach of the driver.

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

4.29.221 BATTERY COMPARTMENTS - The batteries will be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments will be constructed of 3/16" steel plate and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The compartments will include formed fit heavy-duty roto-molded polyethylene battery tray inserts with drains on each side of the frame rails. The batteries will be mounted inside of the roto-molded trays.

4.29.222 JUMPER STUDS - One (1) set of battery jumper studs with plastic color-coded covers will be installed on the battery box on the driver's side. This will allow enough room for easy jumper cable access.

4.29.223 BATTERY CHARGER/ AIR COMPRESSOR - There will be a Kussmaul Pump Plus Kit number 52-21-6100 battery charger, air compressor and display provided.

4.29.224 This kit will include the following:

- 091-193-12, 40 amp single output battery charter
- 091-9-12V, 12 volt DC air compressor with a max ratting of 100 PSI
- 091-198-12-PP, display with battery voltage and air tank pressure

1. The air compressor will be installed to maintain the air brake system pressure when the vehicle is not in use.

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

3. Battery charger/compressor will be located forward wall of ds EMS box . Charger and pump will be mounted low in the forward face of the box down low with the pump discharge mounted down as indicated on the installation instructions. The charger needs to have the 120 volt receptacle, not hard wire.

4. The battery charger indicator will be located behind the driver's door on the outside of the cab.

4.29.225 AUTO EJECT FOR SHORELINE - There will be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus. The shoreline inlet(s) will include red weatherproof flip up cover(s). There will be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting. The shoreline(s) will be connected to the battery charger. There will be a mating connector body supplied with the loose equipment. There will be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency

The shoreline receptacle will be located on the driver side of cab, above wheel.

4.29.226 ALTERNATOR - A Delco Remy®, Model 55SI, alternator will be provided. It will have a rated output current of 430 amps, as measured by SAE method J56. The alternator will feature an integral regulator and rectifier system that has been tested and qualified to an ambient temperature of 257 degrees Fahrenheit (125 degrees Celsius). The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

4.29.227 ELECTRONIC LOAD MANAGER- An electronic load management (ELM) system will be provided that monitors the vehicles 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

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

- System voltage monitoring.

- A shed load will remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
- Sixteen available electronic load shedding levels.
- Priority levels can be set for individual outputs.
- High Idle to activate before any electric loads are shed and deactivate with the service brake.
- If enabled:
    - o "Load Man Hi-Idle On" will display on the information center.
    - o Hi-Idle will not activate until 30 seconds after engine start up.
    - o Individual switch "on" indicator to flash when the particular load has been shed.
    - o The information center indicates system voltage.
    - o The information center, where applicable, includes a "Load Manager" screen indicating the following:
    - o Load managed items list, with priority levels and item condition.
    - o Individual load managed item condition:
    - o ON = not shed
    - o SHED = shed

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

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

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

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

4. Sequencing of the following items will also occur, in conjunction with the ignition switch, at half-second intervals:
    - Cab Heater and Air Conditioning
    - Crew Cab Heater (if applicable)
    - Crew Cab Air Conditioning (if applicable)
    - Exhaust Fans (if applicable)
    - Third Evaporator (if applicable)

4.29.229 HEADLIGHTS - There will be four (4) halogen HB5 replaceable round light assemblies mounted in the front chrome trim housing on each side of the cab grille. The outside light assemblies on each side will contain a low/high headlight bulb. The inside halogen HB5 replaceable round light assemblies will be used as daytime running lights and will be activated with the following measures:
- Ignition switch turn on.
- Parking brake released.
- These lights will be deactivated with any one of the following measures:
- Headlight switch is turned on.
- High-beam flash is turned on.
- Parking brake is applied.

4.29.230 DIRECTIONAL LIGHTS -There will be two (2) Whelen 600® series, LED combination directional/marker lights provided. The lights will be located on the outside cab corners, next to the headlights. The color of the lenses will be clear.

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

4.29.232 CAB CLEARANCE/MARKER/ID LIGHTS - There will be seven (7) Truck-Lite, Model 35200Y, amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

1. Three (3) amber LED identification lights will be installed in the center of the cab above the windshield.

2. Two (2) amber LED clearance lights will be installed, one (1) on each outboard side of the cab above the windshield.

3. Two (2) amber LED marker lights will be installed, one (1) on each side above the cab doors.

4. The lights will be mounted with no guard.

4.29.233 REAR CLEARANCE/MARKER/ID LIGHTING –

1. There will be three (3) Truck-Lite®, Model 35200R, LED lights used as identification lights located at the rear of the apparatus per the following:
    - As close as practical to the vertical centerline
    - Centers spaced not less than 6.00" or more than 12.00" apart
    - Red in color
    - All at the same height

2. There will be two (2) Truck-Lite, Model 35200R, LED lights installed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:
    - To indicate the overall width of the vehicle
    - One (1) each side of the vertical centerline
    - As near the top as practical
    - Red in color
    - To be visible from the rear
    - All at the same height

3. There will be two (2) Truck-Lite, Model 35200R, LED lights installed on the side of the apparatus as marker lights as close to the rear as practical per the following:
    - To indicate the overall length of the vehicle
    - One (1) each side of the vertical centerline
    - As near the top as practical
    - Red in color
    - To be visible from the side
    - All at the same height

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

5. There will be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.Per FMVSS 108 and CMVSS 108 requirements.

4.29.234 MARKER LIGHTS - There will be one (1) pair of amber and red LED marker lights with rubber arm, located At the rear of the apparatus. The amber lens will face the front and the red lens will face the rear of the truck. These lights will be activated with the running lights of the vehicle.

4.29.235 REAR FMVSS LIGHTING The rear stop/tail and directional LED lighting will consist of the following:

- Two (2) Whelen®, Model M6BTT, red LED stop/tail lights
- Two (2) Whelen, Model M6T, amber LED arrow turn lights
- The lights shall be provided with color lenses.
- The lights will be mounted in a polished combination housing.
- There will be two (2) Whelen Model M6BUW, LED backup lights provided in the tail light housing.

4.29.236 LICENSE PLATE BRACKET - There will be one (1) license plate bracket mounted on the rear of the body. A white LED light will illuminate the license plate. A polished stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

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

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

4.29.239 DEUTSCH CONNECTIONS - All external 12V electrical light connections will be installed with Deutsch connectors.

4.29.240 CAB PERIMETER SCENE LIGHTS - There will be four (4) Amdor Model AY-9500-012, 12.00" white LED strip lights provided.

- One (1) under the driver's side cab access step.
- One (1) under the passenger's side cab access step.
- One (1) under the passenger's side crew cab access step.
- One (1) under the driver's side crew cab access step.

The lights will be activated when the battery switch is on and the respective door is open and whenever control has been selected for the body perimeter lights.

4.29.241 BODY PERIMETER SCENE LIGHTS - There will be two (2) Amdor LumaBar H2O™, Model AY-9500-020, 20.00" 12 volt DC LED strip lights provided. The lights will be mounted in the following locations:

- One (1) light under the driver's side turntable access steps
- One (1) light under the passenger's side turntable access steps
- The perimeter scene lights will be activated when the parking brake is applied and the reverse signal activated, activating all the side facing perimeter lights.

4.29.242 ADDITIONAL PERIMETER LIGHTS - There will be ten (10) lights Amdor® Luma Bar® H2O, Model AY-9500-012 12.00" white LED perimeter light(s) provided one (1) light under compartment D1, one (1) light under compartment P1, one (1) light under each side of the front bumper spaced evenly, one (1) light under each side of the rear tailboard, one (1) light under compartment D4, one (1) light under compartment P4, one (1) light under compartment D6 and one (1) light under compartment P6. These lights will be activated the same as the body perimeter lights.

4.29.243 STEP LIGHTS - All steps on the apparatus will be illuminated per the current edition of NFPA 1901 and will match the turn table access step lights.

4.29.244 SCENE LIGHTS - There will be one (1) Fire Research, Model SPA900-Q70 scene light(s) with chrome flange(s) installed on the side of the apparatus, passenger side upper between front and rear cab door. A control for the light(s) selected above will be the following:

- a switch at the driver's side switch panel
- opening the passenger's side cab or crew cab doors
- a switch at the passenger's side switch panel
- no additional switch location
- These lights may be load managed when the parking brake is set.

4.29.245 SCENE LIGHTS - There will be one (1) Fire Research, Model SPA900-Q70 scene light(s) with chrome flange(s) installed on the side of the apparatus, drivers side upper between front and rear cab door.

- A control for the light(s) selected above will be the following:
- a switch at the driver's side switch panel
- opening the driver's side cab or crew cab doors
- a switch at the passenger's side switch panel
- no additional switch location
- These lights may be load managed when the parking brake is set.

4.29.246 12 VOLT LIGHTING - There will be one (1) Fire Research Spectra, Model SPA530-Q20-TW-*, 20,000 lumens 12 volt DC LED scene light(s) with top wire exit provided on push up side mount pole(s), location to be determined at pre-construction meeting.

1. The painted parts of this light assembly to be white with a chrome bezel.
2. The light(s) will be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenge's side switch panel.
3. These lights will be connected to the Do Not Move Truck Indicator circuit.

4.29.247 12 VOLT LIGHTING - There will be one (1) Fire Research Spectra, Model SPA530-Q20-TW-*, 20,000 lumens 12 volt DC LED scene light(s) with top wire exit provided on push up side mount pole(s), location to be determined. The painted parts of this light assembly to be white with a chrome bezel. The light(s) will be controlled by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel. These lights will be connected to the Do Not Move Truck Indicator circuit.

4.29.248 12 VOLT LIGHTING - There will be one (1) Fire Research Spectra Max, Model SPA260-Q20, 12 volt LED surface mounted scene light(s) with white bezel(s) provided drivers side above the rear outrigger, on the painted panel. The light(s) will be controlled in the following way:

- from the driver's side body scene light option control.
- no additional switch location
- no additional switch location
- no additional switch location
- The light(s) may be load managed when the parking brake is applied.

4.29.249 12 VOLT LIGHTING - There will be one (1) Fire Research Spectra Max, Model SPA260-Q20, 12 volt LED surface mounted scene light(s) with white bezel(s) provided passenger side above the rear outrigger, on the painted panel. The light(s) will be controlled in the following way:

- from the passenger's side body scene light option control
- no additional switch location
- no additional switch location
- no additional switch location
- The light(s) may be load managed when the parking brake is applied.

4.29.250 12 VOLT LIGHTING - There will be two (2) Fire Research Evolution, Model FCA851-V20-*, 12 volt LED floodlight(s) provided on the front visor, one (1) on the driver's side and one (1) on the passenger's side. The painted parts to be white. The light(s) will be controlled in the following way:

- a switch at the driver's side switch panel and a switch at the passenger's side switch panel
- a switch at the pump operator's panel
- no additional switch location
- These lights may be load managed when the parking brake is applied.

4.29.251 REAR SCENE LIGHT(S) -There will be two (2) Whelen®, Model M6ZC, LED scene light(s) with chrome flange(s) installed at the rear of the apparatus, one (1) each side high on rear body bulkhead.

1. The light(s) will be controlled by a switch at the driver's side switch panel, by a switch at the passenger's side switch panel and by a cup switch at the driver's side rear bulkhead.

2. The light(s) may be load managed when the parking brake is applied.

4.29.252 WALKING SURFACE LIGHT - There will be Model FRP, 4" round black 12 volt DC LED floodlight with bolt mount provided to illuminate the entire designated walking surface on top of the body. The light will be activated when the body step lights are on.

4.29.253 CARGO AREA - The cargo area will be fabricated of .125" 5052 aluminum with a tensile strength range of 31,000 to 38,000 psi. The sides will not form any portion of the fender compartments. The upper and rear edges of the side panels will have a double break for rigidity. The cargo area will be located ahead of the ladder turntable. Flooring of the cargo area will be aluminum treadplate.

4.29.254 TURNTABLE STEPS - Steps to access the turntable from the driver side and passenger side will be provided just behind the compartmentation. The steps will be a swing-down design, with the stepping area made of Morton Tread-Grip® channel. The step height for the bottom step (the distance from the top surface of the step to the ground) will not exceed 24.00" with the step in its extended position. No step height (the distance between the top surfaces of any two (2) adjacent steps) will be greater than 14.00". The stepwell will be lined with bright aluminum treadplate to act as scuffplates. The steps will be connected to the "Do Not Move Truck" indicator. A handrail will be provided on each side of the access steps.

4.29.255 STEP LIGHTS - There will be three (3) white LED step lights provided for each set of aerial turntable access steps. In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light. The step lights will be actuated by the aerial master switch in the cab.

4.29.256 SMOOTH ALUMINUM REAR WALL - The rear wall will be smooth aluminum.

4.29.257 TOW EYES - Two (2) rear painted tow eyes will be located at the rear of the apparatus and will be mounted directly to the torque box. The inner and outer edges of the tow eyes will be radiused. There will be no garnish ring provided on either tow eye.

4.29.258 COMPARTMENTATION - Compartmentation will be fabricated of 0.125" 5052 aluminum. The side compartments are an integral assembly with the rear fenders. Fully enclosed rear wheel housings will be provided to prevent rust pockets and for ease of maintenance. Due to the severe loading requirements of this aerial, a method of compartment body support suitable for the intended load will be provided. The backbone of the support system will be the chassis frame rail, which is the strongest component of the chassis and is designed for sustaining maximum loads.

1. A support system will be used which will incorporate a floating substructure by using Neoprene Elastomer isolators to allow the body to remain rigid while the chassis goes through its natural flex. The isolators will have a broad range of proven viability in vehicular applications, be of a fail safe design, and allow for all necessary movement in three (3) transitional and rotational modes. This will result in a 500 lb equipment rating for each lower compartment of the body.

2. The compartmentation in front of the rear axle will include a 3.00" steel support assemblies which are bolted to the chassis frame rails. A steel framework will be mounted to the body above these support assemblies connected to the support assemblies with isolators. There will be one (1) support assembly mounted to each chassis frame rail.

3. The compartmentation behind the rear axle will include 3.00" steel support assemblies which are bolted to the chassis frame rails and extend underneath to the outside edge of the body. The support assembly will be coated to isolate the dissimilar metals before it is bolted to the body. There will be one (1) support assembly mounted to each chassis frame rail.

4. Compartment flooring will be of the sweep out design with the floor higher than the compartment door lip. The compartment door openings are framed by flanging the edges in 1.75" and bending out again 0.75" to form an angle. Drip protection is provided over all door openings by means of bright aluminum extrusion or formed bright aluminum treadplate. Side compartment tops will be covered with bright aluminum treadplate with a 1.00" rolled over edge on the front, rear and outward side. The covers are fabricated in one (1) piece and have the corners welded. A bright aluminum treadplate cover will be provided on the front wall of each side compartment. All screws and bolts which protrude into a compartment will have acorn nuts at the ends to prevent injury.

5. The body design has been fully tested. Proven engineering and test techniques such as finite element analysis, model analysis, stress coating and strain gauging have been performed with special attention given to fatigue life and structural integrity of the compartment body and substructure.

4.29.259 AGGRESSIVE WALKING SURFACE - All exterior surfaces designated as stepping, standing, and walking areas will comply with the required average slip resistance of the current NFPA standards.

4.29.260 LOUVERS - All body compartments will have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment and to prevent water from dripping into the compartment. These louvers will be formed into the metal and not added to the compartment as a separate plate.

4.29.261 COMPARTMENT IN PLACE OF PUMP - A roll-up door compartment will be installed in place of the pump and pump panel. The compartment will be approximately 54.25" wide x 64.00" high x 24.50" deep in the lower area and transversed in the top portion of the compartment. The transversed area will be 46.50" wide x 47.00 high. The door opening will be approximately 51.25" wide x 56.38" high. The forward wall will be notched for the boom support.

4.29.262 DRIVER SIDE COMPARTMENTATION - A full height roll-up door compartment ahead of the rear wheels will be 41.75" wide x 64.00" high x 24.25" deep inside with an clear door opening of 38.75" wide x 56.38" high.

1. One (1) roll-up door compartment above the fender compartments and over the rear axles will be provided. The compartment will be 72.13" wide x 33.25" high x 24.25" deep inside with a clear door opening of 63.75" wide x 25.50" high.

2. A compartment with a single pan stainless steel door will be located above the front stabilizer. The compartment will be 23.00" high x 18.00" wide x 24.25" deep with a door opening of 15.75" high x 12.00" wide.

3. A full height roll-up door compartment, behind the rear wheels, will be approximately 43.75" wide x 57.25" high x 21.25" deep. The clear door opening will be approximately 40.75" wide x 49.63" high.

4. There will be one (1) compartment, below the turntable, with a roll-up door. The compartment will be approximately 39.38" wide x 26.38" high x 21.25" deep with a door opening of approximately 33.75" wide x 18.75" high.

4.29.263 COMPARTMENTATION, PASSENGERS SIDE - A full height roll-up door compartment, ahead of the rear wheels, will be 41.75" wide x 64.00" high x 24.25" deep inside with a clear door opening of 38.75" wide x 56.38" high.

1. One (1) roll-up door compartment will be provided above the fender compartments and over the rear axles. The compartment will be 72.13" wide x 33.25" high x 24.25" deep inside with a clear door opening of 63.75" wide x 25.50" high.

2. A compartment with a single pan stainless steel door will be located above the front stabilizer. The compartment will be 18.00" wide x 23.00" high x 24.25" deep with a door opening of 12.00" wide x 15.75" high.

3. A full height roll-up door compartment, behind the rear wheels, will be 43.75" wide x 57.25" high x 21.25" deep. The clear door opening will be 40.75" wide x 49.62" high.

4. There will be a compartment, below the turntable, with a roll-up door. The compartment will be 39.38" wide x 26.38" high x 21.25" deep with a door opening of 33.75" wide x 18.75" high.

4.29.264 SIDE COMPARTMENT ROLL-UP DOORS - There will be ten (10) compartment doors installed on the side compartments, double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™ brand roll-up doors.

1. Door(s) will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

2. Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingression.

3. The doors will be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

4. Bottom panel flange of roll-up door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

5. A stainless steel lift bar to be provided for opening the door and located at the bottom of each door with latches on the outer extrusion of the door frame. A ledge to be supplied over lift bar for additional area to aid in closing the door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

6. All injection molded roll-up door wear components will be constructed of Type 6 nylon.

7. Each roll-up door will have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

8. The header for the roll-up door assembly will not exceed 4.00".

9. A heavy-duty magnetic switch will be used for control of open compartment door warning lights.

4.29.265 COMPARTMENT BLISTER - A blister in the compartment ahead of the rear wheels will be provided to clear the front bracket of the Firemaax suspension. This blister will take away some of the interior area of the compartment.

4.29.266 REAR BUMPER - An 8.00" rear bumper will be furnished. The bumper will be constructed of steel framework and will be covered with polished aluminum treadplate. The bumper will be 7.00" deep x 4.50" high and will be spaced away from the body approximately 1.00". The corners of the bumper will be angled at 30 degrees. It will extend the full width of the body.

4.29.267 DOOR GUARD - There will be 11 compartment doors that will include a guard/drip pan designed to protect the roll-up door from damage when in the retracted position and contain any water spray. The guard will be fabricated from stainless steel and installed High as possible in all compartments.

4.29.268 DOOR LATCHES - SouthCo model #C2-32-11 latches will be provided in place of standard latches. Two (2) latches will be provided. The latches will be provided on all stabilizer doors.

4.29.269 PULL STRAP, DOOR - There will be ten (10) compartment doors provided with pull straps. The compartment door(s) to be provided with a pull strap will be D2, D3, D1, D4, P1, P2, P3, D5, P4 and P5.

4.29.270 PULL STRAP, DOOR - There will be ten (10) compartment doors provided with Amdor Flex-HD pull straps. The compartment door(s) to be provided with a pull strap will be D1.

4.29.271 PAINTED SMOOTH ALUMINUM STABILIZER DOOR - The smooth aluminum door on the compartments above the front stabilizers will be painted job color. Each door will be provided with a Southco non-locking C2 black lever latch.

4.29.272 COMPARTMENT LIGHTING - There will be 11 compartment(s) with two (2) LED compartment light strips. The dual light strips will be centered vertically along each side of the door framing. There will be two (2) light strips per compartment. The dual light strips will be in compartment(s): All compartments.

1. Any remaining compartments will include a single LED compartment light strip.

2. Opening the compartment door will automatically turn the compartment lighting on.

3. There will be a covered metal clamp install 2.00" from each end and evenly spaced no less than 8.00" between the end clamps.

4.29.273 MOUNTING TRACKS - There will be eight (8) sets of tracks for mounting shelf(s) in D3, D1, P1, P3, D4, D5, P4 and P5. These tracks will be installed vertically to support the adjustable shelf(s), and will be full height of the compartment. The tracks will be painted to match the compartment interior.

4.29.274 ADJUSTABLE SHELVES - There will be 14 shelves with a capacity of 500 lb provided.

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

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

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

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

4.29.275 TWO (2) WAY SLIDE-OUT UTILITY TRAY - There will be one (1) slide-out tray provided.

1. Each tray will be rated for up to 500 lb in the extended position. The tray(s) will be constructed of .19" thick aluminum for the tray bottom and special aluminum extrusions for the tray sides, ends and tracks. The corners will be welded.

2. The tray will have 3.00" high sides, will span the full depth of the transverse compartment and will be as wide as possible for the compartment.

3. The tray will be supported with a minimum of six (6) ball bearing rollers. The tray will slide out two thirds (2/3) of its length to either side of the apparatus.

4. Automatic locks will be provided for both the in and out positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

5. The vertical location of the tray within the compartment will be adjustable.

6. The tray(s) location will be determined at the pre-construction meeting.

4.29.276 SLIDE-OUT FLOOR MOUNTED TRAY - There will be four (4) floor mounted slide-out tray(s) provided D-1,P-1,D-4, P-4. A capacity rating will not be available on this tray due to a reduced side height being less than 2.00". The tray(s) will be constructed of a minimum .13" aluminum with welded corners. The finish will be painted to match compartment interior.

1. The tray(s) will be designed for maximum compartment width and depth.

2. The side height of the tray(s) will be as follows:

3. Front: 1.00" high

4. Rear: 2.00" high

5. Left and Right Sides: 2.00" high

6. There will be two undermount-roller bearing type slides rated at 250lb each provided. The pair of slides will have a safety factor rating of 2.

7. To ensure years of dependable service, the slides will be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

8. To ensure years of easy operation, the slides will require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file will have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance will be provided upon request.

9. Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

4.29.277 TWO (2) WAY UTILITY SLIDE-OUT FLOOR MOUNTED TRAY- There will be one (1) floor mounted utility slide-out tray(s) provided Mounted to the floor in D-6, P-6 to go out either side. Each tray will be rated for up to 500lb in the extended position. The tray(s) will be constructed of .19" thick aluminum for the tray bottom and special aluminum extrusions for the tray sides, ends and tracks. The corners will be welded. The finish will be painted to match compartment interior.

1. The tray will be 3.00" high x full depth of the transverse compartment x as wide as possible for the compartment.

2. The tray will be supported with a minimum of six (6) ball bearing rollers. The tray will slide out two thirds (2/3) of its length to either side of the apparatus.

3. Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

4.29.278 TOOL BOARD - An aluminum tool board will be provided.

1. It will be a minimum of .188" thick with .20" diameter holes in a pegboard pattern with 1.00" centers between holes.

2. A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the board.

3. The board will be installed on adjustable tracks on a slide out tray. The tracks will allow side to side adjustment. The board will be as high as space permits and full length of the tray. The tray is not included in this option.

4. There will be Two (2) toolboard(s) provided. The toolboard(s) will be spatter gray painted and installed In the slide out tray of D-6 , P-6 and 36" tall on adjustable track.

4.29.279 TOOLBOARD ADDED TO HALF DEPTH SLIDE-OUT TRAY - An aluminum toolboard will be provided and mounted in a slide-out tray that is half the depth of a transverse compartment (tray not included). The toolboard will be constructed of 0.19" thick aluminum that is painted spatter gray to match compartment interior. The toolboard will be provided with 0.20" diameter holes in a pegboard pattern with 1.00" centers between holes. A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the pegboard.

1. The toolboard will span the full depth of the slide-out tray and will be as tall as possible for the specified mounting location.

2. The toolboard will be mounted on aluminum tracks to allow for side to side adjustment within the tray.

3. The total capacity rating of the toolboard will vary depending on the tray it is mounted in (capacity rating for the toolboard will match the capacity rating of the tray it is mounted in).

4. A total of Two (2) toolboard(s) will be provided and mounted in the slide-out tray(s) location to be determined at pre-construction meeting.

5. SLIDE-OUT TOOLBOARD IN REAR COMPARTMENT - An aluminum toolboard will be provided for use in the rear compartment. The toolboard will be constructed of 0.19" thick aluminum that is painted spatter gray to match compartment interior. The toolboard will be provided with 0.20" diameter holes in a pegboard pattern with 1.00" centers between holes. A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the pegboard.

6. The toolboard will be designed to fit the rear compartment and will be designed to be as tall as possible to fit in the specified mounting location.

7. The toolboard will be mounted inside a 6.00" wide x 3.00" high, utility style slide-out tray. The bottom of the tray will be constructed of 0.19" thick aluminum while special aluminum extrusions will be utilized for the tray sides, ends and tracks. The corners will be welded.

8. The tray will be supported with a minimum of eight (8) ball bearing rollers. The toolboard and tray will slide out two thirds (2/3) of its length in one (1) direction only. Positive locks will be provided for toolboard and tray assembly in both the stowed and extended positions.

9. Additionally, the toolboard and tray assembly will be mounted on shelf type tracks to allow for side to side adjustment within the compartment.

10. The toolboard will be rated for a maximum of 500 lb in the extended position.

11. A total of One (1) toolboard(s) will be provided. The location of each toolboard in the rear compartment will be determined at the pre-construction.

4.29.280 STOKES STORAGE - A bolt-in storage bin will be located in the transverse compartment, D-4, P-4 compartment has room on top of the Torque box for this compartment rear of the compartment. This storage bin will be Plastic stokes basket 86 long x 24 wide x 8 high and will allow room for a stokes basket storage. A strap will be provided on each side to prevent side to side movement of the stokes. The stokes will be accessible from the driver's or passenger's side.

4.29.281 PAINTED STABILIZER TRIM - The trim pieces around the stabilizer openings will be painted job color.

4.29.282 COMPARTMENT IPO HOSE CHUTE - There will be one (1) compartment(s) located on the ds side of the body at the rear, in place of the hose chute. Each compartment will be approximately 17.00" deep x 16.00" high x 10.00" wide. Each compartment will have a smooth aluminum lift up door with a D-ring latch.

4.29.283 TRANSVERSE COMPARTMENT OVER TORQUE BOX - one (1) upper forward body compartments will be transverse over the torque box, to the opposite side of the body. The transverse area will be as large as possible. The in the D-3, P-3 compartment will include this transverse option.

4.29.284 FLOOR EXTENSION - There will be a compartment floor extension provided. The floor extension will extend from the area over the frame rails to within an inch of the compartment door. The floor extension will have a downward 2.00" vertical lip and a 1.00" return flange. The floor extension will be made of .18" thick aluminum. A total of one (1) will be provided and located in the D-5, P-5 compartment at frame rail height so the transverse tray can be mounted on it.

4.29.285 LOCKING NUTS - The SCBA and hatch compartment doors will have nuts with star washers and blue Loctite®. Locking nuts will be provided for the following areas:

1. DEF tank support mounting bracket-to-body.
2. Fuel access door hinges.
3. Wheel chock holder brackets-to-body.
4. Outrigger jack plate storage bracket-to-body.
5. Mud flaps-to-wheel wells.
6. Engine coolant recovery tank under hood mounting bolts.
8. Pump side panel access doors.
9. Rear DS compartment and ladder door hinges.
10. Stream light Survivor and Box light chargers-to-compartment.
11. Relay cover shield for electric components at DS frame rail at transmission.
12. Clamp for step light wires at each crew compartment step.
13. All 12VDC stud terminals whether hot or ground throughout the frame rails and under hood.
14. PS glove box hinge.
15. Interior cab ceiling mounted storage compartment hinges.
16. Interior cab ceiling mounted air conditioning filter and pump access door hinge.
17. Interior cab access door hinge under rear seat transverse compartment.
18. Interior cab access door hinge for engine and transmission oils.
19. Exterior cab transverse compartment access door hinges.
20. Cab mirrors attachment screws-add locking nuts inside under hood after screws are tightened.
21. D1 compartment tool board hinge anchor backing plate bolts-add lock nuts upper and lower after bolts are tightened.
22. Raised module box in R1 ceiling attachment hardware or PS small compartment in aerials.

4.29.286 RUB RAIL - Bottom edge of the side compartments will be trimmed with a bright aluminum extruded rub rail. Trim will be 2.12" high with 1.38" flanges turned outward for rigidity. The rub rails will not be an integral part of the body construction, which allows replacement in the event of damage.

4.29.287 BODY FENDER CROWNS - Black rubber fender crowns will be provided around the rear wheel openings.

4.29.288 EQUIPMENT STORAGE - A total of one (1) compartment(s) will be provided and located on the driver's side centered between the tandem rear wheels. The compartment(s) will be approximately 16.00" wide at the top x 8.00" wide at the bottom with tapered sides. The compartment(s) will be approximately 12.00" high x 26.00". Flooring will be rubber lined and have a drain hole.

A drop down door with support cables and a pair of Southco non-locking C2 black lever latches will be provided for each compartment. The door will be painted stainless steel. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

4.29.289 CORNER FENDER PANEL DOUBLE AIR BOTTLE STORAGE - A total of one (1) air bottle compartment will be provided in the upper corner(s) of the passenger side fender panel. The compartment(s) will be located on the passenger's side ahead of the rear wheel. The air bottle compartment(s) will be in the form of a round tube (7.75" diameter maximum) and of adequate depth (26.00" maximum) to accommodate different size air bottles. The tubes will be mounted separately in a diagonal fashion, one above the other.

Flooring will be rubber lined and have a drain hole. A triangular shaped vertically hinged door and a Southco non-locking C2 black lever latch will be provided for each compartment. The door will be painted stainless steel. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

4.29.290 FOUR AIR BOTTLE STORAGE COMPARTMENT - A total of one (1) air bottle compartment will be provided and located on the passenger's side centered between the tandem rear wheels. The air bottle compartment will consist of individual bins each designed to hold an air bottle with a maximum diameter of 7.63" and a maximum depth of 26.00".

Each compartment will hold a total of four (4) air bottles. The compartment will accommodate three (3) bottles across the top and one (1) centered below. The bottom air bottle will be accessible only when the top center bottle is removed and the hinged partition over the bottom bottle is lifted up. Each bottle will be separated by a partition.

Flooring will be rubber lined and have a drain hole. A drop down door with support cables with pair of Southco non-locking C2 black lever latches will be provided for each compartment. The door will be painted stainless steel. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

4.29.291 AIR BOTTLE COMPARTMENT STRAP -Straps will be provided in the air bottle compartment(s) to help contain the air bottles. The straps will wrap around the neck of each bottle and attach to the wall of the compartment.

4.29.292 AIR BOTTLE STORAGE - A total of two (2) air bottle compartments will be provided and located driver side rear, passenger side rear. The air bottle compartment will be in the form of a round tube, 7.63" diameter, and will be of adequate depth to accommodate different size air bottles. The flooring will be rubber lined and have a drain hole. A painted door with a Southco non-locking C2 black lever latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners (screws) and the body sheet metal.

4.29.293 AIR BOTTLE STORAGE (Single) -A quantity of one air bottle compartment, approximately 7.50" wide x 7.50" tall x 26.00" deep, will be provided on the driver side forward of the rear wheels. The triangular door will cover the air bottle opening and the DEF tank access. The compartment will be square with angled corners. A painted stainless steel door with a Southco non-locking C2 black lever latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal. Inside the compartment, black rubber matting will be provided.

4.29.294 AIR BOTTLE COMPARTMENT STRAP - A strap will be provided in the air bottle compartment to help contain the air bottle when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

4.29.295 EXTENSION LADDER - There will be one (1) 35' two (2) section aluminum Duo-Safety Series 1200-A extension ladder(s) provided.

4.29.296 AERIAL EXTENSION LADDER - There will be one (1) 24' two (2) section aluminum Series 900-A extension ladder(s) provided and located in the aerial torque box.

4.29.297 ROOF LADDERS - There will be two (2) 16' aluminum Duo-Safety Series 875-A roof ladders provided.

4.29.298 ADDED ROOF LADDER - There will be one (1) 20' roof, aluminum, Series 875-A provided.

4.29.299 AERIAL ATTIC EXTENSION LADDER - There will be one (1) 14' Fresno aluminum Duo-Safety Series 701 attic extension ladder(s) provided.

4.29.300 AERIAL FOLDING LADDER - There will be one (1) 10' aluminum Duo-Safety Series 585-A folding ladder(s) provided and located in the aerial torque box.

4.29.301 GROUND LADDER STORAGE - The ground ladders are stored within the torque box and are removable from the rear.

1. Ladders will be enclosed to prevent road dirt and debris from fouling or damaging the ladders.
2. The ladders rest in full length stainless steel slides and are arranged in such a manner that any one ladder can be removed without having to move or remove any other ladder.
3. An AMDOR rollup door will be provided at the rear, double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR manufacturing. The latching mechanism will consist of a full length lift bar lock with latches on the outer extrusion of the door frame.
4. A stainless plate with a two bend flange and a stainless steel hinge will be provided to secure the aerial ladder complement. The plate assembly will be mounted to the bottom of the entrance of the torque box ladder storage area.
5. When the plate is vertical, it will secure the ladders and prevent them from migrating to the rear of the apparatus. When the plate is down and not securing the ladders, the roll-up door cannot close, which will activate the "Open Door Indicator Light" within the cab. The roll-up door together with hinge friction will secure the plate in place during driving operations.
6. A door guard will be provided to prevent tools inside the torque box from damaging the roll-up door.

4.29.302 LADDER STORAGE - The ladder(s) will be stored inside the hose bed between the body sidesheet and one (1) hose bed divider. The ladder(s) will lie flat in a storage trough. Ladder storage assembly will have stainless steel slides and a roller at the rear to aid in loading and removal of ladders. Rear of ladder storage area will have a retaining strap to contain the ladders. The size of the ladders will be tbd. Aluminum grating will be provided above the ladders.

4.29.303 LADDER STORAGE LIGHTING - There will be 21.00" white 12 volt DC LED strip lights in the torque box ladder storage compartment. One (1) light will be provided on each side of the ladder storage area. The lights will be activated when the ladder storage compartment door is opened.

4.29.304 DURA-SURF LADDER SLIDES - Black Dura-Surf friction reducing material will be added to the stainless steel slides, on the bottom horizontal surfaces, of the ladder storage rack.

4.29.305 EQUIPMENT STORAGE - An aluminum trough will be provided in the torque box for the storage of equipment. The "U" shaped trough shall be TBD.

4.29.306 4' PIKE POLE - Four (4) pike poles Fire Hooks Unlimited RH 4' New York style hook with D-handle will be provided and located TBD.

4.29.307 6' PIKE POLE - Two (2) pike poles, Fire Hooks Unlimited, Model RH6, 6' long roof hook, with a steel handle and chisel end will be provided and located TBD.

4.29.308 8' PIKE POLE - There will be One (1) pike pole Fire Hooks Unlimited, Model RH-8, 8' pike pole(s) with steel handle and gas shut off end provided. The pike pole(s) will be stored in tubular holders located TBD.

4.29.309 8' PIKE POLE - One (1) pike pole, Fire Hooks Unlimited, Model RH 8, 8' long roof hook, with a steel handle and chisel end will be provided and located TBD.

4.29.310 PIKE POLES - There will be two (2) Fire Hooks Unlimited NHF-12, 12' pike pole(s) with fiberglass handles provided. The pike pole(s) will be stored on the apparatus.

4.29.311 PIKE POLE 8 FT - There will be one (1) Fire Hooks Unlimited NHF-8, 8 foot pike pole(s) with fiberglass handles provided and located TBD.

4.29.312 ADDITIONAL PIKE POLE - There will be one (1) 8' long pike pole(s), Fire Hooks Unlimited NYFG-8, with fiberglass handle(s) and pry end provided Aerial fly section.

4.29.313 PIKE POLE STORAGE - Aluminum tubing will be used for the storage of three (3) pike poles and will be located in the aerial torque box. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate will be provided.

4.29.314 PIKE POLE STORAGE - Aluminum tubing will be used for the storage of three (3) pike poles and will be located torque box, the 8 eight foot- option- 680352, (2) two 6 foot-option557255. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate will be provided. The pike pole tube will be notched to allow a New York style pike pole to fit into the tube.

4.29.315 WARNING LABEL(S) - There will be one (1) label(s), indicating "NO STEP", provided cover by drivers side batteries inside frame rail that cover s the raised modules.

4.29.316 LABELS AND TAGS - one (1) ID label/tag will be provided. The label/tag will be black colored with contrasting lettering. The label/tag will be located AT THE REAR ABOVE AERIAL INLET LABEL and sized appropriately for the specified location(s). The label/tag will state the following "TEST ONLY".

4.29.317 AIR HORN SYSTEM - Two (2) Buell air horns will be recessed in the front bumper. Models 1062 and 1063 shall be provided. The horn system will be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve will be installed in-line to prevent loss of air in the air brake system.

4.29.318 Air Horn Location - The air horns will be located on each side of the bumper, towards the outside.

4.29.319 AIR HORN CONTROL - The air horns will be actuated by a chrome push button located on the officer's side of the engine tunnel and by the horn button in the steering wheel. The driver will have the option to control the air horns or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

4.29.320 ELECTRONIC SIREN - A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone will be provided. This siren to be active when the battery switch is on and that emergency master switch is on. Electronic siren head will be recessed in the overhead console above the engine tunnel on the driver side.

4.29.321 SIREN CONTROL - The electronic siren will be controllable on the siren head and horn ring only. No foot switches will be required. The driver will have the option to control the siren or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

4.29.322 SPEAKERS - There will be two (2) Whelen Projector™ Series, Model SA314A, 100-watt, cast aluminum speakers with natural finish provided. Each speaker will be connected to the siren amplifier. The speakers will be recessed in each side of the front bumper, just outside of the frame rails.

4.29.323 AUXILIARY MECHANICAL SIREN - A Federal Q2B® siren will be furnished. A siren brake button will be installed on the switch panel. The control solenoid will be powered up after the emergency master switch is activated. The mechanical siren will be recessed in the front bumper in the center. The siren will be properly supported using the bumper framework.

4.29.324 MECHANICAL SIREN CONTROL - The mechanical siren WIll be actuated by a push button located on the officer's side instrument panel and by a foot switch on the driver's side. A second siren brake switch will be installed on the officer side engine tunnel area. The switch will be a chrome push button style.

4.29.325 FRONT ZONE UPPER WARNING LIGHTS - There will be two (2) 23.00" Whelen Freedom IV Rota-Beam LED lightbars mounted on the cab roof, one (1) on each side, above the driver's and passenger's door. The driver's side lightbar will include the following:

- One (1) red flashing LED module in the outside end position.
- One (1) red flashing semi circle LED module in the outside front corner position.
- One (1) white flashing LED module in the outside front position.
- One (1) white flashing LED module in the inside front position.
- One (1) blue flashing semi circle LED module in the inside front corner position.
- The passenger's side lightbar will include the following:
- One (1) blue flashing semi circle LED module in the inside front corner position.
- One (1) white flashing LED module in the inside front position.
- One (1) white flashing LED module in the outside front position.
- One (1) red flashing semi circle LED module in the outside front corner position.
- One (1) red flashing LED module in the outside end position.
- There will be clear lenses included on the lightbar.
- There will be a switch in the cab on the switch panel to control these lightbars.
- The white flashing LED modules will be disabled when the parking brake is applied.
- The blue flashing in a semi circle pattern LED module in the front inside corner positions may be load managed when the parking brake is applied.

4.29.326 TRAFFIC LIGHT CONTROLLER - There will be a GTT, Model 792* strobe Opticom traffic light controller with national standard high priority remote mounted on the front edge of the cab Cab roof ds. The Opticom traffic light controller will be activated by a cab switch with emergency master control. The Opticom traffic light controller will have no momentary activation switch. The Opticom traffic light controller will be disabled when the parking brake is applied.

4.29.327 COVER, TRAFFIC LIGHT CONTROLLER - There will be an aluminum treadplate cover provided over the Opticom traffic light controller for protection.

4.29.328 CAB FACE WARNING LIGHTS - There will be two (2) Whelen, Model M6*C, LED flashing warning lights with chrome flange provided on the front of the cab above the headlights.

- The driver's side front warning light to be blue.
- The passenger's side front warning light to be blue.
- Both lights will include a clear lens.
- There will be a switch located in the cab on the switch panel to control the lights.

4.29.329 FRONT WARNING LIGHT - There will be two (2) Whelen, Model M6*, LED flashing light(s) with chrome trim provided below the headlights as shown on the drawing.

- The color of the light(s) will be red.
- The color of the lens will be clear.
- The light(s) will be activated with the front warning switch.
- These lights may be load managed if colored or disabled if white when the parking brake is applied.
- Any white light will be disabled and any amber light activated when the parking brake is applied.

4.29.330 SIDE ZONE LOWER LIGHTING - There will be six (6) Whelen®, Model M6*C, flashing LED warning lights with chrome trim installed per the following:

1. Two (2) lights, one (1) each side on the bumper extension. The side front lights to be red.
2. Two (2) lights, one (1) each side of cab rearward of crew cab doors. The side middle lights to be blue.
3. Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.
4. The lights will include clear lenses.
5. There will be a switch in the cab on the switch panel to control the lights.

4.29.331 INTERIOR CAB DOOR WARNING LIGHTS - There will be four (4) Weldon, Model 8401-0000-20, amber 12 volt DC LED flashing strip lights provided.

1. One (1) light on the driver's side cab door over the window.
2. One (1) light on the passenger's side cab door over the window.
3. One (1) light on the passenger's side crew cab door over the window.
4. One (1) light on the driver's side crew cab door over the window.
5. Each light will be activated when the battery switch is on and the adjacent door is opened.
6. Each light will be installed so the flash pattern directs traffic away from the doors.

4.29.332 ADDITIONAL SIDE UPPER LIGHTS - There will be six (6) Whelen, Model M4**, 3.38" high x 5.50" long x 1.38" deep LED surface mount flashing lights with chrome trim provided on the outside corner radius of the cab roof over the crew cab doors.

- The side front lights to be red.
- The side middle lights to be blue.
- The side rear lights to be red.
- The color of the lenses will be clear.

1. The lights will be installed on two (2) painted bracket that are attached to the cab roof. Three (3) lights on the driver's side and three (3) lights installed on the passenger's side.

2. There will be a switch in the cab on the switch panel to control the lights.

3. White LED's will be disabled when the parking brake is applied. Colored LED's may be load managed when the parking brake is applied.

4.29.333 SIDE WARNING LIGHTS - There will be two (2) Whelen, Model WIONSMC* LED light(s) provided and located centered over D4 / P4, on the side of the catwalk. The color of each light will be blue LED with a clear lens. Each light will be provided with a chrome plated ABS flange. The light(s) will be activated with the side warning switch.

4.29.334 SIDE WARNING LIGHTS - There will be two (2) Whelen, Model WIONSMC* LED light(s) provided and located centered above D2/P2 on the catwalk.

- The color of each light will be red LED with a clear lens.
- Each light will be provided with a chrome plated ABS flange.
- The light(s) will be activated with the side warning switch.

4.29.335 REAR ZONE LOWER LIGHTING - There shall be two (2) Whelen®, Model M6*C, LED flashing warning lights located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red
- Both lights will include a lens that is clear.
- There will be a switch located in the cab on the switch panel to control the lights.

4.29.336 REAR WARNING LIGHTS - There will be two (2) Whelen®, Model 6RB**, LED flashing warning light(s) with Whelen, Model 6EFLANG, chrome flange(s) provided centered below the rear scene light, on the rear wall.

- The color of the lights will be blue.
- The color of the lens of the light(s) will be clear.
- These lights will be activated with the rear upper warning switch.

4.29.337 REAR OF HOSE BED WARNING LIGHTS - There will be two (2) Whelen Rota-Beam, Model R3165F, 4.00" high x 7.19" wide beacons with red LED's and clear domes provided.

- One (1) will be installed on the driver's side rear of the apparatus.
- One (1) will be installed on the passenger's side rear of the apparatus.
- There will be a switch located in the cab on the switch panel to control the beacons.

4.29.338 TRAFFIC DIRECTING LIGHT - There will be one (1) Whelen® Model TAM85, 46.00" long x 2.87" high x 2.25" deep, amber LED traffic directing light installed at the rear of the apparatus.

1. The Whelen Model TACTL5 control head will be included with this installation.

2. The auxiliary warning mode will be activated with the control head only.

3. This traffic directing light will be mounted on top of the body below the turntable at the rear of the apparatus.

4. The traffic directing light controller will be located within the overhead recessed console above the engine tunnel on the passenger's side.

4.29.339 ELECTRICAL SYSTEM GENERAL DESIGN for ALTERNATING CURRENT -The following guidelines will apply to the 120/240 VAC system installation:

1. General

   A. Any fixed line voltage power source producing alternating current (ac) line voltage will produce electric power at 60 cycles plus or minus 3 cycles.

   B. Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures will conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

   C. Line voltage electrical system equipment and materials included on the apparatus will be listed and installed in accordance with the manufacturer's instructions. All products will be used only in the manner for which they have been listed.

2. Grounding

   A. Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems will not be used. Only stranded or braided copper conductors will be used for grounding and bonding.

   B. An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

   C. The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

   D. In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

   E. All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

3. Operation

   A. Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, will be permanently attached to the apparatus at any point where such operations can take place.

   B. Provisions will be made for quickly and easily placing the power source into operation. The control will be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train will be equipped with a means to prevent the unintentional movement of the control device from its set position.

   C. A power source specification label will be permanently attached to the apparatus near the operator's control station. The label will provide the operator with the information detailed in Figure 19-4.10.

   D. Direct drive (PTO) and portable generator installations will comply with Article 445 (Generators) of the NEC.

4. Overcurrent protection

    A. The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144.00" (3658 mm) in length.

    B. For fixed power supplies, all conductors in the power supply assembly will be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

    C. For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device will be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

5. Wiring Methods

    A. Fixed wiring systems will be limited to the following:

    B. Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)

    C. or

    D. Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

    E. Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring will be run as follows.

    F. Separated by a minimum of 12.00" (305 mm), or properly shielded, from exhaust piping

    G. Separated from fuel lines by a minimum of 6.00" (152 mm) distance

    H. Electrical cord or conduit will be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (610 mm) of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the vehicle.

6. Wiring Identification

    A. All line voltage conductors located in the main panel board will be individually and permanently identified. The identification will reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends will be labeled showing function and wire size.

    B. Wet Locations

    C. All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

    D. All receptacles located in a wet location will be not less than 24.00" (610 mm) from the ground. Receptacles on off-road vehicles will be a minimum of 30.00" (762 mm) from the ground.

E. The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

7. Dry Locations

A. All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 30.00" (762 mm) above the interior floor height.

B. All receptacles will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they will be so marked.

8. Listing - All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

9. Electrical System Testing

A. The wiring and associated equipment will be tested by the apparatus manufacturer or the installer of the line voltage system.

B. The wiring and permanently connected devices and equipment will be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test will be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test will be conducted after all body work has been completed.

C. Electrical polarity verification will be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

10. Operational Test per Current NFPA 1901 Standard

A. The apparatus manufacturer will perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test will be witnessed and the results certified by an independent third-party certification organization.

B. The prime mover will be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

C. The power source will be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in the current NFPA 1901 standard.

D. Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current NFPA 1901 standard will be applied to the low voltage electrical system during the operational test.

4.29.340 GENERATOR

1. The apparatus will be equipped with a complete AC (alternating current) electrical power system. The generator will be a Harrison, Model 10.0MAS-16R/D-11011/15/1, 10,000 watt hydraulic driven unit.

2. The generator will be driven by a transmission power take off unit, through a hydraulic pump and motor.

3. The hydraulic engagement supply will be operational at any time (no interlocks).

4. An electric/hydraulic valve will supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

5. Generator Instruments and Controls - To properly monitor the generator performance a digital meter panel will be furnished and mounted near the circuit breaker panel.

4.29.341 GENERATOR LOCATION - The generator will be permanently mounted above the torque box available space above the torque box.

4.29.342 GENERATOR START - There will be a switch provided on the cab instrument panel to engage the generator.

4.29.343 CIRCUIT BREAKER PANEL - The circuit breaker panel will be located high on the forward wall of compartment D4.

4.29.344 SPARE CIRCUIT BREAKER - The circuit breaker panel will be furnished with two (2) circuit breakers, 120 volt 20 amp, provided as spares.

4.29.345 DIGITAL METER PANEL - The generator meter panel will be installed [Location] in place of the standard location. The digital meter panel will be on anytime the generator is running (no green indicator light is required).

4.29.346 120 VOLT LIGHTING - There will be two (2) Fire Research, Model SPAKR700-K20-ON-HD-***, 120 volt AC 20,000 Lumens LED light(s) with switch, ground base and quick release truck mount brackets provided to be determined. The painted parts of this light assembly to be white with a white bezel. There will be a 30 amp, 120 volt twist lock plug included with each light selected.

4.29.347 ELECTRIC CORD REEL - Furnished with the 120-volt AC electrical system will be an Akron cord reel. The reel will be provided with a 12-volt electric rewind switch that is guarded to prevent accidental operation and labeled for its intended use. The switch will be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

1. The reel will be capable holding 12/3, 600-volt cable or 10/3, 600-volt cable.

2. The exterior finish of the reel(s) will be powder coated silver from the reel manufacturer.

3. A Nylatron guide to be provided to aid in the payout and loading of the reel. A ball stop will be provided to prevent the cord from being wound on the reel.

4. A label will be provided in a readily visible location adjacent to the reel. The label will indicate current rating, current type, phase, voltage and total cable length.

5. A total of two (2) cord reels will be provided one (1) in compartment D5 high and to the left and one (1) in compartment P5 high and to the right.

6. The cord reel should be configured with three (3) conductors.

7. Reel Warranty - The electric reel will come with a five (5)-year warranty provided by the reel manufacturer.

4.29.348 CORD - There will be 200 feet of Carol Super Vu-Tron II yellow 12/3 electrical cord provided for electrical distribution. The cord will be provided with a Fire Power connector. A total of two (2) will be provided.

4.29.349 PORTABLE JUNCTION BOX - There will be four (4)-120 vac 20-amp, Fire Power receptacles, and a locator/indicator light provided in an outlet box. The junction box construction will be weatherproof and have flip-up covers lined with soft neoprene rubber at each outlet opening. The junction box will be a Circle-D, model PF-51G-FP. A total of two (2) will be provided.

