STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

AIRPORTS

SPECIFICATIONS, SPECIAL, PROVISIONS

PROPOSAL AND CONTRACT

FOR

FURNISHING AND DELIVERY

OF

ONE (1) MULTI-PURPOSE STRUCTURAL

FIRE FIGHTING VEHICLE AT

KAHULUI AIRPORT,

KAHULUI, MAUI, HAWAII

AND

ONE (1) MULTI-PURPOSE STRUCTURAL

FIRE FIGHTING VEHICLE AT

DANIEL K. INOUYE INTERNATIONAL AIRPORT,

HONOLULU, OAHU, HAWAII

PROJECT NO. FS1219-26

2026

NOTICE TO BIDDERS
Hawaii Revised Statutes (HRS),
Chapter 103D

The receiving of bids for **FURNISHING AND DELIVERY OF ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE AT KAHULUI AIRPORT, KAHULUI, MAUI, HAWAII, AND ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE AT DANIEL K. INOUYE INTERNATIONAL AIRPORT, HONOLULU, OAHU, HAWAII, PROJECT NO. FS1219-26**, will begin as of the HIePRO Release Date. Bidders shall register and submit complete bids through HIePRO only. Refer to the following HIePRO link for important information on Vendor Registration: https://hiepro.ehawaii.gov/welcome.html.

The solicitation, specifications, proposal, and additional documents designated or incorporated by reference shall be available in HIePRO.

HIePRO OFFER DUE DATE AND TIME is May 15, 2026, at 2:00 p.m., Hawaii Standard Time (HST). **Bidders shall submit and upload the complete proposal to HIePRO prior to the offer due date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents as part of their proposal. The record of each bidder and their respective proposal shall be open to public inspection. FAILURE TO UPLOAD THE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION.**

The scope of work consists of Furnishing and Delivery of One (1) Multi-Purpose Structural Fire Fighting Vehicle at Kahului Airport and One (1) Multi-Purpose Structural Fire Fighting Vehicle at Daniel K. Inouye International Airport.

All Request for Information (RFI) questions shall be submitted in HIePRO **no later than May 5, 2026, at 2:00 p.m., HST.** RFI questions received after the stated deadline shall not be addressed. Verbal RFI(s) shall not receive a response. All responses to RFI questions shall be provided for clarification and information only and issued by formal addendum. Any amendments to the solicitation shall be made by formal addendum and posted in HIePRO.

If there is a conflict between the solicitation and information stated in the responses to RFI questions, the solicitation shall govern and control, unless as amended by formal addendum.

Campaign contributions by State and County Contractors. Contractors are hereby notified of the applicability of HRS § 11-355 which states that campaign contributions are prohibited from specified State or County government contractors during the term of the contract if the contractors are paid with funds appropriated by a legislative body. For more information, contact the Campaign Spending Commission at (808) 586-0285.

Protests. Any protest of this solicitation shall be submitted in writing to the Director of Transportation, in accordance with HRS § 103D-701 and Hawaii Administrative Rules § 3-126.

The Equal Employment Opportunity Regulations of the Secretary of Labor implementing Executive Order 11246, as amended, shall be complied with on this project.

The U.S. Department of Transportation Regulation entitled "Nondiscrimination in Federally Assisted Programs of the U.S. Department of Transportation," Title 49, Code of Federal Regulations (CFR), Part 21, is applicable to this project. Bidders are hereby notified that the Department of Transportation shall affirmatively ensure that the contract entered into pursuant to this advertisement shall be awarded to the lowest responsible bidder without discrimination on the grounds of race, color, national origin, or sex (as directed by 23 CFR Part 200).

For additional information, contact Martinez Jacobs, Project Manager, by phone at (808) 840-5351, or by email at martinez.jacobs@hawaii.gov.

The State reserves the right to reject any or all proposals and to waive any defects in said proposals in the best interest of the public.

CURT T. OTAGURO
Deputy Director of Transportation for Airports

HIePRO RELEASE DATE: April 28, 2026

FURNISHING AND DELIVERY OF
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE AT
KAHULUI AIRPORT, KAHULUI, MAUI, HAWAII AND
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING
VEHICLE AT DANIEL K. INOUYE INTERNATIONAL AIRPORT,
HONOLULU, OAHU, HAWAII

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SPECIAL PROVISIONS

SPECIAL PROVISIONS

The Specifications contained herein are amended as follows:

A. SECTION 1 – DEFINITION AND TERM

1.33 SUBCONTRACTOR is amended by deleting it and replacing it with the following:

"1.33 SUBCONTRACTOR-An individual, partnership, firm, corporation, or joint venture, or other legal entity, as licensed or required to be licensed under Chapter 444, Hawaii Revised Statutes, as amended, which enters into an agreement with the Contractor to perform a portion of the work."

Add the following new definitions:
"1.39 HAWAll ePROCUREMENT SYSTEM (HIePRO) - The State of Hawaii eProcurement System for issuing solicitations, receiving proposals and responses, and issuing notices of award."

B. SECTION 2 – PROPOSAL REQUIREMENTS AND CONDITIONS is amended by the following:

2.3 WITHDRAWAL OF PROPOSALS is amended by replacing the entire subsection with:

"2.3 DELIVERY OF PROPOSALS-**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents with the proposal.** The record of each bidder and respective bid shall be open to public inspection. Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified."