4.29.350 120 VOLT RECEPTACLE - There will be two (2), 20 amp 120 volt AC three (3) wire twist lock receptacle(s) with waterproof flip up cover(s) installed (1)on the passenger side rear and (1)driver side nose cone, centered between the warning lights and the headlights. The NEMA configuration for the receptacles will be L5-20R.

- The receptacle(s) will be powered from the on board generator.
- There will be a label installed near the receptacle(s) that state the following:
- Line Voltage
- Current Ratting (amps)
- Phase
- Frequency
- Power Source

4.29.351 FOUR (4)-SECTION 100 FOOT AERIAL LADDER

4.29.352 CONSTRUCTION STANDARDS - The ladder will be constructed to meet all requirements described in the current edition of NFPA 1901 standards. Some portions of this specification exceed minimum NFPA recommendations and will be considered a minimum requirement to be met.

1. A safety factor of 2:1 is desired for environmental loading (wind plus .25" of ice build-up). This structural safety factor will apply to all structural aerial components including turntable and torque box stabilizer components. Definition of the structural safety factor will be as outlined in NFPA standards:

2. DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.

3. RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.

4. WL= Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.

5. FY = Material yield strength. The stress at which material exhibits permanent deformation.

6. 2.5 x DL + 2.5 x RL + 2.5 x WL equal to/less than FY. The minimum NFPA specification is exceeded here by providing a safety factor above 2:1 while flowing water.

7. 2.0 x DL + 2.0 x RL + 2.0 x WL + 2.0 x ice loading equal to/less than FY. The stability factor or tip over safety factor will be a minimum of 1.5:1 as defined by NFPA standards.

8. An independent engineering firm will verify the aerial safety factor. Design verification will include computer modeling and analysis and extensive strain gauge testing witnessed by an independent registered professional engineer. Verification will include written certification from the independent engineering firm made available by the manufacturer upon request from the purchaser.

9. All welding of aerial components, including the aerial ladder sections, turntable, pedestal, and outriggers will be performed by welders who are certified to American Welding Society (AWS) standards and will be performed by personnel who are certified as qualified under AWS welding codes. The weldment assemblies of each production unit will be tested visually and mechanically by an ASNT certified level II non-destructive test technician to comply with NFPA standards. Testing procedures will conform to the AWS standards guide for non-destructive testing. Test methods may include dye penetrant, ultrasound, and magnetic particle where applicable.

4.29.353 LADDER CONSTRUCTION - The ladder will be designed to provide continuous egress for firefighters and civilians from an elevated position to the ground. The egress section will be designed to maintain the rated load of the aerial device. It will be bolted on for easy replacement. To insure a high strength to weight ratio and an inherent corrosion resistance, the aerial ladder will be completely constructed of high-strength aluminum. The ladder will have the capability to support a minimum of 750 lbs. at the tip and 100 lb. equipment allowance in the unsupported configuration, based upon 360-degree rotation, up to full extension and from 8 degrees below horizontal to 76 degrees above horizontal. All side rails, rungs, handrails, uprights and K braces will be made of structural 6061T6 alloy aluminum extrusions.

1. All material will be tested and certified by the material supplier. All ladder sections will be semi-automatically welded by shielded arc welding methods using 5356 aluminum alloy welding wire. Structural rivets or bolts will not be utilized in the ladder weldment sections. Due to the unpredictable nature of fire ground operations, a minimum safety factor of 2.5:1 is desired without .25" of ice build-up.

2. The aerial ladder will consist of four (4) welded, extruded aluminum telescopic ladder sections. Each ladder section will consist of two (2) extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals and two (2) full-length handrails. The rungs on all sections will be K braced for maximum lateral stability. This K bracing will extend to the center of each rung to minimize ladder side deflection.

3. The ladder rungs will be designed to eliminate the need to replace rubber-rung covers. The rungs will be spaced on 14.00" centers and have an integral skid-resistant surface as outlined in NFPA standards. An oval shaped rung will be utilized to provide a larger step surface at low angles and more comfortable grip at elevated positions. The minimum design load will be 500 lbs. distributed over a 3.50" wide area as outlined in NFPA standards.

4. Each aerial ladder section will have heat sensor labels that are preset to 300 degrees Fahrenheit with expiration year. The heat labels will meet NFPA standards.

5. The aerial ladder will exceed NFPA standards governing the minimum ladder section width and handrail height:
   - Base section: 44.38" wide x 36.56" high
   - Lower mid-section: 34.75" wide x 31.69" high
   - Upper mid-section: 27.50" wide x 27.19" high
   - Fly section: 21.38" wide x 23.63" high

4.29.354 VERTICAL HEIGHT- The ladder will extend to a minimum height of 100' above the ground at full extension and elevation. The measurement of height will be consistent with NFPA standards.

4.29.355 HORIZONTAL REACH- The rated horizontal reach will be 91'7". The measurement of horizontal reach will be consistent with NFPA standards. The measurement will be from the outermost rung at full extension to the centerline of turntable rotation.

4.29.356 OPERATION RANGE- The operating range of the ladder will be 8 degrees below horizontal to 76 degrees above horizontal.

4.29.357 TURNTABLE - The upper turntable assembly will connect the aerial ladder to the turntable bearing. The steel structure will have a mounting position for the aerial elevation cylinders, ladder connecting pins, and upper turntable operator's position.

1. A 46.64" diameter turntable bearing with a 3.00" drive gear face will be bolted to the top of the bearing mounting plate with .88" diameter Grade 8 plated bolts. The gear teeth will be stub tooth form. The rated overturning moment of the turntable bearing will be a minimum of 441,400 ft. lbs.

2. The operator's turntable platform will be constructed of 1.00" steel deck plate with non-skid aluminum oxide surface. The platform will extend from the left side of the aerial control station to the right side ladder rail. The platform will extend 23.00" from the turntable control station base with a width of approximately 18.00". The rear of the platform will extend approximately 26.00" back from the turntable and will be approximately 38.00" wide at the rear. The platform will be fastened by Grade 8 bolts.

3. The turntable handrails will be a minimum of 42.00" high and will not increase the overall travel height of the vehicle. The handrails will be constructed from aluminum and have a slip-resistant, knurled surface.

4.29.358 ELEVATION SYSTEM - Dual 6.00" diameter elevating cylinders will be mounted on the underside of the base section of the ladder. Two (2) 2.50" diameter stainless steel pins will fasten the cylinder to the turntable and also fasten to the ladder. The pins will have 125,000 psi minimum yield strength and will be secured with .50" Grade 8 bolts with lock nuts. The bolts are to ensure that the pins do not walk out of the mounting brackets on the turntable and base section.

1. The elevating cylinders will be mounted utilizing maintenance-free spherical bearings on both ends of the cylinders. The aerial base pivot bearings will be maintenance-free type bearings with no external lubrication required. The cylinders will function only to elevate the ladder and not as a structural member to stabilize the ladder side movement. The elevating cylinders will be provided with pilot-operated check valves on the barrel and rod side of the piston to prevent movement of the ladder in case of a loss of hydraulic pressure.

2. The operation envelope will be 8 degrees below horizontal to 76 degrees above horizontal.

3. The elevation system will be designed following NFPA standards. The elevation hydraulic cylinders will incorporate cushions on the upper limit of travel.

4. The hydraulic system will have a hydraulic circuit to reduce the elevation raising speed of the aerial. When the aerial reaches approximately 65 degrees, the circuit will be activated and the elevation speed will be reduced. The reduced speed will minimize the whipping action of the aerial at maximum elevation. This circuit will only be for the raise function of the aerial. The hydraulic elevation cylinders will also serve as a locking device to hold the aerial in the stored position for road travel. The lowering circuit for the hydraulic cylinders will have a relief valve to prevent damage to the aerial base section or boom support when the aerial is being stored.

4.29.359 EXTENSION/RETRACTION SYSTEM - Both power extension and retraction will be furnished and meet the requirements of NFPA standards. Extension will be by way of two (2) extending cylinders mounted underneath the base section of the ladder. The cylinders will be supplied with dual-pilot operated check valves on each stabilizer cylinder to hold the cylinder in position should a charged line be severed at any point in the hydraulic system. No hoses will be permitted between a holding valve and cylinder. The extension cylinders will have a 4.00" internal diameter (bore) and a 119.00" stroke. The cylinders will operate through a block and tackle wire rope arrangement to extend and retract the ladder. Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders. All cylinder and sheave pivot pins will be made of 125,000 psi yield stainless steel material. The cylinder and sheaved bearing will be designed to not require external lubrication (maintenance free).

1. The normal operating wire rope safety factor will be 5:1, and the stall safety factor will be 2:1 based on the breaking strength of the wire ropes. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used will be 1:12. Wire ropes will be constructed of seven (7) strands over an inner wire core for increased flexibility. The wire rope will be galvanized to reduce corrosion. The first section will have four (4), two (2) extend and two (2) retract, 1/2" 7 x 19 galvanized wire ropes. The second section will have four (4), two (2) extend and two (2) retract, 5/16" 7 x 19 galvanized wire ropes.

2. The ladder assembly will consist of four (4) separate weldments that will extend and retract within each other. Nylatron PAG + OIL slide pads will be utilized between each section to minimize friction. Four (4) T type interlocking load transfer stations will enclose the slide pads. The transfer stations will be located at the upper portion of the base and second ladder sections. Additional guide pads will be located along the aerial section to guide the ladder during retraction and extension.

4.29.360 ROTATION SYSTEM - The aerial will be supplied with a powered rotation system as outlined in NFPA standards. The hydraulic rotation motor will provide continuous rotation under all rated conditions and be supplied with a brake to prevent unintentional rotation. The swing drive brake will meet the side pull test as stated in NFPA standards. A high torque, hydraulic motor driven through a spring applied hydraulically released multiple disk brakes into a planetary gearbox will accomplish rotation. The gearbox will have a minimum continuous torque rating of 60,000 in. lbs. and a minimum intermittent rating of 130,000 in. lbs. The turntable bearing, ring gear teeth, pinion gear, planetary gearbox, and output shaft will be certified by the manufacturer of the components for the application.

4.29.361 ROTATION INTERLOCK - A permanently installed prevention mechanism will be provided as part of the rotation system to prevent the rotation of the aerial device to the side in which the stabilizers have not been fully deployed or are short-jacked.

The mechanism will allow full and unrestricted use of the aerial in the 180 degree area on the side(s) where the stabilizers have been fully deployed.

The system will also have a manual override to comply with NFPA 1901.

4.29.362 TORQUE BOX - A torsion box subframe will be installed between the two (2) sets of stabilizers. The torque box will be constructed of .50" thick steel plate (50,000 psi yield), with steel tubing reinforcement on each side of the box in the turntable area. The torque box will be 41.00" wide x 29.00" high x 253.50" long. The torque box subframe assembly will be capable of withstanding all torsional and horizontal loads when the unit is on its stabilizers. The torque box will be bolted to the chassis frame rails using 20 SAE Grade 8, .75" diameter bolts with nuts.

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

1. A load chart will be visible at the operator's station. The load chart will show the recommended safe load at any condition of the aerial device's elevation and extension. The ratings in the unsupported, fully extended configuration (in addition to 100 lbs. of equipment mounted at the tip) will maintain a 2:1 safety factor with a 35 mph wind.

2. The aerial device will have a rated capacity of 750 lbs. consistent with standards. The rated capacity will include 750 lbs. in personnel allowance and 100 lbs. for equipment mounted at the tip of the ladder. The aerial device will be rated in multiple configurations as outlined in NFPA standards.

35 MPH WIND CONDITIONS/WATERWAY DRY

Degrees of Elevation	-8 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 76
Egress/Fly	750	750	750	750	750	1000	1000
Upper Mid	-	-	-	-	250	500	750
Lower Mid	-	-	-	250	500	750	750
Base	-	-	250	500	750	750	750

35 MPH WIND CONDITIONS/WATERWAY CHARGED

Degrees of Elevation	-8 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 76
Egress/Fly	500	500	500	500	750	1000	1000
Upper Mid	-	-	-	-	250	500	750
Lower Mid	-	-	-	250	250	500	750
Base	-	-	250	500	500	500	750

3. Reduced loads at the fly can be redistributed to the mid or base sections as needed.

4. The tip capacity will be reduced to zero when flowing water with the nozzle above the waterway centerline.

4.29.364 BOOM SUPPORT - A heavy duty boom support will be provided for support of the ladder in the travel position. On the base section of the ladder, a stainless steel scuffplate will be provided where the ladder comes into contact with the boom support. The boom support will be located just to the rear of the chassis cab, recessed into the transverse compartment in place of pump.

4.29.365 AERIAL BOOM SUPPORT LIGHT - There will be one (1) Amdor, Model Luma Bar H2O, white LED strip light mounted on the boom support cradle. This light will be activated when the aerial master switch is activated.

4.29.366 TORQUE BOX MODIFIED - The torque box will be modified for slide-out trays.

4.29.367 HYDRAULIC TANK SPECIAL LOCATION - The hydraulic tank will be located on top of the torque box at the front.

4.29.368 AERIAL BOOM PANEL - There will be one boom panel provided on each side of the aerial ladder base section. The boom panel will be painted #90 red. The boom panels will be designed so no mounting bolts are in the face of the panel. This will keep the lettering surface free of holes.

4.29.369 EXTENSION INDICATOR - Extension markings and corresponding numerical indicators will be provided along each inside and outside top rail of the base section of the aerial every 10'. They will indicate various positions of extension up to full. Markings and indicators will be clearly visible to the console operator. To aid in visibility during hours of darkness, the markings and numerical indicators will be red reflective material.

4.29.370 FOLDING STEPS - One (1) set of folding steps will be provided at the tip of the ladder. An additional set of folding steps will be provided at the base of the fly section. The steps will be bright finished, non-skid with a black coating. Each step will incorporate an LED light to illuminate the stepping surface.

4.29.371 AXE MOUNTING BRACKETS - Brackets will be provided near the end of the fly section of the aerial ladder for mounting a fire axe. The mounting plates will be D/A finished aluminum.

4.29.372 STOKES STORAGE BRACKETS - There will be one (1) aluminum bracket(s) provided at the base section of the aerial ladder on the left side of the aerial device while viewed from the turntable. The brackets will be located inboard of the aerial boom panel. The brackets will be D/A finished and include locking pins to secure the basket.

4.29.373 ADDITIONAL INCLINOMETER - There will be one (1) additional inclinometer(s) provided to indicate the degree of elevation of the aerial device. The inclinometer(s) will be located on the outside of the base section on the opposite side of the standard location. A light will be provided to illuminate the inclinometer.

4.29.374 LIMITED RETRACTION - The aerial device will have limited retraction to limit the overall height of the apparatus.

4.29.375 LADDER STORAGE MOUNTING BRACKETS - There will be D/A finished brackets provided near the end of the fly section of the aerial for mounting a roof ladder. The mounting brackets will accommodate a 10' Duo-Safety 775-A roof ladder as determined by the type of aerial device and the available space.

4.29.376 PLATE FOR DEPARTMENT NUMBERS - There will be two (2) painted aluminum plate(s) provided for department numbers. They will be located [Location].

4.29.377 PIKE POLE MOUNTING BRACKETS - Mounting will be provided near the end of the fly section of the aerial ladder for one (1) pike pole(s). The bracket will be sized to hold a Fire Hooks Unlimited 8' NHFG pike pole with D handle.

4.29.378 LIGHTS FOR TURNTABLE WALKWAY - There will be white LED lights provided at the aerial turntable. The lights will be located to illuminate the entire walking surface of the turntable including the area around the turntable console. These lights will be activated by the aerial master switch.

4.29.379 TURNTABLE CONSOLE LIGHTING - There will be one (1), TecNiq Model T10, white LED light strip mounted in the turntable console cover to illuminate the controls located on both the upper and lower portion of the turntable control station. These lights will be activated by the aerial master switch.

4.29.380 STABILIZER CONTROL STATION - There will be two (2) easily accessible control stations, one (1) for driver side stabilizers and one (1) for passenger side stabilizers, located at the rear of the apparatus. The following controls and indicator lights will be clearly identified, illuminated, and conveniently located for ease of operation and viewing at each of the control stations except where otherwise noted:

- Left Rear Stabilizer Firm On Ground indicator light (driver side panel only)
- Left Rear Stabilizer Fully Extended Indicator light (driver side panel only)
- Left Rear Stabilizer In/Out switch (driver side panel only)
- Left Rear Stabilizer Up/Down switch (driver side panel only)
- Left Front Stabilizer Firm On Ground indicator light (driver side panel only)
- Left Front Stabilizer Fully Extended indicator light (driver side panel only)
- Left Front Stabilizer In/Out switch (driver side panel only)
- Left Front Stabilizer Up/Down switch (driver side panel only)
- Right Rear Stabilizer Firm On Ground indicator light (passenger side panel only)
- Right Rear Stabilizer Fully Extended indicator light (passenger side panel only)
- Right Rear Stabilizer In/Out switch (passenger side panel only)
- Right Rear Stabilizer Up/Down switch (passenger side panel only)
- Right Front Stabilizer Firm On Ground indicator light (passenger side panel only)
- Right Front Stabilizer Fully Extended indicator light (passenger side panel only)
- Right Front Stabilizer In/Out switch (passenger side panel only)
- Right Front Stabilizer Up/Down switch (passenger side panel only)
- Hydraulic emergency power switch
- High idle switch

4.29.381 TURNTABLE CONTROL STATION - There will be a turntable control station located on the left hand side of the turntable so the operator will be able to easily observe the ladder tip while operating the controls. The controls will permit the operator to regulate the speed of the aerial functions within safe limits (as determined by the manufacturer and NFPA standards). The controls will be clearly marked and lighted for nighttime operation. A hinged aluminum cover will be provided. The momentary foot switch located at the turntable control station will activate the aerial function controls. The following controls and indicator lights will be clearly identified, illuminated, and conveniently located for ease of operation and viewing:

- Elevation, extension/retraction, and rotation controls
- High idle switch
- Rung alignment indicator light
- Tip/Tracking lights switch
- Hydraulic system pressure gauge
- Indicator/Alarm test switch
- EPU switch
- Operator's load chart
- Stabilizer Not Fully Extended indicator light and alarm

- Monitor controls
- Aerial waterway flow meter

There will also be a minimum of two (2) 12-volt work lights installed on the turntable to illuminate the surrounding area for nighttime operation. The work lights will be activated by the aerial master switch.

4.29.382 STABILIZERS - The vehicle will come equipped with a stabilization system consisting of four (4) hydraulically operated out and down style stabilizers. This system will meet or exceed all requirements of the NFPA specifications related to stabilization and setup on sloped surfaces.

1. The stabilizer/leveling jacks will have a maximum spread of 12' measured from the centerline of the jack footpads when the beams are fully extended. The beams will be 6.88" wide x 9.00" high with 3/4" thick top and bottom plates and 1/2" thick sides of 100,000-PSI minimum yield strength steel. The cylinders will have pilot-operated check valves with thermal relief designed to insure that the beams will not drift out of the stowed position during travel. Wear pads will guide the stabilizers.

2. The horizontal extension cylinders will be totally enclosed within the beams and will incorporate telescoping hydraulic tubing to supply the jack cylinder hydraulic power. Stabilizer hydraulic hoses will remain stationary during operation of the stabilizers to prevent hose wear and potential failure. The cylinders will be equipped with decelerators to reduce the speed of extension and retraction when the beams are near the fully retracted and extended positions. The stabilizer extension hydraulic cylinders will have the following dimensions: 2.25" bore, 1.38" rod, and 27.25" stroke.

3. The vertical jack cylinders will be capable of 12.00" ground penetration. The cylinders will be supplied with pilot operated check valves on each jack cylinder to hold the cylinder in the stowed or working position, should a charged line be severed at any point in the hydraulic system. For safety, the integral holding valves will be located in the cylinder base end, NOT in the transfer tube. Vertical jack cylinder rods will be fully enclosed by a telescoping inner box to protect the cylinder rods from damage. The stabilizer jack hydraulic cylinders will have the following dimensions: 4.25" bore, 3.00" rod, and 28.88" stroke.

4. Each stabilizer jack will have a polished stainless steel shield. The stainless steel shield will be a maximum of 14.00" wide so as to allow the extension of the stabilizer between parked cars or other obstacles. This plate will serve as a protective guard and a mounting surface for warning lights. The top, forward, and rear edges will be flanged back 90 degrees for added strength.

4.29.383 STABILIZER PADS - The stabilizer footpad will be 12.00" in diameter. The footpad will be attached to the jack cylinder rod by means of a machined ball at the end of the jack cylinder rod which mates to a socket machined into the footpad. The footpad will have the ability to pivot 20 degrees from horizontal in any direction to allow setup on uneven terrain.

4.29.384 AUXILIARY STABILIZER PADS - An auxiliary ground pad will be supplied for each stabilizer to provide additional load distribution on soft surfaces. The pads will be 33" x 26" and made from a lightweight composite material. The ground pressure will not exceed 75 pounds per square inch when the ground pads are used and the apparatus is fully loaded and the aerial device is carrying its rated capacity in any position. The pads will be stored in a double stacked configuration, two (2) behind each rear tandem axle in a single bracket.

4.29.385 STABILIZER CONTROLS - An electrically controlled hydraulic valve will power stabilizer movement. The valve can also be manually controlled in the event of electrical malfunction. Hydraulic power override controls will be incorporated into the valve. The manual override mechanism will be completely sealed within the valve assembly to prevent any possibility of corrosion.

The stabilizer controls will be located to provide the operator with a full view of each stabilizer being positioned. All stabilizer control functions can be operated independently or simultaneously, so that the vehicle may be set up in a restricted area or on uneven terrain. Each stabilizer control panel will include the following:

- In/out stabilizer beam control toggle switch
- Up/down stabilizer jack control toggle switch
- Emergency hydraulic power unit (EPU) control toggle switch
- High idle control toggle switch
- Stabilizer fully extended LED indicator lights
- Stabilizer planted LED indicator lights

As a safety device, an electrically actuated diverter valve will be provided. The hydraulic power will be diverted to the aerial ladder controls automatically the instant all stabilizer jacks are firmly planted on the ground. Once the aerial ladder is raised from the bedded position, the stabilizer hydraulic power is cut off so the stabilizers will not accidentally be moved while the aerial is being operated.

To aid in leveling the unit, two bubble type angle indicators will be located near the stabilizer controls. One indicator will show the angle of the truck from the front to rear and the other will show the side to side angle of the truck. The indicators will be color coded green to show when the truck has been properly leveled allowing the aerial device to be operated at full capacity.

A stabilizer deployment audible warning alarm will be provided at each side of the body, activated by the stabilizer movement.

A "Stabilizers Not Stowed" indicator light will be provided in the cab within view of the driver. It will illuminate automatically whenever the stabilizers are not fully stowed to prevent damage to the vehicle if it is moved. The stabilizer system will also be wired to the "Do Not Move Truck" indicator light. This light will flash whenever the apparatus parking brake is not engaged and the stabilizers are not fully stowed.

4.29.386 PAINTED DOOR, STABILIZER CONTROL BOX - Vertically hinged painted aluminum doors will be provided over each stabilizer control box. The doors will be hinged inboard.

4.29.387 STABILIZER PLACEMENT - There will be four (4) lasers provided and installed on the body, one (1) next to each stabilizer. The lasers will be activated with the aerial master switch and will provide a green X on the ground to show where the stabilizer pads need to be set.

There will be four (4) cameras provided and installed on the body, one (1) directly above each stabilizer. The cameras will be activated with a switch in the cab and will provide a picture to specify the fully extended stabilizer position allowing the driver the ability to position the vehicle with the proper clearance for stabilizer deployment.

4.29.388 STABILIZER PANELS - The stabilizer panels will be painted aluminum in place of polished stainless steel.

4.29.389 HYDRAULIC SYSTEM - All high pressure hoses will have an abrasion resistant cover, and have a rating greater than or equal to the working pressure of the circuit in which they are installed. All hydraulic fittings will be plated to minimize corrosion. The fitting will use an O ring face seal, where possible, to minimize hydraulic leaks. All pressure carrying hydraulic hoses will have a 4:1 safety rating based on burst pressure

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

2. The hydraulic system will be of the load sense design to minimize heat build-up and provide smooth control of the aerial ladder. The system will meet the performance requirement in NFPA standards, which requires adequate cooling after less than 2 1/2 hours of operations.

3. All hydraulic components that are non-sealing, where failure could result in the aerial movement, will comply with NFPA standards and have burst strength of 4:1. Dynamic sealing components, where failure could cause aerial movement, will have a margin of 2:1 on maximum operating pressure per NFPA standards. All hydraulic hoses, tubes, and connections will have minimum burst strength of 3:1 per NFPA standards. A hydraulic oil pressure gauge will be supplied at the base control location per NFPA standards.

4. The aerial hydraulic system will be designed in such a manner that a hydraulic pump failure or line rupture will not allow the aerial or outriggers to lose position. Hydraulic holding valves will be mounted directly into cylinders. To insure reliable performance of holding valves, no hoses or tubing will be permitted between a holding valve and cylinder. The aerial will incorporate the use of trombone steel tubes inside the stabilizer beams to eliminate hydraulic hose wear and leaks. Hydraulic power to the ladder will be transferred from the pedestal by a hydraulic swivel.

4.29.390 HYDRAULIC RESERVOIR - The hydraulic system will consist of a 51-gallon reservoir mounted to the torque box and plumbed to the hydraulic pump. There will be plumbing for a supply and return line and a tank drain on the reservoir. The hydraulic pump suction line will have a shut-off ball valve for pump servicing. The hydraulic oil reservoir fill will be labeled per NFPA standards. The hydraulic system will use multiweight, SAE grade oil. ISO grade will be based on geographical location. The manufacturer will certify that the oil meets or exceeds the hydraulic cleanliness rating of 18/15/13 per ISO 4406:1999 before delivery.

4.29.391 HYDRAULIC FILTERS The system will incorporate the following filters to provide dependable service:

- Separate magnet (not on strainer)
- Reservoir suction strainer: 125 mesh
- Pressure filter with by-pass indicator: 2/3/5 micron, Beta rating of 2/20/75 or better
- Return filter with by-pass indicator: 2/3/5 micron, Beta rating of 2/20/75 or better
- Desiccant breather filter: Water capacity 4 fluid oz, 5 micron rating

4.29.392 HYDRAULIC CYLINDERS - All hydraulic cylinders used on the aerial device will be produced by a manufacturer that specializes in the production of hydraulic cylinders.

4.29.393 POWER TAKEOFF / HYDRAULIC PUMP - The apparatus will be equipped with a power takeoff driven by the chassis transmission and actuated by an electric shift located inside the cab. The power takeoff, which drives the hydraulic pump, will meet all the requirements for the aerial unit operations. The hydraulic pump will be a variable displacement piston pump, for consistent and rapid response, and be capable of supplying hydraulic oil at a nominal 26 gpm flow at pressures up to 2800 psi. The system will operate between 500-2800 psi with flow controls to protect hydraulic components and incorporate a relief valve set at 2950 psi to prevent over pressurization. The hydraulic pump will be solely dedicated to aerial operations. An amber indicator light will be installed on the cab instrument panel to notify the operator that the power takeoff is engaged. An interlock will be provided that allows operation of the aerial power takeoff shift only after the chassis spring brake has been set and the chassis transmission has either been placed in the neutral position or drive position after the driveline has been disengaged from the rear axle.

4.29.394 EMERGENCY PUMP - The hydraulic system will be designed with an auxiliary power unit meeting the guidelines of NFPA standards. The auxiliary power unit will be a 12-volt pump connected to the chassis electrical system. The pump will provide operation at reduced speeds to store the aerial device and outriggers for road transportation. Self-centering switches will be provided at the turntable and each stabilizer control station to activate the system. The system will be designed to provide a minimum of 30 minutes of hydraulic power to operate functions.

4.29.395 HYDRAULIC SWIVEL - The aerial ladder will be equipped with a high pressure hydraulic swivel which will connect the hydraulic lines from the hydraulic pump and reservoir, through the rotation point, to the aerial control bank. The hydraulic swivel will allow for 360-degree continuous rotation of the aerial.

4.29.396 ELECTRIC SWIVEL - The ladder will be equipped with an electric swivel to allow 360-degree rotation of the aerial while maintaining connections in all electrical circuits through the rotation point. A minimum of 28 collector rings that are capable of supplying 30-amp continuous service will be provided. All collector rings will be enclosed and protected against condensation and corrosion.

4.29.397 ELECTRICAL SYSTEM - The aerial electrical system will be designed and manufactured in such a way that the power and signal protection and control compartments will contain circuit protection devices and power control devices. The power and signal protection and control components will be protected against corrosion, excessive heat, excessive vibration, physical damage, and water spray. The aerial electrical system will be designed and manufactured to allow the following:

1. All of the serviceable components will be readily accessible.
2. Circuit protection devices will be utilized to protect each circuit.
3. All circuit protection devices will be sized to prevent wire and component damage when subjected to extreme current overload.
4. General protection circuit breakers will be Type-I automatic reset (continuously resetting) or Type-II (manual resetting) and conform to SAE requirements. When required, automotive type fuses conforming to SAE requirements will be utilized to protect electronic equipment.
5. Power control relays and solenoids, when utilized, will have a direct current (dc) rating of 125% of the maximum current for which the circuit is protected.
6. Toggle switches will be utilized that are certified for the outside conditions that fire apparatus experience.
7. All wiring will be protected through conduit or loom.
8. All wiring harnesses will be properly supported to eliminate harness damage through rubbing.
9. All connectors utilized in the system will be of a waterproof design.
10. An inductive proximity switch and illumination light will be incorporated into the boom support.
11. The aerial master and aerial PTO can be engaged after the water pump has been engaged without having to bring the RPM back to idle.
12. Standard cabling to the tip of the aerial will consist of one (1) 16/20 cable and one (1) 12/8 cable.

4.29.398 DRIVER SIDE TORQUE BOX POWER DISTRIBUTION PANEL - A fuse and relay panel, located behind the driver side stabilizer, will include the following:

1. NEMA 4x rated weatherproof enclosure

2. Relays, fuses, and circuit breakers for aerial and stabilizer control power and interlocks

4.29.399 TURNTABLE LIGHTING - The turntable will be lighted for nighttime operation with a minimum of two (2) work lights activated by the aerial master switch. A foot switch will be located at the turntable console to allow hydraulic flow to the aerial device. The foot switch will be protected by a cover to prevent accidental activation. Activation of the foot switch is necessary for aerial device operation.

4.29.400 TURNTABLE CONSOLE - The following switches and indicator lights will be standard on the turntable console:

- High idle on/off switch
- Tip/Tracking light switch
- Indicator and alarm test switch
- Emergency hydraulic power switch
- "Stabilizers Not Fully Extended" amber indicator light
- Rung alignment green indicator light
- The turntable control station will be lighted for nighttime operation with one (1) work light activated by the aerial master switch. A fuse panel will be located in the turntable console.

4.29.401 TURNTABLE OVERRIDE CONTROLS - The aerial manual override controls will be located in the turntable console.

4.29.402 BOOM SUPPORT - A Turck inductive proximity switch will be provided on the boom support to detect if the aerial device is fully stowed within the boom support.

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

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

4.29.405 STABILIZER ALARM - An electronic warning device will be provided at each stabilizer to warn personnel that the stabilizers are being deployed. The alarms will activate whenever a stabilizer control switch is operated and will produce a fast-pulsing 90 dB signal. The alarms will cancel when the stabilizer control switch is released.

4.29.406 STABILIZER SCENE LIGHTS - A 4.00" clear floodlight will be provided on each stabilizer to illuminate the surrounding area. The light will be actuated by the aerial master switch.

4.29.407 TRACKING LIGHTS - There will be two (2) Unity, Model AG-S-P46SLC, 12-volt LED spot lights furnished. Power to the lights will be controlled by a master on/off switch at the turntable control operator's position. Individual switches will also be provided on each light for on/off. The two (2) "tracking lights" will be mounted on the base section of the ladder, one (1) on each side.

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

1. The front stabilizer pan lights will be red LED with a clear lens

2. The rear stabilizer pan lights will be red LED with a clear lens

3. These warning lights will be activated by the same switch as **THE SIDE WARNING LIGHTS.**

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

4.29.410 STABILIZER SCENE LIGHTS - There will be one (1) Amdor Luma Bar H2O, Model AY-9500-012 LED strip light installed under each stabilizer beam to illuminate the surrounding area. A total of four (4) lights will be installed. The lights will be activated by the aerial master switch.

4.29.411 120-VOLT ELECTRICITY TO TIP - A Fire Power, 120-volt, 20 amp three (3)-wire receptacle with weatherproof cover will be provided at the tip of the aerial device.

4.29.412 120 VOLT LADDER TIP LIGHTING - There will be two (2) Fire Research Spectra, Model SPA570-K20, 120 volt AC white LED floodlight(s) with pedestal mounting bracket(s) provided at the tip of the ladder. The light(s) will be located on the driver and passenger side. Light(s) will be switched at the lighthead, turntable, and cab

4.29.413 2-WAY AERIAL COMMUNICATION SYSTEM - There will be a Fire Research model ICA900-112 two-way intercom system provided. The control module will be located on the turntable operator console, provided there is room, and have an LED volume display and push-button volume control. A hands free module will be located at the aerial tip or platform and constantly transmit to the other module unless the control module push-to-talk button is pressed. Each intercom unit will be weatherproof.

4.29.414 RAISED AERIAL PEDESTAL - The aerial pedestal will be raised to accommodate the height of the cab.

4.29.415 LIFTING EYE ASSEMBLY - ROPE RESCUE ATTACHMENT - A lifting eye assembly will be provided that is designed to evenly distribute load at the tip of the aerial. The egress will include attachment points for the lifting eye assembly. The lift eye assembly is retained by two (2) locking pins, one (1) at each end outboard side of the egress. Leveling is maintained by the lifting eye assembly rotating within the egress mounting.

4.29.416 AERIAL TURNTABLE MANSAVER™ BARS - ManSaver™ bars will be installed at the aerial turntable.

4.29.417 WATER SYSTEM - There will be a 5.00" diameter pipe that is connected to the water supply on one end and to a waterway rotation swivel with a 4.00" internal diameter at the rotation point of the turntable. The waterway rotation swivel will allow 360-degree continuous rotation of the aerial device. The waterway will be routed through the rotation swivel up to the horizontal swivel and two slip-tube assemblies, separated by a flexible connection. The horizontal swivel and slip-tube assemblies will allow the water to flow to the ladder pipe, while the aerial ladder is elevated from -8 degrees to +76 degrees. The heel pivot pin will not be integral with the waterway swivel at any point. The design of the waterway will allow complete servicing of the waterway swivel without disturbance to the heel pivot pin. The integral telescopic water system will consist of the following sections:

- 4.50" diameter tube in the base section
- 4.00" diameter tube in the lower mid-section
- 3.50" diameter tube in the upper mid-section
- 3.00" diameter tube in the fly section

The rotational torque will have sufficient power to rotate the ladder into a full 1,500 gpm water stream directed at 90 degrees to the side, while maintaining the 500 pound tip load. The aerial will be capable of discharging up to 1,500 gpm at 100 psi parallel to the ladder and 90 degrees to each side of center, while maintaining the 500 pound tip load.

An adjustable pressure relief valve will be furnished to protect the aerial waterway from a pressure surge. A 1.50" drain valve will be located at the lowest point of the waterway system.

4.29.418 WATERWAY SEALS - The waterway seals will be of Type B PolyPak™ design, composed of a nitroxile seal and a nitrile wiper, which together offer maximum stability and extrusion resistance on the waterway. The seals will be capable of withstanding pressures up to 2,000 psi and temperatures in excess of 250 degrees Fahrenheit, and will have resistance to all foam generating solutions. The seals will be internally lubricated. The waterway seals will have automatic centering guides constructed of synthetic thermal polymer. To insure longer service life and smoother operation, the guides will provide positive centering of the extendable sections within each other and the base section.

4.29.419 AERIAL MONITOR - A Task Force Tips Model Y4-E21A-L monitor with stow will be provided at the tip with a TFT 2000 gpm Model M-ERP2000. The monitor's functions will be controlled electrically from two (2) separate locations. One (1) control will be located at the control console and the other at the ladder tip. There will be a courtesy light at the tip of the aerial to illuminate the controls.

4.29.420 AERIAL WATERWAY FLOW METER - A Fire Research Corporation Model DF430, digital flow indicator with a four (4) digit LED display will be provided for the aerial waterway at the turntable control station. - The display will have a flow totalizer, programmable high and low flow warnings, and automatically adjust LED brightness for day/night viewing.

4.29.421 REAR INLET - A 5.00" NST inlet to the aerial waterway will be provided at the rear of the apparatus. The rear inlet plumbing will be 10 ga. stainless steel. It will be furnished with a 5.00" chrome plated adapter and a 5.00" chrome plated, long handle cap. The outlet will be located on the driver’s side of the torque box, below the stabilizer control box on the rear wall.

4.29.422 WATERWAY LOCKING SYSTEM - The aerial ladder waterway monitor will be capable of being positioned at either the fly section or at the next lower section of the ladder. The monitor location will be changeable by the use of a single handle, located at the side of the ladder. The handle, attached to a cam bracket, will simply be moved forward to lock the monitor at the fly section and back to lock it to the previous section. **There will be no pins to remove and reinstall.** The monitor will be operational at all times, regardless of its position, without connecting or disconnecting electrical lines.

4.29.423 ADAPTER, STORZ INLET - There will be one (1) Storz 5.00" FNST x 5.00" Storz 30 degree elbow(s) with blind cap provided rear.

4.29.424 WATERWAY SHUTOFF VALVE - A 5.00" electric operated butterfly valve will be installed in the aerial waterway. The switch for the valve will be located at the turntable console of the apparatus. There will be a preset relief valve in the waterway between the butterfly valve and the monitor to protect the waterway when retracting.

4.29.425 TOOLS - The following tools will be provided for retorquing of all specified bolts as recommended by the manufacturer:

- Torque Wrench
- All Required Extensions, Sockets and Adapters
- 4-to-1 Multiplier

4.29.426 INITIAL INSTRUCTION - On initial delivery of the fire apparatus, the contractor will supply a qualified representative to demonstrate the apparatus and provide initial instruction to the fire department regarding the operation, care, and maintenance of the apparatus for a period of three (3) days.

4.29.427 MAINTENANCE EDUCATION - Education will be provided to the City of San Antonio Fire Department services personnel at the Fire Department services facility. This education will cover items such as but not limited to Engine, transmission, suspension or aerial device maintenance or repair. The instructor(s) will be fully knowledgeable and have the full support of Pierce Manufacturing to teach such education.

4.29.428 LOOSE EQUIPMENT - One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit will be provided at delivery.

4.29.429 NFPA REQUIRED LOOSE EQUIPMENT PROVIDED BY FIRE DEPARTMENT - The following loose equipment as outlined in NFPA 1901, 2016 edition, section 8.9.3 will be provided by the fire department.

- Two (2) 3 ft - 4 ft plaster hooks with D handles mounted in brackets fastened to the apparatus.
- Two (2) crowbars.
- Two (2) claw tools.
- Two (2) 12 lb (5 kg) sledgehammers.
- One (1) SCBA complying with NFPA 1981 for each assigned seating position, but not fewer than four (4), mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer.
- One (1) spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space(s).
- One (1) first aid kit.
- Six (6) salvage covers, each a minimum size of 12 ft × 18 ft (3.6 m × 5.5 m).
- Four (4) combination spanner wrenches.
- Two (2) scoop shovels.
- One (1) pair of bolt cutters, 24" (0.6 m) minimum.
- Four (4) ladder belts meeting the requirements of NFPA 1983.
- One (1) 150 ft (45 m) light-use life safety rope meeting the requirements of NFPA 1983.
- One (1) 150 ft (45 m) general-use life safety rope meeting the requirements of NFPA 1983.
- Two (2) 150 ft (45 m) utility ropes having a breaking strength of at least 5000 lb (2300 kg).
- One (1) box of tools to include the following:
- one (1) hacksaw with three (3) blades
- one (1) keyhole saw
- one (1) 12" (.3 m) pipe wrench
- -one (1) 24" (.6 m) pipe wrench
- one (1) ballpeen hammer
- one (1) pair of tin snips
- one (1) pair of pliers
- one (1) pair of lineman's pliers
- assorted types and sizes of screwdrivers
- assorted adjustable wrenches
- assorted combination wrenches
- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, Standard for High Visibility Public Safety Vests, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.

- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- One (1) automatic external defibrillator (AED).
- One (1) double female 2.50" adapter with National Hose Threads (if equipped with a fire pump).
- One (1) double male 2.50" adapter with National Hose Threads (if equipped with a fire pump).
- One (1) rubber mallet, for use on suction hose connections (if equipped with a fire pump).
- Two (2) hydrant wrenches (if equipped with a fire pump).
- If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, will be carried mounted in brackets fastened to the apparatus (if equipped with a fire pump).
- If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side will be carried. Any intake connection larger than 3.00" (75 mm) will include a pressure relief device that meets the requirements of 16.6.6 (if equipped with a fire pump).
- If the apparatus does not have a 2.50" National Hose (NH) intake, an adapter from 2.50" NH female to a pump intake will be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake (if equipped with a fire pump).
- If the supply hose carried has other than 2.50" National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2.50" NH thread male discharge and to allow the hose to connect to a 2.50" NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake (if equipped with a fire pump).

4.29.430 DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 8.9.3 requires one (1) approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus. The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

4.29.431 WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 8.9.3 requires one (1) 2.5 gallon or larger water extinguisher mounted in a bracket fastened to the apparatus. The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

4.29.432 FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, Section 8.9.3 requires two (2) flathead axes mounted in brackets fastened to the apparatus. The axes are not on the apparatus as manufactured. The fire department will provide and mount the axes.

4.29.433 **PICKHEAD AXES PROVIDED BY FIRE DEPARTMENT** -NFPA 1901, 2016 edition, Section 8.9.3 requires three (3) pickhead axes mounted in brackets fastened to the apparatus. The axes are not on the apparatus as manufactured. The fire department will provide and mount the axes.

4.29.434 **PAINT** - The exterior custom cab and body painting procedure will consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces will be removed and sanded to a smooth finish. Exterior seams will be sealed before painting. Exterior surfaces that will not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.

2. Chemical Cleaning and Pretreatment - All surfaces will be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces will be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces will be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion. A final pure water rinse will be applied to all metal surfaces.

3. Surfacer Primer - The Surfacer Primer will be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.

4. Finish Sanding - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.

5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.

6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.

7. Clear Coat - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacture.

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

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

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

11. The cab will be two-tone, with the upper section painted #10 white along with a shield design on the cab face and lower section of the cab and body painted #90 red.

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

1. Topcoats and primers will be chrome and lead free.
2. Metal treatment chemicals will be chrome free. The wastewater generated in the metal treatment process will be treated on-site to remove any other heavy metals.
3. Particulate emission collection from sanding operations will have a 99.99% efficiency factor.
4. Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter is used, it will have an efficiency rating of 98.00%. Water wash systems will be 99.97% efficient
5. Water from water wash booths will be reused. Solids will be removed on a continual basis to keep the water clean.
6. Paint wastes are disposed of in an environmentally safe manner.
7. Empty metal paint containers will be to recover the metal.
8. Solvents used in clean-up operations will be recycled on-site or sent off-site for distillation and returned for reuse.
9. Additionally, the finished apparatus will not be manufactured with or contain products that have ozone depleting substances. Contractor will, upon demand, present evidence that the manufacturing facility meets the above conditions and that it is in compliance with his State EPA rules and regulations.

4.29.436 **PAINT CHASSIS FRAME ASSEMBLY** - The chassis frame assembly will be painted to match the lower job color before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc. Components that are included with the chassis frame assembly that will be painted are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles
- Rear Body support substructure (front and rear)
- Pump house substructure
- Air tanks
- Fuel tank
- Castings
- Individual piece parts used in chassis and body assembly
- Components treated with epoxy E-coat protection prior to paint:
- Two (2) C-channel frame rails
- Two (2) frame liners
- The E-coat process will meet the technical properties shown.

4.29.437 **PAINT, FRONT WHEELS** - All wheel surfaces, inside and outside, will be provided with powder coat paint #90 red.

4.29.438 **PAINT, REAR WHEELS** - All wheel surfaces, inside and outside, will be provided with powder coat paint #90 red.

4.29.439 **AERIAL DEVICE BOOM SUPPORT PAINT** - The aerial device boom support will be painted job color to match lower body paint color.

4.29.440 **FUEL TANK LABEL** - The manufacturer's label on the fuel tank will be taped off so that it does not get painted.

4.29.441 **COMPARTMENT INTERIOR PAINT** - The compartment interior will be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

4.29.442 **AERIAL TURNTABLE PAINT COLOR** - All aerial device ladder components above the rotation point that are not chrome plated or stainless steel will have a natural swirl finish. All buy out components, such as monitor, nozzle, gauges, etc. will be supplied as received from the vendor. Turntable, console, lift cylinders, and extension cylinders will be sanded to remove any metal flakes and smooth any rough surfaces. These components will be prime painted with an epoxy primer and finished painted with a durable white 10 high quality paint (manufacturer's standard brand). The support structure, rotation motor, components below the rotation point, and the stabilizers will be painted high gloss black. The tip of the ladder will be painted a contrasting color for high visibility.

4.29.443 **REFLECTIVE STRIPES** - Three (3) reflective stripes will be provided across the front of the vehicle and along the sides of the body. The reflective band will consist of a 1.00" white stripe at the top with a 1.00" gap then a 6.00" white stripe with a 1.00" gap and a 1.00" white stripe on the bottom.

4.29.444 **CHEVRON STRIPING ON THE FRONT BUMPER** - There will be alternating chevron striping located on the front bumper. The colors will be red and fluorescent yellow green diamond grade. The size of the striping will be 6.00".

4.29.445 **REAR CHEVRON STRIPING** - There will be alternating chevron striping located on the rear-facing vertical surface of the apparatus. Covered surfaces will include the rear wall, aluminum doors, and rear bumper. Rear compartment doors and stainless steel access doors will not be covered.

1. The colors will be red and fluorescent yellow green diamond grade.
2. Each stripe will be 6.00" in width.
3. This will meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface will be covered with chevron striping.

4.29.446 **REFLECTIVE STRIPE ON STABILIZERS** -There will be 4.00" wide alternating red diamond grade and fluorescent yellow green diamond grade reflective chevron stripes provided on the forward and rear facing sides of all four (4) aerial stabilizers. The stripes will be angled at a 45 degree angle.

4.29.447 **JOG(S) IN REFLECTIVE BAND** - The reflective band located on each side of the apparatus body will contain one (1) jog(s) and will be angled at approximately a 45 degrees when installed.

4.29.448 **REFLECTIVE STRIPE INSIDE RUBRAILS** - A reflective stripe will be provided inside the extruded aluminum rubrails. The reflective material will be red (tomato red). There will be a quantity of ten (10) rubrails striped.

4.29.449 **INVERTED "V" CHEVRON STRIPING ON CAB AND CREW CAB DOORS** - There will be alternating chevron striping located on the inside of each cab and crew cab door. The striping will consist of the following colors:

- The first color will be red diamond grade

- The second color will be fluorescent yellow green diamond grade
- The size of the striping will be 4.00".

4.29.450 **LETTERING** - Twenty-one (21) to forty (40) reflective lettering, 3.00" high, with [Outline, Lettering] will be provided.

4.29.451 **LETTERING/NUMERALS ON CAB GRILLE** - Up to six (6) painted letters/numerals with outline, as determined by the fire department, will be provided on the cab grille.

4.29.452 **LETTERING/NUMERALS ON CAB GRILLE** - Three (3) painted letters/numerals with outline, as determined by the fire department, will be provided on the cab grille.

4.29.453 **LETTERING/NUMERALS ON CAB GRILLE** - Up to six (6) painted letters/numerals with outline, as determined by the fire department, will be provided on the cab grille.

4.29.454 FIRE APPARATUS PARTS USB MANUAL - There will be two (2) custom parts manuals for the complete fire apparatus provided in USB format with the completed unit. The manuals will contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in alphabetical order
- Instructions on how to locate parts
- The manuals will be specifically written for the chassis and body model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

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

4.29.456 CHASSIS SERVICE USB MANUALS - There will be two (2) USB format chassis service manuals containing parts and service information on major components provided with the completed unit.

- The manual will contain the following sections:
- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- EngineTires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix
- The manual will be specifically written for the chassis model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

4.29.457 CHASSIS OPERATION USB MANUALS - There will be two (2) USB format chassis operation manuals provided.

4.29.458 Software - Software to maintain the apparatus will be included in purchase. This will include items such as (but not limited to) software for Detroit Diesel, Allison Transmission and Wabco systems.

4.29.459 VEHICLE STABILITY CERTIFICATION - The fire apparatus manufacturer will provide a certification stating the apparatus complies with NFPA 1901, current edition, section 4.13, Vehicle Stability. The certification will be provided at the time of bid.

4.29.460 ENGINE INSTALLATION CERTIFICATION - The fire apparatus manufacturer will provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification will be provided at the time of bid.

4.29.461 POWER STEERING CERTIFICATION - The fire apparatus manufacturer will provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification will be provided at the time of bid.

4.29.462 CAB INTEGRITY CERTIFICATION - The fire apparatus manufacturer will provide a cab integrity certification with this proposal. The certification will state that the cab has been tested and certified by an independent third-party test facility. Testing events will be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. The fire apparatus manufacturer will provide a state-licensed professional engineer to witness and certify all testing events. Testing will meet or exceed the requirements below:

- European Occupant Protection Standard ECE Regulation No.29.
- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.
- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.
- Roof Crush
- The cab will be subjected to a roof crush force of 22,050 lb. This value meets the ECE 29 criteria and is equivalent to the front axle rating up to a maximum of 10 metric tons.
- Additional Roof Crush
- The same cab will be subjected to a roof crush force of 100,000 lbs. This value exceeds the ECE 29 criteria by nearly 4.5 times.

1. Side Impact - The same cab will be subjected to dynamic preload where a 13,275 lb moving barrier slams into the side of the cab at 5.5 mph at a force of 13,000 ft-lbs. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab will see in a rollover incident.

2. Frontal Impact - The same cab will withstand a frontal impact of 32,600 ft-lbs of force using a moving barrier in accordance with SAE J2420.

3. Additional Frontal Impact - The same cab will withstand a frontal impact of 65,200 ft-lbs of force using a moving barrier, (twice the force required by SAE J2420). The same cab will withstand all tests without any measurable intrusion into the survival space of the occupant area.

4.29.463 CAB DOOR DURABILITY CERTIFICATION - Robust cab doors help protect occupants. Cab doors will survive a 200,000 cycle door slam test where the slamming force exceeds 20 G's of deceleration. The bidder will certify that the sample doors similar to those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

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

4.29.465 ELECTRIC WINDOW DURABILITY CERTIFICATION - Cab window roll-up systems can cause maintenance problems if not designed for long service life. The window regulator design will complete 30,000 complete up-down cycles and still function normally when finished. The bidder will certify that sample doors and windows similar to those provided on the apparatus have been tested and have met these criteria without malfunction or significant component wear.

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

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

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

4.29.469 CAB AIR CONDITIONING PERFORMANCE CERTIFICATION - Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system will cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 67 degrees Fahrenheit in 30 minutes. The bidder will certify that a substantially similar air conditioning system has been tested and has met these criteria. The certification will be available at the time of delivery.

4.29.470 AMP DRAW REPORT - The bidder will provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system. The manufacturer of the apparatus will provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which will include the following:
- The nameplate rating of the alternator.
- The alternator rating under the conditions specified per:
- Applicable NFPA 1901 or 1906 (Current Edition).
- The minimum continuous load of each component that is specified per:
- Applicable NFPA 1901 or 1906 (Current Edition).
- Additional loads that, when added to the minimum continuous load, determine the total connected load.
- Each individual intermittent load.
- All of the above listed items will be provided by the bidder per the applicable NFPA 1901 or 1906 (Current Edition).

4.30

ITEM	Quantity	Description
1	6	Pierce Velocity Ladder Truck with Platform

The trucks identified here shall be the same make and model of Pierce Velocity Ladder truck, as identified in Item #1 above, with the addition of these specifications outlined below:

4.30.1 WHEELBASE - The wheelbase of the vehicle will be 268.00".

4.30.2 GVW RATING - The gross vehicle weight rating will be 80,800 lbs.

4.30.3 FRAME & FRAME REINFORCEMENT – see 4.29.4 and 4.29.4

4.30.4 FRONT NON DRIVE AXLE – see 4.29.7

4.30.5 FRONT SUSPENSION – see 4.29.8

4.30.6 FRONT SHOCK ABSORBERS – 4.29.14

4.30.7 FRONT OIL SEALS – see 4.29.15

4.30.8 FRONT TIRES – see 4.29.16

4.30.9 REAR AXLE – see 4.29.17

4.30.10 TOP SPEED OF VEHICLE– see 4.29.18

4.30.11 REAR SUSPENSION– see 4.29.19

4.30.12 REAR OIL SEALS– see 4.29.20

4.30.13 REAR TIRES– see 4.29.21

4.30.14 TIRE BALANCE– see 4.29.22

4.30.15 TIRE PRESSURE MANAGEMENT– see 4.29.23

4.30.16 FRONT HUB COVERS– see 4.29.24

4.30.17 REAR HUB COVERS– see 4.29.25

4.30.18 CHROME LUG NUT COVERS– see 4.29.26

4.30.19 MUD FLAPS– see 4.29.27

4.30.20 WHEEL CHOCKS– see 4.29.28

4.30.21 WHEEL CHOCK BRACKETS– see 4.29.29

4.30.22 ELECTRONIC STABILITY CONTROL– see 4.29.30

4.30.23 ANTI-LOCK BRAKE SYSTEM– see 4.29.31

4.30.24 AUTOMATIC TRACTION CONTROL – see 4.29.32

4.30.25 BRAKES– see 4.29.33

4.30.26 AIR COMPRESSOR, BRAKE SYSTEM– see 4.29.34

4.30.27 BRAKE SYSTEM – see 4.29.35

4.30.28 BRAKE SYSTEM AIR DRYER – see 4.29.36

4.30.29 BRAKE LINES – see 4.29.37

4.30.30 AIR INLET/OUTLET – see 4.29.38

4.30.31 ALL WHEEL LOCK-UP – see 4.29.39

4.30.32 AUXILLARY BRAKING SYSTEMS – see 4.29.40

4.30.33 COMPRESSION FITTINGS ONLY – see 4.29.43

4.30.34 ENGINE – see 4.29.44

4.30.35 HIGH IDLE – see 4.29.45

4.30.36 ENGINE BRAKE – see 4.29.46

4.30.37 CLUTCH FAN – see 4.29.47

4.30.38 ROCKER COVER BOLTS – see 4.29.48

4.30.39 HEAVY DUTY OIL LINE – see 4.29.49

4.30.40 ENGINE AIR INTAKE – see 4.29.50

4.30.41 EXHAUST SYSTEM – see 4.29.51

4.30.42 RADIATOR – see 4.29.52

4.30.43 COOLANT LINES – see 4.29.53

4.30.44 INSULATION WRAP – see 4.29.54

4.30.45 FUEL TANK – see 4.29.55

4.30.46 DIESEL EXHAUST FLUID TANK – see 4.29.56

4.30.47 AUXILIARY FUEL PUMP– see 4.29.57

4.30.48 FUEL COOLER – see 4.29.58

4.30.49 TRANSMISSION – see 4.29.59

4.30.50 TRANSMISSION SHIFTER – see 4.29.60

4.30.51 TRANSMISSION COOLER– see 4.29.61

4.30.52 DOWNSHIFT MODE (W/ENGINE BRAKE) – see 4.29.62

4.30.53 DRIVELINE – see 4.29.63

4.30.54 PAINT PUMP TRANSMISSION AND DRIVE TRANSMISSION OUTPUT YOKES – see 4.29.65

4.30.55 GREASE SHIELD – see 4.29.64

4.30.56 STEERING – see 4.29.66

4.30.57 STEERING WHEEL – see 4.29.67

4.30.58 LOGO AND CUSTOMER DESIGNATION ON DASH – 4.29.68

4.30.59 TAG/LABEL – see 4.29.69

4.30.60 BUMPER – see 4.29.70

4.30.61 GRAVEL PAN – see 4.29.71

4.30.62 LIFT AND TOW MOUNTS WITH TOW EYES – see 4.29.72

4.30.63 TOW EYES – see 4.29.73

4.30.64 TOW HOOKS – see 4.29.74

4.30.65 CAB – see 4.29.75

4.30.66 INTERIOR CAB INSULATION – see 4.29.76

4.30.67 FENDER LINERS – see 4.29.77

4.30.68 PANORAMIC WINDSHIELD – see 4.29.78

4.30.69 WINDSHIELD WIPERS – see 4.29.79

4.30.70 FAST SERVICE ACCESS FRONT TILT HOOD – see 4.29.80

4.30.71 ENGINE TUNNEL – see 4.29.81

4.30.72 CAB REAR WALL EXTERIOR COVERING – see 4.29.82

4.30.73 CAB LIFT – see 4.29.83

4.30.74 CAB LIFT INTERLOCK – see 4.29.84

4.30.75 GRILLE – see 4.29.85

4.30.76 SCUFFPLATE – see 4.29.86

4.30.77 FRONT CAB TRIM – see 4.29.87

4.30.78 MIRRORS – see 4.29.88

4.30.79 MIRROR (SIDE VIEW) – see 4.29.89

4.30.80 FRONT CROSS VIEW MIRROR – see 4.29.90

4.30.81 CAB DOORS – see 4.29.91

4.30.82 CAB DOOR PANELS – see 4.29.92

4.30.83 RECESSED POCKET WITH ELASTIC COVER – see 4.29.93

4.30.84 ELECTRIC WINDOW CONTROLS – see 4.29.94

4.30.85 ELECTRIC CAB DOOR LOCKS – see 4.29.95

4.30.86 DUAL STEPS – see 4.29.96

4.30.87 STEP LIGHTS – see 4.29.97

4.30.88 FENDER CROWNS – see 4.29.98

4.30.89 CREW CAB WINDOWS – see 4.29.99

4.30.90 WINDOWS INTERIOR TRIM – see 4.29.100

4.30.91 STORAGE COMPARTMENT – see 4.29.101

4.30.92 SPECIAL FASTENERS (UNDER SIDE OF CAB INSULATION) – see 4.29.102

4.30.93 CAB INSULATION – see 4.29.103

4.30.94 MOUNTING PLATE ON ENGINE TUNNEL– see 4.29.104

4.30.95 MOUNTING PLATE(S) – see 4.29.105

4.30.96 CAB INTERIOR – see 4.29.106

4.30.97 CAB INTERIOR UPHOLSTERY – see 4.29.107

4.30.98 CAB INTERIOR PAINT– see 4.29.108

4.30.99 CAB FLOOR – see 4.29.109

4.30.100 CAB DEFROSTER – see 4.29.110

4.30.101 AIR CONDITIONING – see 4.29.111

4.30.102 INTERIOR CAB INSULATION – see 4.29.112

4.30.103 SUN VISORS – see 4.29.114

4.30.104 GRAB HANDLE – see 4.29.115

4.30.105 ENGINE COMPARTMENT LIGHTS – see 4.29.116

4.30.106 ACCESS TO ENGINE DIPSTICKS – see 4.29.117

4.30.107 MAP BOX – see 4.29.118

4.30.108 CAB SAFETY SYSTEM – see 4.29.119

4.30.109 FRONTAL IMPACT PROTECTION – see 4.29.120

4.30.110 SIDE ROLL PROTECTION – see 4.29.121

4.30.111 SEATING CAPACITY – see 4.29.122

4.30.112 DRIVER SEAT – see 4.29.123

4.30.113 OFFICER SEAT – see 4.29.124

4.30.114 REAR FACING DRIVER SIDE EMS COMPARTMENT – see 4.29.125

4.30.115 STORAGE COMPARTMENT – see 4.29.126

4.30.116 STORAGE COMPARTMENT – see 4.29.127

4.30.117 FORWARD FACING DRIVER SIDE OUTBOARD SEAT – see 4.29.128

4.30.118 FORWARD FACING CENTER SEAT – see 4.29.129

4.30.119 FORWARD FACING PASSENGER SIDE OUTBOARD SEAT – see 4.29.130

4.30.120 EMS COMPARTMENTS – The rear facing EMS compartments will be stacked side by side by side, secured to each other with bolts to prevent rattling. The center compartment and driver's side compartment will be moved off center towards the passenger's side to allow them to all be tight together.

4.30.121 SHELVING – see 4.29.131

4.30.122 CAB COMPARTMENT LIGHTING – see 4.29.132

4.30.123 SEAT UPHOLSTERY – see 4.29.133

4.30.124 AIR BOTTLE HOLDERS – see 4.29.134

4.30.125 SEAT BELTS – see 4.29.135

4.30.126 SHOULDER HARNESS HEIGHT ADJUSTMENT – see 4.29.136

4.30.127 HELMET STORAGE, PROVIDED BY FIRE DEPARTMENT – see 4.29.137

4.30.128 CAB DOME LIGHTS – see 4.29.138

4.30.129 ADDITIONAL DOME LIGHTS – see 4.29.139

4.30.130 OVERHEAD MAP LIGHTS – see 4.29.140

4.30.131 HAND HELD SPOTLIGHT – see 4.29.141

4.30.132 POWER TO HAND HELD SPOTLIGHT – see 4.29.142

4.30.133 HAND HELD LIGHT – see 4.29.143

4.30.134 CAB INSTRUMENTATION – see 4.29.144

4.30.135 GAUGES – see 4.29.145

4.30.136 INDICATOR LAMPS – see 4.29.146

4.30.137 ALARMS – see 4.29.147

4.30.138 INDICATOR LAMP AND ALARM PROVE-OUT – see 4.29.148

4.30.139 CONTROL SWITCHES – see 4.29.149

4.30.140 CUSTOM SWITCH PANELS – see 4.29.152

4.30.141 DIAGNOSTIC PANEL – see 4.29.153

4.30.142 CAB LCD DISPLAY – see 4.29.154

4.30.143 AIR RESTRICTION INDICATOR – see 4.29.157

4.30.144 "DO NOT MOVE APPARATUS" INDICATOR – see 4.29.158

4.30.145 DO NOT MOVE TRUCK MESSAGES – see 4.29.159

4.30.146 SWITCH PANELS – see 4.29.160

4.30.147 WIPER CONTROL – see 4.29.161

4.30.148 HOURMETER - AERIAL DEVICE – see 4.29.162

4.30.149 AERIAL MASTER – see 4.29.163

4.30.150 AERIAL PTO SWITCH – see 4.29.164

4.30.151 SPARE CIRCUIT – see 4.29.165

4.30.152 SPARE CIRCUIT – see 4.29.166

4.30.153 SPARE CIRCUIT – see 4.29.167

4.30.154 SPARE CIRCUIT – see 4.29.168

4.30.155 SPARE CIRCUIT – see 4.29.169

4.30.156 SPARE CIRCUIT– see 4.29.170

4.30.157 SPARE CIRCUIT– see 4.29.171

4.30.158 EMERGENCY LIGHT SWITCHES – see 4.29.172

4.30.159 STEREO RADIO – see 4.29.173

4.30.160 PUSH BUTTON MOUNTING BRACKET – see 4.29.174

4.30.161 INFORMATION CENTER – see 4.29.175

4.30.162 GENERAL SCREEN DESIGN – see 4.29.176

4.30.163 HOME/TRANSIT SCREEN – see 4.29.177

4.30.164 ON SCENE SCREEN – see 4.29.178

4.30.165 VIRTUAL BUTTONS – see 4.29.179

4.30.166 PAGE SCREEN – see 4.29.180 through 4.29.184

4.30.167 VEHICLE DATA RECORDER– see 4.29.185

4.30.168 SEATBELT MONITORIG SYSTEM – see 4.29.186

4.30.169 INTERCOM SYSTEM- see 4.29.187

4.30.170 WIRELESS UNDER HELMET, RADIO TRANSMIT, ONLY HEADSET- see 4.29.188

4.30.171 HEADSET HANGERS – see 4.29.189

4.30.172 AUXILIARY AUDIO CABLE – see 4.29.190

4.30.173 REMOTE ON/OFF SWITCH FOR AM/FM RADIO – see 4.29.191

4.30.174 COMPLETE MDT INSTALLATION – see 4.29.192

4.30.175 PORTABLE RADIO CHARGER INSTALLATION – see 4.29.193

4.30.176 GPS ANTENNA INSTALLATION – see 4.29.194

4.30.177 RADIO ANTENNA MOUNT – see 4.29.195

4.30.178 RADIO INSTALLED – see 4.29.196

4.30.179 VEHICLE CAMERA SYSTEM – see 4.29.197 through 4.29.198

4.30.180 VEHICLE CAMERA GUARD – see 4.29.199

4.30.181 ELECTRICAL POWER CONTROL SYSTEM – see 4.29.200

4.30.182 SOLID-STATE CONTROL SYSTEM – see 4.29.201

4.30.183 CIRCUIT PROTECTION AND CONTROL DIAGRAM – see 4.29.202

4.30.184 ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS – see 4.29.203

4.30.185 TECH MODULE WITH WIFI – see 4.29.204

4.30.186 PROGNOSTICS – see 4.29.205

4.30.187 ADVANCED DIAGNOSTICS – see 4.29.206

4.30.188 INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM – see 4.29.207

4.30.189 VOLTAGE MONITOR SYSTEM – see 4.29.208

4.30.190 DEDICATED RADIO EQUIPMENT CONNECTION POINTS – see 4.29.209

4.30.191 ENHANCED SOFTWARE – see 4.29.210 through 4.29.213

4.30.192 EMI/RFI PROTECTION – see 4.29.214

4.30.193 ELECTRICAL – see 4.29.215

4.30.194 BATTERY SYSTEM – see 4.29.216 through 4.29.218

4.30.195 MASTER BATTERY SWITCH – see 4.29.219 through 4.29.220

4.30.196 BATTERY COMPARTMENTS – see 4.29.221

4.30.197 JUMPER STUDS – see 4.29.222

4.30.198 BATTERY CHARGER/ AIR COMPRESSOR – see 4.29.223

4.30.199 AUTO EJECT FOR SHORELINE – see 4.29.225

4.30.200 ALTERNATOR – see 4.29.226

4.30.201 ELECTRICAL REQUIREMENTS – All electrical components will be mounted above the frame rails. Nothing should be hanging below the frame rails.

4.30.202 SPECIAL LOCATED JUCTION BOX – The junction box normally located behind the DS front cab door step for the shoreline will be relocated to inside the cab.

4.30.203 RELOCATE, REAR COMMAND ZONE POWER DISTRIBUTION – The command zone modules at the rear of the truck will be relocated to behind the fuel tank. The module will be mounted vertical and as high as possible.

4.30.204 POWER DISTRIBUTION RELOCATE – The relays/solenoids and fuses located in the frame rail will be located in between the frame rails, on the driver side, as high as possible.

4.30.205 There will be an aluminum cover installed around the components to help deflect water and steam.

4.30.206 LABOR FOR CUSTOMER CHANGE - There will be one (1) hours of labor to for removing the PELCC lights from the rear

4.30.207 ELECTRONIC LOAD MANAGER – see 4.29.227

4.30.208 SEQUENCER – see 4.29.228

4.30.209 HEADLIGHTS – see 4.29.229

4.30.210 DIRECTIONAL LIGHTS – see 4.29.230

4.30.211 INTERMEDIATE LIGHT – see 4.29.231

4.30.212 CAB CLEARANCE/MARKER/ID LIGHTS – see 4.29.232

4.30.213 PLATFORM CLEARANCE/MARKER/ID LIGHTS

1. There will be five (5) Truck-Lite, Model 35075Y, amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

2. Three (3) amber LED identification lights will be installed on the front of the aerial basket, centered.

3. Two (2) amber LED clearance/marker lights will be installed, one (1) on each corner of the aerial basket visible from the side and the front of the vehicle.

4. The lights will be mounted with an aluminum guard.

4.30.214 REAR CLEARANCE/MARKER/ID LIGHTING – see 4.29.233

4.30.215 MARKER LIGHTS – see 4.29.234

4.30.216 REAR FMVSS LIGHTING – see 4.29.235

4.30.217 LICENSE PLATE BRACKET – see 4.29.236

4.30.218 LIGHTING BEZEL – see 4.29.237

4.30.219 BACK-UP ALARM – see 4.29.238

4.30.220 DEUTSCH CONNECTIONS – see 4.29.239

4.30.221 CAB PERIMETER SCENE LIGHTS – see 4.29.240

4.30.222 PUMP HOUSE PERIMETER LIGHTS - There will be one (1) Amdor LumaBar H2O™, Model AY-9500-012, 12.00" LED weatherproof strip lights with brackets provided under the passenger's side pump panel running boards. The lights will be controlled by the same means as the body perimeter lights.

4.30.223 BODY PERIMETER SCENE LIGHTS – see 4.29.241

4.30.224 ADDITIONAL PERIMETER LIGHTS – see 4.29.242

4.30.225 STEP LIGHTS – see 4.29.243

4.30.226 SCENE LIGHTS – see 4.29.244

4.30.227 SCENE LIGHTS – see 4.29.245

4.30.228 12 VOLT LIGHTING – see 4.29.246 – 4.29.250

4.30.229 REAR SCENE LIGHT(S) – see 4.29.251

4.30.230 WALKING SURFACE LIGHT – see 4.29.252

4.30.231 CARGO AREA – see 4.29.253

4.30.232 RUNNING BOARDS – The running boards will be fabricated of 0.125" bright aluminum treadplate and supported by structural steel angle assemblies bolted to the chassis frame rails with the following requirements:

1. Running boards will be 14.75" deep and are spaced away from the body 0.50". The rear outside corner or the running board will be finished with a 45 degree corner to match it up with the body width.

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

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

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

4.30.233 TURNTABLE STEPS – see 4.29.254

4.30.234 STEP LIGHTS – see 4.29.255

4.30.235 SMOOTH ALUMINUM REAR WALL – see 4.29.256

4.30.236 TOW EYES – see 4.29.257

4.30.237 COMPARTMENTATION – see 4.29.258

4.30.238 AGGRESSIVE WALKING SURFACE – see 4.29.259

4.30.239 LOUVERS – see 4.29.260

4.30.240 ENGINEER COMPARTMENT - A transverse engineer compartment will be provided ahead of the water pump.

1. The compartment will be approximately 26.00" wide x cab height x 100.00" deep. The door opening will be approximately 23.00" wide. The width of the transverse section over the chassis frame rails will be reduced by 6.00" due to the boom support.

2. The compartment will be furnished with a roll-up door to match the door construction on the body.

3. The top of the compartment will be notched around the aerial device.

4.30.241 COMPARTMENTATION, DRIVER SIDE

1. A full height roll-up door compartment, ahead of the rear wheels, will be provided. The compartment will be 41.75" wide x 64.00" high x 24.25" deep with a clear door opening of 38.75" wide x 56.38" high.

2. One (1) roll-up door compartment will be located above the fender compartments and over the rear axles. The compartment will be 72.13" wide x 33.25" high x 24.25" deep with a clear door opening of 63.75" wide x 25.50" high.

3. The retracted roll-up door will consume approximately 8.00" in height and 12.00" in depth of the upper outboard portion of each compartment.

4. A compartment with a single pan stainless steel lift up door will be located above the front stabilizer. The compartment will be 24.25" wide x 15.50" high x 24.25" deep with a door opening of 18.50" wide x 12.75" high. The compartment will have an aluminum 4-way cover with access to the top of the cord reel and will be extended above the catwalk to accommodate the reel. A top-hinged horizontal lift up stainless steel door will be provided with pneumatic cylinders for payout of the cord. The three (3) sides of the door opening will have stainless steel scuffplates.

5. A full height roll-up door compartment, behind the rear wheels, will be provided. The compartment will be 43.75" wide x 52.25" high x 21.25" deep with a door opening of 40.75" wide x 44.62" high.

6. There will be one (1) roll-up door compartment located below the turntable. The compartment will be 39.38" wide x 21.38" high x 21.25" deep with a door opening of 33.75" wide x 13.75" high.

7. The retracted roll-up door will consume approximately 8.00" in height and 12.00" in depth of the upper outboard portion of each compartment.

4.30.242 COMPARTMENTATION, PASSENGER SIDE

1. A full height roll-up door compartment, ahead of the rear wheels, will be provided. The compartment will be 41.75" wide x 64.00" high x 24.25" deep with a clear door opening of 38.75" wide x 56.38" high.

2. One (1) roll-up door compartment will be located above the fender compartments and over the rear axles. The compartment will be 72.13" wide x 33.25" high x 24.25" deep with a clear door opening of 63.75" wide x 25.50" high.

3. The retracted roll-up door will consume approximately 8.00" in height and 12.00" in depth of the upper outboard portion of each compartment.

4. A compartment with a single pan stainless steel lift up door will be located above the front stabilizer. The compartment will be 24.25" wide x 15.50" high x 24.25" deep with a door opening of 18.50" wide x 12.75" high. The compartment will have an aluminum 4-way cover with access to the top of the cord reel and will be extended above the catwalk to accommodate the reel. A top-hinged horizontal lift up stainless steel door will be provided with pneumatic cylinders for payout of the cord. The three (3) sides of the door opening will have stainless steel scuffplates.

5. A full height roll-up door compartment behind the rear wheels will be provided. The compartment will be 43.75" wide x 52.25" high x 21.25" deep inside the lower 29.75" and 12.00" deep in the upper portion with a door opening of 40.75" wide x 44.62" high.

6. There will be one (1) roll-up door compartment located below the turntable. The compartment will be 39.38" wide x 21.38" high x 12.00" deep with a door opening of 33.75" wide x 13.75" high.

7. The area behind the compartments will be enclosed for long-tool storage.

8. The retracted roll-up door will consume approximately 8.00" in height and 12.00" in depth of the upper outboard portion of each compartment.

4.30.243 SIDE COMPARTMENT ROLLUP DOORS – see 4.29.264

4.30.244 COMPARTMENT BLISTER – see 4.29. 265

4.30.245 REAR BUMPER – see 4.29.266

4.30.246 DOOR GUARD – see 4.29.267

4.30.247 DOOR LATCHES – see 4.29.268

4.30.248 PULL STRAP, DOOR - There will be two (2) compartment doors provided with Amdor Flex-HD pull straps. The compartment door(s) to be provided with a pull strap will be D6 and P6.

4.30.249 PAINTED SMOOTH ALUMINUM STABILIZER DOOR – see 4.29.271

4.30.250 COMPARTMENT LIGHTING – see 4.29.272

4.30.251 MOUNTING TRACKS - There will be eight (8) sets of tracks for mounting shelf(s) in D3, D1, P1, P3, D4, P4, D6 and P6. These tracks will be installed vertically to support the adjustable shelf(s), and will be full height of the compartment. The tracks will be painted to match the compartment interior.

4.30.252 ADJUSTABLE SHELVES - There will be 14 shelves with a capacity of 500 lb provided. The shelf construction will consist of .188" aluminum with 2.00" sides. Each shelf will be painted to match the compartment interior. Each shelf will be infinitely adjustable by means of a threaded fastener, which slides in a track.

1. The shelves will be held in place by .12" thick stamped plated brackets and bolts.
2. The location will be (3) D-1, (1) D-3, (3) D-4, (3) P-1, (1) P3, (3) in P-4 .

4.30.253 TWO (2) WAY SLIDE-OUT UTILITY TRAY

1. There will be one (1) slide-out tray provided.
2. Each tray will be rated for up to 500 lb in the extended position. The tray(s) will be constructed of .19" thick aluminum for the tray bottom and special aluminum extrusions for the tray sides, ends and tracks. The corners will be welded.
3. The tray will have 3.00" high sides, will span the full depth of the transverse compartment and will be as wide as possible for the compartment.
4. The tray will be supported with a minimum of six (6) ball bearing rollers. The tray will slide out two thirds (2/3) of its length to either side of the apparatus.
5. Automatic locks will be provided for both the in and out positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.
6. The vertical location of the tray within the compartment will be adjustable.
7. The tray(s) will be located above the upper portion D6 / P6.

4.30.254 TWO (2) WAY UTILITY SLIDE-OUT FLOOR MOUNTED TRAY

1. There will be one (1) floor mounted utility slide-out tray(s) provided in the engineer compartment, on the transverse and floor extension. Each tray will be rated for up to 500lb in the extended position. The tray(s) will be constructed of .19" thick aluminum for the tray bottom and special aluminum extrusions for the tray sides, ends and tracks. The corners will be welded. The finish will be painted to match compartment interior.
2. The tray will be 3.00" high x full depth of the transverse compartment x as wide as possible for the compartment.
3. The tray will be supported with a minimum of six (6) ball bearing rollers. The tray will slide out two thirds (2/3) of its length to either side of the apparatus.
4. Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

4.30.255 SLIDE-OUT FLOOR MOUNTED TRAY

1. There will be four (4) floor mounted slide-out tray(s) provided D1 / P1 / D4 / P4. A capacity rating will not be available on this tray due to a reduced side height being less than 2.00". The tray(s) will be constructed of a minimum .13" aluminum with welded corners. The finish will be painted to match compartment interior.
2. The tray(s) will be designed for maximum compartment width and depth.
3. The side height of the tray(s) will be as follows:
4. Front: 1.00" high

5. Rear: 2.00" high

6. Left and Right Sides: 2.00" high

7. There will be two undermount-roller bearing type slides rated at 250lb each provided. The pair of slides will have a safety factor rating of 2.

8. To ensure years of dependable service, the slides will be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

9. To ensure years of easy operation, the slides will require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file will have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance will be provided upon request.

10. Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

4.30.256 TOOLBOARD ADDED TO HALF DEPTH SLIDE-OUT TRAY - An aluminum toolboard will be provided and mounted in a slide-out tray that is half the depth of a transverse compartment (tray not included). The toolboard will be constructed of 0.19" thick aluminum that is painted spatter gray to match compartment interior. The toolboard will be provided with 0.20" diameter holes in a pegboard pattern with 1.00" centers between holes. A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the pegboard.

1. The toolboard will span the full depth of the slide-out tray and will be as tall as possible for the specified mounting location.

2. The toolboard will be mounted on aluminum tracks to allow for side to side adjustment within the tray.

3. The total capacity rating of the toolboard will vary depending on the tray it is mounted in (capacity rating for the toolboard will match the capacity rating of the tray it is mounted in).

4. A total of Two (2) toolboard(s) will be provided and mounted in the slide-out tray(s) located on the upper 2 - way slide out tray, each tool board only half the depth of the tray, 36" tall.

4.30.257 SLIDE-OUT TOOLBOARD IN REAR COMPARTMENT

1. An aluminum toolboard will be provided for use in the rear compartment. The toolboard will be constructed of 0.19" thick aluminum that is painted spatter gray to match compartment interior. The toolboard will be provided with 0.20" diameter holes in a pegboard pattern with 1.00" centers between holes. A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the pegboard.

2. The toolboard will be designed to fit the rear compartment and will be designed to be as tall as possible to fit in the specified mounting location.

3. The toolboard will be mounted inside a 6.00" wide x 3.00" high, utility style slide-out tray. The bottom of the tray will be constructed of 0.19" thick aluminum while special aluminum extrusions will be utilized for the tray sides, ends and tracks. The corners will be welded.

4. The tray will be supported with a minimum of eight (8) ball bearing rollers. The toolboard and tray will slide out two thirds (2/3) of its length in one (1) direction only. Positive locks will be provided for toolboard and tray assembly in both the stowed and extended positions.

5. Additionally, the toolboard and tray assembly will be mounted on shelf type tracks to allow for side to side adjustment within the compartment.

6. The toolboard will be rated for a maximum of 500 lb in the extended position.

7. A total of One (1) toolboard(s) will be provided. The location of each toolboard in the rear compartment will be in the torque box as shown on the ladder layout, 100" long.

4.30.258 BRACKET REAR OF BODY - An 8.00" deep, full width bright aluminum treadplate bracket will be provided at the rear of the body, above the torque box roll door. The bracket will be provided to mount lights, cameras, or other accessories.

4.30.259 COMPARTMENT IPO HOSE CHUTE – see 4.29.282

4.30.260 TRANSVERSE COMPARTMENT OVER TORQUE BOX – see 4.29.283

4.30.261 One (1) upper forward body compartments will be transverse over the torque box, to the opposite side of the body. The transverse area will be 19.25" high x 68.00" deep and as wide as the compartments being transversed. The P3/D3 compartment will include this transverse option.

4.30.262 COMPARTMENT FLOOR MATTING - Turtle Tile compartment matting will be provided in six (6) compartment(s). The locations are D-2, D-3, D-6, P-2, P-3, P-6. The color of Turtle Tile will be red.

4.30.263 PARTITION, VERTICAL COMPARTMENT - Two (2) partitions shall be bolted in D6 / P6 even with the boom support blister,. Each partition shall be the full vertical height of the compartment.

4.30.264 FLOOR EXTENSION - There will be a compartment floor extension provided. The floor extension will extend from the area over the frame rails to within an inch of the compartment door. The floor extension will have a downward 2.00" vertical lip and a 1.00" return flange. The floor extension will be made of .18" thick aluminum. A total of two (2) will be provided and located engineer compartment each side.

4.30.265 LOCKING NUTS – see 4.29.285

4.30.266 RUB RAIL – see 4.29.286

4.30.267 BODY FENDER CROWNS – see 4.29.287

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

1. Chrome plated end stanchions will support the handrail. Plastic gaskets will be used between end stanchions and any painted surfaces.

2. Drain holes will be provided in the bottom of all vertically mounted handrails.

3. Handrails will be provided to meet NFPA 1901 section 15.8 requirements. The handrails will be installed as noted on the sales drawing.

4.30.269 EQUIPMENT STORAGE – see 4.29.288

4.30.270 CORNER FENDER PANEL DOUBLE AIR BOTTLE STORAGE – see 4.29.289

4.30.271 FOUR AIR BOTTLE STORAGE COMPARTMENT – see 4.29.290

4.30.272 AIR BOTTLE COMPARTMENT STRAP – see 4.29.291

4.30.273 AIR BOTTLE STORAGE – see 4.29.292

4.30.274 AIR BOTTLE STORAGE (SINGLE) – see 4.29.293

4.30.275 AIR BOTTLE COMPARTMENT STRAP – see 4.29.294

4.30.276 EXTENSION LADDER – see 4.29.295

4.30.277 AERIAL EXTENSION LADDER – see 4.29.296

4.30.278 ROOF LADDER- There will be one (1) 16' aluminum Duo-Safety Series 875-A roof ladder(s) provided.

4.30.279 ADDED ROOF LADDER – see 4.29.298

4.30.280 AERIAL ATTIC EXTENSION LADDER – see 4.29.299

4.30.281 AERIAL FOLDING LADDER – see 4.29.300

4.30.282 GROUND LADDER STORAGE – see 4.29.301

4.30.283 LADDER STORAGE – A completely enclosed compartment will be provided for a 14" 701 ladder between the torque box and the PS side body compartment. This compartment will be in place of hose chute. There will be a smooth aluminum door at the rear with a D-handle latch.

4.30.284 LADDER STORAGE LIGHTING – see 4.29.303

4.30.285 DURA-SURF LADDER SLIDES – see 4.29.304

4.30.286 EQUIPMENT STORAGE - An aluminum trough will be provided in the torque box for the storage of equipment. The "U" shaped trough shall be above the pike poles, 5" tall by 7" wide by as long as the torque box. Need a solid wall at the front of the torque box.

4.30.287 4' PIKE POLE – see 4.29.306

4.30.288 6' PIKE POLE – see 4.29.307

4.30.289 8' PIKE POLE – There will be One (1) pike pole Fire Hooks Unlimited, Model RH-8, 8' pike pole(s) with steel handle and gas shut off end provided. The pike pole(s) will be stored in tubular holders located torque box. Two (2) pike poles, Fire Hooks Unlimited, Model RH6, 6' long roof hook, with a steel handle and chisel end will be provided and located ladder storage.

4.30.290 8' PIKE POLE - One (1) pike pole, Fire Hooks Unlimited, Model RH 8, 8' long roof hook, with a steel handle and chisel end will be provided and located aerial fly section .

4.30.291 PIKE POLES – see 4.29.310

4.30.292 PIKE POLE 8 FT – see 4.29.311

4.30.293 PIKE POLE STORAGE – see 4.29.313

4.30.294 PIKE POLE STORAGE – see 4.29.314

4.30.295 WARNING LABEL(S) – see 4.29.315

4.30.296 LABELS AND TAGS – see 4.29.316

4.30.297 STEPS – A folding step will be provided on the front of each fender compartment for access to the hose bed. The step will be bright finished, non-skid with a black coating. The step will incorporate an LED light to illuminate the stepping surface. The step can be used as a hand hold with two openings wide enough for a gloved hand.

4.30.298 Two (2) additional folding steps will be located one (1) on the driver side front bulkhead and one (1) on the passenger side front bulkhead. The step(s) will be bright finished, non-skid with a black coating. Each step will incorporate an LED light to illuminate the stepping surface. The step(s) can be used as a hand hold with two openings wide enough for a gloved hand.

4.30.299 STIRRUP STEPS WITH TREAD GRIP - There will be one (1) stirrup style steps with cable hanger and tread grip rung provided. The step will be installed under the PS pump panel in place of the stirrup step that is used as standard..

4.30.300 PUMP - Pump will be a Waterous CSU, 2000 gpm single (1) stage midship mounted centrifugal type.

1. Pump will be the class "A" type.
2. Pump will deliver the percentage of rated discharge at pressures indicated below:
    - 100% of rated capacity at 150 psi net pump pressure.
    - 70% of rated capacity at 200 psi net pump pressure.
    - 50% of rated capacity at 250 psi net pump pressure.
3. Pump body will be close-grained gray iron, bronze fitted, and horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).
4. Pump will be designed for complete servicing from the bottom of the truck, without disturbing the pump setting or apparatus piping.
5. Pump case halves will be bolted together on a single horizontal face to minimize a chance of leakage and facilitate ease of reassembly. No end flanges will be used.
6. Discharge manifold of the pump will be cast as an integral part of the pump body assembly and will provide a minimum of three (3) 3.50" openings for flexibility in providing various discharge outlets for maximum efficiency.
7. The three (3) 3.50" openings will be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.
8. Impeller shaft will be stainless steel, accurately ground to size. It will be supported at each end by sealed, anti-friction ball bearings for rigid precise support. Impeller will have flame plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.
9. Bearings will be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings will be used.
10. Pump will be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.
11. The mechanical seal will consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring will press against a highly polished stainless steel stationary ring that is sealed within the pump body.
12. In addition, a throttling ring will be pressed into the steel chamber cover, providing a very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance will not deteriorate, nor will the pump lose prime, while drafting if the seal fails during pump operation.

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

4.30.301 PUMP TRANSMISSION-The pump transmission will be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump will be through a high strength Morse HY-VO silent drive chain. By the use of a chain rather than gears, 50% of the sprocket will be accepting or transmitting torque, compared to two (2) or three (3) teeth doing all the work.

4.30.302 Drive shafts will be 2.35" diameter hardened and ground alloy steel and supported by ball bearings. The case will be designed to eliminate the need for water cooling.

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

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

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

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

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

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

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

4.30.310 INTAKE RELIEF VALVE - A Trident Air Max intake relief valve will be installed on the suction side of the pump preset at 125 psig.

1. Relief valve will have a working range of 50 psig to 350 psig.

2. Outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

3. An adjustable air regulator and pressure indicating gauge will be located at the pump operator's panel.

4.30.311 PRESSURE GOVERNOR - This apparatus will be equipped with a Class1 "Total Pressure Governor Plus" engine/pump governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the engine. The "Total Pressure Governor" is to operate as a pressure sensor (regulating) governor (PSG).

1. A special preset feature will permit a predetermined pressure of RPM to be set. The preset pressure or RPM will be displayed on the message display of the "Total Pressure Governor" . The preset will be easily adjustable by the operator

2. The pressure sensor governor system will be operable only after the vehicle parking brake has been set, the transmission is the pumping mode, and the fire pump has been engaged.

3. The pressure sensor governor system will have two (2) modes of operation: pressure mode or rpm mode.

4. When in the pressure mode, the PSG system will automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).

5. In the rpm mode, the PSG system will automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

6. A pump cavitation protection feature will be provided which will return the engine to idle should the pump cavitate.

7. The digital display will include:

    - Pump intake pressure
    - Pump discharge pressure
    - Engine RPM
    - Battery voltage
    - Oil pressure and temperature
    - Coolant temperature
    - Transmission Temperature
    - Total engine hours
    - Total pump hours
    - Fuel rate

4.30.312 PRIMING PUMP - The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of NFPA 1901. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. One (1) priming control will open the priming valve and start the pump primer.

4.30.313 LIGHT, ADDITIONAL, FOR THERMAL RELIEF VALVE - A two (2) of 2" diameter Whelen model T0B00FBR blue LED grommet mounted lights, will be provided in addition to the standard light for indication when the thermal relief valve is operating.

1. Lights will be located in each side of the pump panel, upper area of dunnage area to be decided at preconstruction meeting.

2. These lights will be activated with the main thermal valve indicator light on the pump panel.

4.30.314 PUMP WITNESS - A witness of the functionality of the pump will be provided at final inspection. This will be a detailed test where the pump is run at full capacity. This will also include a trip to the quarry to flow water through the aerial waterway at full capacity. Assistance will be provided by plumbing personnel at the time of inspection.

4.30.315 MASTER DRAIN HOSE SPECIAL INSTRUCTIONS - Change the copper master drain line to push lock hose and fittings. This is due to drain lines breaking during transport.

4.30.316 THERMAL RELIEF VALVE - A Hale TRV120-L thermal protection device will be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump when the temperature of the pump water exceeds 120 Degrees F (49 C).

1. The thermal protection device will include a red warning light and audible alarm. The warning light with a test switch will be mounted on the pump operator panel.

2. The discharge line will be 3/8 inch diameter tubing plumbed to ground.

4.30.317 PUMP MANUALS - There will be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals will be provided by the pump manufacturer in the form of two (2) USB Drives. Each manual will cover pump operation, maintenance, and parts.

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

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

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

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

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

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

4.30.320 MAIN PUMP INLETS - A 6.00" pump manifold inlet will be provided on each side of the vehicle. The suction inlets will include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

4.30.321 MAIN PUMP INLET CAP PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 16.6.8 requires all intakes to be provided with caps or closures capable of withstanding a hydrostatic gauge pressure of 500 psi.

4.30.322 The caps are not on the apparatus as manufactured. The fire department will provide both caps for the main pump inlets.

4.30.323 HIGH FLOW BALL INTAKE VALVE - Task Force Tips model #AP1ST-NX manually operated lightweight aluminum high flow straight inlet ball intake valve will be provided. The unit will be equipped with an adjustable pressure relief valve under the main valve body. The valve will be controlled with an NFPA compliant slow-close hand wheel gear operator which can be configured for left or right hand operation. A 3/4" bleeder valve will be provided to exhaust excess air or water from the valve and hose line. A position indicator will be provided to allow for quick visualization of the status of the valve in the open, closed or partial positions. For maximum corrosion protection, the aluminum casting will be hard-coat anodized, with a powder coat internal and external finish and all components typically facing the wet side of the valve will be constructed from stainless steel.

1. The connections will be: 5.00" Storz fitting and a 6.00" female NH threaded swivel connection and include polymer bearing strips for prevention of galvanic corrosion. A 5.00" Storz cap will be included.

2. Two (2) inlet valves will be provided on both the driver's side and the passenger's side main pump inlets.

4.30.324 VALVES - All ball valves will be Akron® Brass. The Akron valves will be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

4.30.325 Valves will have a ten (10) year warranty.

4.30.326 NOT REQUIRED, LEFT SIDE INLET

4.30.327 NFPA 1901, 2016 edition, section 16.6.3 requires at least one (1) valved intake will be provided that can be controlled from the pump operator's position.

4.30.328 This apparatus does not have a valved intake as manufactured.

4.30.329 ANODE, INLET - A pair of sacrificial zinc anodes will be provided in the water pump inlets to protect the pump from corrosion.

4.30.330 LEFT SIDE DISCHARGE OUTLETS - There will be one (1) discharge outlet with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

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

4.30.332 LARGE DIAMETER DISCHARGE OUTLET - There will be a 5.00" discharge outlet with a 4.00" Akron valve installed on the right side of the apparatus, terminating with a 5.00" (M) National Standard hose thread adapter. This discharge outlet will be actuated with a handwheel control at the pump operator's control panel. An indicator will be provided to show when the valve is in the closed position.

4.30.333 DISCHARGE CAPS - Chrome plated, rocker lug, caps with chains will be furnished for all side discharge outlets. The caps will be the Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

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

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

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

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

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

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

4.30.340 LARGE DIAMETER OUTLET ELBOWS - The 5.00" outlet will be furnished with a 5.00" (F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

4.30.341 DISCHARGE OUTLET CONTROLS - The discharge outlets will incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism will indicate the position of the valve.

4.30.342 If a handwheel control valve is used, the control will be a minimum of a 3.9" diameter stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

4.30.343 AERIAL OUTLET - The aerial waterway will be plumbed from the pump to the water tower line with 5.00" pipe and a 4.00" Akron valve. The handwheel control for the waterway valve will be located at the pump operator's panel.

4.30.344 An indicator will be provided to show the position of the valve.

4.30.345 FOAM SYSTEM - A foam system will not be required on this apparatus.

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

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

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

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

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

4.30.348 LEFT SIDE PUMP CONTROL PANELS - All pump controls and gauges will be located at the left (driver's) side of the apparatus and properly identified.

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

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

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

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

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

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

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

2. All line pressure gauges will be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification. The gauge and rod guide casting will be removable from the face of the pump panel for ease of maintenance. The casting will be color coded to correspond with the discharge identification tag.

3. All remaining identification tags will be mounted on the pump panel in chrome plated bezels.

4. The pump panel on the right (passenger's) side will be removable with lift and turn type fasteners.

5. Trim rings will be installed around all inlets and outlets.

6. The trim rings for the side discharge outlets will be color coded and labeled to correspond with the discharge identification tag.

4.30.350 PUMP PANEL CONFIGURATION - The pump panel configuration will be arranged and installed in an organized manner that will provide user-friendly operation. Match the approved pump panel drawings.

4.30.351 PUMP OPERATOR'S PLATFORM - A pull out, flip down platform will be provided at the pump operator's control panel. - The front edge and the top surface of the platform will be made of DA finished aluminum with a Morton Cass insert.

4.30.352 The platform will be approximately 13.75" deep when in the stowed position and approximately 22.00" deep when extended. The platform will be 35.00" wide. The platform will lock in the retracted and the extended position.

4.30.353 The platform will be wired to the "step not stowed" indicator in the cab.

4.30.354 PUMP OPERATOR'S PLATFORM PERIMETER LIGHT - There will be an Amdor LumaBar H2O, Model AY-9500-020, 20.00" white 12 volt DC LED strip light provided to illuminate the ground area.

4.30.355 PUMP AND GAUGE PANEL - The pump and gauge panels will be constructed of aluminum with a black vinyl finish. A polished aluminum trim molding will be provided around each panel.

4.30.356 The passenger's side pump panel will be removable and fastened with swell type fasteners.

4.30.357 PUMP COMPARTMENT LIGHT - A pump compartment light will be provided inside the right side pump enclosure and accessible through a door on the pump panel. A .125" weep hole will be provided in each light lens, preventing moisture retention.

4.30.358 PUMP PANEL GAUGES AND CONTROLS - The following will be provided on the pump and gauge panels in a neat and orderly fashion. These gauges will be in addition to what is provided with the pressure controller.

1. Engine Oil Pressure Gauge: With visual and audible warning

2. Engine Water Temperature Gauge: With visual and audible warning

3. Tachometer: Electric

4. Master Pump Drain Control

5. Voltmeter

4.30.359 PUMP ACCESS DOOR LATCHES - one (1) pump access door(s) will be provided with Southco non-locking C2 latches to hold the doors in the closed position in place of standard. Latch (es) will be provided with on the pump access door(s) located passenger side access door

4.30.360 PUMP OVERHEAT INDICATOR LIGHT - A pump overheat indicator light with bell, manufactured by M.C. Products, will be installed at the pump operator's panel. The bell will be located in the pump area on the wall toward the rear of the truck passenger side.

4.30.361 VACUUM AND PRESSURE GAUGES - The pump vacuum and pressure gauges will be liquid filled and manufactured by Class 1 Incorporated ©. - The gauges will be a minimum of 6.00" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#. The pump pressure and vacuum gauges will be installed adjacent to each other at the pump operator's control panel. Test port connections will be provided at the pump operator's panel. One will be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They will have 0.25 in. standard pipe thread connections and polished stainless steel plugs. They will be marked with a label.

4.30.362 PRESSURE GAUGES - The individual "line" pressure gauges for the discharges will be interlube filled and manufactured by Class 1©.

1. The gauges will be a minimum of 3.00" in diameter and will have white faces with black lettering.
2. Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.
3. Gauges will have a pressure range of 30"-0-400#.
4. The individual pressure gauge will be installed as close to the outlet control as practical.
5. This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

4.30.363 STEP/LIGHT SHIELD - There will be an aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the pump operators panel.

1. There will be 12 volt DC white LED lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.
2. One (1) pump panel light will come on when the pump is in ok to pump mode.
3. There will be a light activated above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel.
4. There will be a green pump engaged indicator light activated on at the operator's panel when the pump is shifted into gear from inside the cab.
5. There will be one (1) white LED, step light provided above this step. In order to ensure exceptional illumination, each step light will provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light. The step light will be activated by the pump panel light switch.

4.30.364 ADDITIONAL STEP/LIGHT SHIELD - There will be an additional aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the passenger's side pump panel.

1. There will be 12 volt DC white LED lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.

2. There will be one (1) white LED, step light provided above the step. In order to ensure exceptional illumination, each step light will provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light. The step light will be activated by the pump panel light switch.

4.30.365 AIR HORN SYSTEM – see 4.29.317 through 4.29.318

4.30.366 AIR HORN CONTROL – see 4.29.319

4.30.367 ELECTRONIC SIREN – see 4.29.320

4.30.368 SIREN CONTROL – see 4.29.321

4.30.369 SPEAKERS – see 4.29.322

4.30.370 AUXILIARY MECHANICAL SIREN – see 4.29.323

4.30.371 MECHANICAL SIREN CONTROL – see 4.29.324

4.30.372 FRONT ZONE UPPER WARNING LIGHTS – see 4.29.325

4.30.373 FRONT ZONE UPPER LIGHTING, PLATFORM - There will be two (2) Whelen® Model 6RBRC, 4.18" high x 6.56" long x 3.43" deep, flashing in a semi circle pattern LED lights with chrome trim and clear lenses located at the front of the platform basket facing forward.

4.30.374 There will be a switch in the cab on the switch panel to control the lights. The lights will be deactivated when the aerial device is lifted from the stowed position.

4.30.375 ADDITIONAL WARNING LIGHTS - There will be two (2) Whelen, Model 6RB**, 4.19" high x 6.56" long x 3.44" deep LED flashing in a semi circle warning light(s) with chrome flange, located on the basket, side of basket.

4.30.376 The color of these lights will be red. The lens will be clear.

4.30.377 There will be a switch in the cab on the switch panel to activate these lights. The lights will be deactivated when the aerial device is lifted out of the boom support.

4.30.378 The additional warning light(s) may be load managed if colored or will be deactivated if white, when the parking brake is applied.

4.30.379 ADDITIONAL WARNING LIGHTS - There will be two (2) Whelen, Model M7* LED flashing warning light(s) that include a chrome flange, located on the basket, Front corners of the basketside.

4.30.380 The color of these lights will be blue and include a lens that is clear.

4.30.381 The light(s) will be activated with the roof light switch and be deactivated when the boom is lifted out of the cradle.

4.30.382 The additional warning light(s) may be load managed if colored or will be deactivated if white, when the parking brake is set.

4.30.383 TRAFFIC LIGHT CONTROLLER – see 4.29.326

4.30.384 COVER, TRAFFIC LIGHT CONTROLLER – see 4.29.327

4.30.385 CAB FACE WARNING LIGHTS – see 4.29.328

4.30.386 FRONT WARNING LIGHT – see 4.29.329

4.30.387 SIDE ZONE LOWER LIGHTING – see 4.29.330

4.30.388 INTERIOR CAB DOOR WARNING LIGHTS – see 4.29.331

4.30.389 ADDITIONAL SIDE UPPER LIGHTS – see 4.29.332

4.30.390 SIDE WARNING LIGHTS – see 4.29.333 through 4.29.334

4.30.391 REAR ZONE LOWER LIGHTING – see 4.29.335

4.30.392 REAR WARNING LIGHTS – see 4.29.336

4.30.393 REAR OF HOSE BED WARNING LIGHTS – see 4.29.337

4.30.394 TRAFFIC DIRECTING LIGHT – see 4.29.338

4.30.395 ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT – see 4.29.339

4.30.396 GENERATOR – see 4.29.340

4.30.397 GENERATOR LOCATION - The generator will be mounted in the in the area over the pump in the center. The flooring in this area will be either reinforced or constructed in such a manner that it will handle the additional weight of the generator.