2.4 WITHDRAWAL OF PROPOSALS is amended by replacing the entire subsection with:

"2.4 WITHDRAWAL OF PROPOSALS - Bids may be modified or withdrawn prior to the bid opening date and time. Withdrawal or revision of proposal shall be completed and submitted and uploaded to HIePRO prior to the bid opening date and time."

2.5 PUBLIC OPENING OF PROPOSALS is not applicable.

2.10 BID PREPARATION (adding new requirements)

1. Legal Name. Bidder is required to submit the bid using bidder's exact legal name and License Number as registered at the Department of Commerce and Consumer Affairs. Failure on the part of the bidder to meet this requirement shall result in rejection of bid.

2. Bid Quotation. Bid price(s) quoted herein shall be based on delivery to destination and shall include all other costs and applicable taxes. Bid shall also include, when applicable, costs for installation, modification and instructional training in use of equipment.

3. Tax Liability. Work to be performed under this bid solicitation is a business activity taxable under Chapter 237, Hawaii Revised Statutes (H.R.S.) and Chapter 238, H.R.S., where applicable. Both out-of-state vendors and Hawaii vendors are advised that the gross receipts derived from this bid solicitation are subject to the general excise tax imposed by Chapter 237, H.R.S., at the current rate of 4.5% for Oahu, 4% for the neighbor islands, and where applicable to tangible property imported into the State of Hawaii for resale, subject to the 1/2% use tax imposed by Chapter 238, H.R.S.

4. Make, Model and Other Information. Bidder must identify on the proposal the exact brand or manufacturer's name and equipment/product model number, order number or other identifier(s) of each item offered. Failure to do so or the inclusion of remarks such as "as specified" shall result in rejection of bid.

If any of the called-for elements of product information is missing from bidder's proposal, the State will not be able to determine from the information given, whether or not the product is acceptable. If additional space is needed to provide complete product identification, bidders may attach a separate sheet to the bid for that purpose. Bidders will not be allowed to clarify product identification after bid opening. This is to assure that all bids are submitted under the same conditions with no opportunity for one bidder to have advantage over any other bidder after exposure of offers.

5. Brochures and Specification Literature. Bidder shall submit with his/her bid, current brochures and/or specifications required for bid item(s). Upon request, bidder shall furnish at his/her own expense, within five (5) working days from date of State's request, any further information required to determine

acceptability of equipment offered.

C. SECTION 3.1 – AWARD OF CONTRACT is amended by adding the following after the second paragraph:

"The awarding of the contract(s) will be made by Vehicle Model/Type as listed in the proposal schedule(s) and be awarded to the lowest responsible bidder(s) whose proposal complies with all the requirements prescribed per item.

Within five (5) working days of official commencement date of the Notice to Proceed (NTP), the contractor shall submit to the Project Manager listed in the NTP, a copy of the order(s) placed with the factory for each item awarded. Within ten (1) working days after the factory order is submitted, the Contractor shall also provide a copy of the factory's acknowledgement and confirmation of receiving the order. Requests for extension of time will NOT be considered unless both these documents are furnished with the time limits specified."

D. 6.2 TRADE NAMES AND ALTERNATES is deleted.

SPECIFICATIONS

SECTION 1 - DEFINITION AND TERMS

Whenever the following pronouns are used in these specifications, or in any documents or instruments where these specifications govern, the intent and meaning shall be interpreted as follows:

1.1 ADDENDA - A written document which may be issued by the Director during the bidding period involving changes to the specifications and plans, if any, which shall be considered and made a part of the contract.

1.2 AIRPORTS DIVISION - Airports Division, Department of Transportation, State of Hawaii.

1.3 AWARD - The written acceptance of a proposal by the State.

1.4 BIDDER - Any individual, partnership, corporation or other legal entity, or combination thereof, submitting a proposal for the work contemplated, acting either directly or through a duly authorized representative.

1.5 CALENDAR DAY - Every day shown on the calendar. If no designation of calendar or working day is made, "day" shall mean calendar day.

1.6 CHANGE ORDER - A written order issued by the Director to the Contractor requiring the contract work to be performed in accordance with a change or changes that may involve an adjustment in contract time and price or requiring performance of any unforeseen work essential to complete the contract.

1.7 CONTRACT - The written agreement between the State and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment.

The contract includes the (1) notice to bidders, (2) proposal, (3) contract form and contract bond, (4) specifications, (5) special provisions and plans, if any, (6) addenda, (7) notice to proceed, and (8) change orders and agreements that are required to complete the work, all of which constitute one instrument.

1.8 CONTRACT BOND - The approved form of security, executed by the Contractor and its Surety or Sureties, guaranteeing the completion of the work in accordance with the terms of the contract, and guaranteeing full payment of all claims for labor, materials, and supplies used or incorporated in the work.

1.9 CONTRACT TIME - The number of working days or calendar days allowed for completion of the contract, including authorized time extensions.

If a calendar date is specified as the date of completion in lieu of the number of working days or calendar days, the contract shall be completed by that date.

In case the contract is for a specified period of time, the contract time shall be for said specified period of time.

1.10 CONTRACTOR - The individual, partnership, corporation or other legal entity, or combination thereof, contracting with the State for performance of the prescribed work.

1.11 DEPARTMENT - The State Department of Transportation.

1.12 DIRECTOR - The Director of Transportation, acting either directly or through the Director's duly authorized representative.