4.30.398 GENERATOR START – see 4.29.3 42

4.30.399 CIRCUIT BREAKER PANEL – see 4.29.343

4.30.400 SPARE CIRCUIT BREAKER – see 4.29.344

4.30.401 DIGITAL METER PANEL – see 4.29.345

4.30.402 The generator meter panel will be installed driver side cargo side sheet- see photo in place of the standard location. The digital meter panel will be on anytime the generator is running (no green indicator light is required).

4.30.403 120 VOLT LIGHTING – see 4.29.346

4.30.404 ELECTRIC CORD REEL – see 4.29.347

4.30.405 CORD – see 4.29.348

4.30.406 PORTABLE JUNCTION BOX – see 4.29.349

4.30.407 20 AMP RECEPTACLE - Wired to the power supply will be two (2) receptacles that are a Fire Power, Model FP-11, 120-volt 20 amp three (3) prong type with weather resisting cover located (1) on the passenger side rear and (1) on the driver side nose cone, centered between the warning lights and the headlights.

4.30.408 THREE SECTION 100 FOOT AERIAL PLATFORM

1. GENERAL INFORMATION - It is the intent of these specifications to describe a telescoping, elevating platform. The unit will consist of a three (3) section, aluminum ladder with a self-leveling basket attached, to the ladder fly section.

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

3. CONSTRUCTION STANDARDS - The ladder will be constructed to meet all of the requirements as described in the current edition of NFPA 1901 standards. Some portions of this specification exceed minimum NFPA recommendations. They will be considered a minimum requirement to be met.

4. A safety factor of 2:1 is required for environmental loading (wind plus .25" of ice build-up). This structural safety factor will apply to all structural aerial components including turntable and torque box stabilizer components. Definition of the structural safety factor will be as outlined in NFPA standards:

5. DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.

6. RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.

7. WL = Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.

8. FY = Material yield strength. The stress at which material exhibits permanent deformation.

9. 2.25 x DL + 2.25 x RL + 2.25 x WL equal to/less than FY. The minimum NFPA specification is exceeded here by providing a safety factor above 2:1 while flowing water.

10. 2.0 x DL + 2.0 x RL + 2.0 x WL + 2.0 x wind loading equal to/less than FY.

11. The RL is reduced with a .25" ice build up to maintain a minimum 2:1 structural safety factor.

12. An independent engineering firm will verify the aerial safety factor. Design verification will include computer modeling and analysis, and extensive strain gauge testing witnessed by an independent registered professional engineer. Verification will include written certification from the independent engineering firm made available by the manufacturer upon request from the purchaser.

13. All welding of aerial components, including the aerial ladder sections, turntable, pedestal, and outriggers will be performed by welders who are certified to American Welding Society (AWS) standards. The weldment assemblies of each production unit will be tested visually and mechanically by an ASNT certified level II non-destructive test technician to comply with NFPA standards. Testing procedures will conform to the AWS standards guide for non-destructive testing. Test methods may include dye penetrant, ultrasound, and magnetic particle where applicable.

4.30.409 LADDER CONSTRUCTION - The ladder will be comprised of three (3) sections and will extend to a nominal height, of 100 feet above the ground, as measured by 1901 recommendations.

1. The ladder will be designed to provide continuous egress for firefighters and civilians from an elevated position to the ground. To insure a high strength to weight ratio and an inherent corrosion resistance, the aerial ladder will be completely constructed of high-strength aluminum. All side rails, rungs, handrails, uprights, and K braces will be made of structural 6061T6 alloy aluminum extrusions.

2. All material will be tested and certified by the material supplier. All ladder sections will be semi-automatically welded by shielded arc welding methods using 5356 aluminum alloy welding wire. Structural rivets or bolts will not be utilized in the ladder weldment sections.

3. The aerial ladder will consist of three (3) welded, extruded aluminum telescopic ladder sections. Each ladder section will consist of two (2) extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals and two (2) full-length handrails. The rungs on all sections will be K braced for maximum lateral stability. This K bracing will extend to the center of each rung to minimize ladder side deflection.

4. The ladder rungs will be designed to eliminate the need to replace rubber-rung covers. The rungs will be spaced on 14.00" centers and have an integral skid-resistant surface as outlined in NFPA standards. An oval shaped rung will be utilized to provide a larger step surface at low angles and more comfortable grip at elevated positions. The minimum design load will be 500 lbs. distributed over a 3.50" wide area as outlined in NFPA standards.

5. Each aerial ladder section will have heat sensor labels that are preset to 300 degrees Fahrenheit with expiration year. The heat labels will meet NFPA standards.

6. The aerial ladder will exceed NFPA standards governing the minimum ladder section width and handrail height:

7. - Base section: 42.38" wide x 36.00" high

8. - Mid-section: 32.63" wide x 31.25" high

9. - Fly section: 24.00" wide x 27.38" high

4.30.410 VERTICAL HEIGHT – see 4.29.354

4.30.411 HORIZONTAL REACH - The rated horizontal reach will be 91'9". The measurement of horizontal reach will be consistent with NFPA standards.

4.30.412 OPERATION RANGE - The operating range of the ladder will be 11.5 degrees below horizontal (10 degrees with deep notch cab) to 76 degrees above horizontal with the truck in a level position.

4.30.413 The aerial will be capable of rotating from side-to-side around the back of the truck, encompassing up to 235 degrees of continuous rotation (depending on equipment and where it is located), while the aerial device remains at 11.5 degrees below horizontal (10 degrees with a deep notch cab). This will ensure that the platform stepping surface does not exceed the NFPA recommended maximum step height during a continuous rotation of up to 235 degrees.

4.30.414 MOUNTING OF ELEVATING PLATFORM - The aerial device will be rear mounted, to a torque box, on the truck chassis. Midship mounted aerial devices will not be acceptable.

4.30.415 TORQUE BOX - A "torsion box" subframe will be installed between the two sets of stabilizers. The torque box will be constructed of a minimum .312" steel plate (50,000 pounds per square inch yield) with steel tubing reinforcement, on each side of the box, in the turntable area. The dimensions of the torque box will be 41.00" wide x 29.00" high x 247.63" long. There will be a 1/2" gap between the torque box and the frame rails to promote drying of the surfaces and reduce the effect of corrosion. The torque box subframe assembly will be capable of withstanding all torsional and horizontal loads when the unit is on the stabilizers. The torque box will be bolted to the chassis frame rails using thirty-six .750" SAE grade 8 bolts with nuts.

4.30.416 TURNTABLE - The turntable will be a 1.00" thick aluminum deck, covered with a non-skid, chemical resistant material in the walking areas. The stepping surfaces will meet the skid-resistance requirements of the current NFPA 1901 standard.

1. The turntable will measure 88.50" long x 87.88" wide. The turntable will include an enclosure for the hydraulic valves and rotation motor, which will also serve as a step, for access to the ladder.

2. The turntable handrails will be a minimum 42.00" high and will not increase the overall travel height of the vehicle. The handrails will be constructed out of aluminum and have a slip resistant knurled surface.

3. The upper turntable assembly will connect the aerial ladder to the turntable bearing. The steel structure will have a mounting position for the aerial elevation cylinders, ladder connecting pins, and upper turntable operator's position.

4. A 54.24" diameter turntable bearing with a 3.25" drive gear face will be bolted to the top of the bearing mounting plate with .88" diameter Grade 8 plated bolts. The gear teeth will be stub tooth form. The rated overturning moment of the turntable bearing will be a minimum of 441,400 ft. lbs.

4.30.417 ELEVATION SYSTEM - Dual 7.00" diameter elevating cylinders will be mounted on the underside of the base section of the ladder. Two (2) 2.50" diameter stainless steel pins will fasten the cylinder to the turntable and fasten to the ladder. The pins will have 125,000 psi minimum yield strength and will be secured with .50" Grade 8 bolts with lock nuts. The bolts are to ensure that the pins do not walk out of the mounting brackets on the turntable and base section.

1. The elevating cylinders will be mounted utilizing maintenance-free spherical bearings on both ends of the cylinders. The aerial base pivot bearings will be maintenance-free type bearings with no external lubrication required. The cylinders will function only to elevate the ladder and not as a structural member to stabilize the ladder side movement. The elevating cylinders will be provided with pilot-operated check valves on the barrel and rod side of the piston to prevent movement of the ladder in case of a loss of hydraulic pressure.

2. The operation envelope will be 11.5 degrees below horizontal (10 degrees with a deep notch cab) to 76 degrees above horizontal.

3. The elevation system will be designed following NFPA standards. The elevation hydraulic cylinders will incorporate cushions on the upper limit of travel.

4. The lift cylinders will be equipped with integral holding valves located in the cylinder to prevent the unit from descending should the charged lines be severed, at any point within the hydraulic system and to maintain the ladder in the bedded position during road travel. The integral holding valves will NOT be located in the transfer tubes.

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

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

4.30.418 EXTENSION/RETRACTION SYSTEM – see 4.29.359

4.30.419 ROTATION SYSTEM - The aerial will be supplied with a powered rotation system as outlined in NFPA standards. The hydraulic rotation motor will provide continuous rotation under all rated conditions and be supplied with a brake to prevent unintentional rotation. Two (2) hydraulically driven, planetary gear boxes with drive speed reducers will be used to provide infinite and minute rotation control throughout the entire rotational travel. Two (2) spring applied, hydraulically released disc type swing brakes will be furnished to provide positive braking of the turntable assembly. Provisions will be made for emergency operation of the rotation system should complete loss of normal hydraulic power occur. The hydraulic system will be equipped with pressure relief valves which will limit the rotational torque to a nondestructive power. The gearbox will have a minimum continuous torque rating of 60,000 in. lbs. and a minimum intermittent rating of 130,000 in. lbs. The turntable bearing, ring gear teeth, pinion gear, planetary gearbox, and output shaft will be certified by the manufacturer of the components for the application.

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

1. Envelope control of rotation system to prevent accidental body damage

2. Prevent the aerial from being rotated into an unstable condition

4.30.421 MANUAL OVERRIDE CONTROLS - Manual override controls will be provided for all aerial and stabilizer functions.

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

4.30.423 BASKET LEVELING SYSTEM - A basket leveling system will be provided and so designed, that the basket with its rated load, can be supported and maintained level, relative to the horizontal, regardless of the elevation or flexion of the ladder.

1. Basket leveling will be accomplished by hydraulic circuitry that is independent from the main hydraulic system. The leveling of the basket features a dual master/slave hydraulic cylinder system, with each side capable of supporting the load, while maintaining the basket level. Two (2) master cylinders are mounted between the turntable and the base ladder section, with two (2) slave cylinders mounted between the ladder fly section and the basket. The slave and master cylinders are synchronized, so as the ladder is raised or lowered, exact amounts of hydraulic fluid are transferred between the master and slave cylinders thus maintaining the basket level.

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

3. A momentary switch is provided, on the cab instrument panel, to level the basket should this become necessary due to ambient temperature changes. It is not necessary to start the engine and activate the main hydraulic system to level the basket.

4. The basket leveling system will be manually adjustable from 10 degrees below horizontal to 10 degrees above horizontal.

5. Manual basket leveling switches will be provided at the turntable and basket.

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

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

4.30.426 A load chart will be visible at the operator's station. The load chart will show the recommended safe load at any condition of the aerial device's elevation and extension. The ratings in the unsupported, fully extended configuration (in addition to 100 lbs. of equipment mounted at the tip) will maintain a 2:1 safety factor with a 35 mph wind.

4.30.427 The aerial device will have a rated capacity of 1000 lbs. consistent with standards. The rated capacity will include 1000 lbs. in personnel allowance and 100 lbs. for equipment mounted at the tip of the ladder. The aerial device will be rated in multiple configurations as outlined in NFPA standards.

35 MPH WIND CONDITIONS/WATERWAY DRY

Degrees of Elevation	-11.5 to 29*	30 to 39	40 to 49	50 to 76
Basket	1000	1000	1000	1000
Fly Tip	-	250	500	750
Mid Tip	-	250	500	750
Base	250	500	1000	1000

* -10 degrees with deep notch cab

35 MPH WIND CONDITIONS/WATERWAY CHARGED

Degrees of Elevation	-11.5 to 29*	30 to 39	40 to 49	50 to 76
Basket	500	500	500	500
Fly Tip	-	250	500	750
Mid Tip	-	250	500	750
Base	-	500	750	750

* -10 degrees with deep notch cab

Reduced loads at the fly can be redistributed to the mid or base sections as needed.

4.30.428 The aerial device will be able to maintain the above load capacities while flowing up to 1500 GPM and a nozzle position of 0 to 90 degrees to either side of the ladder centerline, as far above and below horizontal to the platform as nozzle design allows.

4.30.429 While flowing 1500 to 2000 GPM, the nozzle position will be limited to 45 degrees either side of the ladder centerline horizontal to the platform, 30 degrees above horizontal, and as far below horizontal to the platform as nozzle design allows.

4.30.430 Reduced loads in the basket can be redistributed in 250 lb. increments to the fly, mid, or base as needed.

4.30.431 LADDER CRADLE INTERLOCK SYSTEM - A ladder cradle interlock system will be provided through the microprocessor to prevent the lifting of the aerial device from the nested position until the operator places all the stabilizers in a load supporting configuration. A switch will be installed at the boom support to prevent operation of the stabilizers once the aerial has been elevated from the nested position.

4.30.432 BOOM SUPPORT – see 4.29.364

4.30.433 AERIAL BOOM SUPPORT LIGHT – see 4.29.365

4.30.434 HYDRAULIC TANK SPECIAL LOCATION – see 4.29.367

4.30.435 AERIAL BOOM PANEL – see 4.29.368

4.30.436 EXTENSION INDICATOR – see 4.29.369

4.30.437 LIMITED RETRACTION - The aerial device will have limited retraction to prevent interference between the aerial platform and the cab roof.

4.30.438 AXE MOUNTING BRACKETS – see 4.29.371

4.30.439 STOKES STORAGE BRACKETS – see 4.29.372

4.30.440 ADDITIONAL INCLINOMETER – see 4.29.373

4.30.441 LADDER STORAGE MOUNTING BRACKETS - There will be D/A finished brackets provided near the end of the fly section of the aerial for mounting a roof ladder. The mounting brackets will accommodate a 16' Duo-Safety 875-A roof ladder as determined by the type of aerial device and the available space.

4.30.442 PIKE POLE MOUNTING BRACKETS – see 4.29.377

4.30.443 BASKET STRUCTURE - The basket structure will be constructed of structural T6061 aluminum and integrated with the construction of the waterway to ensure a high strength-to-weight ratio. The aerial basket will be fully tested and independent third party certified.

1. The flooring and front decking of the basket will be multi-piece non-slip material, preventing the accumulation of water on the standing surface. The floor will measure approximately 37.19" long x 78.13" wide. The stepping surfaces will meet the skid-resistance requirements of current NFPA 1901 standard.

2. The outside basket steps will be at the same level as the basket floor. The steps on the front and sides are approximately 8.00" deep. The doors and front corners of the basket will be at 45 degrees to allow the basket to be maneuvered closer to buildings when approaching at an angle.

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

4. Two (2) rubber bumpers are provided on the bottom side of the basket structure for damage protection when setting it down on a surface.

5. The basket interior will be illuminated as required per the current edition of NFPA 1901. All hoses and wiring at the basket will be fully enclosed. Electrical sub-components will be mounted under the basket in a separate enclosure for easy servicing while maintaining an unobstructed basket interior.

4.30.444 BASKET SIDES - The sides of the basket will be of tubular aluminum construction and aluminum sheet skin with engine turned finish and, along with the basket doors, will form a continuous 42.00" high wall around the basket.

4.30.445 PLATFORM ENTRANCES/EXITS - Two (2) swing-in, spring-loaded, self-closing double pan doors will be of single pan aluminum construction with engine turned finish and will be provided on the 45 degree angles at the front of the platform. A paddle style door latch will allow the basket doors to be opened from the outside by applying pressure to the paddle with the hand. The rear of the basket will be equipped with a stainless steel vertical self-closing gate for transfer to and from the basket's ladder device. Telescoping-type handrails will be provided as a banister to bridge the gap between the basket and the fly section at all elevations.

4.30.446 ACCESSORY MOUNTING RECEPTACLES - Two (2) universal accessory mounting receptacles will be permanently affixed on the front of the basket to receive the LyfeLine™ family of options such as the LyfeSupport™ rescue basket holders, LyfeEye™ rappelling arms, LyfeLadder™ roof ladder brackets, LyfeHoist™ winch, etc. Complete interchangeability will be required without modification to the basket.

4.30.447 MULTIPLEX DISPLAY COVER - A cover will be provided for the multiplex display in the platform basket. The cover will be hinged at the front of the basket and when down it will cover the multiplex display. The cover will be constructed of brushed stainless steel. - The cover will be held down with a rubber hood latch.

4.30.448 HOSE BOX AT PLATFORM - There will be one (1) hose storage box(es) with a cover and rubber hood latch provided at the platform. The box(es) will be located at the right side of the basket when viewed from the turntable and will match the finish of the aerial device. The box(es) will be sized to fit 100' of 1.75" diameter hose.

4.30.449 LIGHTS FOR TURNTABLE WALKWAY – see 4.29.378

4.30.450 TURNTABLE CONSOLE LIGHTING – see 4.29.379

4.30.451 There will be one (1), TecNiq Model T10, white LED light strip mounted in the turntable console cover to illuminate the controls located on both the upper and lower portion of the turntable control station. These lights will be activated by the aerial master switch.

4.30.452 BASKET HEAT SHIELDS - A heat reflective shield will be provided on the front, sides and bottom of the basket. The double pan basket access doors will form the heat shield at the front of the basket. The side heat shields will be formed by a single sheet of .063 aluminum. Full under the basket heat shield protection, with a non-glare finish, will be provided with a swing-down door for ease of servicing.

4.30.453 INFORMATION CENTER - There will be an information center provided. The information center will operate in temperatures from -40 to 185 degrees Fahrenheit. The information center will employ a Linux operating system and a 7.00" (diagonal measurement) LCD display. The LCD will have a minimum 400nits rated, color display. The LCD will be sunlight readable, true digital operation, and will have improved resolution. The LCD display will be encased in an ABS, black plastic housing with a gray decal. There will be five (5), weather-resistant user interface switches provided. The LCD display can be changed to an available foreign language.

4.30.454 OPERATION - The information center will be designed for easy operation in everyday use. There will be a page button to cycle from one screen to the next screen in a rotating fashion. A video button will allow an NTSC signal into the information center to be displayed on the LCD. If any button is pressed while viewing a video feed, the information center will return to the vehicle information screens. There will be a menu button to provide access to maintenance, setup, and diagnostic screens. All other button labels will be specific to the information being viewed.

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

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

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

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

4.30.459 PAGE SCREENS - The Information center will include the following pages:

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

1. - Rungs Aligned and Rungs Not Aligned will be indicated with text and respective green or red colored ladder symbols.

2. - Ladder Elevation will be indicated via a fire apparatus vehicle with ladder symbol with the degree of elevation indicated between the vehicle and ladder.

3. - Water Flow (if applicable) will be indicated via a water nozzle symbol and text indicating flow / time.

4. - Breathing Air Levels will be indicated via an air bottle symbol and text indicating the percent (%) of air remaining. A green bar graph shown inside the bottle will indicate oxygen levels above 20%. A red bar graph will indicate oxygen levels at or below 20%. When oxygen levels are at or below 10%, the red bar graph will flash.

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

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

1. - Aerial Hydraulic Oil Temperature will be indicated with symbol and text. At A Glance features will be utilized.

2. - Aerial Hydraulic Oil Pressure will be indicated with a symbol and text. At A Glance features will be utilized.

3. - The following calculations will be indicated on a representative vehicle symbol:

4. - Aerial Device Extension length

5. - Aerial Device Height indicating the height of the aerial device tip from the ground

6. - Aerial Device Reach indicating the horizontal distance the aerial reaches from the turntable.

7. - Aerial Device Angle indicating the angle from the vehicle which the device is at.

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

4.30.462 The Level Vehicle page will indicate the following information:

1. - The grade of the vehicle will be indicated via a fire apparatus vehicle symbol with the degree of grade shown in text format. The symbol will tilt dependent on the vehicle grade.

2. - The slope of the vehicle will be indicated via a fire apparatus vehicle symbol with the degree of slope shown in text format. The symbol will tilt dependent on the vehicle slope.

3. - Outriggers status will be indicated via a colored symbol for each outrigger present. Each outrigger status will be defined as one of the following:

4. - Outrigger stowed indicated with a silver pan located close to the vehicle

5. - Outrigger fully extended indicated with a fully deployed green outrigger

6. - Outrigger short-jacked indicated by a yellow outrigger partially deployed

7. - Outrigger not set indicated by a red outrigger that is not set on the ground

4.30.463 - A text box located on the vehicle symbol will be utilized to identify the overall status of the outrigger leveling system. The following status will be indicated in the text box:

1. - Deployed status will indicate all outriggers are properly set on the ground at full extension

2. - Shortjacked status will indicate one or more outriggers are set on the ground but not fully extended.

3. - Not Set status will indicate one or more outriggers is not properly set on the ground.

4. - Stowed status will indicate all outriggers are stowed for vehicle travel.

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

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

4.30.464 MENU SCREENS - The following screens will be available through the Menu button:

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

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

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

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

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

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

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

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

9. Button functions and button labels may change with each screen.

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

1. - Level assist switch

2. - Override switch to override interlocks

3. - Emergency power unit switch

4.30.466 AERIAL DEVICE CONTROL STATIONS - There will be two (2) device control stations. One (1) will be referred to as the basket control station and the other as the turntable control station. All elevation, extension and rotation controls will operate from both of these locations. The controls will permit the operator to regulate the speed of the aerial functions, within the safe limits, as determined by the manufacturer and NFPA standards. The controls will be grouped and operate in an identical manner at both stations for similarity of operation. The controls will be clearly marked and lighted for nighttime operation.

4.30.467 Each control will be equipped, with a positive lock to hold the control in a neutral position, preventing accidental activation. In addition to the neutral lock, a console cover will be provided at the turntable control station. The controls will be so designed to allow the turntable control station to immediately override the basket controls, even if the ladder is being operated by the basket controls.

4.30.468 TURNTABLE CONTROL STATION - The turntable control station will be located, on the left side of the turntable, so the operator may easily observe the basket while operating the controls.

4.30.469 The following items will be installed at the turntable control station, clearly identified, lighted for nighttime operation and conveniently located for ease of operation and viewing:

1. - Electric controls for elevation, rotation, extension/retraction
2. - Manual electric controls for basket leveling
3. - Intercom controls
4. - Tip tracking light switch
5. - Emergency power unit switch
6. - Operator's load chart
7. - Three (3) position switch for selecting aerial operational speed

4.30.470 TURNTABLE WORK LIGHTS - There will be a minimum of two (2) 12-volt work lights installed on the turntable, to illuminate the surrounding area for nighttime operation. The work lights will be activated by the aerial master switch.

4.30.471 BASKET CONTROL CONSOLE - The basket instrument panel will be located at the front center, of the aerial platform. The following controls will be installed at the console and be clearly identified, illuminated for nighttime operation and conveniently located for ease of operation and viewing:

1. - Intercom controls
2. - Operator's load chart

4.30.472 AERIAL FUNCTION CONTROLS - The aerial function controls, elevation, rotation, extension/retraction will be mounted in a separate backlit control box, which will be attached to the front of the platform control console, by means of an easily removable slide mechanism. The aerial function control box will have three (3) fixed attachment points in the basket. The electrical connection will be by a strain relieved, coiled cord that is permanently attached to the control box. To reduce the excess cord in the basket, the coiled cord will use a deutsch style bayonet connector style plug and there will be there (3) locations in the basket. The legend for the control lever functions will be illuminated.

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

4.30.474 STABILIZERS - Two (2) sets of extendible, out and down, "H" type stabilizers will be provided for stability. The stabilizers will have a spread of 16' 6".

4.30.475 The stabilizers will be the double box design, with jack cylinders, that have a 4.25" internal diameter (bore), 3.00" diameter cylinder rod and a 34.88" stroke. The jack cylinders will be equipped with integral holding valves, which will hold the cylinder in either the stowed position or the working position, should a charged line be severed at any point within the hydraulic system. For safety, the integral holding valves will be located in the cylinder base end, NOT in the transfer tube. Vertical jack cylinder rods will be fully enclosed by a telescoping inner box to protect the cylinder rods against damage that may occur.

4.30.476 The extension cylinders will be totally enclosed within the extension beams. The horizontal extension cylinders will be of the trombone type to eliminate wear and potential failure of hydraulic hoses (no exception).

4.30.477 The stabilizers will have the capability of 18.00" of ground penetration, for set-up on uneven terrain. Extension of the horizontal beams will be activated by an extension cylinder, which has a 2.25" internal diameter (bore), 1.38" diameter cylinder rod and a 48.25" stroke. The extension cylinders will be totally enclosed within the extension beams. The cylinders will be equipped with internal decelerators. The cross section dimensions will be 13.00" high x 6.81" wide.

4.30.478 Each stabilizer leg will have attached to the end of the leg a 16 gauge polished stainless steel shield. The stainless steel shield will be of the split-pan design and will be a maximum 13.50" wide to allow the extension of the stabilizer between parked cars. This plate will serve as a protective guard and a mounting surface for warning lights. The top, forward, and rear edges will be flanged back for added strength.

4.30.479 STABILIZER CONTROLS - A portable stabilizer control box will be provided. The control box will be weatherproof and oil resistant. Each function and indicator light will be labeled on a metal photo panel. The control box can be taken as far away as 15 feet from the vehicle with an extension cable. The stabilizer control box will include the following:

1. One (1) green power indicator light for stabilizer control that will be illuminated when the aerial master and "PTO" switches in the cab are activated.

2. Four (4) electric joysticks for stabilizers: each toggle switch will control the extend/retract and raise/lower of its respective stabilizer to allow vehicle set up in restricted areas and/or on uneven surfaces.

3. Leveling assist push button: The outrigger control system will incorporate a computerized self-leveling system in addition to the standard outrigger controls. The operator will have the option to manually or automatically level the truck. The computerized system will ensure full outrigger extension, proper jack penetration, and will level the vehicle within 1/2 a degree of level for safe operation of the aerial device.

4. One (1) electric push button for the engaging the emergency power unit

5. One (1) red "stabilizer not stowed" indicator light: this light will illuminate when the stabilizers are not in the fully stowed position.

6. Four (4) fully extended beams green indicator lights: these lights will be illuminated when each of the respective stabilizer beams are fully extended.

7. Four (4) firm on ground green indicator lights: each light will be illuminated when its respective stabilizer shoe is in the load supporting condition.

8. Each joystick will activate the engine fast idle automatically.

9. Manual override will be supplied for each stabilizer control valve.

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

4.30.481 STABILIZER PADS - A one (1) position, floating stabilizer pad will be provided on each stabilizer. The pads will require no operator adjustment during set up. The stabilizer pad will have the ability to pivot, in a 360-degree plane, for set up on uneven terrain.

4.30.482 AUXILIARY STABILIZER PADS - A set of four auxiliary pads with handles will be provided for additional load distribution on soft surfaces. Their size will be 31.00" x 26.00" and they shall be constructed of a lightweight composite material. The ground contact area for each stabilizer will be such that a unit pressure not greater than 75 psi (500 kPa) will be exerted over the ground contact area when the apparatus is loaded to its maximum in-service weight and the aerial device is carrying its rated capacity in every position permitted by the manufacturer. The pads will be stored in a double stacked configuration, two (2) behind each rear tandem axle in a single bracket.

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

4.30.484 STABILIZER PINS - The stabilizer jacks will not have holes for the stabilizer pins.

4.30.485 STABILIZER CONTROL BOX ALUMINUM DOOR - A vertically hinged smooth aluminum door will be provided over each stabilizer control box. The door will be hinged outboard.

4.30.486 STABILIZER PANELS - The stabilizer panels will be painted aluminum in place of polished stainless steel.

4.30.487 HYDRAULIC SYSTEM - All high-pressure hoses will have an abrasion resistant cover, and have a rating greater than or equal to the working pressure of the circuit in which they are installed. All hydraulic fittings will be plated to minimize corrosion. The fitting will use an O-ring face seal, where possible, to minimize hydraulic leaks. All pressure carrying hydraulic hoses will have a 4:1 safety rating based on burst pressure

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

2. The hydraulic system will be of the load sense design to minimize heat build up and provide smooth control of the aerial ladder. The system will meet the performance requirement in NFPA standards, which requires adequate cooling after less than 2 1/2 hours of operations.

3. All hydraulic components that are non-sealing, where failure could result in the aerial movement, will comply with NFPA standards and have burst strength of 4:1. Dynamic sealing components, where failure could cause aerial movement, will have a margin of 2:1 on maximum operating pressure per NFPA standards. All hydraulic hoses, tubes, and connections will have minimum burst strength of 3:1 per NFPA standards.

4. A hydraulic oil pressure gauge will be supplied at the base control location per NFPA standards.

5. The aerial hydraulic system will be designed in such a manner that a hydraulic pump failure or line rupture will not allow the aerial or outriggers to lose position. Hydraulic holding valves will be mounted directly into cylinders. To insure reliable performance of holding valves, no hoses or tubing will be permitted between a holding valve and cylinder. The aerial will incorporate the use of trombone steel tubes inside the stabilizer beams to eliminate hydraulic hose wear and leaks. Hydraulic power to the ladder will be transferred from the pedestal by a hydraulic swivel.

4.30.488 HYDRAULIC RESERVOIR - The hydraulic system will consist of an oil reservoir mounted to the torque box and plumbed to the hydraulic pump. There will be plumbing for a supply and return line and a tank drain on the reservoir.

4.30.489 The hydraulic pump suction line will have a shut-off ball valve for pump servicing.

4.30.490 The hydraulic oil reservoir fill will be labeled per NFPA standards. The hydraulic system will use multi-weight, SAE grade oil. ISO grade will be based on geographical location. The manufacturer will certify that the oil meets or exceeds the hydraulic cleanliness rating of 18/15/13 per ISO 4406:1999 before delivery.

4.30.491 HYDRAULIC FILTERS The system will incorporate the following filters to provide dependable service:

1. - Separate magnet (not on strainer)
2. - Reservoir suction strainer: 125 mesh
3. - Pressure filter with dirt alarm: Nominal 5 micron filter with a rating of 6.5 micron @ Beta 200 (99.5% efficiency); 7.5 micron @ Beta 1000 (99.9% efficiency)
4. - Return filter with dirt alarm: Nominal 5 micron filter with a rating of 6.5 micron @ Beta 200 (99.5% efficiency); 7.5 micron @ Beta 1000 (99.9% efficiency)
5. - Desiccant breather filter: Water capacity 4 fluid oz, 5 micron rating

4.30.492 HYDRAULIC CYLINDERS - All hydraulic cylinders used on the aerial device will be produced by a manufacturer that specializes in the production of hydraulic cylinders.

4.30.493 POWER TAKEOFF / HYDRAULIC PUMP - The apparatus will be equipped with a power takeoff driven by the chassis transmission and actuated by an electric shift located inside the cab. The power takeoff, which drives the hydraulic pump, will meet all the requirements for the aerial unit operations. The hydraulic pump will be a variable displacement piston pump, for consistent and rapid response, and be capable of supplying hydraulic oil at a nominal 50gpm flow at pressures up to 3000 psi. The system will operate up to 3000 psi with flow controls to protect hydraulic components and incorporate a relief valve set at 3150 psi to prevent over pressurization. The hydraulic pump will be solely dedicated to aerial operations. (no exception) An amber indicator light will be installed on the cab instrument panel to notify the operator that the power takeoff is engaged.

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

4.30.495 EMERGENCY PUMP - The hydraulic system will be designed with an auxiliary power unit meeting the guidelines of NFPA standards. The auxiliary power unit will be a 12-volt pump connected to the chassis electrical system. The pump will provide operation at reduced speeds to store the aerial device and outriggers for road transportation.

4.30.496 Self-centering switches will be provided at the turntable and stabilizer control station to activate the system. The system will be designed to provide a minimum of 30 minutes of hydraulic power to operate functions. (no exception)

4.30.497 HYDRAULIC SWIVEL - The aerial ladder will be equipped with a three (3) port, high-pressure hydraulic swivel that will connect the hydraulic lines from the hydraulic pump and reservoir through the rotation point to the aerial control bank. The hydraulic swivel will allow for 360 degree continuous rotation of the aerial.

4.30.498 ELECTRIC SWIVEL - The ladder will be equipped with an electric swivel to allow 360 degrees rotation of the aerial while connecting all electrical circuits through the rotation point. A minimum of 36 collector rings will be provided that are capable of supplying 20 amp continuous service. All collector rings will be enclosed and protected with desiccant plugs against condensation and corrosion. No oil or silicone will be used.

4.30.499 WATER SWIVEL - Water will be transferred to the aerial waterway by means of a 5.00" internal diameter waterway, through the swivel, permitting 360 degree continuous rotation.

4.30.500 13-BIT ABSOLUTE ENCODER - The aerial ladder will be equipped with a 13-Bit Absolute Encoder, CAN-based, which provides 8192 counts per shaft turn for position and direction reference.

1. The 13-Bit Absolute Encoder will provide a unique binary word to reference each position and direction for all 360 degrees of rotation.
2. If the power is interrupted for any reason, the 13-Bit Absolute Encoder will allow power to be returned to the system without having to re-zero the settings.
3. The 13-Bit Absolute Encoder will be an integral part of a microprocessor based control system.

4.30.501 ELECTRICAL SYSTEM - The 100' platform will utilize the Pierce Command ZoneTM System. The system will consist of the following components:

4.30.502 A tethered, CAN-based, stabilizer control will be provided. The tethered control will be weatherproof and oil resistant. The stabilizer control will be illuminated with a LED strip light in the face of the unit. The electrical connection at the tethered control will be permanently attached by a strained relieved coil cord that will allow the operator to move at least 14 feet away from the electrical connection for operation.

1. Remote Stabilizer Controls
2. Brightness control
3. Weatherproof and oil resistant
4. One (1) green "power" indicator light
5. One (1) red "stabilizer not stowed" indicator light
6. One (1) electric push button for level assist
7. One (1) electric push button for the emergency power unit
8. One (1) electric joystick for each stabilizer control:
9. Extend/retract function
10. Raise/lower function
11. One (1) green "stabilizer fully extended" indicator light for each stabilizer
12. One (1) green "firm on ground" indicator light for each stabilizer
13. Control System Modules
14. Each of the control system modules will be configured as follows:
15. Sealed to a NEMA 4X rating
16. Operating range from -40 degrees F to 156 degrees F (-40 degrees C to 70 degrees C)
17. Communicate using J1939 data link
18. Two (2) diagnostic LED lights
19. One (1) green light that illuminates when module has power (B+) and ground

20. One (1) red light that flashes to indicate the module is capable of communicating via the data link
21. Up to 16 diagnostic LEDs on each module
22. Ground matrix identification system
23. The following control system modules will be used:
24. Control Module
25. Main controller for the system
26. USB connection allows for computer diagnostics
27. Power Module
28. Built-in fault sensing
29. Eight (8) digital outputs
30. Pulse width modulating (PWM) capable
31. 10A continuous per output
32. Circuit protection based on actual current draw (not affected by heat)
33. Current Control Module
34. Built-in fault sensing
35. Three (3) analog inputs
36. Eight (8) digital outputs
37. Pulse width modulating (PWM) capable
38. 3A continuous per output
39. Closed Loop System
40. Circuit protection based on actual current draw (not affected by heat)
41. Input Module
42. 16 software selectable (digital or analog) inputs
43. Output Module
44. 16 digital outputs
45. Input/Output Module
46. Eight (8) software selectable (digital or analog) inputs
47. Eight (8) digital outputs

4.30.503 TRACKING LIGHTS - There will be two (2) Unity, Model AG-S-P46SLC 12-volt LED spot lights furnished. Power to the lights will be controlled by a master on/off switch at the turntable control operator's position. Individual switches will also be provided on each light for on/off. The two (2) "tracking lights" will be mounted on the base section of the ladder, one (1) on each side.

4.30.504 AERIAL LOCATOR LIGHT - There will be two (2) beacons installed at the aerial tip for the purpose of locating the aerial device while in operation.

1. The beacons will be Whelen Model L31H*F, LED.
2. Both beacons will be activated whenever the aerial is raised from the cradle.
3. The color of the locator light will be amber.
4. The lens color will be the same color as the LED's.
5. The lights may be load managed when the parking brake is applied.

4.30.505 STABILIZER WARNING LIGHTS - There will be our (4) Whelen®, Model M6*C, LED flashing warning lights with Whelen, Model M6FC, chrome flanges installed, one (1) on each stabilizer cover panel. The front stabilizer pan lights will be red LED with a clear lens The rear stabilizer pan lights will be red LED with a clear lens. These warning lights will be activated by the same switch as the side warning lights.

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

4.30.507 STABILIZER SCENE LIGHTS - There will be one (1) Amdor Luma Bar H2O, Model AY-9500-012 LED strip light installed under each stabilizer beam to illuminate the surrounding area. A total of four (4) lights will be installed. The lights will be activated by the aerial master switch.

4.30.508 PLATFORM 120-VOLT ELECTRIC SYSTEM - Two (2) Fire Power 120-volt 20 amp three (3)-wire type with weather resisting cover receptacles with weatherproof covers will be provided in the aerial platform.

1. The receptacles will be located at the rear of the basket.
2. Each receptacle will be supplied from individual branch circuits protected by dedicated 20 amp/120-volt circuit breakers. All wiring will be sized to and conform to the latest edition of NEC standards.
3. The circuit will be labeled "Aerial Ckt #1"

4.30.509 FRONT OF PLATFORM 120 VOLT LIGHTING - There will be One (1) Fire Research Spectra, Model SPA100-K20 white LED 120 volt light(s) provided at the front of the platform basket, facing forward on the center, front of platform. The painted parts are to be white. Light will be switched at the platform/tip, turntable, and cab

4.30.510 120 VOLT UNDER PLATFORM LIGHTING - There will be one (1) Fire Research Spectra, Model SPA260-K15, LED 120 volt AC floodlight(s) with white bezel(s) provided under the platform on the passenger side only, facing down. Due to the light optics the lights will be installed so the light is directed forward and downward. These light(s) will be switched at the platform/tip, turntable, and cab.

4.30.511 3-WAY AERIAL COMMUNICATION SYSTEM - There will be a Fire Research model ICA900-213 three-way intercom system provided. There will be two (2) control modules located, one (1) at the turntable operator console and one (1) at the pump panel. Each control module will have and an LED volume display and push-button volume control. A hands free module will be located at the aerial tip or platform and constantly transmit to the other module unless the push-to-talk button is pressed. - Each intercom unit will be weatherproof.

4.30.512 BREATHING AIR - Breathing air will be supplied to the aerial platform. The air system will incorporate one (1), 437 cubic foot, 4500-psi cylinder. To allow the turntable operator an unobstructed view of the platform the cylinder will be mounted on the right side of the ladder. The air cylinder will be interconnected through a pressure regulator located at the air cylinder. A shutoff valve with guard will be provided on the cylinder. At the platform, the breathing air will be accessible via two (2) quick couplings for air masks. These will have a Hansen brass 3000 series coupling. One (1) coupling will be located at the front of the basket on the right side and one (1) coupling will be located at the rear of the basket on the left hand side. There will be a weather resistant storage compartment for two (2) air masks provided in the basket. A 100' recharge hose will be provided for refilling the air cylinder without having to remove the tank from its mounting.

4.30.513 The breathing air cylinder will be designed and constructed to conform to the requirements of the United Nations (UN) on the transportation of dangerous goods.

4.30.514 BREATHING AIR LEVEL AND WARNING SYSTEM - The level of breathing air remaining will be visible on the LCD display at all operating positions. The display will incorporate a low-pressure warning circuit that activates an audible alarm when 20% of maximum air cylinder capacity remains. A second, louder audible alarm will activate when the remaining air level drops to 10% of maximum air cylinder capacity.

4.30.515 Air Bottle Lettering - The cylinder for the breathing air mounted on the aerial device will have white colored lettering for the graphics.

4.30.516 RAISED AERIAL PEDESTAL - The aerial pedestal will be raised to accommodate the height of the cab.

4.30.517 LYFECOMBO™BRACKETS - One (1) set of brackets will be supplied and mounted to the front of the platform basket. The brackets have been designed to increase firefighter safety and add to the functionality of the aerial device. The brackets will have three (3) functions that include: securing the roof ladder to the basket to allow firefighter access below the basket, two (2) rappelling arms to serve as an anchor point which allow rappelling from the basket, and mounting bars to allow the secure mounting of a rescue basket for transporting patients using the aerial. Each bracket will be easily removable using two (2) positively latched, 1.00" diameter aluminum pins.

4.30.518 LyfeLadder™support brackets will be incorporated into the design of the 3-in-1 option brackets. The brackets will be designed to mount an 875A Duo-Safety roof ladder up to 20 feet long securely in place. The ladder will be secured through its beams and one (1) rung, by a 1.00" diameter aluminum rod capable of being positively latched in place and able to withstand a minimum of a 500lb load while maintaining a minimum of a two to one (2:1) safety factor. There will also be a latch to keep the ladder in a vertical position at all times that will attach to a rung 28.00" below the primary attachment point. Strain gauging and testing will have been completed on the system (ladder and complete holding device) providing the above criteria has been met. A set of nylon guides will be provided to aid in positioning the roof ladder on the mounting brackets.

4.30.519 LyfeEye™ rappelling brackets will be provided. The LyfeEye brackets will be incorporated into the design of the 3-in-1 option brackets. Each bracket in the set will have a forged stainless steel eyebolt with a 1.38" inside diameter for use as a rappel line anchor. Each bracket will have a capacity of 300 lbs.

4.30.520 LyfeSupport™ rescue basket support bars will be provided. The bars will be incorporated into the design of the 3-in-1 option brackets. The bars will be easily removable from the 3-in-1 bracket to allow for individual storage of these bars when they are not needed. Two (2) quick clip basket straps will be used to secure the rescue basket to the brackets.

4.30.521 AERIAL TURNTABLE MANSAVER™ BARS - ManSaver™ bars will be installed at the aerial turntable.

4.30.522 AERIAL WATERWAY - The aerial waterway will be capable of being supplied by either a midship mounted pump or an external water source through a 5.00" intake at the rear of the apparatus.

4.30.523 A 5.00" water swivel will be installed below the aerial turntable permitting the ladder to rotate 360 degrees continuously.

4.30.524 A 5.00" water swivel will be installed at the aerial heel pivot pin that will permit water tower operations of -11.5 degrees to 76 degrees. The heel pivot pin will not be integral with the waterway swivel at any point. The waterway design will allow complete servicing of the waterway swivel without disturbing the heel pivot pin.

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

4.30.526 A 1.50" drain will be provided for the waterway with the control at the rear of the unit.

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

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

4.30.529 PLATFORM WATER SYSTEM - A 4.00" (internal diameter) water swivel will connect the fly section waterway to the platform waterway. The water swivel will permit water tower operations from -11.5 degrees to 76 degrees. The water will be routed from the swivel to a 4.00" gear operated butterfly valve on the front of the platform using a 4.00" 6061 pipe. The deluge gun will be bolted onto the butterfly valve.

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

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

4.30.532 One (1) - 2.50" preconnect will be provided at the front of the platform. The preconnect will be gated at the platform. The preconnect will be furnished with 2.50" NST threads and chrome plated cap.

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

1. One (1) will be a Y4-M21A-P double hand wheel controlled monitor with a TFT YST-4NN stacked tips.

2. One (1) will be Y4-E21A-P electric monitor with a TFT 2000 gpm Model M-ERP2000 electric nozzle.

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

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

4.30.535 REAR INLET - A 5.00" NST inlet to the aerial waterway will be provided at the rear of the apparatus, on the driver's side, low on the rear wall. The inlet pipe will run up the side and across the top of the torque box to the swivel. The inlet will protrude into the ladder storage area approximately 2.00" inches. The inlet will be furnished with a 5.00" chrome plated adapter and a 5.00" chrome plated, long handle cap.

4.30.536 AERIAL FLOW TEST WITH PITOT GAUGE - The end user will witness their aerial flow water while here for their final inspection. A Pitot gauge will also be utilized during the flow test as requested by the customers.

4.30.537 **SPECIFICATIONS 4.29.425 THROUGH 4.29.470 APPLY.**

4.30.538 VINYL STRIPE ON LOWER REAR PLATFORM BASKET - Prior to the basket being mounted on the aerial tip, the lower portion rear facing surfaces each side of the rear of the basket, approximately 12.00" tall from bottom of basket up and full width will have a Black vinyl stripe provided. There will also be the same color stripe provided that is approximately 3.00" tall from the bottom of the lower fly tip cross tube weldment to the top of this weldment.

4.30.539 These vinyl stripes will aid in limiting reflection from the lightbar on the back of the basket into the cab when driving, but will not take away from the overall portion of the basket being visible while in operation.

4.30.540 SIGN PANELS - A pair of sign panels 2.75" x 8.0" will be fabricated from brushed aluminum sheet and installed on the sides of the pumphouse immediately below the blue LED pump overheat lights, one on each side. 1.0" high red reflective lettering will be applied to each panel to spell out "PUMP" on the top line and "OVERHEAT" on the bottom line.

4.30.541 EMBLEMS - There will be a pair of American flag emblem/s, installed Upper section of crew cab doors. The flag will be waving design and made out of Gerber Vision material.

4.30.542 EMBLEM - There will be one (1) reflective emblem(s), approximately 16.00" - 18.00" in size, installed R-1 door. The emblem will be modeled after the department submitted information (art, patch, etc).

4.31

ITEM	Quantity	Description
3	1	Pierce Velocity Engine Truck

4.31.1 VELOCITY CHASSIS- Chassis provided will be a new, tilt-type custom fire apparatus. The chassis will be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis will be designed and manufactured for heavy-duty service, with adequate strength and capacity for the intended load to be sustained and the type of service required. The chassis will be the manufacturer's first line tilt cab.

4.31.2 WHEELBASE – Minimum 239.00”

4.31.3 GVW RATING – Minimum 49,800 lbs.

4.31.4 FRAME - The chassis frame will be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails will have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle. Each rail will have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle. The frame rails will be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

4.31.5 FRAME REINFORCEMENT - In addition, a mainframe inverted "L" liner will be provided. It will be heat-treated steel measuring 12.00" x 3.00" x 0.25". Each liner will have a section modulus of 7.795 cubic inches, yield strength of 110,000 psi, and rbm of 857,462 in-lb. Total rbm at wheelbase center will be 3,976,502 in-lb.

4.31.6 The frame liner will be mounted inside of the chassis frame rail and extend the full length of the frame.

4.31.7 FRONT NON DRIVE AXLE - The Oshkosh TAK-4® front axle will be of the independent suspension design with a ground rating of 22,800 lb.

4.31.8 Upper and lower control arms will be used on each side of the axle. Upper control arm castings will be made of 100,000-psi yield strength 8630 steel and the lower control arm casting will be made of 55,000-psi yield ductile iron.

4.31.9 The center cross members and side plates will be constructed out of 80,000-psi yield strength steel.

4.31.10 Each control arm will be mounted to the center section using elastomer bushings. These rubber bushings will rotate on low friction plain bearings and be lubricated for life. Each bushing will also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

4.31.11 There will be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

4.31.12 The upper control arm will be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

4.31.13 Camber at load will be 0 degrees for optimum tire life.

4.31.14 The ball joint bearing will be of low friction design and be maintenance free.

4.31.15 Toe links that are adjustable for alignment of the wheel to the center of the chassis will be provided.

4.31.16 The wheel ends will have little to no bump steer when the chassis encounters a hole or obstacle.

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

4.31.18 The axle will have a third party certified turning angle of 45 degrees. Front discharge, front suction, or aluminum wheels will not infringe on this cramp angle.

4.31.19 FRONT SUSPENSION - Front Oshkosh TAK-4™ independent suspension will be provided with a minimum ground rating of 22,800 lb.

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

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

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

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

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

4.31.25 FRONT SHOCK ABSORBERS - KONI heavy-duty telescoping shock absorbers will be provided on the front suspension.

4.31.26 FRONT OIL SEALS - Oil seals with viewing window will be provided on the front axle.

4.31.27 FRONT TIRES - Front tires will be Michelin 425/65R22.50 radials, 20 ply XFE wide base tread, rated for 22,800 lb maximum axle load and 75 mph maximum speed.

4.31.28 The tires will be mounted on 22.50" x 12.25" steel disc type wheels with a ten (10)-stud, 11.25" bolt circle.

4.31.29 REAR AXLE - The rear axle will be a Meritor™, Model RS-26-185, with a capacity of 27,000 lb.

4.31.30 TOP SPEED OF VEHICLE - A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 68 mph.

4.31.31 REAR SUSPENSION - The rear suspension will be Standens, semi-elliptical, 3.00" wide x 53.00" long, 12-leaf pack with a ground rating of 27,000 lb. The spring hangers will be castings.

4.31.32 The two (2) top leaves will wrap the forward spring hanger pin, and the rear of the spring will be a slipper style end that will ride in a rear slipper hanger. To reduce bending stress due to acceleration and braking, the front eye will be a berlin eye that will place the front spring pin in the horizontal plane within the main leaf.

4.31.33 A steel encased rubber bushing will be used in the spring eye. The steel encased rubber bushing will be maintenance free and require no lubrication.

4.31.34 REAR OIL SEALS - Oil seals will be provided on the rear axle(s).

4.31.35 REAR TIRES - Rear tires will be four (4) Michelin 12R22.50 radials, 16 ply "all position" XZE* tread, rated for 27,120 lb maximum axle load and 75 mph maximum speed.

4.31.36 The tires will be mounted on 22.50" x 8.25" steel disc type wheels with a ten (10)-stud, 11.25" bolt circle.

4.31.37 TIRE BALANCE - All tires will be balanced with Counteract balancing beads. The beads will be inserted into the tire and eliminate the need for wheel weights.

4.31.38 TIRE PRESSURE MANAGEMENT - There will be a RealWheels LED AirSecure™ tire alert pressure management system provided, that will monitor each tire's pressure. A sensor will be provided on the valve stem of each tire for a total of six (6) tires.

4.31.39 The sensor will calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor will activate an integral battery operated LED when the pressure of that tire drops 5 to 8 psi.

4.31.40 Removing the cap from the sensor will indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED will immediately start to flash.

4.31.41 FRONT HUB COVERS - Stainless steel hub covers will be provided on the front axle. An oil level viewing window will be provided.

4.31.42 HUB COVERS (rear) - Stainless steel baby moon covers will be provided over the rear axle hubs.

4.31.43 CHROME LUG NUT COVERS - Chrome lug nut covers will be supplied on front and rear wheels.

4.31.44 MUD FLAPS - Mud flaps with a Pierce logo will be installed behind the front and rear wheels.

4.31.45 WHEEL CHOCKS - There will be one (1) pair of Ziamatic AC-44, aluminum alloy wheel blocks provided.

4.31.46 WHEEL CHOCK BRACKETS - There will be one (1) pair of Ziamatic QCH-44-V vertical mounting wheel chock brackets provided for the Ziamatic AC-44 wheel chocks. The brackets will be mounted one front and one rear.

4.31.47 ELECTRONIC STABILITY CONTROL - A vehicle control system will be provided as an integral part of the ABS brake system from Meritor Wabco.

4.31.48 The system will monitor and update the lateral acceleration of the vehicle and compare it to a critical threshold where a side roll event may occur. If the critical threshold is met, the vehicle control system will automatically reduce engine RPM, engage the engine retarder (if equipped), and selectively apply brakes to the individual wheel ends of the front and rear axles to reduce the possibility of a side roll event.

4.31.49 The system will monitor directional stability through a lateral accelerometer, steer angle sensor and yaw rate sensor. If spinout or drift out is detected, the vehicle control system will selectively apply brakes to the individual wheel ends of the front and rear axles to bring the vehicle back to its intended direction.

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

4.31.51 AUTOMATIC TRACTION CONTROL - An anti-slip feature will be included with the ABS. The Automatic Traction Control will be used for traction in poor road and weather conditions. The Automatic Traction Control will act as an electronic differential lock that will not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) will work with the engine ECU, sharing information concerning wheel slip. Engine ECU will use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. A "mud/snow" switch will be provided on the instrument panel. Activation of the switch will allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

4.31.52 BRAKES - The service brake system will be full air type. The front brakes will be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance. The brake system will be certified, third party inspected, for improved stopping distance.

4.31.53 The rear brakes will be Meritor™, Disc Plus, Model EX225, disc operated with automatic slack adjusters and a 17.00" ventilated rotor for improved stopping distance.

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

4.31.55 BRAKE SYSTEM - The brake system will include:

1. brackets. Bendix® dual brake treadle valve
2. Heated automatic moisture ejector on air dryer
3. Total air system capacity of 4,362 cubic inches
4. Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
5. Spring set parking brake system
6. Parking brake operated by a push-pull style control valve
7. A parking "brake on" indicator light on instrument panel
8. Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
9. A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)
10. 1/4 turn drain valve on each air tank
11. The air tank will be primed and painted to meet a minimum 750 hour salt spray test.
12. To reduce the effects of corrosion, the air tank will be mounted with stainless steel

4.31.56 BRAKE SYSTEM AIR DRYER - The air dryer will be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

4.31.57 BRAKE LINES - Color-coded nylon brake lines will be provided. The lines will be wrapped in a heat protective loom in the chassis areas that are subject to excessive heat.

4.31.58 AIR INLET/OUTLET - One (1) air inlet/outlet will be installed with the female coupling located on the driver side pump panel. This system will tie into the "wet" tank of the brake system and include a check valve in the inlet line and an 85 psi pressure protection valve in the outlet line. The air outlet will be controlled by a needle valve.

4.31.59 A mating male fitting will be provided with the loose equipment.

4.31.60 The air inlet will allow a shoreline air hose to be connected to the vehicle. This will allow station air to be supplied to the brake system of the vehicle to insure constant air pressure.

4.31.61 U-BOLT GUARD OVER PARKING BRAKE KNOB - There will be one (1) U-bolt type protective guard(s) installed over the "Parking Brake" knob to prevent accidental activation of the brake. The guard will be located on the driver's side.

4.31.62 AIR TANK DRAINS - Air tank drains will be mounted at the bottom of the air tank centered on the bottom of the tank for maximum drainage.

4.31.63 COMPRESSION FITTINGS ONLY - Any nylon tube on the apparatus that is pneumatic will be plumbed with compression type fittings where applicable.

4.31.64 ENGINE - The chassis will be powered by an electronically controlled engine as described below:

Make:	Detroit™
Model:	DD13®
Power:	505 hp at 1625 rpm
Torque:	1750 lb-ft at 1075 rpm
Governed Speed:	Full Load - 1900 rpm Road/2080 rpm Parked PTO
Emissions Certification:	EPA 2016 (GHG17)
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	781 cubic inches (12.8L)
Starter:	Delco Remy 39MT™
Fuel Filters:	Dual cartridge style with check valve, water separator, and water in fuel sensor

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

4.31.66 HIGH IDLE - A high idle switch will be provided, inside the cab, on the instrument panel, that will automatically maintain a preset engine rpm. The high idle will automatically engage when the parking brake is set and the engine has been idling for 5 minutes. A switch will be installed, at the cab instrument panel, for activation/deactivation override.

4.31.67 The high idle will be operational only when the parking brake is on, the truck transmission is in neutral, and the engine has been idling for 5 minutes. A green indicator light will be provided adjacent to the switch. The light will illuminate when the above conditions are met. The light will be labeled "OK to Engage High Idle".

4.31.68 The high idle circuit will be programmed to allow high idle with the parking brake applied, transmission in neutral and pump in gear.

4.31.69 When the truck transmission is shifted into gear with the high idle on, the high idle will drop out for a safe shift condition.

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

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

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

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

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

4.31.75 ROCKER COVER BOLTS - The rear most bolts on the engine rocker cover will be flat head style. This is in place of the "stud" style provided as standard.

4.31.76 HEAVY DUTY OIL LINE - A heavy duty oil line and fittings will be provided between the engine oil pan and the oil level manifold.

4.31.77 ENGINE AIR INTAKE - An air intake with an ember separator (to prevent road dirt, burning embers, and recirculating hot air from entering the engine) will be mounted at the front of the apparatus, on the passenger side of the engine. The ember separator will be mounted in the air intake with flame retardant, roto-molded polyethylene housing. It will be easily accessible by the hinged access panel at the front of the vehicle.

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

4.31.79 EXHAUST MODIFICATION - The exhaust pipe will be brought out from under the body at a 90 degree angle from the truck. The tail pipe will terminate at the body side and will be flush with the body side.

4.31.80 EXHAUST MODIFICATION - The tail pipe will terminate as close to the rear axle as possible without creating interference.

4.31.81 RADIATOR - The radiator and the complete cooling system will meet or exceed NFPA and engine manufacturer cooling system standards.

4.31.82 For maximum corrosion resistance and cooling performance, the entire radiator core will be constructed using long life aluminum alloy. The core will be made of aluminum fins, having a serpentine design, brazed to aluminum tubes. The tubes will be brazed to aluminum headers. No solder joints or leaded material of any kind will be acceptable in the core assembly. The radiator core will have a minimum frontal area of 1434 square inches. Supply tank made of glass-reinforced nylon and a return tank of cast aluminum alloy shall be crimped on to the core assembly using header tabs and a compression gasket to complete the radiator core assembly. The radiator will be compatible with commercial antifreeze solutions.

4.31.83 There will be a full steel frame around the entire radiator core assembly. The radiator core assembly will be isolated within the steel frame by rubber inserts to enhance cooling system durability and reliability. The radiator will be mounted in such a manner as to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. The radiator assembly will be isolated from the chassis frame rails with rubber isolators.

4.31.84 The radiator assembly will include an integral deaeration tank permanently mounted to the top of the radiator framework, with a readily accessible remote-mounted overflow tank. For visual coolant level inspection, the radiator will have a built-in sight glass. The radiator will be equipped with a 15 psi pressure relief cap.

4.31.85 A drain port will be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

4.31.86 A heavy-duty fan will draw in fresh, cool air through the radiator. Shields or baffles will be provided to prevent recirculation of hot air to the inlet side of the radiator.

4.31.87 COOLANT LINES - Gates® silicone hoses will be used for all engine/heater coolant lines installed by the chassis manufacturer.

4.31.88 The chassis manufacturer will also use Gates brand hose on other heater, defroster and auxiliary coolant circuits. There will be some areas in which an appropriate Gates product is not available. In those instances, a comparable silicone hose from another manufacturer will be used.

4.31.89 Hose clamps will be stainless steel "constant torque type" to prevent coolant leakage. They will react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

4.31.90 INSULATION WRAP - The lower radiator hose will be wrapped with orange heat resistant insulation to prevent damage to electrical harness.

4.31.91 FUEL TANK - A 75 gallon fuel tank will be provided and mounted at the rear of the chassis. The tank will be constructed of 12-gauge, hot rolled steel. It will be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank will be mounted with stainless steel straps.

4.31.92 A .75" drain plug will be provided in a low point of the tank for drainage.

4.31.93 A fill inlet will be located on the left hand and right hand side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Ultra Low Sulfur - Diesel Fuel Only."

4.31.94 A .50" diameter vent will be provided running from top of tank to just below fuel fill inlet.

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

4.31.96 AeroQuip® wire braid, reinforced fuel lines will be provided for the chassis fuel system. The fittings will be reusable screw type.

4.31.97 DIESEL EXHAUST FLUID TANK - A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the driver's side body rearward of the rear axle.

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

4.31.99 A fill inlet will be provided and marked "Diesel Exhaust Fluid Only". The fill inlet will be located adjacent to the engine fuel inlet behind a common hinged, spring loaded, painted door on the driver side of the vehicle.

4.31.100 The tank will meet the engine manufacturer’s requirement for 10 percent expansion space in the event of tank freezing.

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

4.31.102 The stainless steel flip door for selecting between DEF fill and the diesel fill will be spring loaded to default to covering the DEF fill.

4.31.103 FUEL COOLER - An air to fuel cooler will be installed in the engine fuel return line. The fuel filler cap will have a retaining chain and holder provided on the fuel fill door.

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

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

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

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

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

4.31.109 The transmission ratio will be:

1st	3.51 to 1.00
2nd	1.91 to 1.00
3rd	1.43 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
6th	0.64 to 1.00
R	4.80 to 1.00

4.31.110 TRANSMISSION COOLER - A Modine plate and fin transmission oil cooler will be provided using engine coolant to control the transmission oil temperature.

4.31.111 DOWNSHIFT MODE (w/engine brake) - The transmission will be provided with an aggressive downshift mode.

4.31.112 This will provide earlier transmission downshifts to 2nd gear from 6th gear, resulting in improved engine braking performance.

4.31.113 DRIVELINE - Drivelines will be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints.

4.31.114 The shafts will be dynamically balanced before installation.

4.31.115 A splined slip joint will be provided in each driveshaft. The slip joint will be coated with Glidecoat® or equivalent.

4.31.116 PAINT PUMP TRANSMISSION AND DRIVE TRANSMISSION OUTPUT YOKES - The pump transmission and drive transmission output yokes will be brush painted, not spray painted. The drive transmission output yoke will be the same color as the driveshaft which is black. The pump transmission yokes will be brush painted job color.

4.31.117 STEERING - Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

4.31.118 A tilt and telescopic steering column will be provided to improve fit for a broader range of driver configurations.

4.31.119 STEERING WHEEL - The steering wheel will be 18.00" in diameter, have tilting and telescoping capabilities, and a 4-spoke design.

4.31.120 LOGO AND CUSTOMER DESIGNATION ON DASH - The dash panel will have an emblem containing the Pierce logo and customer name. The emblem will have three (3) rows of text for the customer's department name. There will be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

1. The first row of text will be: San Antonio
2. The second row of text will be: Fire
3. The third row of text will be: Department

4.31.121 SHROUD - An aluminum shroud will be mounted over the Wabco main module located in the frame rails to deflect water and debris from above.

4.31.122 TAG/LABEL - The following one (1) tags or labels will be provided DS nose cone above fill location on the chassis or cab. The tag/label will be configured and read "POWER STEERING FLUID: 15W40 DO NOT OVER FILL" see photo of 29395 in job efolder.

4.31.123 STEERING GEAR OIL - Standard steering gear oil to be replace with 15W40 CJ-4 motor oil. All labeling will be changed to reflect the 15W40 CJ-4 motor oil.

4.31.124 BUMPER - A one (1)-piece, 0.25" thick steel channel bumper, a minimum 10.00" high will be attached to the front of the chassis frame. The bumper will be painted job color.

4.31.125 A 9.00" formed steel channel will be mounted directly behind bumper for additional strength.

4.31.126 The bumper will be extended 10.00" from front face of cab.

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

4.31.128 LIFT AND TOW MOUNTS WITH TOW EYES - Mounted to the frame extension will be lift and tow mounts. Incorporated in the mounts will be two (2) painted steel tow eyes. The lift and tow mounts will be designed and positioned to adapt to certain tow truck lift systems. The tow eyes will not be used for lifting of the apparatus.

4.31.129 The inner and outer edges of the tow eyes will have a 0.25" radius.

4.31.130 The lift and tow mounts with eyes will be painted orange.

4.31.131 TOW EYES - Two (2) cutouts will be provided in the front face of the bumper to allow two (2) Chicago style tow eyes to extend out the front. The inner and outer edges of the utility eyes will have a 0.25 radius.

4.31.132 The tow eyes will be designed and positioned to allow up to a 6,000 pound straight horizontal pull in line with the centerline of the vehicle. The tow eyes will not be used for lifting of the apparatus.

4.31.133 The utility eyes will be painted red.

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

4.31.135 CAB - The Velocity cab will be designed specifically for the fire service and will be manufactured by Pierce Manufacturing.

4.31.136 To provide quality at the source and single source customer support, the cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

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

4.31.138 The cab will have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts) and rear wall areas. The A-pillar will be constructed of 0.25" heavy wall extrusions joined by a solid A356-T6 aluminum joint casting. The B-pillar and C-pillar will also be constructed from 0.25" heavy wall extrusions. The rear wall will be constructed of two (2) 4.00" x 2.00" outer aluminum extrusions and two (2) 3.00" x 2.00" inner aluminum extrusions. All main vertical structural members will run from the floor to 7.50" x 3.50" x 0.125" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.75" thick corner casting at each of the front corners of the roof assembly.

4.31.139 The front of the cab will be constructed of a 0.25" thick firewall, covered with a 0.125" front skin (for a total thickness of 0.38"), and reinforced with 24.50" wide x 10.00" deep x 0.50" thick supports on each side of the engine tunnel. The cross-cab support will be welded to the A-pillar, 0.25" firewall, and engine tunnel, on the left and right sides.

4.31.140 The cab floors will be constructed of 0.1875" thick aluminum plate and reinforced at the firewall with an additional 0.25" thick cross-floor support providing a total thickness of 0.44" of structural material at the front floor area. The front floor area will also be supported with three (3) 0.50" plates bolted together that also provides the mounting point for the cab lift. This tubing will run from the front of the cab to the 0.1875" thick engine tunnel, creating the structure to support the forces created when lifting the cab.

4.31.141 The cab will be a full-tilt style. A 3-point cab mount system with rubber isolators will improve ride quality by isolating chassis vibrations from the cab.

4.31.142 The crew cab will be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

4.31.143 The forward cab section will have an overall height (from the cab roof to the ground) of approximately 102.00". The crew cab section will have a 10.00" raised roof, with an overall cab height of approximately 112.00". The raised portion will start at the most forward point of the B-pillar and continue rearward to the back of the cab. The overall height listed will be calculated based on a truck configuration with the lowest suspension weight ratings, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension will increase the overall height listed.

4.31.144 The cab will have an interior width of not less than 93.50". The driver and passenger seating positions will have a minimum 24.00" clear width at knee level.

4.31.145 To reduce injuries to occupants in the seated positions, proper head clearance will be provided. The floor-to-ceiling height inside the forward cab of will be no less than 60.25". The floor-to-ceiling height inside the crew cab will be no less than 62.95" in the center position and 68.75" in the outboard positions.

4.31.146 The crew cab will measure a minimum of 71.50" from the rear wall to the backside of the engine tunnel (knee level) for optimal occupant legroom.

4.31.147 INTERIOR CAB INSULATION - The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab will be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling.

4.31.148 FENDER LINERS - Full-circular, aluminum inner fender liners in the wheel wells will be provided.

4.31.149 PANORAMIC WINDSHIELD - A one (1)-piece, safety glass windshield with more than 2,802 square inches of clear viewing area will be provided. The windshield will be full width and will provide the occupants with a panoramic view. The windshield will consist of three (3) layers: the outer light, the middle safety laminate, and the inner light. The 0.114" thick outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage. The inner light will provide yet another chip resistant layer. The cab windshield will be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

4.31.150 WINDSHIELD WIPERS - Three (3) electric windshield wipers with a washer, in conformance with FMVSS and SAE requirements, will be provided. The wiper blades will be 21.65" long and together will clear a minimum of 1,783 square inches of the windshield for maximum visibility in inclement weather.

4.31.151 The windshield washer fluid reservoir will be located at the front of the vehicle and be accessible through the access hood for simple maintenance.

4.31.152 FAST SERVICE ACCESS FRONT TILT HOOD - A full-width access hood will be provided for convenient access to engine coolant, steering fluid, wiper fluid, cab lift controls, headlight power modules, and ember separator. The hood will also provide complete access to the windshield wiper motor and components. The hood will be contoured to provide a sleek, automotive appearance. The hood will be constructed of two (2) fiberglass panels bonded together and will include reinforcing ribs for structural integrity. The hood will include air cylinders to hold the hood in open and closed positions, and a heavy duty latch system that will meet FMVSS 113 (Hood Latch System). The spring-loaded hood latch will be located at the center of the hood with a double-action release lever located behind the Pierce logo. The two (2)-step release requires the lever first be pulled to the driver side until the hood releases from the first latch (primary latch) then to the passenger side to fully release the hood (secondary latch).

4.31.153 ENGINE TUNNEL - To provide structural strength, the engine tunnel sidewalls will be constructed of 0.50" aluminum plate that is welded to both the 0.25" firewall and 0.38" heavy wall extrusion under the crew cab floor. To maximize occupant space, the top edges will be tapered.

4.31.154 The back of the engine tunnel will be no higher than 16.25" off the crew cab floor.

4.31.155 The engine tunnel will be insulated on both sides for thermal and acoustic absorption. The underside of the tunnel will be sprayed with insulation. The insulation will keep noise (dBA) levels at or lower than the specifications in the current edition of the NFPA 1901 standards.

4.31.156 CAB REAR WALL EXTERIOR COVERING - The exterior surface of the rear wall of the cab will be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cab is lowered.

4.31.157 CAB LIFT - A hydraulic cab lift system will be provided, consisting of an electric-powered hydraulic pump, fluid reservoir, dual lift cylinders, remote cab lift controls and all necessary hoses and valves. The hydraulic pump will have a backup manual override, for use in the event of an electrical failure.

4.31.158 The cab lift controls will be located at the driver side front of the cab, easily accessible under the full width front access hood. The controls will include a permanently mounted raise/lower switch. For enhanced visibility during cab tilt operations, a remote control tether with on/off switch will be supplied on a coiled cord that will extend from 2.00' (coiled) to 6.00' (extended).

4.31.159 The cab will be capable of tilting 42 degrees and 80 degrees with crane assist to accommodate engine maintenance and removal. The cab pivots will be located 46.00" apart to provide stability while tilting the cab.

4.31.160 The rear of the cab will be locked down by a two (2)-point, automatic, hydraulic, double hook mechanism that fully engages after the cab has been lowered (self-locking). The dual 2.25" diameter hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the cab is in the tilt position.

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

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

4.31.163 GRILLE - A bright finished aluminum mesh grille screen, inserted behind a formed bright finished grille surround, will be provided on the front center of the cab, and will serve as an air intake to the radiator.

4.31.164 SCUFFPLATE - A treadplate scuffplate will be installed on the top edge of both rear facing seat risers. The scuffplate will be flanged to the front to protect the painted edge of the seat riser.

4.31.165 FRONT CAB TRIM - Bright finished wrap-around housings will be provided on each side of the front cab face for mounting of the headlights and front directional lights. The housings will mate up to the side edge of the forward grille, and then extend around the front corners of the cab rearward, providing for a streamlined automotive appearance.

4.31.166 MIRRORS - Ramco, Model 6001FFHR-750HR, polished aluminum 9.25" wide x 13.50" high mirrors, with full flat glass section, will be mounted on each side of the front cab corner. A convex section will be bolted to the top of each mirror.

4.31.167 The flat glass in each mirror will be heated and adjustable with remote controls that are convenient to the driver.

4.31.168 The convex section in each mirror will be heated and adjustable with remote controls.

4.31.169 MIRROR (SIDE VIEW) - Exterior officer's side view mirror will be provided on the cab. Mirror will allow passenger to view the side cab blind spot and the area to the rear of the truck.

4.31.170 Mirror will be located on the cab door, mounted on an adjustable arm. Mirror head will be an 8.00" convex mirror.

4.31.171 FRONT CROSS VIEW MIRROR - There will be one (1) 8.00" diameter eyeball mirror provided on the passenger side front corner of the cab. It will be mounted high, above the windshield. The mirror will provide the driver with a view of the front bumper and the front of the truck.

4.31.172 The mirror housing, tubing, clamps and hardware will be constructed of corrosion resistant stainless steel.

4.31.173 Mirror head will be K-10, EB50S-S, 8.00" stainless steel housing with three (3) arms.

4.31.174 A 4.00" riser will be provided between the mirror body and support arm on passenger side only.

4.31.175 CAB DOORS - The forward cab and crew cab doors will be the half-height style door. To enhance entry and egress to the cab, the forward cab doors will be a minimum of 43.59" wide x 64.71" high. The crew cab doors will measure a minimum of 37.87" wide x 73.75" high.

4.31.176 The forward cab and crew cab doors will be constructed of extruded aluminum with a nominal material thickness of 0.125". The exterior door skins will be constructed from 0.090" aluminum.

4.31.177 The forward cab door windows will include a 7.50" high x 10.00" wide drop area at the front to enhance visibility.

4.31.178 A customized, vertical, pull-down type door handle will be provided on the exterior of each cab door. The exterior handle will be designed specifically for the fire service to prevent accidental activation, and will provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands. Each door will also be provided with an interior flush, open style paddle handle that will be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles will provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

4.31.179 The cab doors will be provided with both interior (rotary knob) and exterior (keyed) locks exceeding FMVSS standards. The keys will be Model 1041. The locks will be capable of activating when the doors are open or closed. The doors will remain locked if locks are activated when the doors are opened, then closed.

4.31.180 A full length, heavy duty, stainless steel, piano-type hinge with a 0.38" pin and 11 gauge leaf will be provided on all cab doors. There will be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

4.31.181 A chrome grab handle will be provided on the inside of each cab and crew cab door.

4.31.182 The cab steps at each cab door location will be located below the cab doors and will be exposed to the exterior of the cab.

4.31.183 CAB DOOR PANELS - The inner cab door panels will be constructed out of brushed stainless steel. The cab door panels will be removable.

4.31.184 RECESSED POCKET WITH ELASTIC COVER - To provide organized storage (clutter control) in the cab for miscellaneous equipment, the cab interior will be provided with a recessed storage pocket. The pocket will be 5.63" wide x 2.00" high x 6.00" deep. The pocket will be provided with a perforated elastic material cover to secure the equipment in the pocket. The pocket will be installed in location 7 on the driver side console.

4.31.185 RECESSED POCKET WITH ELASTIC COVER - To provide organized storage (clutter control) in the cab for miscellaneous equipment, the cab interior will be provided with recessed storage pockets. The pockets will be 5.63" wide x 2.00" high and as deep as possible. The pockets will be provided with a perforated elastic material cover to secure the equipment in the pocket. The pockets will be installed Loc 8, as indicated on the instrument panel layout.

4.31.186 ELECTRIC WINDOW CONTROLS - Each cab entry door will be equipped with an electrically operated tempered glass window. A window control panel will be located on the door panel within easy reach of the respective occupant. Each switch will allow intermittent or auto down operation for ease of use. Auto down operation will be actuated by holding the window down switch for approximately 1 second. The driver control panel will contain a control switch for each cab door's window. All other door control panels will contain a single switch to operate the window within that door.

4.31.187 The window switches will be connected directly to the battery power. This allows the windows to be raised and lowered when the battery switch is in the off position.

4.31.188 ELECTRIC CAB DOOR LOCKS - The front driver and passenger doors will have a door lock master switch (custom designed rotary lock knob) built into the interior door latch that will control all front and rear side exit door locks. Each rear cab door will have its own lock control. Each door will have a keyed exterior lock mechanism built into the door handle assembly.

4.31.189 There will be one (1) concealed switch on the exterior of the cab, located under the front full width service access panel that operates the cab door locks.

4.31.190 The lock system will include two (2) key FOBs that allow for keyless entry into the vehicle. The key FOB system will use code hopping technology for high security and be FCC part 15 compliant.

4.31.191 DUAL STEPS - A dual step will be provided below each cab and crew cab door. The steps will be designed with a grip pattern punched into bright aluminum treadplate material providing support, slip resistance, and drainage. The steps will be a bolt-on design and provide a 24.00" wide x 7.00" deep stepping surface. The step design raises the middle step higher and closer to the cab floor, resulting in a 12.00" distance from the step to cab floor in the cab and a 13.50" distance from the step to cab floor in the crew cab. Stepping distances from the ground to first step will be 16.50" and from first step to middle step will be 12.00".

4.31.192 The first step will be lit by a white 12 volt DC LED light provided on the step.

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

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

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

4.31.196 FENDER CROWNS - Rubber fender crowns will be provided around the cab wheel openings. Crowns will be black.

4.31.197 ADDITIONAL HANDRAILS - There will be two (2) handrail(s) provided rear corner of the cab, same length and height as the crew cab handrails. The handrail will be an anodized aluminum extrusion with a ribbed design to provide a positive gripping surface.

4.31.198 CREW CAB WINDOWS - One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the front cab door. The windows will be sized to enhance light penetration into the cab interior. The windows will measure 20.00" wide x 20.50" high.

4.31.199 One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the crew cab door.

4.31.200 WINDOWS INTERIOR TRIM - For improved aesthetics, the cab side windows will include a vacuum formed ABS interior trim panel.

4.31.201 WINDOWS, REAR - The rear wall of the crew cab will have two (2) windows, each being 11.25" wide x 18.00" high.

4.31.202 WINDOW INTERIOR TRIM - For improved aesthetics, the cab rear wall windows will include a vacuum formed ABS interior trim panel.

4.31.203 STORAGE COMPARTMENT - Provided under the forward facing crew cab seats will be a transverse compartment. The compartment will be saddle style where it is open top to bottom, 21.50" wide x 32.62" high x 26.25" deep (drivers side) and 24.00" deep (passenger side). The upper section will be 21.50" wide x 17.12" high x 26.25" deep (driver side) and 24.00" deep (passenger side). The top 11.38" of the upper compartment will be full width (transverse) of the crew cab. The lower section on both sides will be 21.50" wide x 15.50" high x 20.00" deep. The compartment will extend from the bottom of the cab to top of the seat riser.

4.31.204 There will be an access door on both sides of the cab with double pan doors.

4.31.205 Doors will be latched with recessed, polished stainless steel D-ring handles and Eberhard 106 locks. The doors will include gas shock style positive door holders. A magnetic style switch will be provided to activate the door open warning system.

4.31.206 There will be one (1) drop down door, single pan construction, on the forward face of the seat riser.

4.31.207 The drop down door will include two (2) flush quarter turn latches.

4.31.208 The crew cab door grab handles will be located above the side compartment doors. The cab side access doors will be painted to match the cab exterior and the drop down door inside the cab will be constructed of polished stainless steel.

4.31.209 The compartment interior will be painted spatter gray.

4.31.210 FORWARD FACING CREW CAB SEATS - The outboard forward facing seats in the crew cab will be moved inboard by 3".

4.31.211 COMPARTMENT LIGHT - There will be eight (8) white LED strip lights, one (1) each side of lower and upper exterior compartment door opening. The lights will be controlled by an automatic door switch.

4.31.212 CAB ROOF DRIP RAIL - For enhanced protection from inclement weather, a drip rail will be furnished on the sides of the cab. The drip rail will be constructed of bright polished extruded aluminum, and be bonded to the sides of the cab. The drip rail will extend the full length of the cab roof. The drip rails will also be located under the light brackets welded on the cab roof.

4.31.213 MOUNTING PLATE ON ENGINE TUNNEL - Equipment installation provisions will be installed on the engine tunnel.

4.31.214 A .188" smooth aluminum plate will be bolted to the top surface of the engine tunnel. The plate will extend from behind the instrument panel console, down the taper in the tunnel and terminate at the rear of the storage compartment mounted to the rear of the engine tunnel. The rear horizontal surface of the tunnel will not be covered. The front of the plate will be flanged 45 degrees downward to prevent items from rolling underneath it. The front horizontal surface will be 10.00" from the front flange to the taper down the engine tunnel. This front surface will not follow the profile of the engine tunnel. The plate will be spaced off the engine tunnel .75" to allow for wire routing below the plate.

4.31.215 The mounting surface will be painted to match the cab interior.

4.31.216 CAB INTERIOR - With safety as the primary objective, the wrap-around style cab instrument panel will be designed with unobstructed visibility to instrumentation. The dash layout will provide the driver with a quick reference to gauges that allows more time to focus on the road.

4.31.217 The center console will be a high impact ABS polymer and will be easily removable for access to the defroster. The center console will include louvers strategically located for optimal air flow and defrost capability to the windshield.

4.31.218 The passenger side dashboard will be constructed of painted aluminum for durability and low maintenance. For enhanced versatility, the passenger side dash will include a flat working surface.

4.31.219 To provide optional (service friendly) control panels, switches and storage modules, a painted aluminum overhead console will also be provided.

4.31.220 To complete the cab front interior design, painted aluminum modesty panels will be provided under the dash on both sides of the cab. The driver side modesty panel will provide mounting for the battery switch and diagnostic connectors, while the passenger side modesty panel provides a glove box, and ground access to the main electrical distribution panel via quick quarter turn fasteners.

4.31.221 To provide a deluxe automotive interior, the engine tunnel, side walls and rear wall will be covered by a leather grain vinyl that is resistant to oil, grease, and mildew.

4.31.222 The headliner will be installed in both forward and rear cab sections. The headliner panel will be a composition of an aluminum panel covered with a sound barrier and upholstery.

4.31.223 The cab structure will include designated raceways for electrical harness routing from the front of the cab to the rear upper portion of the cab. Raceways will be extruded in the forward door frame, floor, walls and overhead in the area where the walls meet the ceiling. The raceways located in the floor will be covered by aluminum extrusion, while the vertical and overhead raceways will be covered by painted aluminum covers. The raceways will improve harness integrity by providing a continuous harness path that eliminates wire chafing and abrasion associated with exposed wiring or routing through drilled metal holes. Harnesses will be laid in place.

4.31.224 CAB INTERIOR UPHOLSTERY - The cab interior upholstery will be dark silver gray. All cab interior materials will meet FMVSS 302 (flammability of interior materials).

4.31.225 CAB INTERIOR PAINT - A rich looking interior will be provided by painting all the metal surfaces inside the cab fire smoke gray, vinyl texture paint.

4.31.226 CAB FLOOR - The cab and crew cab floor areas will be covered with Polydamp™ acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

4.31.227 The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a 0.25" thick closed cell foam (no water absorption) which offers a sound dampening material for reducing sound levels.

4.31.228 CAB DEFROSTER - To provide maximum defrost and heating performance, a 54,961 BTU heater-defroster unit with 558 SCFM of air flow will be provided inside the cab. The defroster unit will be strategically located under the center forward portion of the instrument panel. For easy access, a removable metal cover will be installed over the defroster unit. The defroster will include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the 1-piece windshield. The defroster ventilation will be built into the design of the cab dash instrument panel and will be easily removable for maintenance. The defroster will be capable of clearing 98 percent of the windshield and side glass when tested under conditions where the cab has been cold soaked at 0 degrees Fahrenheit for 10 hours, and a 2 ounce per square inch layer of frost/ice has been able to build up on the exterior windshield. The defroster system will meet or exceed SAE J382 requirements.

4.31.229 The heater-defroster will be controlled by an integral electronic control panel. The defroster control panel will allow the driver to control heat flow to the windshield. The control panel will include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel will include highly visible, progressive LED indicators for both fan speed and temperature.

4.31.230 AIR CONDITIONING - Due to the large space inside the cab, a high-performance, customized air conditioning system will be furnished. A 19.10 cubic inch compressor will be installed on the engine.

4.31.231 The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 64 degrees Fahrenheit in the forward section of the cab, and 69 degrees Fahrenheit in the rear section of the cab, at 50 percent relative humidity within 30 minutes. The cooling performance test will be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

4.31.232 A roof-mounted condenser with a 63,000 BTU output that meets and exceeds the performance specification will be installed on the cab roof. The condenser cover and mounting legs to be painted white as provided by manufacturer.

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

4.31.234 There will be a hinge on the forward edge of the filter cover and two (2) quarter turn fasteners with a knob on the rear edge to allow easy access.

4.31.235 The evaporator unit will have a 49,000 BTU (4.08 tons) rating that meets and exceeds the performance specifications.

4.31.236 Adjustable air outlets will be strategically located on the evaporator cover per the following:

4.31.237 Four (4) will be directed towards the drivers location

4.31.238 Four (4) will be directed towards the officers location

4.31.239 Eight (8) will be directed towards crew cab area

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

4.31.241 The air conditioner will be controlled by dual zone integral electronic control panels for the heater, defroster and air conditioner. The cab control panel will be located in the center console. For ease of operation, the control panels will include variable adjustment for temperature and fan control.

4.31.242 INTERIOR CAB INSULATION - The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. The cab will be insulated with 2.00" insulation in the rear wall, 3.00" insulation in the side walls, and 1.50" insulation in the ceiling. Headliners will be constructed from a 0.20" high density polyethylene corrugated material. Each headliner will be wrapped with a 0.25" thick foil faced poly damp low emissivity foam insulation barrier for acoustic and thermal control.

4.31.243 Designed for maximum sound absorption and thermal insulation, the rear cab wall will be insulated with a 1.50" thick open cell acoustical foam. The thermal protection of the foam will provide and R-value of 4 per 1.00" thickness.

4.31.244 SPECIAL DRAIN TUBES - Two (2) condensate drain tubes will be provided for the air conditioning evaporator. The drip pan will have two (2) drain tubes plumbed separately to allow for the condensate to exit the drip pan. The drain tubes will terminate under the cab, by the front of the wheel wells.

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

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

4.31.247 GRAB HANDLE - A black rubber covered grab handle will be mounted on the door post of the driver side cab and passenger door to assist in entering the cab. The grab handle will be securely mounted to the post area between the door and windshield.

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

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

4.31.250 These light(s) will be activated automatically when the cab is raised or when the dip stick door is opened.

4.31.251 ACCESS TO ENGINE DIPSTICKS - For access to the engine oil and transmission fluid dipsticks, there will be a door on the engine tunnel, inside the crew cab. The door will be on the rear wall of the engine tunnel, on the vertical surface. The door will be 17.75" wide x 12.75" high and be flush with the wall of the engine tunnel.

4.31.252 The engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling. An additional port will be provided for filling the engine oil.

4.31.253 The door will have a rubber seal for thermal and acoustic insulation. One (1) flush latch will be provided on the access door.

4.31.254 MAP BOX - One (1) long map box with two (2) partitions will be installed to create a three (3) bin box open from top. The overall map box size will be 4 wide x 45 long x 8 deep and will then be divided into three (3) equal bins by use of permanent partitions.

4.31.255 The map box will be constructed of .125" aluminum and will be painted to match the cab interior.

4.31.256 There will be a quantity of one (1).

4.31.257 The map box will Mounted on forward wall of center EMS cabinet between driver and officer above engine tunnel. Locate the top of the map box 3" down from the top of the cabinet, centered L/R.

4.31.258 CAB SAFETY SYSTEM - The cab will be provided with a safety system designed to protect occupants in the event of a side roll or frontal impact, and will include the following:

4.31.259 A supplemental restraint system (SRS) sensor will be installed on a structural cab member behind the instrument panel. The SRS sensor will perform real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a side roll or frontal impact event.

4.31.260 A slave SRS sensor will be installed in the cab to provide capacity for eight (8) crew cab seating positions.

4.31.261 A fault-indicating light will be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.

4.31.262 A driver side front air bag will be mounted in the steering wheel and will be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt.

4.31.263 A passenger side knee bolster air bag will be mounted in the modesty panel below the dash panel and will be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt.

4.31.264 Air curtains will be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.

4.31.265 Suspension seats will be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.

4.31.266 Seat belts will be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

4.31.267 FRONTAL IMPACT PROTECTION - The SRS system will provide protection during a frontal or oblique impact event. The system will activate when the vehicle decelerates at a predetermined G force known to cause injury to the occupants. The cab and chassis will have been subjected, via third party test facility, to a crash impact during frontal and oblique impact testing. Testing included all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspensions components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing provided configuration specific information used to optimize the timing for firing the safety restraint system. The sensor will activate the pyrotechnic devices when the correct crash algorithm, wave form, is detected.

4.31.268 The SRS system will deploy the following components in the event of a frontal or oblique impact event:

4.31.269 Driver side front air bag

4.31.270 Passenger side knee bolster air bag

4.31.271 Air curtains mounted in the outboard bolster of outboard seat backs

4.31.272 Suspension seats will be retracted to the lowest travel position

4.31.273 Seat belts will be pre-tensioned to firmly hold the occupant in place

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

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

4.31.276 Air curtains mounted in the outboard bolster of outboard seat backs

4.31.277 Suspension seats will be retracted to the lowest travel position

4.31.278 Seat belts will be pre-tensioned to firmly hold the occupant in place

4.31.279 SEATING CAPACITY - The seating capacity in the cab will be five (5).

4.31.280 DRIVER SEAT - A Pierce PS6® seat will be provided in the cab for the driver. The seat design will be a cam action type with air suspension. For increased convenience, the seat will include electric controls to adjust the rake (15 degrees), height (1.12" travel) and horizontal (7.75" travel) position. Electric controls will be located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have a reclining back, adjustable from 20 degrees back to 45 degrees forward. Providing for maximum comfort, the seat back will be a high back style with manual lumbar adjustment lever, for lower back support, and will include minimum 7.50" deep side bolster pads for maximum support. The lumbar adjustment lever will be easily located at the lower outboard position of the seat cushion. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control).

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

4.31.282 Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.

4.31.283 A suspension seat safety system will be included. When activated in the event of a side roll, this system will pretension the seat belt and retract the seat to its lowest travel position.

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

4.31.285 OFFICER SEAT - A Pierce PS6® seat will be provided in the cab for the passenger. The seat will be a cam action type with air suspension. For increased convenience, the seat will include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not belted.

4.31.286 The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

4.31.288 Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.

4.31.289 A suspension seat safety system will be included. When activated, this system will pretension the seat belt and then retract the seat to its lowest travel position.

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

4.31.291 REAR FACING DRIVER SIDE EMS COMPARTMENT - A rear facing EMS compartment will be provided in the crew cab at the driver side outboard position. The compartment will be mounted 4.50" off the edge of the seat riser.

4.31.292 The compartment will be 20.00" wide x 30.00" high x 25.00" deep with one (1) Amdor roll up door, non-locking, with white finish, radius track style. That is, it will travel over the top and down the back of the compartment. Front top corners of the compartment will be radiused. This will allow access through the front and top section of the compartment.

4.31.293 The compartment will be constructed of smooth aluminum and painted to match the cab interior. A shield will be installed to keep items in this compartment from falling into the door tracking area and jamming the door.

4.31.294 COMPARTMENT LIGHT

4.31.295 There will be one (1) white LED strip light installed on the left side of the compartment opening. The lights will be controlled by an automatic door switch.

4.31.296 STORAGE COMPARTMENT - A rear facing radio storage compartment will be provided in the crew cab at the passenger side outboard position. The compartment will be mounted 4.50" off the edge of the seat riser.

4.31.297 The compartment will be 20.00" wide x 30.00" high x 23.00" deep and will be provided with an access panel that screws into place. There will be ventilation holes provided in the access panel.

4.31.298 The compartment will be constructed of smooth aluminum, and painted to match the cab interior.

4.31.299 FORWARD FACING DRIVER SIDE OUTBOARD SEAT - There will be one (1) forward facing, Pierce PS6® seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle, that will activate an alarm indicating a seat is occupied but not buckled.

4.31.300 The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

4.31.302 Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.

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

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

4.31.305 FORWARD FACING CENTER SEAT - There will be one (1) forward facing, Pierce PS6® seat provided at the center position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

4.31.306 The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

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

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

4.31.310 FORWARD FACING PASSENGER SIDE OUTBOARD SEAT - There will be one (1) forward facing, Pierce PS6® seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle, that will activate an alarm indicating a seat is occupied but not buckled.

4.31.311 The seat back will be an SCBA back style with 7.50 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

4.31.313 Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.

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

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

4.31.316 EMS COMPARTMENTS - The rear facing EMS compartments will be stacked side by side by side, secured to each other with bolts to prevent rattling. The center compartment and driver's side compartment will be moved off center towards the passenger's side to allow them to all be tight together.

4.31.317 STORAGE COMPARTMENT - A storage compartment will be provided in the crew cab. The compartment will be located on the top rear of the engine tunnel, facing the rear of the crew cab. The front edge of the compartment will be even with the rear edge of the engine tunnel.

4.31.318 The compartment will be 47.50" wide x 20.50" high x 17.75" deep at the bottom and 20.00" deep at the top. The interior door will be web netting. The netting is to be made with 1.00" wide nylon material with 2.00" openings. Side release buckles will be used to fasten all sides of the opening. The clear door opening of the compartment will be 45.00" wide x 18.00" high.

4.31.319 A permanent vertical partition will be provided on the left side of the compartment. The partition will be mounted to provide an 18.00" wide clear opening on the left side of the compartment. An adjustable shelf will be provided on the right side of the partition. The shelf will be constructed of 0.090" aluminum with a 1.25" up-turned lip. Shelving will be infinitely adjustable by means of a threaded tightener sliding in a track.

4.31.320 Compartment will be constructed of smooth aluminum and painted to match the cab interior.

4.31.321 COMPARTMENT LIGHT - There will be two (2) white LED strip lights installed, one (1) each side of the compartment opening. The lights will be controlled by a switch on the exterior of the compartment.

4.31.322 SHELVING - There will be one (1) shelf provided. Each shelf will be constructed of 0.090" aluminum with a 1.25" up-turned lip. Shelving will be infinitely adjustable by means of a threaded tightener sliding in a track.

4.31.323 The location will be one (1) shelf in the driver side rear facing EMS cabinet.

4.31.324 REAR FACING OVERHEAD STORAGE COMPARTMENT - There will be two (2) overhead rear facing storage compartments installed at the raised roof within the crew cab, on each side of the air conditioner. The compartments will be approximately 22.00" wide x 10.00" high x 34.00" deep at the bottom.

4.31.325 Each compartment will include one (1) drop down compartment door. A locking push button combination latch will be provided. The flange will be as small as possible to create the largest clear door opening. The compartment door will open 180 degrees.

4.31.326 The compartment will be constructed of smooth aluminum and painted to match the cab interior.

4.31.327 COMPARTMENT LIGHT - The storage compartment lighting will consist of one (1) white LED strip light installed horizontally above each compartment door opening.

4.31.328 CAB COMPARTMENT LIGHTING - There will be one (1) Pierce 20.00" LED compartment light strip(s) provided in in the PS radio compartment in the crew cab rear facing, mounted on the outside wall..

4.31.329 A switch provided in the PS radio compartment in the crew cab rear facing, mounted on the outside wall will turn compartment lighting on.

4.31.330 SEAT UPHOLSTERY - All seat upholstery will be gray Turnout Tuff material.

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

4.31.332 There will be a quantity of four (4) SCBA brackets.

4.31.333 SEAT BELTS - All seating positions in the cab, crew cab and tiller cab (if applicable) will have red seat belts.

4.31.334 To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length will meet or exceed the current edition of NFPA 1901 and CAN/ULC - S515 standards. The shoulder belt web length will be 120.00".

4.31.335 The 3-point shoulder type seat belts will also include the ReadyReach D-loop assembly to the shoulder belt system. The ReadyReach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

4.31.336 SHOULDER HARNESS HEIGHT ADJUSTMENT - All seating positions furnished with 3-point shoulder type seat belts will include a height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter.

4.31.337 A total of five (5) seating positions will have the adjustable shoulder harness.

4.31.338 HELMET STORAGE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 14.1.7.4.1 requires a location for helmet storage be provided.

4.31.339 There is no helmet storage on the apparatus as manufactured. The fire department will provide a location for storage of helmets.

4.31.340 CAB DOME LIGHTS - There will be four (4) Whelen, Model 60C*EGCS, 6.00" round dual LED dome lights provided. Two (2) lights will be mounted above the inside shoulder of the driver and officer and two (2) lights will be installed and located, one (1) on each side of the crew cab.

4.31.341 The color of the LED's will be red and white.

4.31.342 The white LED's will be controlled by the door switches and the lens switch.

4.31.343 The color LED's will be controlled by the lens switch.

4.31.344 ADDITIONAL DOME LIGHTS - There will be one (1) 6.00" round Whelen, Model 60CREGCS white and red LED dome light installed in the cab located centered in the ceiling panel in front of the center seat, standard lights mounted to the inside edge of the outer panels, all three in a straight row, match 29674.

4.31.345 The white light will be controlled by the door switch and a switch on the light.

4.31.346 The red light will be controlled by the switch on the light.

4.31.347 OVERHEAD MAP LIGHTS - There will be two (2) Peterson, Model M371S, rectangular LED adjustable map lights installed in the cab:

4.31.348 One (1) overhead in front of the driving position.

4.31.349 One (1) overhead in front of the passenger's position.

4.31.350 Each light will include a switch on the light housing.

4.31.351 The light switches will be energized when the spare wire cut off switch is on.

4.31.352 HAND HELD SPOTLIGHT - There will be four (4) Streamlight, Model Survivor 90503, LED flashlights with chargers and AC/DC chords provided and installed one each side in the front of the cab to the rear of the cab door on the angled portion and two in the rear crew cab area on the wire cover at the ceiling, match 29756 and 29674.

4.31.353 POWER TO HAND HELD SPOTLIGHT - The 12 volt DC power to recharge the hand lights will be from the spare wire fuse panel located Front lights mount on the angled section toward the rear door frame each side DS and PS front. Rear lights hanging from the ceiling and 1 E-spot on top of the d.s EMS top but toward the engine tunnel. routing of the wiring to be down front of cabinet.

4.31.354 HAND HELD LIGHT - There will be one (1) light Streamlight E-Spot, LiteBox Vehicle Mount Systems, Model 45855, LED hand held flashlights with an orange thermoplastic body provided.

4.31.355 The location will be one on the d-s ems box top. See photo, put the bolts up from the inside of the compartment before door is installed so the bolts can't damage the roll up door.

4.31.356 The system will include the hand light, a charger and the vehicle mount system and strap.

4.31.357 CAB INSTRUMENTATION - The cab instrument panel will consist of gauges, an LCD display, telltale indicator lights, alarms, control switches, and a diagnostic panel. The function of instrument panel controls and switches will be identified by a label adjacent to each item. Actuation of the headlight switch will illuminate the labels in low light conditions. Telltale indicator lamps will not be illuminated unless necessary. The cab instruments and controls will be conveniently located within the forward cab section directly forward of the driver. Gauge and switch panels will be designed to be removable for ease of service and low cost of ownership.

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

1. Voltmeter gauge (Volts)
2. Low volts (11.8 VDC) - Amber indicator on gauge assembly with alarm
3. High volts (15 VDC) - Amber indicator on gauge assembly with alarm
4. Very low volts (11.3 VDC) - Amber indicator on gauge assembly with alarm
5. Very high volts (16 VDC) - Amber indicator on gauge assembly with alarm

- Tachometer (RPM)
- Speedometer (Primary (outside) MPH, Secondary (inside) Km/H)
- Fuel level gauge (Empty - Full in fractions)

6. Low fuel (1/8 full) - Amber indicator on gauge assembly with alarm
7. Very low fuel (1/32) fuel - Amber indicator on gauge assembly with alarm

- Engine oil pressure gauge (PSI)

8. Low oil pressure to activate engine warning lights and alarms - Red indicator on gauge assembly with alarm

- Front air pressure gauge (PSI)

9. Low air pressure to activate warning lights and alarm - Red indicator on gauge assembly with alarm

- Rear air pressure gauge (PSI)

10. Low air pressure to activate warning lights and alarm - Red indicator on gauge assembly with alarm

- Transmission oil temperature gauge (Fahrenheit)

11. High transmission oil temperature activates warning lights and alarm - Amber indicator on gauge assembly with alarm

- Engine coolant temperature gauge (Fahrenheit)

12. High engine temperature activates an engine warning light and alarm - Red indicator on gauge assembly with alarm

- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions)

13. Low fluid (1/8 full) - Amber indicator on gauge assembly with alarm
14. All gauges and gauge indicators will perform prove out at initial power-up to ensure proper performance.

4.31.359 INDICATOR LAMPS - To promote safety, the following telltale indicator lamps will be integral to the gauge assembly and are located above and below the center gauges. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols.

4.31.360 The following amber telltale lamps will be present:

1. Low coolant
2. Trac cntl (traction control) (where applicable)
3. Check engine
4. Check trans (check transmission)
5. Aux brake overheat (Auxiliary brake overheat)

6. Air rest (air restriction)
7. Caution (triangle symbol)
8. Water in fuel
9. DPF (engine diesel particulate filter regeneration)
10. Trailer ABS (where applicable)
11. Wait to start (where applicable)
12. HET (engine high exhaust temperature) (where applicable)
13. ABS (antilock brake system)
14. MIL (engine emissions system malfunction indicator lamp) (where applicable)
15. SRS (supplemental restraint system) fault (where applicable)
16. DEF (low diesel exhaust fluid level)
17. The following red telltale lamps will be present:
    - Warning (stop sign symbol)
    - Seat belt
    - Parking brake
    - Stop engine
    - Rack down
18. The following green telltale lamps will be provided:
    - Left turn
    - Right turn
    - Battery on
19. The following blue telltale lamp will be provided:
    - High beam

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

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

4.31.363 INDICATOR LAMP AND ALARM PROVE-OUT - Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

4.31.364 CONTROL SWITCHES - For ease of use, the following controls will be provided immediately adjacent to the cab instrument panel within easy reach of the driver.

4.31.365 Emergency master switch: A molded plastic push button switch with integral indicator lamp will be provided. Pressing the switch will activate emergency response lights and siren control. A green lamp on the switch provides indication that the emergency master mode is active. Pressing the switch again disables the emergency master mode.