1.13 EQUAL OR APPROVED EQUAL - Whenever this term is used in the specifications and plans, if any, it means a brand or article pre-qualified in accordance with Section 6.2 Trade Names and Alternates and which may be used in place of the one specified.

1.14 H.A.R. or HAR - Hawaii Administrative Rules.

1.15 H.R.S. or HRS - Hawaii Revised Statutes.

1.16 HARBORS DIVISION - Harbors Division, Department of Transportation, State of Hawaii.

1.17 HIGHWAYS DIVISION - Highways Division, Department of Transportation, State of Hawaii.

1.18 HOLIDAYS - The days which are set apart and established as State holidays pursuant to Section 8-1, H.R.S.

1.19 INSPECTOR - The Director's authorized representative assigned to make detailed inspections of contract performance and materials supplied.

1.20 NOTICE TO BIDDERS - The public announcement, as required by law, inviting proposals for the work to be performed or materials to be furnished.

1.21 NOTICE OF FINAL ACCEPTANCE - Written notice from the Director to the Contractor that the entire contract has been completed in all respects in accordance with the specifications and plans, if any, and any changes thereof previously approved by the Director.

1.22 NOTICE TO PROCEED - Written notice from the Director to the Contractor advising the Contractor of the date on which he is to begin the prosecution of the work.

1.23 PLANS - The contract drawings approved by the Director which show the location, character, dimensions and details of the work to be done and shall be a part of the contract.

1.24 PROCUREMENT OFFICER - The Director's duly authorized representative including project managers, project engineers and contract administrators assigned to prepare, evaluate and administer contracts for the purchasing of goods and services.

1.25 PROPOSAL (OR BID) - The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

1.26 PROPOSAL FORM - The approved format prepared by the Department or a facsimile thereof on which bids for the work must be prepared and submitted. (Reasonable facsimile acceptable for bidding.)

1.27 PROPOSAL GUARANTY - The security furnished with a proposal to guarantee that the bidder will enter into the contract and furnish all other requirements if the bidder's proposal is accepted.

1.28 QUALIFICATION QUESTIONNAIRE - The specified forms on which the bidder shall furnish required information as to the bidder's ability to perform and finance the work.

1.29 S.L.H. or SLH - Session Laws of Hawaii.

1.30 SPECIAL PROVISIONS - Revisions to the specifications. The specific clauses setting forth conditions or requirements peculiar to the project under consideration which are not thoroughly or satisfactorily stipulated in these specifications.

1.31 SPECIFICATIONS - The directions, provisions, and requirements pertaining to the method and manner of performing the work and to the quantities and qualities of materials to be furnished under the contract.

1.32 STATE - The State of Hawaii.

1.33 SUBCONTRACTOR - An individual, partnership, corporation, other legal entity, or any combination thereof, that enters into an agreement with the Contractor to perform a portion of the work for the Contractor.

1.34 SUPERINTENDENT - The Contractor's representative who is responsible for and in charge of the work.

1.35 SURETY - The corporation, partnership or individual, other than the Contractor, executing a bond furnished by the Contractor and guaranteeing performance by the Contractor.

1.36 TITLES (OR HEADINGS) - The titles or headings of the Sections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation. Unless otherwise indicated, whenever the word "Section" is used, reference is being made to a Section in these specifications.

1.37 WORK - The furnishing of all labor, materials, equipment, and other incidentals necessary or convenient for the successful completion of the project and the execution of all the duties and obligations imposed by the contract.

1.38 WORKING DAY - Any day, except Saturdays, Sundays and State holidays.

SECTION 2 - PROPOSAL REQUIREMENTS AND CONDITIONS

2.1 PROPOSAL FORMS - All proposals shall be made on forms furnished by the Department. All proposals shall give the prices proposed in the spaces provided and shall be signed by the bidder, who shall fill out all blanks in the proposal form as therein required.

2.2 REJECTION OF PROPOSALS CONTAINING ALTERATIONS, ERASURES, OR IRREGULARITIES - Proposals may be rejected if they show any alterations of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.

When proposals are signed by any agent, other than the officer or officers of a corporation authorized to sign contract on its behalf or a member of copartnership, a Power of Attorney must be on file with the Department prior to opening bids or shall be submitted with the proposal; otherwise, the proposal may be rejected as irregular and unauthorized.

Members of a joint venture may be requested to supply the Department with a copy of their joint venture agreement or each member of the joint venture may be required to sign the proposal.

2.3 DELIVERY OF PROPOSALS - Each proposal shall be placed, together with the proposal guaranty, when required, in an envelope and sealed and so marked as to indicate the identity of the project, the name and address of the bidder, and other required information and then delivered as indicated in the Notice to Bidders. Proposals will be received up to the time fixed in the Notice to Bidders for the opening of bids.

2.4 WITHDRAWAL OF PROPOSALS - Any proposal may be withdrawn at any time prior to the time fixed in the Notice to Bidders for the opening of proposals upon the filing of a written request therefor with the Department, executed by the bidder or his duly authorized representative. The withdrawal of a proposal shall not preclude a bidder from submitting a new proposal.

2.5 PUBLIC OPENING OF PROPOSALS - Proposals will be opened and read publicly at the time and place indicated in the Notice to Bidders. Bidders or their authorized agents are invited to be present.

2.6 DISQUALIFICATION OF BIDDERS - Any of the following reasons may be considered as being sufficient grounds for the disqualification of a bidder and the rejection of his proposal or proposals.