4.31.366 Headlight / Parking light switch: A three (3)-position maintained rocker switch will be provided. The first switch position will deactivate all parking lights and the headlights. The second switch position will activate the parking lights. The third switch position will activate the headlights.

4.31.367 Panel backlighting intensity control switch: A three (3)-position momentary rocker switch will be provided. The first switch position decreases the panel backlighting intensity to a minimum level as the switch is held. The second switch position is the default position that does not affect the backlighting intensity. The third switch position increases the panel backlighting intensity to a maximum level as the switch is held.

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

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

4.31.370 "Ok To Engage High Idle" indicator lamp: A green indicator light will be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

4.31.371 The following standard controls will be provided adjacent to the cab gauge assembly within easy reach of the driver. All switches will have backlit labels for low light applications.

4.31.372 Ignition switch: A three (3)-position maintained/momentary rocker switch will be provided. The first switch position will deactivate vehicle ignition. The second switch position will activate vehicle ignition. The third momentary position will disable the Command Zone audible alarm if held for three (3) to five (5) seconds. A green indicator lamp will be activated with vehicle ignition.

4.31.373 Engine start switch: A two (2)-position momentary rocker switch will be provided. The first switch position is the default switch position. The second switch position will activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

4.31.374 4-way hazard switch: A two (2)-position maintained rocker switch will be provided. The first switch position will deactivate the 4-way hazard switch function. The second switch position will activate the 4-way hazard function. The switch actuator will be red and includes the international 4-way hazard symbol.

4.31.375 Heater, defroster, and optional air conditioning control panel: A control panel with membrane switches will be provided to control heater/defroster temperature and heater, defroster, and air conditioning fan speeds. A green LED status bar will indicate the relative temperature and fan speed settings.

4.31.376 Turn signal arm: A self-canceling turn signal with high beam headlight and windshield wiper/washer controls will be provided. The windshield wiper control will have high, low, and intermittent modes.

4.31.377 Parking brake control: An air actuated push/pull park brake control valve will be provided.

4.31.378 Chassis horn control: Activation of the chassis horn control will be provided through the center of the steering wheel.

4.31.379 CUSTOM SWITCH PANELS - The design of cab instrumentation will allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There will be positions for up to four (4) switch panels in the overhead console on the driver's side, up to four (4) switch panels in the engine tunnel console facing the driver, up to four (4) switch panels in the overhead console on the officer's side and up to two (2) switch panels in the engine tunnel console facing the officer. All switches will have backlit labels for low light applications.

4.31.380 DIAGNOSTIC PANEL - A diagnostic panel will be accessible while standing on the ground and located inside the driver's side door left of the steering column. The diagnostic panel will allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches will allow ABS systems to provide blink codes should a problem exist.

4.31.381 The diagnostic panel will include the following:

1. Engine diagnostic port
2. Transmission diagnostic port
3. ABS diagnostic port
4. SRS diagnostic port (where applicable)
5. Command Zone USB diagnostic port
6. ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
7. Diesel particulate filter regeneration switch (where applicable)
8. Diesel particulate filter regeneration inhibit switch (where applicable)

4.31.382 CAB LCD DISPLAY

4.31.383 A digital four (4)-row by 20-character dot matrix display will be integral to the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into three (3) sections. Each section will have a dedicated function. The upper left section will display the outside ambient temperature.

4.31.384 The upper right section will display, along with other configuration specific information:

1. Odometer
2. Trip mileage
3. PTO hours
4. Fuel consumption
5. Engine hours

4.31.385 The bottom section will display INFO, CAUTION, and WARNING messages. Text messages will automatically activate to describe the cause of an audible caution or warning alarm. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist.

4.31.386 AIR RESTRICTION INDICATOR - A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm shall be provided.

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

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

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

4.31.390 The following messages will be displayed (where applicable):

1. Do Not Move Truck
2. DS Cab Door Open (Driver Side Cab Door Open)
3. PS Cab Door Open (Passenger's Side Cab Door Open)
4. DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
5. PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
6. DS Body Door Open (Driver Side Body Door Open)
7. PS Body Door Open (Passenger's Side Body Door Open)
8. Rear Body Door Open
9. DS Ladder Rack Down (Driver Side Ladder Rack Down)
10. PS Ladder Rack Down (Passenger Side Ladder Rack Down)
11. Deck Gun Not Stowed
12. Lt Tower Not Stowed (Light Tower Not Stowed)
13. Fold Tank Not Stowed (Fold-A-Tank Not Stowed)
14. Aerial Not Stowed (Aerial Device Not Stowed)
15. Stabilizer Not Stowed
16. Steps Not Stowed
17. Handrail Not Stowed

4.31.391 Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause major damage to the apparatus if the apparatus is moved will be displayed as a caution message after the parking brake is disengaged.

4.31.392 SWITCH PANELS - The emergency light switch panel will have a master switch for ease of use plus individual switches for selective control. Each switch panel will contain eight (8) membrane-type switches each rated for one million (1,000,000) cycles. Panels containing less than eight (8) switch assignments will include non-functioning black appliqués. Documentation will be provided by the manufacturer indicating the rated cycle life of the switches. The switch panel(s) will be located in the overhead position above the windshield on the driver side overhead to allow for easy access.

4.31.393 Additional switch panel(s) will be located in the overhead position(s) above the windshield or in designated locations on the lower instrument panel layout.

4.31.394 The switches will be membrane-type and also act as an integral indicator light. For quick, visual indication the entire surface of the switch will be illuminated white whenever back lighting is activated and illuminated green whenever the switch is active. An active illuminated switch will flash when interlock requirements are not met or device is actively being load managed. For ease of use, a two (2)-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch will be placed in the center of the switch. The label will allow light to pass through the letters for ease of use in low light conditions.

4.31.395 WIPER CONTROL - For simple operation and easy reach, the windshield wiper control will be an integral part of the directional light lever located on the steering column. The wiper control will include high and low wiper speed settings, a one (1)-speed intermittent wiper control and windshield washer switch. The control will have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use.

4.31.396 SPARE CIRCUIT - There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

4.31.397 The above wires will have the following features:

1. The positive wire will be connected directly to the battery power.
2. The negative wire will be connected to ground.
3. Wires will be protected to 40 amps at 12 volts DC.
4. Power and ground will terminate PS radio box.
5. Termination will be with 3/8" studs and plastic covers.
6. Wires will be sized to 125% of the protection.
7. This circuit(s) may be load managed when the parking brake is set.

4.31.398 SPARE CIRCUIT - There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

1. The positive wire will be connected directly to the battery power.
2. The negative wire will be connected to ground.
3. Wires will be protected to 15 amps at 12 volts DC.
4. Power and ground will terminate One in DS rear facing EMS compt. mounted at the top, and one in the center rear facing EMS box to be mounted PS rear shelf track . All must be wired to the in/out service switch thru the blue sea junction box.
5. Termination will be with 15 amp, power point plug with rubber cover.

6. Wires will be sized to 125% of the protection.

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

4.31.399 SPARE CIRCUIT- There will be three (3) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

1. The positive wire will be connected to the auxiliary switch located on the instrument panel to the right of the steering wheel, option 614250.

2. The negative wire will be connected to ground.

3. Wires will be protected to 60 amps at 12 volts DC.

4. Power and ground will terminate in the passenger side radio compartment in the crew cab, all flashlights, power points, radios and charger, rocket modem to be connected to these terminal strips.

5. Termination will be to a Blue Sea System, model 5026, 12 circuit with negative bus bar, straight blade fuse block. The terminal block will include a cover with circuit labels.

6. Wires to the fuse block will be sized to 125% of the protection.

7. This circuit(s) may be load managed when the parking brake is applied.

4.31.400 SPARE CIRCUIT - There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

1. The positive wire will be connected directly to the battery power.

2. The negative wire will be connected to ground.

3. Wires will be protected to 2.0 amps at 12 volts DC.

4. Power and ground will terminate # 9 location.

5. Termination will be a Blue Sea Systems part number 1016 dual USB charger socket.

6. Wires will be sized to 125% of the protection.

7. This circuit(s) may be load managed when the parking brake is applied.

4.31.401 SPARE CIRCUIT - There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

1. The positive wire will be connected directly to the battery power

2. The negative wire will be connected to ground

3. Wires will be protected to 15 amps at 12 volts DC

4. Power and ground will terminate Location # 9

5. Termination will be with 15 amp, power point plug with rubber cover

6. Wires will be sized to 125 percent of the protection

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

4.31.402 SPARE CIRCUIT - There will be a Cole Hersee part number 75908 disconnect switch installed in the spare wire circuit(s) to connect or disconnect the power to the spare wire(s) located the blue sea junction boxes in the PS rear facing cabinet. The label and switch will be installed to the lower right side of the steering wheel, match 29756, and 29674.

4.31.403 SPARE CIRCUIT - There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus. The above wires will have the following features:

1. The positive wire will be connected directly to the battery power.
2. The negative wire will be connected to ground.
3. Wires will be protected to 15 amps at 12 volts DC.
4. Power and ground will terminate one each side under the open top, 3 slot map box, mounted to the center EMS compartment. Make sure these are connected to the Blue Sea junction boxes thru the in service / out of service switch..
5. Termination will be with 15 amp, power point plug with rubber cover.
6. Wires will be sized to 125% of the protection.
7. This circuit(s) may be load managed when the parking brake is set.

4.31.404 EMERGENCY LIGHT SWITCHES - The emergency light switching will work as follows: The emergency master switch must be activated for all emergency lighting to function.

4.31.405 The emergency master "saved states" feature will not be activated. This means that if the emergency master switch is on and individual switch is turned off. Then the emergency master is turned off, upon turning the emergency master switch back on the individual switch which was previously turn off will turn back on.

4.31.406 All emergency lighting will be turned on whenever the emergency master switch is turned on.

4.31.407 Individual emergency light switches may be deactivated and/or reactivated after the emergency master switch is turned on.

4.31.408 STEREO RADIO - A Jensen, heavy duty AM/FM/CD/Weatherband stereo radio, with front auxiliary input will be installed within reach of the officer . There will be 5.25" speakers installed one (1) pair of 5.25" speakers in the cab and one (1) pair of 5.25" speakers in the crew cab. The antenna will be a roof-mounted rubber antenna located in an open space, on the cab roof. The following features will be included:

1. CD Player with Electronic Skip Protection (ESP)
2. Full 7-Channel NOAA Weatherband Tuner with SAME technology
3. Built-in Clock
4. Audio CD, CD-R, R/W, MP3 CD compatible
5. Radio Broadcast Data System Text Display
6. Front panel USB input
7. Front and Rear Auxiliary Audio Input
8. Receives audio (A2DP/AVRCP) from Bluetooth enabled device

9. Supports Bluetooth HFP to receive phone calls from BT-enabled phones

10. Low battery alert (<10.8Vdc)

11. Heavy Duty design with Conformal Coated Circuit Boards for maximum durability under all conditions

4.31.409 SWITCH, MASTER, AM/FM RADIO - There will be a remote switch provided inside the cab to control the AM/FM radio. The switch will be installed in reach of the driver in switch panel. The radio will automatically turn on with when the battery switch is turned on.

4.31.410 PUSH BUTTON MOUNTING BRACKET- A mounting bracket will be provided chrome buttons will be in the wedge bracket near the officer. Match to job 29765 and 29674, see pictures. They will locate near edge with wiring coming from below the engine tunnel mount plate. For the mounting of push button controls. The mounting bracket will be large enough for three (3) push buttons. The controls and labels will be mounted horizontally, next to each other. The bracket will be fabricated from smooth aluminum and painted to match work surface.

4.31.411 INFORMATION CENTER - An information center employing a 7.00" diagonal touch screen color LCD display will be encased in an ABS plastic housing. The information center will have the following specifications:

1. Operate in temperatures from -40 to 185 degrees Fahrenheit

2. An Optical Gel will be placed between the LCD and protective lens

3. Five weather resistant user interface switches

4. Grey with black accents

5. Sunlight Readable

6. Linux operating system

7. Minimum of 1000nits rated display

8. Display can be changed to an available foreign language

9. A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.

10. Programmed to read US Customary

4.31.412 GENERAL SCREEN DESIGN - Where possible, background colors will be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background will be used. If a caution or warning situation arises the following will occur:

1. An amber background/text color will indicate a caution condition

2. A red background/text color will indicate a warning condition

4.31.413 The information center will utilize an "Alert Center" to display text messages for audible alarm tones. The text messages will be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages will cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" will change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color will be shown for all alert center messages.

4.31.414 A label for each button will exist. The label will indicate the function for each active button for each screen. Buttons that are not utilized on specific screens will have a button label with no text or symbol.

4.31.415 HOME/TRANSIT SCREEN - This screen will display the following:

1. Vehicle Mitigation (if equipped)
2. Water Level (if equipped)
3. Foam Level (if equipped)
4. Seat Belt Monitoring Screen
5. Tire Pressure Monitoring (if equipped)
6. Digital Speedometer
7. Active Alarms

4.31.416 ON SCENE SCREEN - This screen will display the following and will be auto activated with pump engaged (if equipped):

1. Battery Voltage
2. Fuel
3. Oil Pressure
4. Coolant Temperature
5. RPM
6. Water Level (if equipped)
7. Foam Level (if equipped)
8. Foam Concentration (if equipped)
9. Water Flow Rate (if equipped)
10. Water Used (if equipped)
11. Active Alarms

4.31.417 VIRTUAL BUTTONS - There will be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

4.31.418 PAGE SCREEN - The page screen will display the following and allow the user to progress into other screens for further functionality:

1. Diagnostics
2. Faults
3. Listed by order of occurrence
4. Allows to sort by system
5. Interlock

6. Throttle Interlocks
7. Pump Interlocks (if equipped)
8. Aerial Interlocks (if equipped)
9. PTO Interlocks (if equipped)

4.31.419 Load Manager - A list of items to be load managed will be provided. The list will provide a description of the load.

4.31.420 The lower the priority numbers the earlier the device will be shed should a low voltage condition occur.

4.31.421 The screen will indicate if a load has been shed (disabled) or not shed.

4.31.422 "At a glance" color features are utilized on this screen.

1. Systems
2. Command Zone
3. Module type and ID number
4. Module Version
5. Input or output number
6. Circuit number connected to that input or output
7. Status of the input or output
8. Power and Constant Current module diagnostic information
9. Foam (if equipped)
10. Pressure Controller (if equipped)
11. Generator Frequency (if equipped)
12. Live Data
13. General Truck Data
14. Maintenance
15. Engine oil and filter
16. Transmission oil and filter
17. Pump oil (if equipped)
18. Foam (if equipped)
19. Aerial (if equipped)
20. Setup
21. Clock Setup
22. Date & Time

23. 12 or 24 hour format
24. Set time and date
25. Backlight
26. Daytime
27. Night time
28. Sensitivity
29. Unit Selection
30. Home Screen
31. Virtual Button Setup
32. On Scene Screen Setup
33. Configure Video Mode
34. Set Video Contrast
35. Set Video Color
36. Set Video Tint

4.31.423 DO NOT MOVE - The screen will indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices will be indicate

1. Driver Side Cab Door
2. Passenger's Side Cab Door
3. Driver Side Crew Cab Door
4. Passenger's Side Crew Cab Door
5. Driver Side Body Doors
6. Passenger's Side Body Doors
7. Rear Body Door(s)
8. Ladder Rack (if applicable)
9. Deck Gun (if applicable)
10. Light Tower (if applicable)
11. Hatch Door (if applicable)
12. Stabilizers (if applicable)
13. Steps (if applicable)
14. Notifications
15. View Active Alarms - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm

16. Silence Alarms - All alarms are silenced
17. Timer Screen
18. HVAC (if equipped)
19. Tire Information (if equipped)
20. Ascendant Set Up Confirmation (if equipped)
21. Button functions and button labels may change with each screen.

4.31.424 VEHICLE DATA RECORDER - There will be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided.

4.31.425 The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

4.31.426 The vehicle data recorder will be capable of recording the following data via hardwired and/or CAN inputs:

1. Vehicle Speed - MPH
2. Acceleration - MPH/sec
3. Deceleration - MPH/sec
4. Engine Speed - RPM
5. Engine Throttle Position - % of Full Throttle
6. ABS Event - On/Off
7. Seat Occupied Status - Yes/No by Position
8. Seat Belt Buckled Status - Yes/No by Position
9. Master Optical Warning Device Switch - On/Off
10. Time - 24 Hour Time
11. Date - Year/Month/Day

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

1. Seat Occupied & Buckled = Green LED indicator illuminated
2. Seat Occupied & Unbuckled = Red LED indicator with audible alarm
3. No Occupant & Buckled = Red LED indicator with audible alarm
4. No Occupant & Unbuckled = No indicator and no alarm
5. The seat belt monitoring screen will become active on the Command Zone color display when:

- The home screen is active;
- and there is any occupant seated but not buckled or any belt buckled with an occupant;
- and there are no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS will be activated.
- The SBMS will include an audible alarm that will warn that an unbuckled occupant condition exists and the parking brake is released, or the transmission is not in park.

4.31.428 INTERCOM SYSTEM - There will be digital, single radio interface, intercom located in the cab. The front panel will have master volume, and squelch controls with illuminated indicators, allowing for independent level setting of radio and auxiliary audio devices.

4.31.429 There will be one (1) radio listen only / transmit control with select, monitor, receive, and transmit indicators. There will be one (1) auxiliary audio input with select, and receive indicators.

4.31.430 There will be one (1) wireless base station for up to five (1-5) headset users provided.

4.31.431 The wireless base station will have a 100' to 1100' range, line of sight. Objects between the transmitter and receiver affect range.

4.31.432 The following Firecom components will be provided:

1. One (1) 5100D Intercom
2. One (1) WB505R wireless base station (1-5 wireless positions)
3. All necessary power and station cabling

4.31.433 WIRELESS UNDER HELMET, RADIO TRANSMIT ONLY HEADSET - There will be four (4) Firecom™, Model UHW-505, wireless under the helmet, radio transmit headset(s) provided. A heavy duty, coiled 12 volt charging pigtail with plug will be provided driver's seat, officer seat, driver's side outboard forward facing seat and passenger's side outboard forward facing seat. Each headset will feature:

1. Noise cancelling electric microphone
2. Flexible microphone boom
3. Ear seals with 20 dB noise reduction
4. Stereo Listen-Through Ear dome microphones
5. Radio Push To Transmit button (Left or Right Side)
6. Rechargeable battery operates for 24 hours on a full charge
7. IP-66 when worn

4.31.434 HEADSET HANGERS - There will be five (5) headset hanger(s) installed driver's seat, officer's seat, driver's side outboard forward facing seat, passenger's side outboard forward facing seat and rear, center, forward facing seat. The hanger(s) will meet NFPA 1901, Section 14.1.11, requirement for equipment mounting.

4.31.435 MDT SYSTEM - There will be one (1) Data 911, Model M7 mobile data terminal provided match 30782 .

4.31.436 MOBILE 2-WAY RADIO - There will be one (1) Harris, Model Unity XG-100M mid power mobile radio(s) provided match 30782 . The following will be provided for each:

1. P25 Trunking software
2. Remote Control head CH721
3. Palm microphone
4. Auxiliary speaker

4.31.437 CRADLE POINT MULTI-BAND ROUTER - A cradle point multiband router for AT&T, model IBR1100LPE-AT will be provided and mounted match 30782. A multi-band N-MIMO Cell and GPS antenna, white will be included,

4.31.438 AUXILIARY AUDIO CABLE - An auxiliary 3.5mm stereo male to 2 RCA male audio cable will be provided from the intercom aux inlet to the AM/FM radio. Auxiliary audio will be mixed with the two-way radio and intercom traffic at exactly one half the strength of the signal in the headsets.

4.31.439 COMPLETE MDT INSTALLATION - There will be one (1) customer supplied Mobile Data Terminal (MDT), Docking station, Mounting bracket, power supply, antenna, GPS, modem, and all cabling sent to the apparatus manufacturers preferred installer to be installed this will be on the officers side of engine tunnel metal plate.. Specific shipping requirements will be followed.

4.31.440 GPS / MULTIMODE ANTENNA INSTALLATION - There will be one (1) customer supplied GPS / Multimode antenna(s) with stud mount for thick roof material to be installed on the roof. The antenna coax cable(s) will be run per the packing list / instructions provided to the third party installer.

4.31.441 Specific shipping requirements will be followed. The GPS / Multimode antenna will be sent to the apparatus manufacturers preferred installer prior to cab fabrication.

4.31.442 TWO WAY RADIO INSTALLATION - There will be one (1) customer supplied two way radio(s) sent to the apparatus manufacturers preferred radio installer to be installed Radio in panel # 6 upper to right of the officer per the shipping document. No antenna mount or whip will be included in this option. Specific radio shipping requirements will be followed.

4.31.443 PORTABLE RADIO CHARGER INSTALLATION - There will be four (4) customer supplied portable two-way radio chargers(s) sent to the apparatus manufacturers preferred radio installer to be installed two near the driver one located facing the driver and one facing the officer/ one on each side of the cab outside ems compartments. Specific shipping requirements will be followed.

4.31.444 MOBILE RADIO MODEM INSTALLATION - There will be one (1) customer supplied modem(s) sent to the apparatus manufacturers preferred installer to be installed PS rear facing radio compartment. Specific shipping requirements will be followed.

4.31.445 RADIO ANTENNA MOUNT - There will be one (1) standard 1.125", 18 thread antenna-mounting base(s) installed One to the rear of the driver side a/c routed to the radio box behind the officer. Make sure there is at least 2' of cable to get outside the box if needed on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the radio box. A weatherproof cap will be installed on the mount.

4.31.446 SPECIAL WIFI ANTENNA MOUNT LOCATION -The Command Zone advanced electronics WiFi-GPS antenna will be relocated from its standard right crewcab roof location forward on the cab roof on the right side. When relocating this antenna it must be located a minimum of nine (9) inches away from any other metallic object.

4.31.447 VEHICLE CAMERA SYSTEM - There will be a color vehicle camera system provided with the following:

1. One (1) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse
2. The camera images will be displayed on the driver's Command Zone™, color display. Audio from the microphone on the active camera will be not provided.
3. The following components will be included:
4. One (1) SV-CW134639CAI, camera
5. One (1) amplified speaker (if applicable)
6. All necessary cables

4.31.448 VEHICLE CAMERA GUARD - There will be one (1) aluminum treadplate guard(s) fastened over the vehicle camera(s) located REAR OF THE TRUCK - SEE PHOTO .

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

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

4.31.451 Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers will be Type-I automatic reset (continuously resetting). When required, automotive type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

4.31.452 SOLID-STATE CONTROL SYSTEM - A solid-state electronics based control system will be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network will consist of electronic modules located near their point of use to reduce harness lengths and improve reliability. The control system will comply with SAE J1939-11 recommended practices.

4.31.453 The control system will operate as a master-slave system whereas the main control module instructs all other system components. The system will contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system will utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX™ specifications providing a lower cost of ownership.

4.31.454 For increased reliability and simplified use the control system modules will include the following attributes:

1. Green LED indicator light for module power
2. Red LED indicator light for network communication stability status
3. Control system self test at activation and continually throughout vehicle operation

4. No moving parts due to transistor logic
5. Software logic control for NFPA mandated safety interlocks and indicators
6. Integrated electrical system load management without additional components
7. Integrated electrical load sequencing system without additional components
8. Customized control software to the vehicle's configuration
9. Factory and field re programmable to accommodate changes to the vehicle's operating parameters
10. Complete operating and troubleshooting manuals
11. USB connection to the main control module for advanced troubleshooting
12. To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules will meet the following specifications:
13. Module circuit board will meet SAE J771 specifications
14. Operating temperature from -40C to +70C
15. Storage temperature from -40C to +70C
16. Vibration to 50g
17. IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)
18. Operating voltage from eight (8) volts to 16 volts DC
19. The main controller will activate status indicators and audible alarms designed to provide warning of problems before they become critical.

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

4.31.456 ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS - Advanced on-board diagnostic messages will be provided to support rapid troubleshooting of the electrical power and control system. The diagnostic messages will be displayed on the information center located at the driver's position.

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

1. Text description of active warning or caution alarms
2. Simplified warning indicators
3. Amber caution indication with intermittent alarm
4. Red warning indication with steady tone alarm

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

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

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

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

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

4.31.463 The system will send automatic indications to the Command Zone, color display and/or wireless enabled device to proactively alert of upcoming service intervals. Prognostics will include:

1. Engine oil and filter
2. Transmission oil and filter
3. Pump oil (if equipped)
4. Foam oil (if equipped)
5. Aerial oil and filter (if equipped)

4.31.464 ADVANCED DIAGNOSTICS - An advanced, Windows-based, diagnostic software program will be provided for this control system. The software will provide troubleshooting tools to service technicians equipped with a Windows-based computer or wireless enabled device.

4.31.465 The service and maintenance software will be easy to understand and use and have the ability to view system input/output (I/O) information.

4.31.466 INDICATOR LIGHT AND ALARM PROVE-OUT SYSTEM - A system will be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

4.31.467 VOLTAGE MONITOR SYSTEM - A voltage monitoring system will be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system will provide visual and audible warning when the system voltage is below or above optimum levels.

4.31.468 The alarm will activate if the system falls below 11.8 volts DC for more than two (2) minutes.

4.31.469 DEDICATED RADIO EQUIPMENT CONNECTION POINTS - There will be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment. The studs will consist of the following:

1. 12-volt 40-amp battery switched power
2. 12-volt 60-amp ignition switched power
3. 12-volt 60-amp direct battery power
4. There will also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

4.31.470 ENHANCED SOFTWARE - The solid-state control system will include the following software enhancements:

1. All perimeter lights and scene lights (where applicable) will be deactivated when the parking brake is released.

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

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

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

4.31.472 The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10Khz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10Khz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

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

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

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

4.31.476 All holes made in the roof will be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.

4.31.477 Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.

4.31.478 Electrical components designed to be removed for maintenance will not be fastened with nuts and bolts. Metal screws will be used in mounting these devices. Also a coil of wire will be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

4.31.479 Corrosion preventative compound will be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation (of the plug).

4.31.480 All lights that have their sockets in a weather exposed area will have corrosion preventative compound added to the socket terminal area.

4.31.481 All electrical terminals in exposed areas will have silicon (1890) applied completely over the metal portion of the terminal.

4.31.482 All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, will be furnished. Rear identification lights will be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads will be protected from damage by installing a false bulkhead inside the rear compartments.

4.31.483 An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

4.31.484 The results of the tests will be recorded and provided to the purchaser at time of delivery.

4.31.485 BATTERY SYSTEM -There will be six (6) 12 volt Exide®, Model 31S950X3W, batteries that include the following features will be provided:

1. 950 CCA, cold cranking amps
2. 190 amp reserve capacity
3. High cycle
4. Group 31
5. Rating of 5700 CCA at 0 degrees Fahrenheit
6. -140 minutes of reserve capacity
7. Threaded stainless steel studs

4.31.486 Each battery case will be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover will be manifold vented with a central venting location to allow a 45 degree tilt capacity.

4.31.487 The inside of each battery will consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

4.31.488 BATTERY SYSTEM - A single starting system will be provided. An ignition switch and starter button will be located on the instrument panel.

4.31.489 MASTER BATTERY SWITCH - There will be a Cole Hersee, Model 75908, master battery switch to activate the battery system, provided inside the cab within easy reach of the driver. An indicator light will be provided on the instrument panel to notify the driver of the status of the battery system.

4.31.490 BATTERY COMPARTMENTS - The batteries will be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments will be constructed of 3/16" steel plate and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The compartments will include formed fit heavy-duty roto-molded polyethylene battery tray inserts with drains on each side of the frame rails. The batteries will be mounted inside of the roto-molded trays.

4.31.491 JUMPER STUDS - One (1) set of battery jumper studs with plastic color-coded covers will be installed on the battery box on the driver's side. This will allow enough room for easy jumper cable access.

4.31.492 BATTERY CHARGER/ AIR COMPRESSOR - A Kussmaul Pump Plus 1200, Model 091-9-1200, single output battery charger/air compressor system will be provided. A Kussmaul, Model 091-194-IND, auto charge status center indicating the state of charge will be included.

4.31.493 The automatic charger will maintain one (1) set of batteries with a maximum output current of 40 amps.

4.31.494 The 12-volt air compressor will be installed to maintain the air system pressure when the vehicle is not in use.

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

4.31.496 Battery charger/compressor will be located DS EMS box. Charger and pump will be mounted low as possible on the forward face of the EMS box. Pump discharge should be mounted down as indicated on the installation instructions. The Charger needs to have a 120 volt receptacle , not hard wired..

4.31.497 The battery charger indicator will be located behind the driver's door on the outside of the cab.

4.31.498 SHORELINE - There will be a 20 amp 120 volt AC straight blade shoreline inlet provided to operate the dedicated 120 volt AC circuits on the apparatus without the use of the generator.

1. The shoreline inlet will include a red flip up cover.
2. The shoreline(s) will be connected to battery charger.
3. There will be a mating connector body supplied with the loose equipment.
4. There will be a label installed near the inlet(s) that state the following:
5. Line Voltage
6. Current Ratting (amps)
7. Phase
8. Frequency
9. The shoreline receptacle will be located on the driver side of cab, above wheel.

4.31.499 ALTERNATOR - A Delco Remy®, Model 55SI, alternator will be provided. It will have a rated output current of 430 amps, as measured by SAE method J56. The alternator will feature an integral regulator and rectifier system that has been tested and qualified to an ambient temperature of 257 degrees Fahrenheit (125 degrees Celsius). The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

4.31.500 POWER DISTRIBUTION RELOCATE - The relays/solenoids and fuses located in the frame rail will be located in between the frame rails, on the driver side, as high as possible. There will be an aluminum cover installed around the components to help deflect water and steam.

4.31.501 SPECIAL LOCATED JUCTION BOX - The junction box normally located behind the DS front cab door step for the shoreline will be relocated to inside the cab.

4.31.502 GUARD - There will be an aluminum cover installed around the relays/solenoids and fuses located in the frame rail to help deflect water and steam.

4.31.503 HATCH COMPARTMENT HARNESS ROUTING - The wiring required for the hatch will come up at the front of the hatch from the body therefore avoiding any wiring down the length of the hatch compartment.

4.31.504 ELECTRONIC LOAD MANAGER - An electronic load management (ELM) system will be provided that monitors the vehicles 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

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

4.31.506 The system will include the following features:

1. System voltage monitoring.
2. A shed load will remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
3. Sixteen available electronic load shedding levels.
4. Priority levels can be set for individual outputs.
5. High Idle to activate before any electric loads are shed and deactivate with the service brake.
6. If enabled:
    - "Load Man Hi-Idle On" will display on the information center.
    - Hi-Idle will not activate until 30 seconds after engine start up.
    - Individual switch "on" indicator to flash when the particular load has been shed.
    - The information center indicates system voltage.
7. The information center, where applicable, includes a "Load Manager" screen indicating the following:
    - Load managed items list, with priority levels and item condition.
8. Individual load managed item condition:
    - ON = not shed
    - SHED = shed

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

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

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

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

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

1. Cab Heater and Air Conditioning
2. Crew Cab Heater (if applicable)
3. Crew Cab Air Conditioning (if applicable)
4. Exhaust Fans (if applicable)
5. Third Evaporator (if applicable)

4.31.512 HEADLIGHTS - There will be four (4) halogen HB5 replaceable round light assemblies mounted in the front chrome trim housing on each side of the cab grille. The outside light assemblies on each side will contain a low/high headlight bulb.

4.31.513 The inside halogen HB5 replaceable round light assemblies will be used as daytime running lights and will be activated with the following measures:

- Ignition switch turn on.
- Parking brake released.

4.31.514 These lights will be deactivated with any one of the following measures:

- Headlight switch is turned on.
- High-beam flash is turned on.
- Parking brake is applied.

4.31.515 DIRECTIONAL LIGHTS - There will be two (2) Whelen 600® series, LED combination directional/marker lights provided. The lights will be located on the outside cab corners, next to the headlights. The color of the lenses will be clear.

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

4.31.517 CAB CLEARANCE/MARKER/ID LIGHTS - There will be seven (7) Whelen, Model 0SA00MCR, amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

1. Three (3) amber LED identification lights will be installed in the center of the cab above the windshield.
2. Two (2) amber LED clearance lights will be installed, one (1) on each outboard side of the cab above the windshield.
3. Two (2) amber LED marker lights will be installed, one (1) on each side above the cab doors.

4.31.518 REAR CLEARANCE/MARKER/ID LIGHTING - There will be three (3) Truck-Lite®, Model 33050R, LED lights used as identification lights recessed and located at the rear of the apparatus per the following:

1. As close as practical to the vertical centerline
2. Centers spaced not less than 6.00" or more than 12.00" apart
3. Red in color
4. All at the same height

4.31.519 There will be two (2) Truck-Lite, Model 33050R, LED lights recessed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

1. To indicate the overall width of the vehicle
2. One (1) each side of the vertical centerline
3. As near the top as practical
4. Red in color
5. To be visible from the rear
6. All at the same height

4.31.520 There will be two (2) Truck-Lite, Model 33050R, LED lights recessed on the side of the apparatus as marker lights as close to the rear as practical per the following:

1. To indicate the overall length of the vehicle
2. One (1) each side of the vertical centerline
3. As near the top as practical
4. Red in color
5. To be visible from the side
6. All at the same height

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

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

4.31.523 All per FMVSS 108 and CMVSS 108 requirements.

4.31.524 REAR FMVSS LIGHTING - The rear stop/tail and directional LED lighting will consist of the following:

1. Two (2) Whelen®, Model M6BTT, red LED stop/tail lights
2. Two (2) Whelen, Model M6T, amber LED arrow turn lights
3. The lights shall be provided with clear lenses.

4. The lights will be mounted in a polished combination housing.

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

4.31.525 LICENSE PLATE BRACKET - There will be one (1) license plate bracket mounted on the rear of the body. A white LED light will illuminate the license plate. A polished stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

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

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

4.31.528 BACK-UP OBSTACLE SENSING SYSTEM - A SenseStat, model MA-ODSS-4M17BT, ultrasonic backing sensor system with 4 individual zones and an LED distance display will be provided.

4.31.529 The system will detect objects that are up to eight (8) feet from the rear of the vehicle reading each of four (4) separate sensors, and displaying the distance to the one that is closest to an object.

4.31.530 A 3.5"W x 2.9"L x 1.6"H, four (4) column color LED display located on top of the center console, above switch panel 7, match Denver 30237 will show the direction and location of the obstacle. The display will show the distance from the sensor to the obstacle in meters or in feet & fractions of a foot to the sensor that is closest to an object. There will be an 800Hz audible alarm with volume control integrated into the display

4.31.531 MARKER LIGHTS - There will be one (1) pair of amber and red Britax, Model L427.203.L12, LED marker lights with rubber arm, located On the side rear corner body each side in standard location, seal the hole in the arm so it does not collect water. The amber lens will face the front and the red lens will face the rear of the truck and be the most rearward marker light.

4.31.532 These lights will be activated with the running lights of the vehicle and when the respective directional lights are activated.

4.31.533 DEUTSCH CONNECTIONS - All external 12V electrical light connections will be installed with Deutsch connectors.

4.31.534 CAB PERIMETER SCENE LIGHTS - There will be four (4) Amdor Model AY-9500-012, 12.00" white LED strip lights provided.

1. One (1) under the driver's side cab access step.

2. One (1) under the passenger's side cab access step.

3. One (1) under the passenger's side crew cab access step.

4. One (1) under the driver's side crew cab access step.

4.31.535 The lights will be activated when the battery switch is on and the respective door is open and whenever control has been selected for the body perimeter lights.

4.31.536 PUMP HOUSE PERIMETER LIGHTS - There will be four (4) Amdor LumaBar H2O™, Model AY-9500-012, 12.00" LED weatherproof strip lights with brackets provided. The lights will be mounted in the following locations:

1. One (1) light will be provided under the driver's side top mount pump panel access step
2. One (1) light will be provided under the driver's side pump panel running board
3. One (1) light will be provided under the passenger's side pump panel running board
4. One (1) light will be provided under the passenger's side top mount pump panel access step

4.31.537 BODY PERIMETER SCENE LIGHTS - There will be two (2) Amdor LumaBar H2O™, Model AY-9500-012, 12.00" 12 volt DC LED strip lights provided at the rear step area of the body, one (1) each side shining to the rear.

4.31.538 The perimeter scene lights will be activated when the parking brake is applied, either directional light is activated, activating all side facing perimeter lights and the reverse signal activated, activating all the side facing perimeter lights.

4.31.539 ADDITIONAL PERIMETER LIGHTS - There will be six (6) lights Amdor® Luma Bar® H2O, Model AY-9500-012 12.00" white LED perimeter light(s) provided one (1) light under compartment D1, one (1) light under compartment D3, one (1) light under compartment P1, one (1) light under compartment P3 and one (1) light under each side of the front bumper spaced evenly. These lights will be activated the same as the body perimeter lights.

4.31.540 STEP LIGHTS - There will be four (4) white LED, step lights provided. One (1) step light will be provided on each side, on the front compartment face and two (2) step lights at the rear to illuminate the tailboard.

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

4.31.542 These step lights will be actuated when the ignition switch is on and the parking brake is set.

4.31.543 All other steps on the apparatus will be illuminated per the current edition of NFPA 1901.

4.31.544 ADDITIONAL STEP LIGHT - Additional lighting will be provided by white LED step lights. The step lights will be installed DS rear aux compartment, at the very top. The quantity of additional step lights will be one (1) light.

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

4.31.546 The additional step lights will be activated by the same means as the standard step lights.

4.31.547 CUP SWITCH - All plastic cup switches will be replaced with S/S cup switches.

4.31.548 SCENE LIGHTS - There will be one (1) Fire Research, Model SPA900-Q70 scene light(s) with chrome flange(s) installed on the side of the apparatus, Drivers side upper section between the doors. A control for the light(s) selected above will be the following:

1. a switch at the driver's side switch panel
2. opening the driver's side cab or crew cab doors
3. a switch at the passenger's side switch panel
4. no additional switch location
5. These lights may be load managed when the parking brake is set.

4.31.549 SCENE LIGHTS - There will be one (1) Fire Research, Model SPA900-Q70 scene light(s) with chrome flange(s) installed on the side of the apparatus, Passenger side upper section between the doors.

1. A control for the light(s) selected above will be the following:
2. a switch at the driver's side switch panel
3. opening the passenger's side cab or crew cab doors
4. a switch at the passenger's side switch panel
5. no additional switch location
6. These lights may be load managed when the parking brake is set.

4.31.550 12 VOLT LIGHTING - There will be one (1) Fire Research Spectra, Model SPA530-Q20*, 12 volt DC LED scene light(s) provided on push up side mount pole(s), located Just behind the speed lays and just below the top of the pump panel side step, Driver side, match 29674. The painted parts of this light assembly to be white with a white bezel. The light(s) will be controlled in the following way:

1. a switch at the driver's side switch panel
2. a switch at the pump operator's panel
3. a switch at the passenger's side switch panel
4. a cup switch just to the front of the locking ring on the light pole, on the 4-way
5. These light(s) may be load managed when the parking brake is applied.
6. These lights will be connected to the Do Not Move Truck Indicator circuit.

4.31.551 12 VOLT LIGHTING - There will be one (1) Fire Research Spectra, Model SPA530-Q20*, 12 volt DC LED scene light(s) provided on push up side mount pole(s), located Just behind the speed lays and just below the top of the pump panel side step, Passenger Side, match 29674. The painted parts of this light assembly to be white with a white bezel. The light(s) will be controlled in the following way:

1. a switch at the driver's side switch panel
2. a switch at the pump operator's panel
3. a switch at the passenger's side switch panel
4. a cup switch just to the front of the locking ring on the light pole, on the 4-way
5. These light(s) may be load managed when the parking brake is applied.
6. These lights will be connected to the Do Not Move Truck Indicator circuit.

4.31.552 12 VOLT LIGHTING - There will be one (1) Fire Research, Model SPA851-Q20-*, 12 volt LED floodlight(s) provided on the front visor, centered. The painted parts of this light assembly to be white with a white bezel. The light(s) will be controlled in the following way:

1. a switch at the driver's side switch panel
2. a switch at the pump operator's panel
3. a switch at the passenger's side switch panel

4. no additional switch location

5. These lights may be load managed when the parking brake is applied.

4.31.553 REAR SCENE LIGHT(S) - There will be two (2) Fire Research, Model SPA900-Q70, LED scene light(s) with chrome trim bezels installed at the rear of the apparatus, on the rear bulkhead of the hatch compartment.

4.31.554 The light(s) will be controlled by a switch at the driver's side switch panel, by a switch at the top mount pump panel and by a cup switch at the driver's side rear bulkhead.

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

4.31.556 WALKING SURFACE LIGHT - There will be Model FRP, 4" round black 12 volt DC LED floodlight with bolt mount provided to illuminate the entire designated walking surface on top of the body.

4.31.557 The light(s) will be activated by the same switching that has been selected for the other rear scene light(s) on the apparatus.

4.31.558 WATER TANK - Booster tank will have a capacity of 750 gallons and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated. Tank joints and seams will be nitrogen welded inside and out. - Tank will be baffled in accordance with NFPA Bulletin 1901 requirements.

4.31.559 Baffles will have vent openings at both the top and bottom to permit movement of air and water between compartments.

4.31.560 Longitudinal partitions will be constructed of .38" polypropylene plastic and will extend from the bottom of the tank through the top cover to allow for positive welding.

4.31.561 Transverse partitions will extend from 4.00" off the bottom of the tank to the underside of the top cover.

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

4.31.563 Tank top will be constructed of .50" polypropylene. It will be recessed .38" and will be welded to the tank sides and the longitudinal partitions.

4.31.564 Tank top will be sufficiently supported to keep it rigid during fast filling conditions.

4.31.565 Construction will include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels will be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

4.31.566 A sump that is 8.00" long x 10.00" wide x 6.00" deep will be provided at the bottom of the water tank.

4.31.567 Sump will include a drain plug and the tank outlet.

4.31.568 Tank will be installed in a fabricated cradle assembly constructed of structural steel.

4.31.569 Sufficient crossmembers will be provided to properly support bottom of tank. Crossmembers will be constructed of steel bar channel or rectangular tubing.

4.31.570 Tank will "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, will be placed on all horizontal surfaces that the tank rests on.

4.31.571 Stops or other provision will be provided to prevent an empty tank from bouncing excessively while moving vehicle.

4.31.572 Mounting system will be approved by the tank manufacturer.

4.31.573 Fill tower will be constructed of .50" polypropylene and will be a minimum of 8.00" wide x 14.00" long.

4.31.574 Fill tower will be furnished with a .25" thick polypropylene screen and a hinged cover.

4.31.575 An overflow pipe, constructed of 4.00" schedule 40 polypropylene, will be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

4.31.576 POLY TANK NOTCH - A notch will be provided at the front of the poly water tank. The notch will be large enough for hose, hydraulic lines, or electrical wiring at the front of the hose bed.

4.31.577 One (1) sleeve will be provided in the water tank for a 3.00" pipe to the rear.

4.31.578 HOSE BED - The hose bed will be fabricated of .125"-5052 aluminum with a nominal 38,000 psi tensile strength. Standard hose bed width will be 68.00" inside. Upper and rear edges of side panels will have a double break for rigidity.

4.31.579 The upper inside area of the beavertails will be covered with brushed stainless steel to prevent damage to painted surface when hose is removed.

4.31.580 Flooring of the hose bed will be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats will be a minimum of 0.50" x 4.50" with spacing between slats for hose ventilation.

4.31.581 Hose bed will accommodate 200' of 3" (should be about 7 inches spacing), 1000' of 5" (should be about 41.25 inches spacing), 200' of 1.75 (should be about 8 inches spacing), 400' of 1.75" (should be about 11 inches spacing).

4.31.582 HOSE BED DIVIDER - Three (3) adjustable hosebed dividers will be furnished for separating hose. Each divider will be constructed of a .25" brushed aluminum sheet. Flat surfaces will be sanded for uniform appearance, or constructed of brushed aluminum. An oval opening will be provided near the rear of the divider to be used as a hand hold and aid in accessing the hose bed. Divider will be fully adjustable by sliding in tracks, located at the front and rear of the hose bed. Divider will be held in place by tightening bolts, at each end. Acorn nuts will be installed on all bolts in the hose bed which have exposed threads.

4.31.583 HOSE RESTRAINT - The hose in the hosebed will be restrained by black nylon velcro straps at the top of the hosebed and a black nylon web strap netting at the top and rear of the hosebed. The netting will include quick release fasteners.

4.31.584 The center of the black nylon velcro strap at the front of the hosebed will be located 32.0" rearward of the cross divider.

4.31.585 The center of the buckle bracket mounted on the top of the side sheet flange for the black nylon web strap netting will be mounted 36.0" from the rear most edge of the side sheet (beavertail).

4.31.586 SCUFFPLATE INSIDE UPPER BEAVERTAIL The upper inside area of the beavertails will be covered with polished stainless steel in place of the brushed stainless steel to prevent damage to painted surface when hose is removed.

4.31.587 RUNNING BOARDS - Running boards will be fabricated of .125" bright aluminum treadplate. Each running board will be supported by a welded 2.00" square tubing and channel assembly, which will be bolted to the pump compartment substructure. Running boards will be 12.75" deep and spaced .50" away from the pump panel. A splash guard will be provided above the running board treadplate.

4.31.588 TAILBOARD - The tailboard will also be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.

4.31.589 The tailboard area will be 24.00" deep in the center area and 8.00" deep to the rear of the side compartments. The tailboard will be T-shaped. The outboard sides of the tailboard will be angled at 45 degrees beginning at the point where the body meets the tailboard at the outboard edge angling rearward to the rear edge of the tailboard.

4.31.590 The exterior side will be flanged down and in for increased rigidity of tailboard structure.

4.31.591 REAR WALL, SMOOTH ALUMINUM/BODY MATERIAL - The rear facing surfaces of the center rear wall will be smooth aluminum. The bulkheads, the surface to the rear of the side body compartments, will be smooth and the same material as the body. Any inboard facing surfaces below the height of the hosebed will be aluminum diamondplate.

4.31.592 TOW BAR - A tow bar will be installed under the tailboard at center of truck. Tow bar will be fabricated of 1.00" CRS bar rolled into a 3.00" radius. Tow bar assembly will be constructed of .38" structural angle. When force is applied to the bar, it will be transmitted to the frame rail.

4.31.593 Tow bar assembly will be designed and positioned to allow up to a 30-degree upward angled pull of 17,000 lb, or a 20,000 lb straight horizontal pull in line with the centerline of the vehicle.

4.31.594 Tow bar design will have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

4.31.595 RUNNING BOARD HOSE RESTRAINT - A pair of 2.00" wide black nylon straps with Velcro fasteners will be provided for each hose tray to secure the hose during travel. There will be Two (2) hose trays located one (1) in each side running board.

4.31.596 HOSE TRAY - Two (2) hose trays will be recessed one (1) in each side running board. The size of the tray will be 59.5" long, 9" wide, and 10" deep. Rubber matting will be installed on the floor of the tray to provide proper ventilation.

4.31.597 COMPARTMENTATION - Body and compartments will be fabricated of .125", 5052-H32 aluminum. Side compartments will be an integral assembly with the rear fenders. Circular fender liners will be provided for prevention of rust pockets and ease of maintenance. Compartment flooring will be of the sweep out design with the floor higher than the compartment door lip.

4.31.598 The compartment door opening will be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.

4.31.599 Drip protection will be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

4.31.600 The top of the compartment will be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers will have the corners welded.

4.31.601 Side compartment covers will be separate from the compartment tops.

4.31.602 Front facing compartment walls will be covered with bright aluminum treadplate.

4.31.603 All screws and bolts which protrude into a compartment will have acorn nuts on the ends to prevent injury.

4.31.604 UNDERBODY SUPPORT SYSTEM - Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load will be provided. The backbone of the support system will be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads. The support system will include .375" thick steel vertical angle supports bolted to the chassis frame rails with .625" diameter bolts. Attached to the bottom of the steel vertical angles will be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the body.

4.31.605 A steel frame will be mounted on the top of these supports to create a floating substructure which will result in a 500 lb equipment support rating per lower compartment. The floating substructure will be separated from the horizontal members with neoprene elastomer isolators. These isolators will reduce the natural flex stress of the chassis from being transmitted to the body.

4.31.606 Isolators will have a broad load range, proven viability in vehicular applications, be of a fail safe design and allow for all necessary movement in three (3) transitional and rotational modes.

4.31.607 The neoprene isolators will be installed in a modified V three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body.

4.31.608 AGGRESSIVE WALKING SURFACE - All exterior surfaces designated as stepping, standing, and walking areas will comply with the required average slip resistance of the current NFPA standards.

4.31.609 LOUVERS - Louvers will be stamped into compartment walls to provide the proper airflow inside the body compartments and to prevent water from dripping into the compartment. Where these louvers are provided, they will be formed into the metal and not added to the compartment as a separate plate.

4.31.610 TESTING OF BODY DESIGN - Body structural analysis has been fully tested. Proven engineering and test techniques such as finite element analysis, stress coating and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the cab, body and substructure. Body will be tested while loaded to its greatest in-service weight. The criteria used during the testing procedure will include:

1. Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
2. Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
3. Driving the vehicle at 35 mph on a washboard road.
4. Driving the vehicle at 55 mph on a smooth road.
5. Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.
6. Evidence of actual testing techniques will be made available upon request.

4.31.611 COMPARTMENTATION, DRIVER'S SIDE - A full height, rollup door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will be 34.50" wide x 57.25" high x 25.88" deep in the lower 31.00" of the compartment and 12.00" deep in the remaining upper portion. The height of the compartment will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 28.75" wide x 57.25" high.

4.31.612 Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

4.31.613 A rollup door compartment over the rear wheels will be provided. The interior dimensions of this compartment will be 66.50" wide x 25.38" high x 12.00" deep. The height of the compartment will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the compartment door closed. The clear door opening of this compartment will be 58.25" wide x 25.12" high.

4.31.614 Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

4.31.615 A full height, rollup door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 47.50" wide x 58.25" high x 25.88" deep in the lower 26.00" of height and 12.00" deep in the remaining upper section of the compartment. The height of the compartment will be measured from the compartment floor to the bottom edge of the door roll. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 44.75" wide x 58.25" high.

4.31.616 Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

4.31.617 RIGHT SIDE COMPARTMENTATION - The right side compartmentation will consist of three rollup door compartments. A full height, rollup door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will be 34.50" wide x 66.63" high x 25.88" deep in the lower 25.00" of the compartment and 12.00" deep in the remaining upper portion. The clear door opening will be a minimum of 28.75" wide x 56.88" high.

4.31.618 A rollup door compartment over the rear wheels will be provided. The interior dimensions of this compartment will be 66.50" wide x 32.88" high x 12.00" deep. The clear door opening will be a minimum of 58.25" wide x 23.13" high.

4.31.619 A full height, rollup door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 47.75" wide x 67.63" high x 25.88" deep in the lower 26.00" of height and 12.00" deep in the remaining upper section of the compartment. The clear door opening will be a minimum of 44.75" wide x 57.88" high.

4.31.620 The interior height of the compartments will be measured from the compartment floor to the ceiling. The spool of the rollup door at the top of the compartment takes up some usable space. The depth of the compartments will be measured from the back wall to the inside of the door frame.

4.31.621 Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

4.31.622 ROLLUP DOOR, SIDE COMPARTMENTS - There will be six (6) compartment doors installed on the side compartments, double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™ brand rollup doors.

4.31.623 Door(s) will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

4.31.624 Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingression.

4.31.625 The doors will be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

4.31.626 Bottom panel flange of rollup door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

4.31.627 A polished stainless steel lift bar to be provided for each roll-up door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

4.31.628 All injection molded rollup door wear components will be constructed of Type 6 nylon.

4.31.629 Each rollup door will have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

4.31.630 The header for the rollup door assembly will not exceed 4.00".

4.31.631 A heavy-duty magnetic switch will be used for control of open compartment door warning lights.

4.31.632 COMPARTMENTATION, REAR - A rollup door compartment above the rear tailboard will be provided.

4.31.633 Interior dimensions of this compartment will be 40.00" wide x 47.38" high x 25.88" deep in the lower 38.75" of height and 15.75" deep in the remaining upper portion. Depth of the compartment will be calculated with the compartment door closed.

4.31.634 For a chassis with a rear mounted fuel tank, a louvered removable access panel will be furnished on the back wall of the compartment.

4.31.635 Rear compartment will be open into the rear side compartments.

4.31.636 Clear door opening of this compartment will be 33.25" wide x 38.75" high.

4.31.637 Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

4.31.638 ROLLUP DOOR, REAR COMPARTMENT - The rear compartment will have a rollup door. The door will be double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™ brand rollup doors.

4.31.639 The door will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

4.31.640 Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingression.

4.31.641 The door will be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

4.31.642 Bottom panel flange of rollup door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

4.31.643 A polished stainless steel lift bar to be provided for each roll-up door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

4.31.644 All injection molded rollup door wear components will be constructed of Type 6 Nylon.

4.31.645 The door will have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

4.31.646 The header for the rollup door assembly will not exceed 4.00".

4.31.647 A heavy-duty magnetic switch will be used for control of open compartment door warning lights.

4.31.648 DOOR GUARD - There will be seven (7) compartment doors that will include a guard/drip pan designed to protect the roll-up door from damage when in the retracted position and contain any water spray. The guard will be fabricated from stainless steel and installed All roll up doors.

4.31.649 COMPARTMENT LIGHTING - There will be seven (7) compartment(s) with two (2) LED compartment light strips. The dual light strips will be centered vertically along each side of the door framing. There will be two (2) light strips per compartment.The dual light strips will be in compartment(s): All compartments.

4.31.650 Any remaining compartments will include a single LED compartment light strip.

4.31.651 Opening the compartment door will automatically turn the compartment lighting on.

4.31.652 There will be a covered metal clamp install 2.00" from each end and evenly spaced no less than 8.00" between the end clamps.

4.31.653 LATCH, LEVER STYLE - Each hatch compartment cover will be provided with a slam style latch with lever handle to hold the doors in the closed position.

4.31.654 There will be a total of two (2) hatch covers.

4.31.655 HATCH COMPARTMENT - Two (2) hatch compartments 151.75" long x 13.75" wide x 22.00" maximum depth will be provided above the driver and passenger side compartments, with one (1) liftup top opening hatch door. Compartment will extend the full length of the side body compartmentation.

4.31.656 Sides of the compartment will be constructed of the same material as the body and painted job color. A chrome and black vinyl molding will be provided to cover the seam between the top of the body panel and the bottom of the hatch compartment.

4.31.657 Top of the compartment will be constructed of bright aluminum treadplate.

4.31.658 One (1) liftup, bright aluminum treadplate door will be provided on the top of the compartment with a chrome grab handle.

4.31.659 The door will have lipped edges with a rubber seal for weather resistance, and an inner pan with one (2) recessed lights.

4.31.660 The door will be hinged on the outboard side and will be held open with gas springs.

4.31.661 One (1) socket and plunger type latch will be provided to hold the door in the closed position.

4.31.662 Each door will have a clear door opening of 9.50" wide.

4.31.663 Compartment will drain to an area below the hose bed.

4.31.664 ACCESS DOOR - The cargo door switch/es shall be magnetic. The magnetic switch/es shall be fastened with screws, not two-way tape.

4.31.665 MOUNTING TRACKS - There will be six (6) sets of tracks for mounting shelf(s) in D3, D2, D1, R1, P2 and P3. These tracks will be installed vertically to support the adjustable shelf(s), and will be full height of the compartment. The tracks will be painted to match the compartment interior.

4.31.666 ADJUSTABLE SHELVES - There will be 13 shelves with a capacity of 500 lb provided. The shelf construction will consist of .188" aluminum painted spatter gray with 2.00" sides.

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

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

4.31.669 The location(s) will be in D1 at the transition point, in D1 in the upper third, in D3 at the transition point, in D3 in the lower third, in D3 in the upper third, in R1 in the upper third, in P3 at the transition point, in P3 in the lower third, in P3 in the upper third, in D2 centered between the floor and ceiling, in P2 centered between the floor and ceiling, in P3 in the upper third and in D3 in the upper third.

4.31.670 SLIDE-OUT FLOOR MOUNTED TRAY - There will be one (1) floor mounted slide-out tray(s) provided. Each tray will have 2.00" high sides and a minimum capacity rating of 500 lb in the extended position.

4.31.671 Each tray will be constructed of aluminum painted spatter gray

4.31.672 There will be two undermount-roller bearing type slides rated at 250lb each provided. The pair of slides will have a safety factor rating of 2.

4.31.673 To ensure years of dependable service, the slides will be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

4.31.674 To ensure years of easy operation, the slides will require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file will have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance will be provided upon request.

4.31.675 Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

4.31.676 The location(s) will be D1.

4.31.677 SWING OUT TOOLBOARD - A swing out aluminum toolboard will be provided. It will be a minimum of .188" thick with .20" diameter holes in a pegboard pattern with 1.00" centers between holes. A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the pegboard. The board will be mounted on a pivoting device at the front of the compartment on the top and bottom to allow easy movement in and out of the compartment. The maximum tool load will be 400 pounds. The board will have positive lock in the stowed and extended position. The board will be mounted stationary within the compartment.

4.31.678 There will be One (1) toolboard(s) provided. The toolboard(s) will be spatter gray painted and installed P1.

4.31.679 PAINTED BODY TRIM PIECE - Painted trim will be provided on the compartment horizontal body seam in two (2) compartments. The locations will be At compartment break between hatch and upper side compartments. The trim will be made of a material and painted to match the body material as practical.

4.31.680 The trim piece will be bonded to the painted surface with a high viscosity adhesive.

4.31.681 COMPARTMENT ABOVE FULL DEPTH SECTION AT REAR

4.31.682 There will be a compartment provided at the rear wall above the driver side rear of the truck for the FDLER with the door hinge inboard toward the R-1, make sure to use a small magnetic switch for door open, mount the P25 light at the very top, make sure the interior of the compartment is smooth with no obstructions full depth lower extended portion of side body panel. The compartment will be as large as space allows extending thru the rear wall using any available space between the rear compartment, side compartment, and the water tank.

4.31.683 A vertically hinged, single pan, aluminum treadplate door with a flush Southco C2 chrome latch will be provided. The door will be hinged along the outboard side of the compartment.

4.31.684 LOCKING NUTS - The SCBA and hatch compartment doors shall have nuts with star washers and blue Loctite®. Locking nuts shall be provided for the following areas:

1. DEF tank support mounting bracket-to-body.
2. Fuel access door hinges.
3. Wheel chock holder brackets-to-body.
4. Mud flaps-to-wheel wells.
5. Engine coolant recovery tank under hood mounting bolts.
6. Pump side panel access doors.
7. Pump operator's walkway floor compartment doors.
8. Rear DS compartment and ladder door hinges.
9. Stream light Survivor and Box light chargers-to-compartment
10. Relay cover shield for electric components at DS frame rail at transmission.
11. Clamp for step light wires at each crew compartment step.
12. All 12VDC stud terminals whether hot or ground throughout the frame rails and under hood.
13. PS glove box hinge.
14. Interior cab ceiling mounted storage compartment hinges.
15. Interior cab ceiling mounted air conditioning filter and pump access door hinge.
16. Interior cab access door hinge under rear seat transverse compartment.
17. Interior cab access door hinge for engine and transmission oils.
18. Exterior cab transverse compartment access door hinges.
19. Cab mirrors attachment screws-add locking nuts inside under hood after screws are tightened.
20. D1 compartment tool board hinge anchor backing plate bolts-add lock nuts upper and lower after bolts are tightened.
21. Raised module box in R1 ceiling attachment hardware or PS small compartment in aerials.

4.31.685 RUB RAIL - Bottom edge of the side compartments will be trimmed with a bright aluminum extruded rub rail. Trim will be 2.12" high with 1.38" flanges turned outward for rigidity. The rub rails will not be an integral part of the body construction, which allows replacement in the event of damage.

4.31.686 BODY FENDER CROWNS - Black rubber fender crowns will be provided around the rear wheel openings.

4.31.687 BODY FENDER LINER - A painted fender liner will be provided. The liners will be removable to aid in the maintenance of rear suspension components.

4.31.688 HARD SUCTION HOSE - Hard suction hose will not be required.

4.31.689 HANDRAILS - The handrails will be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface. Chrome plated end stanchions will support the handrail. Plastic gaskets will be used between end stanchions and any painted surfaces. Drain holes will be provided in the bottom of all vertically mounted handrails. Handrails will be provided to meet NFPA 1901 section 15.8 requirements. The handrails will be installed as noted on the sales drawing.

4.31.690 HANDRAILS - One (1) vertical handrail, not less than 29.00" long, will be located on each rear beavertail. One (1) full width horizontal handrail will be provided below the hose bed at the rear of the apparatus. - One (1) handrail, 10.00" long, will be provided mounted Rear above R-1 driver side, mounted horizontally.

4.31.691 AIR BOTTLE STORAGE (Triple) - A quantity of one (1) air bottle compartment designed to hold (3) air bottles up to 7.25" in diameter x 26.00" deep will be provided on the passenger side forward of the rear wheels. A painted stainless steel door with a Southco non-locking C2 black lever latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal. Inside the compartment, black Dura-Surf friction reducing material will be provided.

4.31.692 AIR BOTTLE COMPARTMENT STRAP - A strap will be provided in the air bottle compartment(s) to help contain the air bottles when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

4.31.693 AIR BOTTLE STORAGE (Double) - A quantity of one (1) air bottle compartment, 15.25" wide x 7.75" tall x 26.00" deep, will be provided on the passenger side rearward of the rear wheels . A painted stainless steel door with a Southco non-locking C2 black lever latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal. Inside the compartment, black Dura-Surf friction reducing material will be provided.

4.31.694 AIR PACK STORAGE - A total of one (1) air pack compartment(s) will be provided and located driver side ahead of the wheel. The air pack compartment(s) will be tapered to match the profile of the space available in the fender. The compartment(s) will be approximately 15.50" wide at the top and 5.00" wide at the bottom for the wheel cutout. The compartment(s) will be 15.50" tall at the body side compartment and 6.00" tall at the wheel cutout. The compartment(s) will be 26.00" deep and have a drain hole. Inside the compartment, black Dura-Surf friction reducing material will be provided.

4.31.695 A painted stainless steel hinged door with a Southco non-locking C2 black lever latch will be provided to contain the air pack. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

4.31.696 AIR BOTTLE STORAGE (Single) - A quantity of one (1) air bottle compartment, approximately 7.50" wide x 7.50" tall x 26.00" deep, will be provided on the driver side rearward of the rear wheels. The compartment will be square with angled corners. A painted stainless steel door with a Southco non-locking C2 black lever latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal. Inside the compartment, black rubber matting will be provided.

4.31.697 EXTENSION LADDER - There will be a 24' two-section aluminum Duo-Safety Series 900-A extension ladder provided.

4.31.698 ROOF LADDER - There will be a 14' aluminum Duo-Safety Series 775-A roof ladder provided.

4.31.699 LADDER STORAGE - The ladders will be stored between the water tank and the passenger's side compartments. The ladders will extend into the pump compartment just to the rear of the water pump discharges. The ladder storage area will be enclosed as practical by means of sheet metal to protect the ladders from road dirt. The ladders that extend into the pump house will also be enclosed. A black rubber boot will be provided to enclose the ladders in the gap between the pump house and the body.

4.31.700 Each ladder will be stored vertically in a separate stainless steel storage trough. Each stainless steel trough will be lined with Dura-Surf nylon slides. An aluminum enclosure will be provided at the rear of the body to properly contain the ladders. This enclosure will extend to the rear of the side body compartments. The enclosure will also include a vertically hinged aluminum treadplate door with a D-handle latch to access the ladders.

4.31.701 FOLDING LADDER - One (1) 10.00' aluminum, Series 585-A, Duo-Safety folding ladder will be installed in a U-shaped trough inside the ladder storage compartment.

4.31.702 PIKE POLE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) 8 ft or longer pike pole mounted in a bracket fastened to the apparatus. The pike pole is not on the apparatus as manufactured. The fire department will provide and mount the pike pole. The pike pole(s) will be a Akron 12' pike pole.

4.31.703 6' PIKE POLE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) 6' pike pole or plaster hook mounted in a bracket fastened to the apparatus.

4.31.704 The pike pole is not on the apparatus as manufactured. The fire department will provide and mount the pike pole. The pike pole(s) will be a Akron 6' pike pole.

4.31.705 PIKE POLE STORAGE - Aluminum tubing will be used for the storage of four (4) pike poles and will be located in ladder storage compartment. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate will be provided.

4.31.706 BELL - A chrome plated, 12.00" bronze cast bell, complete with an eagle, will be mounted on the passenger side radiused corner of cab face. The cab will be properly reinforced to support the weight of the bell. A rope pull, for the bell, will be installed inside the cab.

4.31.707 WARNING LABEL(S) - There will be one (1) label(s), indicating "NO STEP", provided on cover over relay in ds frame rail.

4.31.708 STEPS - A folding step will be provided on the front of each fender compartment. The step will be bright finished, non-skid with a black coating. Each step will incorporate an LED light to illuminate the stepping surface. The step can be used as a hand hold with two openings wide enough for a gloved hand.

4.31.709 REAR FOLDING STEPS - Bright finished, non-skid folding steps with a black coating will be provided at the rear. Each step will incorporate an LED light to illuminate the stepping surface. The steps can be used as a hand hold with two openings wide enough for a gloved hand.

4.31.710 Four (4) additional folding steps will be located two (2) on the driver side front bulkhead, two (2) on the passenger side front bulkhead and two (2) on the inboard wall of the passenger side rear bulkhead. The step(s) will be bright finished, non-skid with a black coating. Each step will incorporate an LED light to illuminate the stepping surface. The step(s) can be used as a hand hold with two openings wide enough for a gloved hand.

4.31.711 STIRRUP STEPS WITH TREAD GRIP - There will be two (2) stirrup style steps with cable hanger and tread grip rung provided. The step will be installed One each side below the runningboard at pump panel walkway same locations as previous units 29674- see photo. This needs to be mounted as far out as possible. Previous units were under and smashed your shin when climbing.

4.31.712 PUMP - Pump will be a Waterous CSU, 1500 gpm single (1) stage midship mounted centrifugal type. Pump will be the class "A" type. Pump will deliver the percentage of rated discharge at pressures indicated below:

1. 100% of rated capacity at 150 psi net pump pressure.
2. 70% of rated capacity at 200 psi net pump pressure.
3. 50% of rated capacity at 250 psi net pump pressure.

4.31.713 Pump body will be close-grained gray iron, bronze fitted, and horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).

4.31.714 Pump will be designed for complete servicing from the bottom of the truck, without disturbing the pump setting or apparatus piping.

4.31.715 Pump case halves will be bolted together on a single horizontal face to minimize chance of leakage and facilitate ease of reassembly. No end flanges will be used.

4.31.716 Discharge manifold of the pump will be cast as an integral part of the pump body assembly and will provide a minimum of three (3) 3.50" openings for flexibility in providing various discharge outlets for maximum efficiency.

4.31.717 The three (3) 3.50" openings will be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.

4.31.718 Impeller shaft will be stainless steel, accurately ground to size. It will be supported at each end by sealed, anti-friction ball bearings for rigid precise support. Impeller will have flame plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.

4.31.719 Bearings will be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings will be used.

4.31.720 Pump will be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.

4.31.721 The mechanical seal will consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring will press against a highly polished stainless steel stationary ring that is sealed within the pump body.

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

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

4.31.724 PUMP TRANSMISSION - The pump transmission will be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump will be through a high strength Morse HY-VO silent drive chain. By the use of a chain rather than gears, 50% of the sprocket will be accepting or transmitting torque, compared to two (2) or three (3) teeth doing all the work.

4.31.725 Drive shafts will be 2.35" diameter hardened and ground alloy steel and supported by ball bearings. The case will be designed to eliminate the need for water cooling.

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

4.31.727 AIR PUMP SHIFT - Pump shift engagement will be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control will also be located on the left side pump panel.

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

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

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

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

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

4.31.733 AUXILIARY COOLING SYSTEM - A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. Heat exchanger will be cylindrical type and will be a separate unit. It shall be installed in the pump compartment with the control located in the pump house. Exchanger will be plumbed to the master drain valve.

4.31.734 INTAKE RELIEF VALVE - A Trident Air Max intake relief valve will be installed on the suction side of the pump preset at 125 PSI. The relief valve will have a working range of 50 PSI to 350 PSI. The outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag. An adjustable air regulator and pressure indicating gauge will be installed on a common bezel and located behind a stainless steel access door behind the right pump panel.

4.31.735 PRESSURE GOVERNOR - This apparatus will be equipped with a Class1 "Total Pressure Governor Plus" engine/pump governor/throttle system that is connected directly to the Electronic Control Module (ECM) mounted on the engine. The "Total Pressure Governor" is to operate as a pressure sensor (regulating) governor (PSG).

4.31.736 A special preset feature will permit a predetermined pressure of RPM to be set. The preset pressure or RPM will be displayed on the message display of the "Total Pressure Governor" . The preset will be easily adjustable by the operator

4.31.737 The pressure sensor governor system will be operable only after the vehicle parking brake has been set, the transmission is the pumping mode, and the fire pump has been engaged.

4.31.738 The pressure sensor governor system will have two (2) modes of operation: pressure mode or rpm mode.

4.31.739 When in the pressure mode, the PSG system will automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).

4.31.740 In the rpm mode, the PSG system will automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

4.31.741 A pump cavitation protection feature will be provided which will return the engine to idle should the pump cavitate. The digital display will include:

1. Pump intake pressure
2. Pump discharge pressure
3. Engine RPM
4. Battery voltage
5. Oil pressure and temperature
6. Coolant temperature
7. Transmission Temperature
8. Total engine hours
9. Total pump hours
10. Fuel rate

4.31.742 PRIMING PUMP - The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of NFPA 1901. All wetted metallic parts of the priming system are to be of brass and stainless steel construction. One (1) priming control will open the priming valve and start the pump primer.

4.31.743 LIGHT, ADDITIONAL, FOR THERMAL RELIEF VALVE - A two (2) of 2" diameter Whelen model T0B00FBR blue LED grommet mounted lights, will be provided in addition to the standard light for indication when the thermal relief valve is operating.

4.31.744 Lights will be located in On the passenger side and drivers side on the upper center just behind the FRC light head side of the pump house near the top mount control pump panel, facing to the side of the truck so light is visible from the ground - see photos.

4.31.745 These lights will be activated with the main thermal valve indicator light on the pump panel.

4.31.746 MASTER DRAIN HOSE SPECIAL INSTRUCTIONS - Change the copper master drain line to push lock hose and fittings. This is due to drain lines breaking during transport.

4.31.747 THERMAL RELIEF VALVE - A thermal protection device will be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump.

4.31.748 The thermal protection device will be set to relieve water when the temperature of the pump water exceeds 170 degrees Fahrenheit. The thermal protection device will include an indicator light and audible buzzer.

4.31.749 The components of the thermal protection device will be manufactured of brass and stainless steel and be compatible with most foam concentrates.

4.31.750 The thermal protection device will have 1-1/4 inch NPT threads for easy adaptability to existing pump discharge openings. The discharge line will be 3/8 inch diameter tubing vented to atmosphere or back to the booster tank.

4.31.751 The thermal protection device will have a hydrostatic test rating of 600 PSIG (41 BAR).

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

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

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

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

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

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

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

4.31.759 MAIN PUMP INLETS - A 6.00" pump manifold inlet will be provided on each side of the vehicle. The suction inlets will include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

4.31.760 MAIN PUMP INLET CAP PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 16.6.8 requires all intakes to be provided with caps or closures capable of withstanding a hydrostatic gauge pressure of 500 psi.

4.31.761 The caps are not on the apparatus as manufactured. The fire department will provide both caps for the main pump inlets.

4.31.762 INTAKE VALVE - A total of Two (2)TFT model AX1ST-NX- 6" FNST outlet X 5" Storz, jumbo ball intake valves will be provided by the dealer.

4.31.763 VALVES - Two (2) full flow Waterous valves will be used for the side 2.50" discharges. All remaining ball valves, 3.00" or less, will be Akron Brass brand.

4.31.764 The Waterous valves will have a solid bronze ball that is chromium plated for a hard, durable surface. The spring loaded floating seal assembly requires no adjustment yet provides a tight seal against both pressure and vacuum pressures.

4.31.765 The Akron valves will be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

4.31.766 LEFT SIDE INLET - There will be one (1) auxiliary inlet with a 2.50" valve at the left side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter. The auxiliary inlet will be provided with a strainer, chrome swivel and plug. Inlet valve location will be behind the pump panel.

4.31.767 ANODE, INLET - A pair of sacrificial zinc anodes will be provided in the water pump to protect the pump from corrosion. Two (2) will be placed in the inlet side of the pump and the other in the discharge side of the pump.

4.31.768 INLET CONTROL - The side auxiliary inlet(s) will incorporate a quarter-turn ball valve with the control located at the top mount control panel. The valve operating mechanism will indicate the position of the valve. There will be one (1) inlet.

4.31.769 INLET BLEEDER VALVE - A 0.75" bleeder valve will be provided for each side gated inlet. The valves will be located behind the panel with a swing style handle control extended to the outside of the panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. The water discharged by the bleeders will be routed below the chassis frame rails. No snubber bleeder valves are acceptable.

4.31.770 TANK TO PUMP - The booster tank will be connected to the intake side of the pump with 3.00" piping and a quarter turn 3.50" Waterous valve with the control remotely located at the operator's panel. Tank to pump line will run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling will be included in this line to prevent damage from vibration or chassis flexing.

4.31.771 A check valve will be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

4.31.772 TANK REFILL - 1.50" combination tank refill and pump re-circulation line will be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

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

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

4.31.775 LARGE DIAMETER DISCHARGE OUTLET - There will be a 4.00" discharge outlet with a 3.50" Waterous valve installed on the right side of the apparatus, terminating with a 4.00" (M) National Standard hose thread adapter. This discharge outlet will be actuated with a handwheel control at the pump operator's control panel. An indicator will be provided to show when the valve is in the closed position.

4.31.776 REAR DISCHARGE OUTLET - There will be one (1) discharge outlet piped to the rear of the hose bed, driver's side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing will consist of 2.50" piping along with a 2.50" full flow ball valve with the control from the pump operator's panel.

4.31.777 DISCHARGE CAPS - Chrome plated, rocker lug, caps with chains will be furnished for all side discharge outlets.

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

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

4.31.780 The valves will be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders will be located at the bottom of the pump panel. They will be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders will be routed below the chassis frame rails. No snubber drain valves are acceptable.

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

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

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

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

4.31.785 REAR OUTLET ELBOWS - The 2.50" discharge outlets located at the rear of the apparatus will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

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

4.31.787 LARGE DIAMETER OUTLET ELBOWS - The 4.00" outlet(s) will be furnished with one (1) 4.00" (F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

4.31.788 DISCHARGE DRAIN VALVES - Provide a manual style drain in all low plumbing points that would normally have automatic drains.

4.31.789 DISCHARGE OUTLET CONTROLS - The discharge outlets will incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism will indicate the position of the valve.

4.31.790 If a handwheel control valve is used, the control will be a minimum of a 3.9" diameter stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

4.31.791 The deluge gun outlet will be located Locate the Extend-a-gun closer to the front wall so the monitor will mount on the extend-a-gun in the retracted position, and the monitor pointing to the officer side. Make sure the monitor does not hit the hose reel..

4.31.792 DELUGE RISER - A 3.00" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping shall be installed securely so no movement develops when the line is charged. The riser shall be gated and controlled at the pump operator's panel.

4.31.793 TELESCOPIC PIPING - The deluge riser piping shall include a 18.00" Task Force Model XG18 Extend-A-Gun extension.

4.31.794 This extension shall be telescopic to allow the deluge gun to be raised 18.00" increasing the range of operation.

4.31.795 A position sensor shall be provided on the telescopic piping that shall activate the "do not move vehicle" light inside the cab when the monitor is in the raised position.

4.31.796 The deluge outlet shall be moved to the driver's side as far as possible.

4.31.797 MONITOR - A Task Force Crossfire XFC-52 monitor package will be furnished and properly installed on the deluge riser. The monitor will include a M-R nozzle, 10" stream straightener and quad stacked tips. The portable base unit with folding legs and a safety valve will have (2) 2.50" female NST inlets. The monitor will be painted as provided by monitor manufacturer.

4.31.798 The deluge riser Extend-a-Gun will have provisions for direct mounting a Task Force Tips CrossFire monitor.

4.31.799 SPEEDLAYS WITH TRAY - Ahead of the pump enclosure will be two (2) 1.75" speedlay hose beds. Each bed will have a 2.00" preconnect line with a 2.00" quarter-turn ball valve and terminate with a 1.50" National Standard hose thread 90 degree swivel. The swivel will be located at the top of the speedlay compartment to allow easy removal of the hose in either direction.

4.31.800 Individual controls for the speedlays will be at the pump operator's panel.

4.31.801 Each compartment will be capable of carrying 200 feet of 1.75" double jacketed hose with the one (1) compartment located above the other.

4.31.802 A removable tray will be provided for each speedlay hosebed. The speedlay trays will be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes will be in the floor and additional hand holes will be provided in the sides for easy removal and installation from the compartment. The floor of the trays will be perforated to allow for drainage and hose drying. The bottom of the speedlay compartments will be lined with stainless steel to allow the tray to slide with ease. Scuffplates will be provided on both sides, at the sides and bottom of each opening to protect the paint.

4.31.803 SPEEDLAY HOSE RESTRAINT - A black 2.00" nylon webbing design with 2.00" box pattern will be provided across each end of two (2) speedlay(s) to secure the hose during travel. The webbing will be permanently attached at the top of the speedlay opening. There will be velcro with 16.00" extended tails fasteners located at the opposite end of the permanently attached webbing.

4.31.804 Two (2) 90 degree swivel elbow will be located make sure the swivels are as far outboard as possible, accessible from the ground.

4.31.805 BOOSTER HOSE REELS - Two (2) Hannay electric rewind booster hose reels will be installed over the pump in a recessed open compartment, one each side.

4.31.806 The rewind provided on each reel will be horizontal versus the standard vertical.

4.31.807 The exterior finish of the reel will be painted job color matching the body exterior.

4.31.808 A polished stainless steel roller and guide assembly will be mounted on each side of the apparatus.

4.31.809 Discharge controls will be provided at the pump operator's panel. Plumbing to the reels will consist of 1.50" Aeroquip hose and a 1.50" valves.

4.31.810 Reel motors will be protected from overload with 50 amp automatic reset circuit breakers.

4.31.811 Electric rewind control will be two (2) rubber covered buttons, one (1) mounted on each pump panel adjacent to hose reel.

4.31.812 Booster hose, 1.00" diameter and 200 feet long, with chrome plated Barway, or equal couplings will be provided on each reel.

4.31.813 Working pressure of the booster hose will be a minimum of 800 psi.

4.31.814 Capacity of the hose reel will be 200 feet of 1.00" booster hose.

4.31.815 BOOSTER REEL HOSE RESTRAINT - A two (2) tulip clip style clamp part no. 72-0011 will be provided for restraining the booster reel hose.

4.31.816 The tulip clip will be attached to the body or pumphouse in Dealer to Supply.

4.31.817 HUSKY 12 FOAM SYSTEM - A Pierce Husky 12 foam proportioning system will be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class "A" & "B" foam concentrates, including the high viscosity (6000 cps), alcohol resistant Class B foams. Operation will be based on direct measurement of water flow, and remain consistent within the specified flows and pressures. The system will automatically balance and proportion foam solution at rates from 0.1% to 9.9% regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.

4.31.818 The design of the system will allow operation from draft, hydrant, or relay operation. This will provide a versatile system to meet the demands at a fire.

1. System Capacity - The system will have the ability to deliver the following minimum foam solution flow rates at accuracies that meet or exceed NFPA requirements at a pump rating of 250 PSI.

    - 200GPM @ 6%
    - 400GPM @ 3%
    - 1200 GPM @ 1%

    Class A foam setting in .1 % increments from .1% to 1%. Typical settings of 1%, .5% and .3% (Maximum capacity will be limited to the plumbing and water pump capacity)

2. Control System - The system will be equipped with a digital electronic control display located on the pump operator's panel. Push button controls will be integrated into the panel to turn the system on/off, control the foam percentage, direct which foam to use on a multi-tank system, and to set the operation modes (automatic, manual, draft, calibration, or flush).

    - The percent of injection will have presets for class A and class B foam. These presets can be changed at the fire department as desired. The percent of injection will be able to be easily changed at the scene to adjust to changing demands.

    - In order to minimize the use of abbreviations and interpretations, system information will be displayed on the panel by way of .50 tall LEDs that total fourteen characters (two lines of 7 each). System on and foam pump on indicator lights will also be included. Information displayed will include mode of operation (automatic, manual, draft, calibration, or flush), foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

    - The control display will direct a microprocessor, which receives input from the systems water flow meter while also monitoring the position of the foam concentrate pump. The microprocessor will compare the values of the water flow versus the position/rate of the foam pump, to ensure the proportion rate is accurate. One (1) check valve will be installed in the plumbing to prevent foam from contaminating the water pump.

3. Low Level, Foam Tank - The control head will display a warning message when the foam tank in use is below a quarter tank.

4. Hydraulic Drive System - The foam concentrate pump will be powered by a hydraulic drive system, which is automatically activated, whenever the vehicle water pump is engaged. A system that drives the foam pump via an electric motor will not be acceptable. A large parasitic electric load used to power the foam pump can cause an overload of the chassis electrical system.

    Hydraulic oil cooler will be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. The oil/water cooler will be designed to allow continuous system operation without allowing hydraulic oil temperature to exceed the oil specifications.

The hydraulic oil reservoir will be of four (4) gallons minimum capacity and will also be of sufficient size to minimize foaming and be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels.

5. Foam Concentrate Pump - The foam concentrate pump will be of positive displacement, self-priming; linear actuated design, driven by the hydraulic motor. The pump will be constructed of brass body; chrome plated stainless steel shaft, with a stainless steel piston. In order to increase longevity of the pump, no aluminum will be present in its construction.

   - A relief system will be provided which is designed to protect the drive system components and prevent over pressuring the foam concentrate pump

   - The foam concentrate pump will have minimum capacity for 12 gpm with all types of foam concentrates with a viscosity at or below 6000 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. The system will deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. Recirculating foam concentrate back to the storage tank can cause agitation and premature foaming of the concentrate, which can result in system failure. The foam concentrate pump will be self-priming and have the ability to draw foam concentrate from external supplies such as drums or pails.

6. External Foam Concentrate Connection - An external foam pick-up will be provided to enable use of a foam agent that is not stored on the vehicle. The external foam pick-up will be designed to allow continued operation after the on-board foam tank is empty. The external foam pick-up will be designed to allow use with training foam or colored water for training purposes.

7. Panel Mounted Strainer / External Pick-Up Connection - A bronze body strainer / connector unit will be provided. The unit will be mounted to the pump panel. The external foam pick-up will be one (1) - 1.00" male connection with chrome-plated cap integrated to a 2.00" strainer cleanout cap. A check valve will be installed in the pick-up portion of the cleanout cap. A basket style stainless steel screen will be installed in the body of the strainer / connector unit. Removal of the 2.00" cleanout cap will be all that is required to gain access to and remove the stainless steel basket screen. The strainer / connector unit will be ahead of the foam concentrate pump inlet port to insure that all agent reaching the foam pump has been strained.

8. Pick-Up Hose - A 1.00" flexible hose with an end for insertion into foam containers will be provided. The hose will be supplied with a 1.00" female swivel NST thread swivel connector. The hose will be shipped loose.

9. Discharges - The foam system will be plumbed to seven (7) discharges. The discharges capable of dispensing foam will be two (2) speedlays, Two (2) booster reels, deck gun, passenger side 2.5" and rear 2.5".

10. System Electrical Load - The foam proportioning will not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

11. Tank Selector - An electric valve will be used for the foam supply valve. The foam supply valve will be controlled at the foam system control head for ease of operation. The supply valve will be electric, remote controlled, to eliminate air pockets in the foam tank supply hose.

12. Maintenance Message - A message will be displayed on the control head to advise when system maintenance needs to be performed. The message will display interval for cleaning the foam strainer, cleaning for the water strainers, and changing the hydraulic oil.

13. Flush System - The system will be designed such that a flush mode will be provided to allow the system to flush all foam concentrate with clear water. The flush circuit control logic will ensure the foam tank supply valve is closed prior to opening the flush valve. The flush valve will be operated at the foam system control head for ease of operation. The valve will be electrically controlled and located as close to the foam tank supply valve as possible. A manual flush drain valve will be labeled and located under the driver's side running board.

4.31.819 FOAM GENERATING SYSTEM, CAF - A Pierce Hercules® system rated to provide 200 cfm capacity for generating compressed air foam will be provided. The system will supply six (6) discharges with compressed air foam. It will be capable of providing foam solution or compressed air foam from any of the specified CAFS discharges simultaneously. In addition, the consistency of the compressed air foam (wet to dry) from each discharge will be adjustable. All CAF capable discharges will have the discharge valve control, air injection control, and discharge pressure gauge mounted in a group on the operator's panel. Each CAF capable discharge will feature a wafer type check valve to prevent reverse flows of compressed air foam that is integrated into the discharge valve. The wafer check valve will be a type and design approved by the manufacturer of the discharge valve.

4.31.820 DISCHARGES TO CAF CAPABLE - The two (2) speedlays, passenger side booster reel, passenger side 2.5", rear 2.5" and monitor discharges will be capable of discharging compressed air foam. There is no second pump on the vehicle

4.31.821 AIR COMPESSOR - A Pierce Hercules® oil flooded rotary screw compressor rated at 200cfm @ 150psig will be provided. The compressor will be mounted between the chassis frame rails. The compressor will be driven by the vehicle transmission through a clutch type PTO. All components of the system will be sized and rated for the system to deliver compressed air, uninterrupted, for up to 2 hours at a time without undue stresses, vibrations, or overheating. The air compressor will be capable of delivering the rated capacity of the compressor when the fire pump is delivering 400gpm @150psi from tank or draft.

4.31.822 All components of the air compressor system will be readily available on the domestic air compressor market (USA). The compressor will be designed and assembled by Pierce Manufacturing using standard components available to air compressor OEM's.

4.31.823 The PTO will be a 10 bolt SAE type mounted to the PTO opening of the vehicle's Allison transmission. The PTO will be rated for at least 20 percent more torque throughput than the air compressor will demand.

4.31.824 The air/oil separator for the compressor system will be easily serviced. The separator will be inside the air/oil receiver tank. The separator will consist of two stages. The first stage being a centrifuge arrangement engineered into the tank. The second stage will be a dual cartridge arrangement featuring an "inside to outside" flow of the air through the cartridges. The separation system will be capable of a 250 SCFM flow at 40 psi tank pressure. The allowable oil carry over will be no more than 10 parts per million oil in air.

4.31.825 A steel air/oil receiver tank will be provided. The tank will be constructed and tested to the applicable standards as addressed by NFPA 1901 for CAF system air compressor tanks. The tank will be mounted in a manner that allows easy access to the fill opening and the level sight gauges. The tank will be of the vertical type with the minimum pressure valve of the compressor system integrated into the top of the tank. The minimum pressure valve will be rotatable to facilitate different discharge arrangements from the tank.

4.31.826 The compressor lubricant will be filtered by cartridge type filter. The filter will have a 25 micron rating and a safety bypass valve. The filter assembly will be mounted and located in a manner that allows easy service. A thermostat valve will be integrated into the oil filter assembly's housing. The thermostat will route lubricant to the oil cooler to maintain the compressors temperature between minimum and maximum limits.

4.31.827 A water/oil cooler will be provided to cool the compressor. The cooler will be sized to meet the duty cycle requirements as specified. The oil cooler will use water from the vehicle fire pump as the cooling medium and will be protected from freezing by adequate drains and other means.

4.31.828 A heavy duty, automotive type, dry element air cleaner will be provided. The air cleaner will be mounted in such a manner as to be easily serviced. The air cleaner will be mounted, or the inlet of the filter routed, in such a manner that the air cleaner intakes fresh air from outside the vehicle body.

4.31.829 The system will have the following safety or monitoring devices.

1. Minimum pressure valve
2. Compressor lube temperature gauge
3. Compressor system pressure gauge
4. Air flow meter
5. Compressor lube temperature warnings, audible and visible
6. High pressure relief valve on receiver tank
7. Applicable warning and information decals

4.31.830 The compressors PTO controls will be installed in such a manner as to render the PTO inoperative if the fire pump is not engaged. Further, the air compressor's PTO engagement will be prevented at compressor pressures above 10 psi at compressor re-start. The air compressor will be controlled by a modulating inlet valve mounted on the air compressors inlet port. A controller will be provided that senses air pressure and controls the delivery volume of the air compressor while maintaining a constant pressure. The controller will feature an automatic balancing system to maintain the air pressure within plus or minus 5% of the discharge pressure of the fire pump, throughout a pressure range of 60psi to 175psi.

4.31.831 The compressor system will have operator’s controls at the pump panel for the following functions.

1. Automatic pressure regulation, to match the compressor discharge pressure to the pump discharge pressure.
2. Fixed pressure regulation, to set the air pressure at on pressure for the use of air tools, etc.
3. PTO engagement switch
4. PTO engaged indicator light

4.31.832 AIR TOOL OUTLET - A 1.00" air outlet supplied by the CAFS compressor shall be provided on the pump operator’s panel for a side mount pumphouse and on the left pump panel for a top mount pumphouse. This outlet will have a chrome plated 1.0" FNST swivel fitting at the panel and a valve behind the pump panel. The outlet will be capable of supplying the capacity of the compressor. A mating 1.0" MNST x 1.0" NPT fitting will be supplied with loose equipment.

4.31.833 SINGLE FOAM TANK REFILL - The foam system's proportioning pump will be used to fill the Class A foam tank. This will allow use of the auxiliary foam pick-up to pump the foam from pails or a drum on the ground into the foam tank. A foam shut-off switch will be installed in the fill dome of the tank to shut the system down when the tank is full. The fill operation will be controlled by a mode in the foam system controller stating TANK FILL. While the proportioner pump is filling the tank, the controller will display FILL TANK. When the tank is full, as determined by the float switch in the tank dome, the pump will stop and the controller will display TANK FULL.

4.31.834 CAF AIR INJECTION VALVE CONTROL - The CAF air injection valve will be controlled by a rocker switch. The switch will be a momentary switch, interlocked to the CAFS compressor control, to return the air injection valve to close when the air compressor switch is turned off.

4.31.835 The switches will be located as close as possible to the corresponding discharge valve control. The tag will be color coded to match the discharge valve control.

4.31.836 FOAM SYSTEM TRAINING - The fire department will be provided training for the foam / CAFS system installed on their apparatus. The operation of the systems will only be demonstrated by factory approved or certified personnel.

4.31.837 This demonstration will include:

1. A review of the foam system manual, emphasizing key areas
2. A walk around review of the system components on the finished truck
3. A hands-on foam / CAFS system startup and foam discharge session
4. Instructions on the use of the manual overrides
5. A demonstration explaining the proper way to shutdown and flush the foam system.

4.31.838 FOAM TANK - The foam tank will be an integral portion of the polypropylene water tank. The cell will have a capacity of 30 gallons of foam with the intended use of Class A foam. The foam cell will not reduce the capacity of the water tank. The foam cell will have a screen in the fill dome and a breather in the lid.

4.31.839 FOAM TANK DRAIN - A system of 1.00" foam tank drains will be provided, integrated into the foam systems strainer and tank to foam pump valve management system. The tank to pump hoses running from the tank(s) to the panel mounted strainer will 1.00" diameter. The foam system controller will have a mode that allows for a given foam valve to be opened at will. Flow of foam from the tank valve to the strainer will be usable as a tank drain mode.

4.31.840 An adaptor will be supplied, that allows the 1.00" foam intake screen to assembly to be used as a drain outlet. The standard supplied 1.00" foam pick up hose will be attached to the screen assembly by way of the adapter. The drain mode will allow the operator to open and close the tank valve as required from the control head, to drain foam and re-fill foam containers through the connected hose, without foam spillage beneath the vehicle.

4.31.841 PUMP COMPARTMENT - The pump compartment will be separate from the hose body and compartments so that each may flex independently of the other. It will be a fabricated assembly of steel tubing, angles and channels which support both the fire pump and the side running boards.

4.31.842 Compartment will be mounted on chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

4.31.843 Pump compartment, pump, plumbing and gauge panels must be removable from the chassis as a single assembly.

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

4.31.845 TOP MOUNT PUMP CONTROL PANELS - All pump controls and gauges to be properly marked and located above the pump to the rear of the walkway. Operator to face the rear of the truck when viewing the control panel from the operating position. The control panel will be in two planes with both planes to be full width of the pump house.

4.31.846 The upper plane will contain the pump master gauges, engine monitoring gauges, electrical switches, and foam controls (if applicable). The upper plane will be hinged at the bottom with a full length stainless steel hinge. The fasteners used to hold the panel in the upright position will be quarter turn type. Vinyl covered cable or chains will be used to hold the gauge panel in the dropped position.

4.31.847 The lower plane is to contain all the line pressure gauges and valve control rods. The line pressure gauge will be mounted directly below the corresponding discharge control handle and recessed within the same chrome plated casting for quick identification. All outlet and inlet controls will be the lever type with direct linkage utilizing bell cranks and universal swivels to the valve itself. The control levers will be made of a 0.62" (minimum) stainless steel rod.

4.31.848 The gauge and valve control bezels will be removable from the face of the pump panel for ease of maintenance.

4.31.849 IDENTIFICATION TAGS - Identification tags for the discharge controls will be recessed within the same bezel. The discharge identification tags will be color coded, with each discharge having its own unique color. All remaining identification tags will be mounted on the pump panel in chrome plated bezels. The side pump panels will be easily removable for ease of maintenance. Polished stainless steel trim collars to be installed around all inlets and outlets.

4.31.850 WALKWAY - A 19.00" wide walkway will be provided for access to the top control panel. The walkway will be constructed of bright aluminum treadplate and properly reinforced. There will be six six (6) white LED lights provided on the back of the cab to illuminate the walkway. The lights will come on with the body perimeter lights.

4.31.851 WALKWAY TOOL COMPARTMENT - A tool compartment will be provided on each side of the walkway. Each compartment will have an aluminum treadplate door and will be equipped with a two (2) white LED lights with chrome bezels, one (1) in each compartment.

4.31.852 PUMP PANEL CONFIGURATION - The pump panel configuration will be arranged and installed in an organized manner that will provide user-friendly operation. Match 29674, Chrome plated swing handles should be used on both sides. They should ALL be vertical swing and lined up in a horizontal row. Chrome snubbers should NOT be used, MOVE the PS access door up 1" from 29674, follow drawings EXACTLY!.

4.31.853 PUMP AND GAUGE PANEL - The side control panels will be constructed of aluminum with a black vinyl finish. A polished aluminum trim molding will be provided around each panel.

4.31.854 The gauge and top mount control panels will be constructed of aluminum with a black vinyl finish. A polished aluminum trim molding will be provided around each panel.

4.31.855 The gauge panel will be hinged at the bottom with a full length stainless steel hinge. The fasteners that hold the panel in the up-right position will be quarter-turn style. Vinyl covered chains will be used to hold the panel in the dropped position.

4.31.856 The driver's and passenger's side pump panels will be removable and fastened with swell type fasteners.

4.31.857 On the front of the pump house structure, provisions will be provided for access to the pump.

4.31.858 PUMP COMPARTMENT LIGHT - A pump compartment light will be provided inside the right side pump enclosure and accessible through a door on the pump panel.

4.31.859 A .125" weep hole will be provided in each light lens, preventing moisture retention.

4.31.860 PUMP PANEL GAUGES AND CONTROLS - The following will be provided on the pump and gauge panels in a neat and orderly fashion. These gauges will be in addition to what is provided with the pressure controller.

1. Engine Oil Pressure Gauge: With visual and audible warning
2. Engine Water Temperature Gauge: With visual and audible warning
3. Tachometer: Electric
4. Master Pump Drain Control
5. Voltmeter

4.31.861 INDICATOR LIGHTS @ PUMP PANEL - The following indicator lights will be provided at the pump panel. These will be in addition to the indicators included with the pressure controller.

1. Check Transmission Warning Indicator Light
2. Stop Engine Warning Indicator Light
3. Check Engine Warning Indicator Light.

4.31.862 PUMP ACCESS DOOR LATCHES - four (4) pump access door(s) will be provided with Southco non-locking C2 latches to hold the doors in the closed position in place of standard. Latch(es) will be provided on the pump access door(s) located DS and PS access doors, use chrome plated latches, not black, match 29674, but move the PS door 1" higher

4.31.863 SPECIAL LABEL - A special label will be provided and installed Locate on the pump panel, FOAM mounted below foam level gauge, and WATER mounted below water level gauge. The label will be worded as follows, "FOAM CELL CAPACITY 30 GALLONS" to be red with white lettering, mtd below foam level gauge, and "WATER CAPACITY 750 GALLONS" to be blue with white lettering mtd below water level gauge..

4.31.864 PUMP OVERHEAT INDICATOR LIGHT - A pump overheat indicator light with bell, manufactured by M.C. Products, will be installed at the pump operator's panel.

4.31.865 The bell will be located in the pump area on the wall toward the rear of the truck passenger side.

4.31.866 The temperature switch shall be a screw in type switch installed in the pump body.

4.31.867 L100 hood light above switch panel. Switch order from top to bottom: panel lights, pump engaged, front flood, dr flood, ps flood, rear scene. On top mount pump operators panel.

4.31.868 PUMP TO TANK LINKAGE - A standard plastic bezel will be provided around the tank to pump control. The linkage will open the valve all the way by using the longest hole in the valve handle.

4.31.869 VACUUM AND PRESSURE GAUGES - The pump vacuum and pressure gauges will be liquid filled and manufactured by Class 1 Incorporated ©.

4.31.870 The gauges will be a minimum of 4.00" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#.

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

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

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

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

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

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

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

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

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

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

4.31.881 WATER LEVEL GAUGE There will be an electronic water level gauge provided on the operator's panel that registers water level by means of five (5) colored LED lights. The lights will be durable, ultra-bright five (5) LED design viewable through 180 degrees. The water level indicators will be as follows:

1. 100 percent = Green
2. 75 percent = Yellow
3. 50 percent = Yellow
4. 25 percent = Yellow
5. Refill = Red

4.31.882 The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the water tank is empty.

4.31.883 The level measurement will be based on the sensing of head pressure of the fluid in the tank.

4.31.884 The display will be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design will provide complete protection from water and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The field calibratable display measures head pressure to accurately show the tank level.

4.31.885 WATER LEVEL GAUGE - There will be two (2) additional water level indicator, Whelen®, Model PSTANK, LED module installed one (1) each side rearward of crew cab doors.

4.31.886 This light module will include four (4) colored levels, and function similar to the water level indicator located at the operators panel:

1. First green module indicates a full water level
2. Second blue module indicates a water level above 3/4 full
3. Third amber module indicates a water level above 1/2 full
4. Last red module indicates a water level above 1/4 full and empty
5. Above 1/4 this light will be steady burning
6. At empty this light will be flashing
7. This module will be activated when the parking brake is applied.

4.31.887 FOAM LEVEL GAUGE An electronic foam level gauge will be provided on the operator's panel that registers foam level by means of five (5) colored LED lights. The lights will be durable, ultra-bright five (5) LED design viewable through 180 degrees. The foam level indicators will be as follows:

1. 100 percent = Green
2. 75 percent = Yellow
3. 50 percent = Yellow
4. 25 percent = Yellow
5. Refill = Red

4.31.888 The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the foam tank is empty.

4.31.889 The level measurement will be based on the sensing of head pressure of the fluid in the tank.

4.31.890 The display will be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design will provide complete protection from foam and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The display will be able to be calibrated in the field and will measure head pressure to accurately show the tank level.

4.31.891 LIGHT SHIELDS - There will be one (1) 16 gauge stainless steel light shield installed over the operator's panel.

4.31.892 There will be three (3) Amdor LumaBar H2O, Model AY-9500-020, 20.00" LED pump panel lights installed under the stainless steel shield. The center pump panel light will come on at the operator's panel when the pump is in "ok to pump" mode. The remaining lights to be actuated from a switch located on the pump panel.

4.31.893 A light will come on above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel.

4.31.894 A green pump engaged indicator will come on at the operator's panel when the pump is shifted into gear from inside the cab.

4.31.895 ADDITIONAL STEP/LIGHT SHIELD - There will be an additional aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the driver's side pump panel.

4.31.896 There will be 12 volt DC white LED lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.

4.31.897 There will be one (1) white LED, step light provided above the step. In order to ensure exceptional illumination, each step light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light. The step light will be activated by the pump panel light switch.

4.31.898 ADDITIONAL STEP/LIGHT SHIELD - There will be an additional aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the passenger's side pump panel.

4.31.899 There will be 12 volt DC white LED lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.

4.31.900 There will be one (1) white LED, step light provided above the step. In order to ensure exceptional illumination, each step light will provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light. The step light will be activated by the pump panel light switch.