A. More than one proposal for the same work from an individual, firm, or corporation under the same or different name.

B. Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the Department until such participant shall have been reinstated as a qualified bidder.

C. Evidence of assistance from a person who has been an employee of the agency within the preceding two years and who participated while in State office or employment in the matter with which the contract is directly concerned, pursuant to Section 84-15, HRS.

D. Lack of proposal guaranty.

E. Unsigned proposal or proposal not signed in ink by person or persons legally authorized to submit a proposal on behalf of the bidder.

2.7 MATERIAL GUARANTY - The bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the prosecution of the work, together with samples. Such samples may be subjected to tests to determine their quality and fitness for the work.

2.8 OUT-OF-STATE BIDDERS - Pursuant to Section 103D-1008, Hawaii Revised Statutes, on out-of-state purchases where the bidder or vendor is an out-of-state vendor, not doing business in the State, the bid price of such out-of-state vendor, for the purpose of determining the lowest price bid, shall be increased by the applicable retail rate of general excise tax and the applicable use tax. The lowest responsible bidder, taking into consideration the above increases, shall be awarded the contract, but the contract amount of any contract awarded shall be the amount of the bid offered and shall not include the amount of said increases.

Such increases will not be applied in case an out-of-state vendor specifies in its bid that its bid price includes said general excise tax; the bidder will be required to pay said general excise tax and use tax in case the bidder is awarded the contract.

2.9 TAX REQUIREMENTS - Work to be done under this contract is a taxable transaction and the bidder receiving the award for this work will be required to pay the State of Hawaii General Excise Tax (GET) and the State of Hawaii use Tax.

Additional information regarding the tax rates may be obtained from the Department of Taxation (DOTAX) website at http://tax.hawaii.gov/geninfo/countysurcharge/

If awardee is an out-of-state bidder not holding a Hawaii GET License, the awardee will have to obtain a Hawaii GET License and pay all taxes due to obtain a tax clearance required before final contract payment is made by the State.

To obtain the tax clearance applications, see subsection 3.1.A. Tax Clearance of these Specifications.

Vendors may apply for either a regular or a one-time GET License. Information on applying for a GET License may be found at http://tax.hawaii.gov/geninfo/get/

SECTION 3 - AWARD AND EXECUTION OF CONTRACT

3.1 AWARD OF CONTRACT - The State reserves the right to reject any and all proposals and to waive any defects as may be deemed to be in the best interest of the public.

The award of contract, if it be awarded, shall be made within sixty (60) calendar days after the opening of bids to the lowest responsive and responsible bidder whose proposal complies with all the prescribed requirements. The Department may request the bidders to allow the Department to consider the bids for the issuance of an award beyond the sixty (60) calendar day period. Agreement to such an extension shall be made by a bidder in writing. Only bidders who have agreed to such an extension shall be eligible for the award. No response to request shall mean bidder shall no longer be eligible for award.

Requirement for award. The Bidder, as proof of compliance with the requirements of section 103D-310(c), HRS, upon award of a contract made pursuant to section 103D-302, HRS, shall provide the documents listed below. The documents shall be submitted promptly to the Department. If a valid certificate/clearance is not submitted on a timely basis upon award, the Bidder may be deemed non-responsible.

A. Tax Clearance.

Pursuant to section 103D-310(c), 103-53 and 103D-328, HRS, the bidder shall submit a tax clearance certificate from the State of Hawaii Department of Taxation (DOTAX) and the Internal Revenue Service (IRS), subject to section 103D-328, HRS, current within six months of issuance date.

FORM A6, TAX CLEARANCE CERTIFICATE, is available at the following website:

https://tax.hawaii.gov/

To receive DOTAX Forms by fax or mail, phone (808)587-4242 or 1-800-222-3229.

The application for the Tax Clearance Certificate is the responsibility of the bidder. Bidder shall submit directly to the DOTAX or IRS. The approved certificate may then be submitted to the Department.

B. Certificate of Compliance.

Pursuant to section 103D-310(c), HRS, the bidder shall submit a certificate of compliance for Hawaii Employment Security Law (Chapter 383, HRS), Workers' Compensation Law (Chapter 386, HRS), Temporary Disability Insurance (Chapter 392, HRS), and Prepaid Health Care Act (Chapter 393, HRS), from the State of Hawaii Department of Labor and Industrial Relations (DLIR), current within six months of issuance date.

Form LIR#27, Application for Certificate of Compliance with section 3-122-112, HAR, is available at the following website:

https://labor.hawaii.gov/

Contact the DLIR Unemployment Insurance Division at (808) 586-8926 for additional information.

Inquiries regarding the status of a LIR#27 Form are available from the DLIR Disability Compensation Division at (808)586-9200.

The application for the Certificate of Compliance is the responsibility of the bidder. Bidder shall submit directly to the DLIR. The approved certificate may then be submitted to the Department.

C. Certificate of Good Standing.

Pursuant to section 103D-310(c), HRS, the bidder shall submit a certificate of good standing from the business registration division (BREG) of the State of Hawaii Department of Commerce and Consumer Affairs (DCCA), current within six months of issuance date, to demonstrate it is either:

(1) incorporated or organized under the laws of the State; or

(2) registered to do business in the State as a separate branch or

division that is capable of fully performing under the contract.

A Hawaii business that is a sole proprietorship, is not required to register with the BREG, and therefore not required to submit a certificate of good standing. Bidders are advised of costs associated with registering and obtaining a Certificate of Good Standing from the DCCA.