4.31.901 AIR HORN SYSTEM - Two (2) Buell air horns will be recessed in the front bumper. Models 1062 and 1063 shall be provided. The horn system will be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve will be installed in-line to prevent loss of air in the air brake system.

4.31.902 AIR HORN LOCATION - The air horns will be located on each side of the bumper, towards the outside.

4.31.903 AIR HORN CONTROL - The air horns will be actuated by a push button located on officer side instrument panel and by the horn button in the steering wheel. The driver will have the option to control the air horns or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

4.31.904 ELECTRONIC SIREN - A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone will be provided. This siren to be active when the battery switch is on and that emergency master switch is on. Electronic siren head will be recessed in the overhead console above the engine tunnel on the driver side.

4.31.905 SIREN CONTROL - The electronic siren will be controllable on the siren head and horn ring only. No foot switches will be required.

4.31.906 The driver will have the option to control the siren or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

4.31.907 SPEAKERS - There will be two (2) Whelen Projector™ Series, Model SA314A, 100-watt, cast aluminum speakers with natural finish provided. Each speaker will be connected to the siren amplifier.

4.31.908 The speakers will be recessed in each side of the front bumper, just outside of the frame rails.

4.31.909 AUXILIARY MECHANICAL SIREN - A Federal Q2B® siren will be furnished. A siren brake button will be installed on the switch panel.

4.31.910 The control solenoid will be powered up after the emergency master switch is activated.

4.31.911 The mechanical siren will be recessed in the front bumper in the center. The siren will be properly supported using the bumper framework.

4.31.912 MECHANICAL SIREN CONTROL - The mechanical siren WIll be actuated by a push button located on the officer's side instrument panel and by a foot switch on the driver's side.

4.31.913 A second siren brake switch will be installed on the officer side engine tunnel area. The switch will be a chrome push button style.

4.31.914 FRONT ZONE UPPER WARNING LIGHTS - There will be (1) traffic light controller and (12) Whelen flashing LED warning lights with chrome trim mounted on a box with removable cover on the cab roof. The lights will be configured per the following:

1. One (1) Model 6RBR with red flashing in a semi circle pattern LEDs in the driver's side end position.
2. One (1) Model M6J with blue to the rear and red forward flashing LEDs in the driver's side front corner position. The corner position will be at a 45 degree angle to the front of the cab.
3. One (1) Model 6RBR with red flashing in a semi circle pattern LEDs in the driver's side first front position.
4. One (1) Model 6RBB with blue flashing in a semi circle pattern LEDs in the driver's side second front position.
5. One (1) Model 6RBR with red flashing in a semi circle pattern LEDs in the driver's side third front position.
6. One (1) Model M6D with red/white flashing LEDs in the driver's side fourth front position.
7. One (1) 792* Strobe traffic light controller set to national standard high priority in the center position.
8. One (1) Model M6D with red/white flashing LEDs in the passenger's side fourth front position.
9. One (1) Model 6RBR with red flashing in a semi circle pattern LEDs in the passenger's side third front position.
10. One (1) Model 6RBB with blue flashing in a semi circle pattern LEDs in the passenger's side second front position.
11. One (1) Model 6RBR with red flashing in a semi circle pattern LEDs in the passenger's side first front position.
12. One (1) Model M6J with blue to the rear and red forward flashing LEDs in the passenger's side front corner position. The corner position will be at a 45 degree angle to the front of the cab.
13. One (1) Model 6RBR with red flashing in a semi circle pattern LEDs in the passenger's side end position.
14. The color of the lenses will be clear.

15. There will be a switch in the cab on the switch panel to control the flashing LEDs.

16. The traffic light controller will be activated by a cab switch with emergency master control.

17. There will be no momentary switch to activate the traffic light controller.

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

19. The flashing LEDs in the front corner, second, third and fifth positions may be load managed when the parking brake is applied.

4.31.915 CAB FACE WARNING LIGHTS - There will be two (2) Whelen, Model M6*C, LED flashing warning lights with chrome flange provided on the front of the cab above the headlights.

1. The driver's side front warning light to be blue.

2. The passenger's side front warning light to be blue.

3. Both lights will include a clear lens.

4. There will be a switch located in the cab on the switch panel to control the lights.

4.31.916 FRONT WARNING LIGHT - There will be two (2) Whelen, Model M6*, LED flashing light(s) with chrome trim provided below the headlights as shown on drawing.

1. The color of the light(s) will be red.

2. The color of the lens will be clear.

3. The light(s) will be activated with the front warning switch.

4. The light may be load managed if colored or disabled if white when the parking brake is applied.

5. Any white light will be disabled and any amber light activated when the parking brake is applied.

4.31.917 SIDE ZONE LOWER LIGHTING - There will be six (6) Whelen®, Model M6*C, flashing LED warning lights with chrome trim installed per the following:

1. Two (2) lights, one (1) each side on the front cab corner. The side front lights to be red.

2. Two (2) lights, one (1) each side of cab rearward of crew cab doors. The side middle lights to be blue.

3. Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.

4. The lights will include clear lenses.

5. There will be a switch in the cab on the switch panel to control the lights.

4.31.918 INTERIOR CAB DOOR WARNING LIGHTS - There will be four (4) Weldon, Model 8401-0000-20, amber 12 volt DC LED flashing strip lights provided.

1. One (1) light on the driver's side cab door over the window.

2. One (1) light on the passenger's side cab door over the window.

3. One (1) light on the passenger's side crew cab door over the window.

4. One (1) light on the driver's side crew cab door over the window.

5. Each light will be activated when the battery switch is on and the adjacent door is opened.

6. Each light will be installed so the flash pattern directs traffic away from the doors.

4.31.919 SIDE WARNING LIGHTS - There will be two (2) Whelen, Model M6*C LED flashing warning light(s) with bezel(s) provided one each side on the forward area centered between top of the hatch and bottom of the compartment. Please match 28165.

1. The color of the lights will be red.
2. All of these lights will include a clear lens.
3. These lights will be activated with the Side Zone Lower warning lights.

4.31.920 ADDITIONAL SIDE UPPER LIGHTS - There will be six (6) Whelen, Model M4**, 3.38" high x 5.50" long x 1.38" deep LED surface mount flashing lights with chrome trim provided on the outside corner radius of the cab roof over the crew cab doors.

1. The side front lights to be red.
2. The side middle lights to be blue.
3. The side rear lights to be red.
4. The color of the lenses will be clear.
5. The lights will be installed on two (2) painted brackets that are attached to the cab roof. Three (3) lights on the driver's side and three (3) lights installed on the passenger's side.
6. There will be a switch in the cab on the switch panel to control the lights.
7. White LED's will be disabled when the parking brake is applied. Colored LED's may be load managed when the parking brake is applied.

4.31.921 SIDE WARNING LIGHTS - There will be two (2) Whelen, Model WIONSMC* LED light(s) provided and located near the rear body in the rub rail one each side.

1. The color of each light will be red LED with a clear lens.
2. Each light will be provided with a chrome plated ABS flange.
3. The light(s) will be activated with the side warning switch.

4.31.922 REAR ZONE LOWER LIGHTING - There shall be two (2) Whelen®, Model M6*C, LED flashing warning lights located at the rear of the apparatus.

1. The driver's side rear light to be red
2. The passenger's side rear light to be red
3. Both lights will include a lens that is clear.
4. There will be a switch located in the cab on the switch panel to control the lights.

4.31.923 REAR WARNING LIGHTS - There will be two (2) Whelen®, Model M6*C, LED flashing warning light(s) with bezel(s) provided each side high on rear compartment bulkheads.

1. The color of these light(s) will be blue.
2. These light(s) will be controlled with the rear upper warning switch.
3. These light(s) will include a lens that is clear.

4.31.924 REAR OF HOSE BED WARNING LIGHTS - There will be two (2) Whelen Rota-Beam, Model R316*F, 4.00" high x 7.19" wide beacons with clear domes provided.

1. The rear zone upper lights to be red in color.
2. There will be a switch located in the cab on the switch panel to control the beacons.
3. The rear warning lights will be mounted on top of the compartmentation with all wiring totally enclosed. The rear deck lights will be mounted on the beavertails as high as possible.

4.31.925 TRAFFIC DIRECTING LIGHT - There will be one (1) Whelen®, Model TAM65, 36.00" long x 2.84" high x 2.24" deep, amber LED traffic directing light installed at the rear of the apparatus.

1. The Whelen, Model TACTL5, control head will be included with this installation.
2. The light will be powered up at all times and disabled with the cab in service switch.
3. The auxiliary warning mode will be activated with the control head only.
4. This traffic directing light will be recessed with a stainless steel trim plate at the rear of the apparatus as high as practical.
5. The traffic directing light controller will be located within the overhead recessed console above the engine tunnel on the passenger's side.
6. A short demonstration and test of the foam system using foam will be provided for the customer at pick-up.

4.31.926 SPANNER HOLDER ASSEMBLY - There will be two (2) spanner and holder assembly, Akron 443, with two (2) style #10 and one (1) style #15 spanner provided. The holder assembly will be mounted DTF to be added at shop.

4.31.927 AIR BOTTLE HOLDERS - There will be three (3) "Hands-Free" auto clamp style bracket(s) shipped with loose equipment. The bracket will be for use with Scott NxG2, 45 Minute - 4500 PSI, 6.32" Diameter, Carbon.

4.31.928 LOOSE EQUIPMENT - The following equipment will be furnished with the completed unit. One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit.

4.31.929 NFPA REQUIRED LOOSE EQUIPMENT PROVIDED BY FIRE DEPARTMENT - The following loose equipment as outlined in NFPA 1901, 2016 edition, section 5.9.3 and 5.9.4 will be provided by the fire department.

1. 800 ft (60 m) of 2.50" (65 mm) or larger fire hose.
2. 400 ft (120 m) of 1.50" (38 mm), 1.75" (45 mm), or 2.00" (52 mm) fire hose.
3. One (1) handline nozzle, 200 gpm (750 L/min) minimum.
4. Two (2) handline nozzles, 95 gpm (360 L/min) minimum.
5. One (1) smoothbore of combination nozzle with 2.50" shutoff that flows a minimum of 250 gpm.
6. One (1) SCBA complying with NFPA 1981 for each assigned seating position, but not fewer than four (4), mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer.

7. One (1) spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space(s).

8. One (1) first aid kit.

9. Four (4) combination spanner wrenches.

10. Two (2) hydrant wrenches.

11. One (1) double female 2.50" (65 mm) adapter with National Hose threads.

12. One (1) double male 2.50" (65 mm) adapter with National Hose threads.

13. One (1) rubber mallet, for use on suction hose connections.

14. Two (2) salvage covers each a minimum size of 12 ft x 14 ft (3.7 m x 4.3 m).

15. One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, Standard for High Visibility Public Safety Vests, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.

16. Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.

17. Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.

18. One (1) automatic external defibrillator (AED).

19. Four (4) ladder belts meeting the requirements of NFPA 1983, Standard on Fire Service Life Safety Rope and System Components (if equipped with an aerial device).

4.31.930 If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, will be carried mounted in brackets fastened to the apparatus.

4.31.931 If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side will be carried. Any intake connection larger than 3.00" (75 mm) will include a pressure relief device that meets the requirements of 16.6.6.

4.31.932 If the apparatus does not have a 2.50" National Hose (NH) intake, an adapter from 2.50" NH female to a pump intake will be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.

4.31.933 If the supply hose carried has other than 2.50" National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2.50" NH thread male discharge and to allow the hose to connect to a 2.50" NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

4.31.934 SOFT SUCTION HOSE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 5.8.2.1 requires a minimum of 20' of suction hose or 15' of supply hose will be carried. Hose is not on the apparatus as manufactured. The fire department will provide suction or supply hose.

4.31.935 DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 5.9.4 requires one (1) approved dry chemical portable fire extinguisher with a minimum 80-B:C rating mounted in a bracket fastened to the apparatus. The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

4.31.936 WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, section 5.9.4 requires one (1) 2.5 gallon or larger water extinguisher mounted in a bracket fastened to the apparatus. The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

4.31.937 FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) flathead axe mounted in a bracket fastened to the apparatus. The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

4.31.938 PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT - NFPA 1901, 2016 edition, Section 5.9.4 requires one (1) pickhead axe mounted in a bracket fastened to the apparatus. The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

4.31.939 PAINT - The exterior custom cab and body painting procedure will consist of a seven (7) step finishing process as follows:

4.31.940 Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces will be removed and sanded to a smooth finish. Exterior seams will be sealed before painting. Exterior surfaces that will not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.

4.31.941 Chemical Cleaning and Pretreatment - All surfaces will be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces will be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces will be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion. A final pure water rinse will be applied to all metal surfaces.

4.31.942 Surfacer Primer - The Surfacer Primer will be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.

4.31.943 Finish Sanding - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.

4.31.944 Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.

4.31.945 Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.

4.31.946 Clear Coat - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacture.

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

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

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

4.31.950 The cab will be two-tone, with the upper section painted #10 white along with a shield design on the cab face and lower section of the cab and body painted #90 red.

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

1. Topcoats and primers will be chrome and lead free.
2. Metal treatment chemicals will be chrome free. The wastewater generated in the metal treatment process will be treated on-site to remove any other heavy metals.
3. Particulate emission collection from sanding operations will have a 99.99% efficiency factor.
4. Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter is used, it will have an efficiency rating of 98.00%. Water wash systems will be 99.97% efficient
5. Water from water wash booths will be reused. Solids will be removed on a continual basis to keep the water clean.
6. Paint wastes are disposed of in an environmentally safe manner.
7. Empty metal paint containers will be to recover the metal.
8. Solvents used in clean-up operations will be recycled on-site or sent off-site for distillation and returned for reuse.
9. Additionally, the finished apparatus will not be manufactured with or contain products that have ozone depleting substances. Contractor will, upon demand, present evidence that the manufacturing facility meets the above conditions and that it is in compliance with his State EPA rules and regulations.

4.31.952 PAINT CHASSIS FRAME ASSEMBLY - The chassis frame assembly will be painted to match the lower job color before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

4.31.953 Components that are included with the chassis frame assembly that will be painted are:

1. Frame rails
2. Frame liners
3. Cross members
4. Axles
5. Suspensions
6. Steering gear
7. Battery boxes
8. Bumper extension weldment
9. Frame extensions
10. Body mounting angles
11. Rear Body support substructure (front and rear)
12. Pump house substructure
13. Air tanks
14. Fuel tank
15. Castings
16. Individual piece parts used in chassis and body assembly
17. Components treated with epoxy E-coat protection prior to paint:
18. Two (2) C-channel frame rails
19. Two (2) frame liners
20. The E-coat process will meet the technical properties shown.

4.31.954 PAINT, FRONT WHEELS - All wheel surfaces, inside and outside, will be provided with powder coat paint #90 red.

4.31.955 PAINT, REAR WHEELS - All wheel surfaces, inside and outside, will be provided with powder coat paint #90 red.

4.31.956 FUEL TANK LABEL - The manufacturer's label on the fuel tank will be taped off so that it does not get painted.

4.31.957 COMPARTMENT INTERIOR PAINT - The compartment interior will be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

4.31.958 REFLECTIVE STRIPES - Three (3) reflective stripes will be provided across the front of the vehicle and along the sides of the body. The reflective band will consist of a 1.00" white stripe at the top with a 1.00" gap then a 6.00" white stripe with a 1.00" gap and a 1.00" white stripe on the bottom.

4.31.959 CHEVRON STRIPING ON THE FRONT BUMPER - There will be alternating chevron striping located on the front bumper. The colors will be red and fluorescent yellow green diamond grade. The size of the striping will be 6.00".

4.31.960 REAR CHEVRON STRIPING - There will be alternating chevron striping located on the rear-facing vertical surface of the apparatus. The rear surface, excluding the rear compartment door, will be covered. The colors will be red and fluorescent yellow green diamond grade. Each stripe will be 6.00" in width. This will meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface will be covered with chevron striping.

4.31.961 REFLECTIVE STRIPE INSIDE RUBRAILS - A reflective stripe will be provided inside the extruded aluminum rubrails. The reflective material will be ruby red. There will be a quantity of six (6) rubrails striped.

4.31.962 INVERTED "V" CHEVRON STRIPING ON CAB AND CREW CAB DOORS -There will be alternating chevron striping located on the inside of each cab and crew cab door. The striping will consist of the following colors:

1. The first color will be fluorescent yellow green diamond grade
2. The second color will be red diamond grade
3. The size of the striping will be 4.00".

4.31.963 STRIPE, CAB FACE - A black vinyl stripe will be provided on the paint break.

4.31.964 LETTERING - There will be reflective lettering, 3.00" high, with outline provided. There will be 27 letters provided.

4.31.965 SIGN PANELS - A pair of sign panels 2.75" x 8.0" will be fabricated from brushed aluminum sheet and installed on the sides of the pumphouse immediately below the blue LED pump overheat lights, one on each side. 1.0" high red reflective lettering will be applied to each panel to spell out "PUMP" on the top line and "OVERHEAT" on the bottom line.

4.31.966 LETTERING - There will be reflective lettering, 20.00" high, with no outline or shade provided. There will be four (4) letters provided.

4.31.967 LETTERING - One (1) to twenty (20) reflective lettering, 9.00" high, with outline will be provided.

4.31.968 LETTERING - There will be reflective lettering, 5.00" high, with outline provided. There will be six (6) letters provided.

4.31.969 LETTERING - There will be non-reflective vinyl lettering, 24.00" high, with no outline or shade provided. There will be three (3) letters provided.

4.31.970 LETTERING - There will be reflective lettering, 2.00" high, with outline provided. There will be 18 letters provided.

4.31.971 LETTERING - There will be reflective lettering, 6.00" high, with outline provided. There will be three (3) letters provided.

4.31.972 LETTERING - There will be reflective lettering, 4.00" high, with outline provided. There will be ten (10) letters provided.

4.31.973 EMBLEMS - There will be a pair of American flag emblem/s, installed crew cab doors- non waving. The flag will be waving design and made out of Gerber Vision material.

4.31.974 EMBLEM - There will be one (1) reflective emblem(s), approximately 16.00" - 18.00" in size, installed r-1 door. The emblem will be modeled after the department submitted information (art, patch, etc).

005 - SUPPLEMENTAL TERMS & CONDITIONS

Original Contract Term.

This contract shall begin upon the effective date of the ordinance awarding the contract, or date specified in the award letter if this contract does not exceed $50,000. This contract shall terminate upon completion of all work described herein or delivery of all goods ordered, as applicable.

Cooperative Contract Provisions.

Term Consistent with Cooperative Contract. Notwithstanding anything to the contrary herein, no new orders may be placed hereunder after the expiration or termination of the underlying cooperative contract. Renewals cannot extend beyond the term of the underlying cooperative contract. Extensions cannot extend beyond the term of the underlying cooperative contract.

Contract Documents. The terms and conditions for performance and payment of compensation for this contract are set forth in the following contract documents, true and correct copies of which are attached hereto and fully incorporated herein for all purposes:

This Request for Offer, including any attachments identified herein and addenda issued by City prior to acceptance of an offer from Offeror;

Any Purchase Orders Issued hereunder by City of San Antonio ("City"); and

Exhibit I – All applicable terms and conditions of the Cooperative Purchasing Contract number HGAC through FS12-17.

Order of Priority of Contract Documents. Should a conflict arise among the provisions of the contract documents, this RFO and any Purchase Order issued hereunder shall govern over Exhibit I, unless otherwise specifically provided herein.

This RFO includes the following: Instructions to Offerors, General Terms and Conditions, Supplemental Terms and Conditions, Product Specifications and Description of Services, Definitions, Price Schedule, any Attachments identified herein.

Warranty.

The warranty specified in Exhibit 1, if any, a minimum of 90-days product guarantee, or the manufacturer's standard commercial warranty, whichever is greater, shall apply to all products and/or services purchased under this RFO, unless otherwise specified in the Specifications/Scope of Services section of this RFO. This warranty shall provide for replacement of defective merchandise, parts, and labor, and shall include pick-up of the defective merchandise from City and delivery of the replacement(s) to the same location. The warranty shall be effective from the date of acceptance of the merchandise, or completion of the service, as applicable.

Rejection of Disclaimers of Warranties & Limitations Of Liability.

ANY TERM OR CONDITION IN EXHIBIT I, OR IN ANY DOCUMENT FURNISHED BY VENDOR, DISCLAIMING THE IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR ATTEMPTING TO LIMIT VENDOR'S LIABILITY SHALL BE OF NO FORCE OR EFFECT, AND SHALL BE STRICKEN FROM THE CONTRACT DOCUMENTS AS IF NEVER CONTAINED THEREIN.

All Or None Bid.

City of San Antonio will make award to one vendor only.

Insurance.

A) Prior to the commencement of any work under this Agreement, Vendor shall furnish copies of all required endorsements and completed Certificate(s) of Insurance to the City's Finance Department, which shall be clearly labeled "*SAFD-LADDER AND PLATFORM TRUCKS*" in the Description of Operations block of the Certificate. The Certificate(s) shall be completed by an agent and signed by a person authorized by that insurer to bind coverage on its behalf. The City will not accept a Memorandum of Insurance or Binder as proof of insurance. The certificate(s) must be signed by the Authorized Representative of the carrier, and list the agent's signature and phone number. The certificate shall be mailed, with copies of all applicable endorsements, directly from the insurer's authorized representative to the City. The City shall have no duty to pay or perform under this Agreement until such certificate and endorsements have been received and approved by the City's Finance Department. No officer or employee, other than the City's Risk Manager, shall have authority to waive this requirement.

B) The City reserves the right to review the insurance requirements of this Article during the effective period of this Agreement and any extension or renewal hereof and to modify insurance coverages and their limits when deemed necessary and prudent by City's Risk Manager based upon changes in statutory law, court decisions, or circumstances surrounding this Agreement. In no instance will City allow modification whereby City may incur increased risk.

C) A Vendor's financial integrity is of interest to the City; therefore, subject to Vendor's right to maintain reasonable deductibles in such amounts as are approved by the City, Vendor shall obtain and maintain in full force and effect for the duration of this Agreement, and any extension hereof, at Vendor's sole expense, insurance coverage written on an occurrence basis, unless otherwise indicated, by companies authorized to do business in the State of Texas and with an A.M Best's rating of no less than A- (VII), in the following types and for an amount not less than the amount listed below:

TYPE	AMOUNTS
1. Commercial General Liability Insurance to include coverage for the following: a. Premises/Operations b. Products/Completed Operations c. Personal/Advertising Injury	For Bodily Injury and Property Damage of $1,000,000 per occurrence; $2,000,000 General Aggregate, or its equivalent in Umbrella or Excess Liability Coverage

D) Vendor agrees to require, by written contract, that all subcontractors providing goods or services hereunder obtain the same categories of insurance coverage required of Vendor herein, and provide a certificate of insurance and endorsement that names the Vendor and the CITY as additional insureds. Policy limits of the coverages carried by subcontractors will be determined as a business decision of Vendor. Respondent shall provide the CITY with said certificate and endorsement prior to the commencement of any work by the subcontractor. This provision may be modified by City's Risk Manager, without subsequent City Council approval, when deemed necessary and prudent, based upon changes in statutory law, court decisions, or circumstances surrounding this agreement. Such modification may be enacted by letter signed by City's Risk Manager, which shall become a part of the contract for all purposes.

E) As they apply to the limits required by the City, the City shall be entitled, upon request and without expense, to receive copies of the policies, declaration page, and all required endorsements. Vendor shall be required to comply with any such requests and shall submit requested documents to City at the address provided below within 10 days. Vendor shall pay any costs incurred resulting from provision of said documents.

City of San Antonio
Attn: Finance Department
P.O. Box 839966
San Antonio, Texas 78283-3966

F) Vendor agrees that with respect to the above required insurance, all insurance policies are to contain or be endorsed to contain the following provisions:

- Name the City, its officers, officials, employees, volunteers, and elected representatives as additional insureds by endorsement, as respects operations and activities of, or on behalf of, the named insured performed under contract with the City, with the exception of the workers' compensation and professional liability policies;

- Provide for an endorsement that the “other insurance” clause shall not apply to the City of San Antonio where the City is an additional insured shown on the policy;

- Workers’ compensation, employers’ liability, general liability and automobile liability policies will provide a waiver of subrogation in favor of the City.

- Provide advance written notice directly to City of any suspension or non-renewal in coverage, and not less than ten (10) calendar days advance notice for nonpayment of premium.

G) Within five (5) calendar days of a suspension, cancellation or non-renewal of coverage, Vendor shall provide a replacement Certificate of Insurance and applicable endorsements to City. City shall have the option to suspend Vendor’s performance should there be a lapse in coverage at any time during this contract. Failure to provide and to maintain the required insurance shall constitute a material breach of this Agreement.

H) In addition to any other remedies the City may have upon Vendor’s failure to provide and maintain any insurance or policy endorsements to the extent and within the time herein required, the City shall have the right to order Vendor to stop work hereunder, and/or withhold any payment(s) which become due to Vendor hereunder until Vendor demonstrates compliance with the requirements hereof.

I) Nothing herein contained shall be construed as limiting in any way the extent to which Vendor may be held responsible for payments of damages to persons or property resulting from Vendor’s or its subcontractors’ performance of the work covered under this Agreement.

J) It is agreed that Vendor’s insurance shall be deemed primary and non-contributory with respect to any insurance or self insurance carried by the City of San Antonio for liability arising out of operations under this Agreement.

K) It is understood and agreed that the insurance required is in addition to and separate from any other obligation contained in this Agreement and that no claim or action by or on behalf of the City shall be limited to insurance coverage provided..

L) Vendor and any Subcontractors are responsible for all damage to their own equipment and/or property.

Incorporation of Attachments.

Each of the attachments listed below is an essential part of this contract, which governs the righ ts and duties of the parties, incorporated herein by reference, and shall be interpreted in the order of priority as appears below, with this document taking priority over all attachments:

Attachment A – PRICE SCHEDULE

006 – GENERAL TERMS & CONDITIONS

Electronic Offer Equals Original. If Vendor is submitting an electronic offer, City and Vendor each agree that this transaction may be conducted by electronic means, as authorized by Chapter 322, Texas Business & Commerce Code, known as the Electronic Transactions Act.

Delivery of Goods/Services.

Destination Contract. Vendor shall deliver all goods and materials F.O.B., City of San Antonio's designated facility, inside delivery, freight prepaid, to the address provided in this RFO or, if different, in the Purchase Order. Vendor shall bear the risk of loss until delivery. Freight charges will be paid only when expedited delivery is requested and approved in writing by City. Vendor shall be responsible for furnishing necessary personnel or equipment and/or making necessary arrangements to off load at City of San Antonio facility, unless otherwise noted herein.

Failure to Deliver. When delivery is not met as provided for in the contract, City may make the purchase on the open market, with any cost in excess of the contract price paid by Vendor, in addition to any other direct, indirect, consequential or incidental damages incurred by City as a result thereof. In addition, Vendor may be removed from City's list of eligible bidders.

Purchase Orders. Each time a City department wishes to place an order against this contract, it will issue Vendor a purchase order. Vendor must have the purchase order before making any delivery.

Acceptance by City. City shall have a reasonable time (but not less than 30 days) after receipt to inspect the goods and services tendered by Vendor. City at its option may reject all or any portion of such goods or services which do not, in City's sole discretion, comply in every respect with all terms and conditions of the contract. City may elect to reject the entire goods and services tendered even if only a portion thereof is nonconforming. If City elects to accept nonconforming goods and services, City, in addition to its other remedies, shall be entitled to deduct a reasonable amount from the price thereof to compensate City for the nonconformity. Any acceptance by City, even if non-conditional, shall not be deemed a waiver or settlement of any defect in such goods and services.

Testing. After award of contract, City may, at its sole option, test the product delivered to ensure it meets specifications. Initial testing shall be at City's expense. However, if the product does not to meet specifications, Vendor shall reimburse City for the costs of testing. City may withhold the cost of testing from any amounts owed to Vendor under this or any other contract, or invoice Vendor for same. If invoiced, Vendor shall pay City within 30 calendar days' of the invoice.

Invoicing and Payment.

Address for Invoices. All original invoices must be sent to: City of San Antonio, Attn: Accounts Payable, P.O. Box 839976, San Antonio, Texas 78283-3976.

Information Required On Invoice.

All invoices must be in a form and content approved by City. City may require modification of invoices if necessary in order to satisfy City that all billing is proper and pursuant to the terms of the contract. Invoices are required to show each City Purchase Order Number. Invoices must be legible. Items billed on invoices must be specific as to applicable stock, manufacturer, catalog or part number (if any). All invoices must show unit prices for each item being billed, the quantity of items being billed and the total for each item, as well as the total for all items on the invoice. If prices are based on list prices basis, then the list prices, the percentage discount or percentage surcharge, net unit prices, extensions and net total prices must be shown. Prompt payment discounts offered shall be shown separately on the invoice.

Payment by City.

In accordance with the Texas Prompt Payment Act, City shall have not less than 30 days to pay for goods or services. Time for payment, including payment under discount terms, will be computed from the later of: (1) the date City receives conforming goods under the contract; (2) the date performance of the service under the contract is completed; or (3) the date City receives a correct and valid invoice for the goods or services. Payment is deemed to be made on the date of mailing of the check. Payment is made in US dollars only.

This provision shall not apply where there is a bona fide dispute between City and Vendor about the goods delivered or the service performed that causes the payment to be late, or where the invoice is not mailed to the address provided herein.

The payment amount due on invoices may not be manually altered by City personnel. Once disputed items are reconciled, Vendor must submit a corrected invoice or a credit memorandum for the disputed amount. City will not make partial payments on an invoice where there is a dispute.

NECESSITY OF TIMELY INVOICE / WAIVER OF PAYMENT. NOTWITHSTANDING THE FORGOING, CITY CANNOT PAY FOR ANY GOODS OR SERVICES WITHOUT AN INVOICE. VENDOR MUST INVOICE CITY NO LATER THAN 90 CALENDAR DAYS FROM THE DATE GOODS ARE DELIVERED OR SERVICES RENDERED. FAILURE TO SUBMIT AN INVOICE WITHIN SAID 90 DAY SHALL NEGATE ANY LIABILITY ON THE PART OF CITY AND CONSTITUTE A **WAIVER** BY VENDOR OF ANY AND ALL RIGHT OR CLAIMS TO COLLECT MONEYS THAT VENDOR MAY RIGHTFULLY BE OTHERWISE ENTITLED TO FOR GOODS OR SERVICES PERFORMED.

The total price for all goods and/or services is shown on the Price Schedule. No additional fees or expenses of Vendor shall be charged by Vendor nor be payable by City. The parties hereby agree that all compensable expenses of Vendor are shown on the Price Schedule. If there is a discrepancy on the Price Schedule between the unit price for an item, and the extended price, the unit price shall govern.

Amendments. Except where the terms of this contract expressly provide otherwise, any alterations, additions, or deletions to the terms hereof, shall be effected by amendment, in writing, executed by both City and Vendor. The Director of the Purchasing and General Services Department, or Director's designee, shall have authority to execute amendments on behalf of City without further action by the San Antonio City Council, subject to and contingent upon appropriation of funds for any increase in expenditures by City.

Termination.

Termination-Breach. Should vendor fail to fulfill in a timely and proper manner, as determined solely by the Director, its material obligations under this contract, or violate any of the material terms of this contract, City shall have the right to immediately terminate the contract in whole or in part. Notice of termination shall be provided in writing to the Vendor, effective upon the date set forth in the notice. City may, in City's sole discretion, provide an opportunity for Vendor to cure the default. If City elects to offer an opportunity to cure, City shall provide notice to Vendor specifying the matters in default and the cure period. If Vendor fails to cure the default within the cure period, City shall have the right, without further notice, to terminate the contract in whole or in part. Such termination shall not relieve Vendor of any liability to the City for damages sustained by virtue of any breach by Vendor.

Termination-Notice. City may terminate this contract, in whole or in part, without cause. City shall be required to give Vendor notice ten days prior to the date of termination of the contract without cause.

Termination-Funding. City retains the right to terminate this contract at the expiration of each of City's budget periods. This contract is conditioned on a best efforts attempt by City to obtain and appropriate funds for payment of any debt due by City herein.

Termination by City may be effected by Director, without further action by the San Antonio City Council.

Independent Contractor. Vendor covenants and agrees that it is an independent contractor and not an officer, agent, servant or employee of City. City shall not be liable for any claims which may be asserted by any third party occurring in connection with the services to be performed by Vendor under this contract and that Vendor has no authority to bind City. The doctrine of respondeat superior shall not apply as between City and Vendor.

INDEMNIFICATION.

VENDOR covenants and agrees to FULLY INDEMNIFY, DEFEND and HOLD HARMLESS, CITY and the elected officials, employees, officers, directors, volunteers and representatives of CITY, individually and collectively, from and against any and all costs, claims, liens, damages, losses, expenses, fees, fines, penalties, proceedings, actions, demands, causes of action, liability and suits of any kind and nature, including but not limited to, personal or bodily injury, death and property damage, made upon CITY directly or indirectly arising out of, resulting from or related to VENDOR'S activities under this Agreement, including any acts or omissions of VENDOR, any agent, officer, director, representative, employee, consultant or subcontractor of VENDOR, and their respective officers, agents employees, directors and representatives while in the exercise of the rights or performance of the duties under this Agreement. The indemnity provided for in this paragraph

shall not apply to any liability resulting from the negligence of CITY, it s officers or employees, in instances where such negligence causes personal injury, death, or property damage. IN THE EVENT VENDOR AND CITY ARE FOUND JOINTLY LIABLE BY A COURT OF COMPETENT JURISDICTION, LIABILITY SHALL BE APPORTIONED COMPARATIVELY IN ACCORDANCE WITH THE LAWS FOR THE STATE OF TEXAS, WITHOUT, HOWEVER, WAIVING ANY GOVERNMENTAL IMMUNITY AVAILABLE TO CITY UNDER TEXAS LAW AND WITHOUT WAIVING ANY DEFENSES OF THE PARTIES UNDER TEXAS LAW. In addition, Vendor agrees to indemnify, defend, and hold City harmless from any claim involving patent infringement, trademarks, trade secrets, and copyrights on goods supplied.

The provisions of this INDEMNITY are solely for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity. VENDOR shall advise CITY in writing within 24 hours of any claim or demand against CITY or VENDOR known to VENDOR related to or arising out of VENDOR's activities under this AGREEMENT and shall see to the investigation and defense of such claim or demand at VENDOR's cost. CITY shall have the right, at its option and at its own expense, to participate in such defense without relieving VENDOR of any of its obligations under this paragraph.

Assignment. Except as otherwise stated herein, Vendor may not sell, assign, pledge, transfer or convey any interest in this contract, nor delegate the performance of any duties hereunder, by transfer, by subcontracting or any other means, without the consent of Director. As a condition of such consent, if such consent is granted, Vendor shall remain liable for completion of the services and provision of goods outlined in this contract in the event of default by the successor vendor, assignee, transferee or subcontractor. Any attempt to transfer, pledge or otherwise assign this Contract without said written approval, shall be void ab initio and shall confer no rights upon any third person.

Ownership of Documents. Pursuant to Texas Local Government Code Chapter 201, any and all Records produced by Vendor pursuant to the provisions of this contract are the exclusive property of City; and no such Record shall be the subject of any copyright or proprietary claim by Vendor. The term "Record" as used herein shall mean any document, paper, letter, book, map, photograph, sound or video recording, microfilm, magnetic tape, electronic medium, or other information recording medium, regardless of physical form or characteristic. Vendor understands and acknowledges that as the exclusive owner of any and all such Records, City has the right to use all such Records as City desires, without restriction.

Records Retention.

Vendor and its subcontractors, if any, shall properly, accurately and completely maintain all documents, papers, and records, and other evidence pertaining to the services rendered hereunder ("Documents"), and shall make such Documents available to City at their respective offices, at all reasonable times and as often as City may deem necessary during the contract period, including any extension or renewal hereof, and the record retention period established herein, for purposes of audit, inspection, examination, and making excerpts or copies of same by City and any of its authorized representatives.

Vendor shall retain any and all Documents produced as a result of services provided hereunder for a period of four years ("Retention Period") from the date of termination of the contract. If, at the end of the Retention Period, there is litigation or other questions arising from, involving or concerning these Documents or the services provided hereunder, Vendor shall retain the records until the resolution of such litigation or other such questions. Vendor acknowledges and agrees that City shall have access to any and all such Documents at any and all times, as deemed necessary by City, during said Retention Period. City may, at its election, require Vendor to return the documents to City at Vendor's expense prior to or at the conclusion of the Retention Period. In such event, Vendor may retain a copy of the documents.

Vendor shall notify City, immediately, in the event Vendor receives any requests for information from a third party, which pertain to the Documents referenced herein. Vendor understands and agrees that City will process and handle all such requests.

Severability. If any clause or provision of this contract is held invalid, illegal or unenforceable under present or future federal, state or local laws, including but not limited to the City Charter, City Code, or ordinances of the City of San Antonio, Texas, then and in that event it is the intention of the parties hereto that such invalidity, illegality or unenforceability shall not affect any other clause or provision hereof and that the remainder of this contract shall be construed as if such invalid, illegal or unenforceable clause or provision was never contained herein. It is also the intention of the parties hereto that in lieu of each clause or provision of this contract that is invalid, illegal, or unenforceable, there be added as a part of the contract a clause or provision as similar in terms to such invalid, illegal or unenforceable clause or provision as may be possible, legal, valid and enforceable.

Compliance with Law. Vendor shall provide and perform all services required under this Agreement in compliance with all applicable federal, state and local laws, rules and regulations.

Certifications. Vendor warrants and certifies that Vendor and any other person designated to provide services hereunder has the requisite training, license and/or certification to provide said services, and meets all competence standards promulgated by all other authoritative bodies, as applicable to the services provided herein.

Non-waiver of Performance. Unless otherwise specifically provided for in this Agreement, a waiver by either Party of a breach of any of the terms, conditions, covenants or guarantees of this Agreement shall not be construed or held to be a waiver of any succeeding or preceding breach of the same or any other term, condition, covenant or guarantee herein contained. Further, any failure of either Party to insist in any one or more cases upon the strict performance of any of the covenants of this Agreement, or to exercise any option herein contained, shall in no event be construed as a waiver or relinquishment for the future of such covenant or option. In fact, no waiver, change, modification or discharge by either party hereto of any provision of this Agreement shall be deemed to have been made or shall be effective unless expressed in writing and signed by the party to be charged. No act or omission by a Party shall in any manner impair or prejudice any right, power, privilege, or remedy available to that Party hereunder or by law or in equity, such rights, powers, privileges, or remedies to be always specifically preserved hereby.

Venue. Venue of any court action brought directly or indirectly by reason of this contract shall be in Bexar County, Texas. This contract is made and is to be performed in Bexar County, Texas, and is governed by the laws of the State of Texas.

Non-discrimination. As a condition of entering into this agreement, Vendor represents and warrants that it will comply with City's Commercial Nondiscrimination Policy, as described under Section IILC.1 of the SBEDA Ordinance. As part of such compliance, Vendor shall not discriminate on the basis of race, color, religion, ancestry or national origin, sex, age, marital status, sexual orientation, or on the basis of disability or other unlawful forms of discrimination in the solicitation, selection, hiring or commercial treatment of subcontractors, vendors, suppliers, or commercial customers, nor shall Vendor retaliate against any person for reporting instances of such discrimination. Vendor shall provide equal opportunity for subcontractors, vendors and suppliers to participate in all of its public sector and private sector subcontracting and supply opportunities, provided that nothing contained in this clause shall prohibit or limit otherwise lawful efforts to remedy the effects of marketplace discrimination that have occurred or are occurring in City's Relevant Marketplace. Vendor understands and agrees that a material violation of this clause shall be considered a material breach of this agreement and may result in termination of this agreement, disqualification of Vendor from participating in City contracts, or other sanctions. This clause is not enforceable by or for the benefit of, and creates no obligation to, any third party. Vendor shall include this nondiscrimination clause in all subcontracts for the performance of this contract.

Prohibition on Contracts with Companies Boycotting Israel

Texas Government Code §2270.002 provides that a governmental entity may not enter into a contract with a company for goods or services, unless the contract contains a written verification from the company that it:

(1) does not boycott Israel; and
(2) will not boycott Israel during the term of the contract.

"Boycott Israel" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

"Company" means a for-profit sole proprietorship, organization, association, corporation, partnership, joint venture, limited partnership, limited liability partnership, or limited liability company, including a wholly owned subsidiary, majority-owned subsidiary, parent company, or affiliate of those entities or business associations that exists to make a profit.

By submitting an offer to or executing contract documents with the City of San Antonio, Company hereby verifies that it does not boycott Israel, and will not boycott Israel during the term of the contract. City's hereby relies on Company's verification. If found to be false, City may terminate the contract for material breach.

Delinquent Taxes. In the event that Vendor is or subsequently becomes delinquent in the payment of taxes owed to the City of San Antonio, City reserves the right to deduct any delinquent taxes from payments that City may owe to the delinquent Vendor as a result of this contract.

Binding Contract. This contract shall be binding on and inure to the benefit of the parties hereto and their respective heirs, executors, administrators, legal representatives, and successors and assigns, except as otherwise expressly provided for herein.

Entire Agreement. This contract, including City's final electronically posted online version, together with its authorizing ordinance, and its price schedule(s), attachments, purchase orders, and exhibits, if any, constitutes the final and entire agreement between the parties hereto and contains all of the terms and conditions agreed upon. No other agreements, oral or otherwise, regarding the subject matter of this contract shall be deemed to exist or to bind the parties hereto, unless same be in writing, dated subsequent to the date hereof, and be duly executed by the parties, in accordance with the Amendment provision herein. **Parties agree that City's final electronically posted online version of this solicitation contains the agreed upon specifications, scope of services, and terms and conditions of this contract, and shall control in the event of a conflict with any printed version signed and submitted by Vendor.**

007 – SIGNATURE PAGE

By submitting an offer, whether electronically or by paper, Offeror represents that:

(s)he is authorized to bind Offeror to fully comply with the terms and conditions of City's Request for Offer for the prices stated therein;

(s)he has read the entire document, including the final version issued by City, and agreed to the terms therein;

Offeror is in good standing with the Texas State Comptroller's Office; and

to the best of his/her knowledge, all information is true and correct.

If submitting your offer by paper, complete the following and sign on the signature line below. Failure to sign and submit this Signature Page will result in rejection of your offer.

Offeror Information Please Print or Type	
Vendor ID No.	1042940
Signer's Name	Jeffrey A. Doran Patrick Siddons
Name of Business	Siddons-Martin Emergency Group
Street Address	1362 E. Richey Road
City, State, Zip Code	Houston, Texas 7073
Email Address	jdoran@siddons-martin.com pat.siddons@siddons-martin.com
Telephone No.	1-800-784-6806
Fax No.	281-442-0850
City's Solicitation No.	RFO 6100006506

Jeffrey A. Doran Patrick Siddons

Signature of Person Authorized to Sign Offer

008 – STANDARD DEFINITIONS

Whenever a term defined by the Uniform Commercial Code ("UCC"), as enacted by the State of Texas, is used in the Contract, the UCC definition shall control, unless otherwise defined in the Contract.

All-or-None Offer – an RFO in which City will award the entire contract to one offeror only.

Alternate Offer – two or more offers with substantive variations in the item or service offered from the same offeror in response to a solicitation.

Assignment – a transfer of claims, rights or interests in goods, services or property.

Bid Bond – security to ensure that Offeror (a) will not withdraw the offer within the period specified for acceptance, and (b) will furnish any required bonds and any necessary insurance within the time specified in the solicitation.

City – the City of San Antonio, a Texas home-rule municipal corporation.

Contractor – the offeror whose offer is accepted by City and is, therefore, the person, firm or entity providing goods or services to City under a contract.

Director – the Director of City's Purchasing & General Services Department, or Director's designee.

Line Item – a listing of items in an offer for which an offeror is expected to provide separate pricing.

Offer – a complete, signed response to an RFO that, if accepted, would bind Offeror to perform the resultant contract.

Offeror – a person, firm or entity that submits an offer in response to a solicitation. The offeror whose offer is accepted by City may also be referred to herein as Contractor, Vendor or Supplier.

Payment Bond – a particular form of security provided by the contractor to protect City against loss due to the contractor's failure to pay suppliers and subcontractors.

Performance Bond – a particular form of security provided by the contractor to protect City against loss due to the contractor's inability or unwillingness to complete the contract as agreed.

Performance Deposit – security provided by the contractor to protect City against loss due to the contractor's inability or unwillingness to complete the contract as agreed.

Pre-Submittal Conference – a meeting conducted by City, held in order to allow offerors to ask questions about the proposed contract and particularly, the contract specifications.

Purchase Order – a validly issued order placed by an authorized City department for the purchase of goods or services, written on City's standard purchase order form, and which is the vendor's authority to deliver to and invoice City for the goods or services specified in an RFO for the price stated in vendor's offer.

Specifications – a description of what City requires and what Offeror must offer; a description of the physical or functional characteristics of a product or material, or the nature of a service or construction item.

Subcontractor – a person, firm or entity providing goods or services to a vendor to be used in the performance of the vendor's obligations under the contract with City.

Supplier – the offeror whose offer is accepted by City and is, therefore, the person, firm or entity providing goods or services to City under a contract.

Vendor – the offeror whose offer is accepted by City and is, therefore, the person, firm or entity providing goods or services to City under a contract.

009 – ATTACHMENTS

ATTACHMENT A-PRICE SCHEDULE

ITEM	QUANTITY	DESCRIPTION
1	8 each	Pierce Velocity® Ladder Truck

PRICE EACH: $ 1,124,106.00

TOTAL: $ 8,992,848.00

CAB & CHASSIS YEAR, MAKE & MODEL:

2018 Velocity 8410 100' Aerial

SPECIFIC MAKE & MODEL OF TRANSMISSION OFFERED:

Allison EVS 4500 PR

SPECIFIC MAKE & MODEL OF ENGINE OFFERED (INCLUDE SAE NET HP):

Detroit DDC 13 525 hp, 1850 ft-lb

CAB & CHASSIS WARRANTY: 1 year Basic, 3 Year Chassis, 10 year Cab Structural

BODY WARRANTY: 10 year Body Structural

DELIVERY: Delivery will be made within 270-300 calendar days after receipt of purchase order.

MANUFACTURER CUT-OFF DATE: January 30, 2018

INDICATE THE LAST DAY THAT THE CITY CAN PLACE ORDERS UNDER THIS CONTRACT WITHOUT MISSING THE PRODUCTION CUT OFF DATE: January 30, 2018

BID PRICES SHALL REMAIN FIRM FOR ALL ORDERS PLACED PRIOR TO THIS CUT OFF DATE. IN THE EVENT THAT CITY DOES NOT AWARD A CONTRACT PRIOR TO PRODUCTION CUT OFF DATE, CAN BIDDER PROVIDE BID ITEMS, AT THE BID PRICE SUBMITTED, AFTER THE PRODUCTION CUT OFF DATE? January 30, 2018

ITEM	QUANTITY	DESCRIPTION
2	6 each	Pierce Velocity® Ladder Truck with Platform

PRICE EACH: $ 1,332,670.00 (2 - 2018 Units)

TOTAL: $ 2,665,340.00

Pricing after January 20, 2019 $1,372,650.00 per unit

CAB & CHASSIS YEAR, MAKE & MODEL:

2018 Velocity 7010

SPECIFIC MAKE & MODEL OF TRANSMISSION OFFERED:

Allison EVS 4500PR

SPECIFIC MAKE & MODEL OF ENGINE OFFERED (INCLUDE SAE NET HP):

Detroit 525 hp, 1850 ft-lb.

CAB & CHASSIS WARRANTY: 1 year Basic, Chassis 3 year , 10 year Cab Structural

BODY WARRANTY: 10 year Body Structural

DELIVERY: Delivery will be made within 300 - 330 calendar days after receipt of purchase order.

MANUFACTURER CUT-OFF DATE: January 30, 2018

INDICATE THE LAST DAY THAT THE CITY CAN PLACE ORDERS UNDER THIS CONTRACT WITHOUT MISSING THE PRODUCTION CUT OFF DATE: January 30, 2018

BID PRICES SHALL REMAIN FIRM FOR ALL ORDERS PLACED PRIOR TO THIS CUT OFF DATE. IN THE EVENT THAT CITY DOES NOT AWARD A CONTRACT PRIOR TO PRODUCTION CUT OFF DATE, CAN BIDDER PROVIDE BID ITEMS, AT THE BID PRICE SUBMITTED, AFTER THE PRODUCTION CUT OFF DATE? January 30, 2018

ITEM	QUANTITY	DESCRIPTION
3	1 each	Pierce Velocity® Engine Truck

PRICE EACH: $ 703,599.00

TOTAL: $ 703,599.00

CAB & CHASSIS YEAR, MAKE & MODEL:

2018 Velocity 8410

SPECIFIC MAKE & MODEL OF TRANSMISSION OFFERED:

Allison EVS 4000P

SPECIFIC MAKE & MODEL OF ENGINE OFFERED (INCLUDE SAE NET HP):

Detroit DDC DD13 505 hp, 1750 ft-lb.

CAB & CHASSIS WARRANTY: 1 year Basic, 3 year Chassis, 10 year Cab Structural

BODY WARRANTY: 10 year Structural

DELIVERY: Delivery will be made within 270-300 calendar days after receipt of purchase order.

MANUFACTURER CUT-OFF DATE: January 30, 2018

INDICATE THE LAST DAY THAT THE CITY CAN PLACE ORDERS UNDER THIS CONTRACT WITHOUT MISSING THE PRODUCTION CUT OFF DATE: January 30, 2018

BID PRICES SHALL REMAIN FIRM FOR ALL ORDERS PLACED PRIOR TO THIS CUT OFF DATE. IN THE EVENT THAT CITY DOES NOT AWARD A CONTRACT PRIOR TO PRODUCTION CUT OFF DATE, CAN BIDDER PROVIDE BID ITEMS, AT THE BID PRICE SUBMITTED, AFTER THE PRODUCTION CUT OFF DATE? January 30, 2018

ITEM	QUANTITY	DESCRIPTION
4	1 each	HGAC FEE

HGAC FEE: $ 2,000.00 EACH $ 2,000.00 TOTAL

Authorized Warranty Provider:

Siddons-Martin Emergency Group

Warranty Provider Address:

5511 Binz-Englemann Road Kirby, Texas 78219

Prompt Payment Discount: _____% _____days. (If no discount is offered, Net 30 will apply.)

Deduct $2,500.00 per unit if paid within 10 days of acceptance at Kirby Facility

Delivery will be made within _____ calendar days after receipt of purchase order.

Deduct $420,259.00 if total payment within 30 days ARO Siddons-Martin Emergency Group.