To purchase a Certificate of Good Standing, go to On-Line Services at the following website:

https://cca.hawaii.gov/

The application for the Certificate of Good Standing is the responsibility of the bidder. Bidder shall submit directly to the DCCA. The approved certificate may then be submitted to the Department.

D. IN LIEU OF the certificates referenced in subsection A, B, and C, bidder may make available proof of compliance through a state procurement office designated certification process.

3.2 CANCELLATION OF AWARD - The State reserves the right to cancel the award of any contract any time before the execution of said contract by all parties without any liability to the successful bidder or any other bidder.

3.3 EXECUTION OF CONTRACT - The contract shall be executed by the successful bidder and returned, together with the contract bonds, when required, within ten (10) days after the award of the contract or within such further time as the Director may allow after the bidder has received the contract for execution.

Pursuant to Section 103D-309, H.R.S., the contract shall not bind the State in any way unless said contract has been fully and properly executed by all the parties thereto and the Comptroller has endorsed thereon a certificate that there is available an unexpended appropriation over and above all outstanding contracts, sufficient to cover the amount required by the contract.

3.4 FAILURE TO EXECUTE CONTRACT - Failure to execute the contract and file acceptable bonds, when required, within

ten (10) days after the award of the contract, or within such further time as the Director may allow, shall be cause for the cancellation of the award and the forfeiture of the proposal guaranty. Award of the contract may then be made to the next lowest responsible bidder.

SECTION 4 - SCOPE OF WORK

4.1 WORK TO BE DONE - The work to be done is described in the Section(s) following Section 9 of these specifications.

4.2 PERFORMANCE OF WORK - The Contractor shall employ, so far as possible, such methods and means in carrying out his work so as not to cause any interruption, disturbance, or interference with the public.

In case the Contractor is performing work in a building, the Contractor shall conduct the work in such a manner so as not to cause any interruption, disturbance, or interference with the business activities of the tenants in the building.

4.3 EXTRA WORK - New and unforeseen items of work will be classed as extra work when they cannot be covered by any of the various items for which there is a bid price.

4.4 CHANGES AND CLAIMS FOR ADJUSTMENT

A. Change order. By a written order, at any time, and without notice to any surety, the procurement officer may, subject to all appropriate adjustments, make changes within the general scope of this contract in any one or more of the following:

1. Drawings, designs, or specifications, if the goods to be furnished are to be specially manufactured for the State in accordance therewith;
2. Method of shipment or packing;
3. Place of delivery;
4. Changes in the work within the scope of the contract; or
5. Changes in the time of performance of the contract that do not alter the scope of work.

B. Adjustments of price or time for performance. If any change order increases or decreases the contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed by the order, an adjustment shall be made and the contract modified in writing accordingly. Any adjustment in contract price made pursuant to this clause shall be determined in accordance with the price adjustment clause of this contract. Failure of the parties to agree to an adjustment shall not excuse the contractor from proceeding with the contract as changed, provided that the procurement officer promptly and duly make the provisional adjustments in payment or time for performance as may be reasonable. By proceeding with the work, the contractor shall not be deemed to have

prejudiced any claim for additional compensation, or an extension of time for completion.

C. Time period for claim. Within thirty (30) days after receipt of a written change order under subsection (a) unless the period is extended by the procurement officer in writing, the contractor shall file notice of intent to assert a claim for an adjustment. Later notification shall not bar the contractor's claim unless the State or county is prejudiced by the delay in notification.

D. Claim barred after final payment. No claim by the contractor for an adjustment hereunder shall be allowed if notice is not given prior to final payment under this contract.

E. Other claims not barred. In the absence of a change order, nothing in this clause shall be deemed to restrict the contractor's right to pursue a claim as under the contract or for breach of contract.

4.5 PRICE ADJUSTMENT

Any adjustment in contract price pursuant to a clause in this contract shall be made in one or more of the following ways:

A. By agreement on a fixed price adjustment before commencement of the pertinent performance or as soon thereafter as practicable;

B. By unit prices specified in the contract or subsequently agreed upon;

C. By the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as specified in the contract or subsequently agreed upon;

D. In such other manner as the parties may mutually agree; or

E. In the absence of agreement between the parties, by a unilateral determination by the procurement officer of the costs attributable to the event or situation covered by the clause, plus appropriate profit or fee, all as computed by the procurement officer in accordance with generally accepted accounting principles and applicable sections of chapters 3-123 and 3-126 of the Hawaii Administrative Rules.

4.6 VARIATION IN QUANTITY

Upon agreement of the parties, the quantity of goods or services or both specified in this contract may be increased by a maximum of ten (10) percent provided (1) the unit prices will remain the same except for any price adjustments otherwise applicable and (2) the procurement officer makes a written determination that such an increase will either be more economical than awarding another contract or that it would not be practical to award another contract.

SECTION 5 - CONTROL OF WORK

5.1 AUTHORITY OF DIRECTOR - The Director shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed, the manner of performance and rate of progress of the work, and compensation for work performed, interpretation of the contract and fulfillment of the contract on the part of the Contractor. The Director shall have authority to enforce and make effective such decisions and orders which the Contractor fails to carry out properly and diligently. The decision of the Director shall be final.

5.2 COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS - These specifications, plans, special provisions, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work.

5.3 CLAIMS AND DISPUTES - The Contractor may give notice in writing to the procurement officer for claims that extra compensation, damages, or an extension of time for completion is due the Contractor for one or more of the following reasons:

A. Requirements not clearly covered in the contract, or not ordered by the procurement officer as an extra work;

B. Failure between the State and the Contractor to agree to an adjustment in price for a contract change order issued by the State; or

C. An action or omission on the part of the procurement officer requiring performance changes within the scope of the contract.

The Contractor shall continue with performance of the contract in compliance with the directions or orders of the procurement officer, but by so doing, the Contractor shall not be deemed to have prejudiced any claim for additional compensation, damages, or an extension of time for completion; provided:

A. The notice in writing be given:

1. Before the commencement of the work involved, if at that time the Contractor knows of such requirements or the occurrence of such actions or omissions; or

2. Within thirty (30) calendar days after the

Contractor knows of such requirements or the occurrence of such action or omission if the Contractor did not have such knowledge before the commencement of the work; or

3. Within thirty (30) calendar days after receipt of the written contract change order that was not agreed upon by both parties; or

4. Within such further time as may be allowed by the procurement officer in writing.

B. The notice shall clearly state the Contractor's intention to make claim and the reasons why the Contractor believes that additional compensation, changes or an extension of time may be remedies to which the Contractor is entitled; and afford the procurement officer every facility for keeping records of the actual cost of work. Failure on the part of the Contractor to give such notification or to afford the procurement officer proper facilities for keeping strict account of actual cost shall constitute waiver of the claim for such extra compensation. The filing of such notice by the Contractor and the keeping of costs by the procurement officer shall not in any way be construed to prove the validity of the claim.

The procurement officer will review the notice and render a decision. The procurement officer's decision shall be final and conclusive unless, within thirty (30) calendar days from the date of the decision, the Contractor mails or otherwise furnishes a written appeal to the Director. The decision of the Director shall be final. Later notification of such claims shall not bar the Contractor's claim unless the State is prejudiced by the delay in notification. No claim by the Contractor for an adjustment hereunder shall be allowed if notice is not given before final payment under this contract. Any adjustment in the contract price made pursuant to this clause shall be determined according to Section 4.5 - Price Adjustment.

The provisions of this Section shall not be construed as establishing any claims contrary to the terms of Section 4.4 - Changes and Claims for Adjustment.

Nothing herein contained, however, shall excuse the Contractor from compliance with any rules of law precluding any state officers and any Contractors from acting in collusion or bad faith in issuing or performing contract change orders which are clearly not within the scope of the contract.

SECTION 6 - CONTROL OF MATERIAL AND EQUIPMENT

6.1 DEFECTIVE MATERIALS - All materials not conforming to the requirements of these specifications or the special provisions shall be considered defective and all such materials, whether in place or not, shall be rejected. They shall be removed immediately from the site of the work, unless otherwise permitted by the Director. No rejected materials, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the Director. Upon failure on the part of the Contractor to comply promptly with any order to remove and replace defective materials, the Director may remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

6.2 TRADE NAMES AND ALTERNATES - For convenience in designation on the plans or in the specifications, certain equipment or articles or materials may be designated under a trade name or the name of a manufacturer and its information catalogue. The use of alternate equipment or an article or material which is of equal quality and of the required characteristics for the purposes intended will be permitted, subject to the written approval of the Director, in accordance with the following requirements:

A. QUALIFICATION BEFORE BID OPENING - When the specifications and/or plans specify one or more manufacturer's brand names of materials or equipment to indicate a quality, style, appearance, or performance, the bidder will be assumed to have based its bid on one of the specified named products, except where such proprietary product are specified, alternate brands may be qualified if found equal or better by the Director. Bidders requesting qualification of alternate proprietary products must submit a request to the Director for review and approval at the earliest date possible, but in any event, such request must be received at the Contracts office not later than ten (10) days before the bid opening date, not including the bid opening date.

It shall be the responsibility of the bidder to submit sufficient evidence based upon which a determination can be made by the Director that the alternate brand is qualified. The evidence shall be transmitted with a covering letter which shall list the evidence submitted and the items for which the substitution is requested.

If the evidence accompanying a request for substitution is insufficient to qualify a particular

model, the request shall be denied provided that further evidence may be submitted to qualify the item five (5) days prior to the bid opening date if the initial request was made prior to the deadline set above.

B. SUBSTITUTION AFTER BID OPENING - Substitution of material or equipment will not be allowed after the bid opening date except under the following unforeseen circumstances:

1. If a specified or pre qualified item is delayed by a lengthy strike in the factory or other unforeseeable contingency beyond the control of the Contractor which would cause an abnormal delay in the project completion.

2. If a specified or pre qualified item is found to be unusable due to change or other circumstances.

3. If the Contractor is willing to provide a more recently developed or manufactured item of material or equipment of the same manufacturer which the Director determines to be equal or better than the one specified or pre-qualified.

A substitution request, regardless of reason, shall be fully explained in writing by the Contractor and shall include its justification for said request, the quantities and unit prices involved, quotations and such other documents as are deemed necessary to support the request. Any savings in cost will accrue to the State and any additional cost for the substituted items will be paid by the Contractor.

The burden of proof as to the comparative quality and suitability of alternate equipment, articles, or materials shall be upon the bidder or Contractor and bidder or Contractor shall furnish, at its own expense, all information necessary or related thereto as required by the Director. The Director shall be the sole judge as to the comparative quality and suitability of alternate equipment, articles or materials and the Director's decisions shall be final.

The above shall not be construed to mean that substitution for brand name specified materials and equipment will be allowed; the Director reserves the right to deny any request he deems irregular or not in the best interest of the State.

6.3 ASSIGNMENT OF ANTITRUST CLAIMS FOR OVERCHARGES FOR GOODS AND MATERIALS PURCHASED

A. Vendor and purchaser recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, vendor hereby assigns to purchaser any and all claims for such overcharges as to goods and materials purchased in connection with this order or contract, except as to overcharges which result from antitrust violations commencing after the price is established under this order or contract and which are not passed on to the purchaser under an escalation clause.

B. Contractor and owner recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the owner. Therefore, contractor hereby assigns to owner any and all claims for such overcharges as to goods and materials purchased in connection with this order or contract, except as to overcharges which result from antitrust violations commencing after the price is established under this order or contract and any change order. In addition, contractor warrants and represents that each of its first tier suppliers and subcontractors shall assign any and all such claims to owner, subject to the aforementioned exception.

SECTION 7 - LEGAL RELATIONS AND RESPONSIBILITY

7.1 LAWS TO BE OBSERVED - The Contractor shall comply with all federal, state, city and county laws, ordinances, rules and regulations which in any manner affect those engaged or employed in the work, the materials used in the work, and the conduct of the work. Any reference to such laws, ordinances, rules and regulations shall include any amendments thereto effective as of the date of the call for sealed proposals.

The Contractor shall hold harmless, indemnify, defend and where appropriate, insure the State, its officers, agents and employees against any claim or liability arising from or based on the violation of any such laws, ordinances, rules or regulations. If any discrepancy or inconsistency is discovered in the contract for the work in relation to any law, ordinance, rule, regulation, order or decree, the Contractor shall forthwith report the same to the Director in writing.

7.2 PERMITS AND LICENSES - The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work.

7.3 PATENTS - The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and shall hold harmless, indemnify, defend and where appropriate, insure the State, its officers, agents and employees from all suits at law or actions of every nature, for or on account of the use of any patented materials, equipment, devices or processes.

7.4 RESPONSIBILITY FOR INJURY AND DAMAGE - The State, its officers, agents and employees shall not be held accountable in any manner for any loss or damage to the work or any part thereof, or for any of the materials and equipment used or employed in performing the work, or for any injury to any person or persons either workers or the public, or for any damage to property caused by the Contractor or its workers or any one employed by the Contractor. The Contractor shall be responsible for any liability imposed by law for any injury to any person or any damage to property resulting from defects or obstructions or from any cause whatsoever during the progress of the work or at any time before its completion and final acceptance. The acceptance of the completed work of the Contractor by the Director shall not relieve the Contractor from any liability which may have accrued or may accrue as a result of the performance of the work by the Contractor. The Contractor shall hold harmless, indemnify, defend and where appropriate, insure the State, its officers, agents and employees, from all suits or actions of every name, kind and description, brought for or on account of

any injuries or damages sustained by any persons or property caused by the Contractor, its servants or agents, or by or on account of any act or omission of the Contractor or its servants or agents, regardless of whether such actions or any claim is brought against them or any one of them before or after the final acceptance of the work. In addition to any remedy authorized by law, the State may withhold payment of any money due to Contractor as shall be reasonable until disposition has been made of any suits or claims for injuries or damages.

It is not the intention of the parties to this contract to make the public or any member thereof a third party beneficiary hereunder, or to authorize anyone not a party hereto to maintain a suit for personal injuries or property damage based on a contract theory of liability. In any event, the Contractor shall hold harmless, indemnify, defend and where appropriate, insure the State from suits and claims for personal injuries or property damage where such injuries or damage are caused by the negligent acts or omissions of the Contractor, its agents or employees.

7.5 COOPERATION BETWEEN CONTRACTORS - Where two or more Contractors are employed on related or adjacent work, each shall conduct its operations in such a manner as not to cause any unnecessary delay or hindrance to the other.

7.6 CONTRACTOR'S RESPONSIBILITY FOR WORK - Until the acceptance of the contract, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all damages to any portion of the work occasioned by any of the above causes before its completion and acceptance and shall bear the expenses thereof.

7.7 NO PERSONAL LIABILITY - Neither the Director nor any other officer or authorized employee of the Department shall be personally responsible for any liability arising under the contract.

7.8 INSURANCE - Prior to commencing with the work, the Contractor shall, at its own expense, obtain and submit to the Department, Certificate of Insurance from an insurance company authorized by the laws of the State to issue such insurance in the State of Hawaii showing full policy coverage of the Contractor.

TYPES OF INSURANCE:

A. Workers' Compensation:

The Contractor shall obtain worker's compensation insurance for all persons whom they employ in carrying out the work under this contract. This insurance shall be in strict conformity with the requirements of the most current and applicable State of Hawaii Worker's Compensation Insurance laws in effect on the date of the execution of this contract and as modified during the duration of the contract. The minimum limit of liability for workers compensation is the HRS 386 statutory limit.

B. Comprehensive Automobile Liability:

The Contractor shall obtain Auto Liability Insurance covering all owned, non-owned and hired autos with a combined single Limit of not less than $1,000,000 per accident for bodily injury and property damage with the State of Hawaii named as additional insured. The required limit of insurance may be provided by a single policy or with a combination of primary and excess policies.

C. Commercial General Liability:

The Contractor shall obtain General Liability insurance with a limit of not less than $1,000,000 per occurrence and in the aggregates. The General liability insurance shall include the State of Hawaii as an additional insured. The required limit of insurance may be provided by a single policy or with a combination of primary and excess policies.

All policies must provide that 30 days prior written notice of cancellation or material change in coverage be given to certificate holders stated above.

Such insurance when accepted by the Director in writing shall become applicable and shall remain unmodified throughout the entire term of the contract and in no event shall be terminated or otherwise allowed to lapse prior to written certification of final acceptance of the work by the State. Such insurance aforementioned shall cover the State for all work performed under the contract, all work performed incidental thereto or directly or indirectly connected therewith, including other work performed outside of the work area, and all change orders.

Any delay in the submission and approval of insurance certificates shall not be justification of or grounds for a request by the Contractor postponing the issuance of a notice to proceed notwithstanding the fact that the Contractor shall not be allowed to proceed with the work until said certificates are submitted and approved.

Failure to obtain insurance in accordance with the Section, on the part of the Contractor, shall be considered a major breach of the contract; and should the State be forced to expend funds which would have been covered under the insurance, the Contractor agrees to assume the liability for such funds and to indemnify and hold the State harmless.

SECTION 8 - PROSECUTION AND PROGRESS

8.1 PROGRESS OF WORK - The Contractor shall diligently prosecute the work to completion within the time limit specified in the proposal. The Contractor shall give its personal attention to the fulfillment of the contract and shall keep the work under its control. Work shall commence on the date indicated in the "Notice to Proceed" letter from the State.

8.2 LIQUIDATED DAMAGES - Time is of the essence in this contract and in case the Contractor fails to complete the work within the time specified in the proposal, damages will be sustained by the State. Since the amount of damages is difficult and not possible of definite ascertainment and proof, the amount of such damages are fixed in advance at the sum shown in the proposal for each and every calendar (or working) day which the Contractor has delayed in the completion of this contract; and the Contractor shall pay such amount as liquidated damages, and not by way of penalty, and in case the same are not paid, the State may deduct such amount thereof from any monies due or that may become due the Contractor under this contract.

If the Contractor finds it impossible for reasons beyond its control to complete the work within the contract time as specified, the Contractor shall, within 10 days from the first day of notification from the manufacturer or supplier of any delay and prior to the expiration of the contract time, make a written request to the Director for an extension of time setting forth therein the reasons which the Contractor believes will justify the granting of its request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Director finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, the Director may extend the time for completion in such extension as the conditions justify. The extended time for completion shall then be in full force and effect the same as though it were the original time for completion.

8.3 TEMPORARY SUSPENSION OF WORK

A. Order to stop work. The Director, may, by written order to the contractor, at any time, and without notice to any surety, require the contractor to stop all or any part of the work called for by this contract. This order shall be for a specified period not exceeding sixty (60) days after the order is delivered to the contractor, unless the parties agree to any further period. Any such order shall be identified specifically as a stop work order issued pursuant to this section. Upon receipt of such an order, the contractor shall forthwith comply with its terms and take all reasonable steps to minimize the occurrence of costs allocable to

the work covered by the order during the period of work stoppage. Before the stop work order expires, or within any further period to which the parties shall have agreed, the Director shall either:

1. Cancel the stop work order; or

2. Terminate the work covered by such order as provided in the "termination for default clause" or the "termination for convenience clause" of this contract.

B. Cancellation or expiration of the order. If a stop work order issued under this section is canceled or if the period of the order or any extension thereof expires, the contractor shall have the right to resume work. An appropriate adjustment shall be made in the delivery schedule or contract price, or both, and the contract shall be modified in writing accordingly; if:

1. The stop work order results in an increase in the time required for, or in the contractor's cost properly allocable to, the performance of any part of this contract; and

2. The contractor asserts a claim for such an adjustment within thirty (30) days after the end of the period of work stoppage; provided that, if the Director decides that the facts justify such action, any such claim asserted may be received and acted upon at any time prior to final payment under this contract.

C. Termination of stopped work. If a stop work order is not canceled and the work covered by such order is terminated for default or convenience, the reasonable costs resulting from the stop work order shall be allowable by adjustment or otherwise.

D. Adjustment of price. Any adjustment in contract price made pursuant to this clause shall be determined in accordance with the price adjustment clause of this contract.

8.4 DEFAULT AND TERMINATION OF CONTRACT

A. Termination by Default. If the contractor refuses or fails to perform any of the provisions of this contract with such diligence as will ensure its completion within the time specified in this contract, or any extension thereof, otherwise fails to timely satisfy the contract provisions, or commits any other substantial breach of this contract, the Director may notify the contractor in writing of the delay or non-performance and if not cured in ten (10) days or any

longer time specified in writing by the Director, such officer may terminate the contractor's right to proceed with the contract or such part of the contract as to which there has been delay or a failure to properly perform. In the event of termination in whole or in part the Director may procure similar goods or services in the manner and upon terms deemed appropriate by the Director. The contractor shall continue performance of the contract to the extent it is not terminated and shall be liable for excess costs incurred in procuring similar goods or services.

1. Contractor's duties. Notwithstanding termination of the contract and subject to any directions from the Director, the contractor shall take timely, reasonable, and necessary action to protect and preserve property in the possession of the contractor in which the State or county has an interest.

2. Compensation. Payment for completed goods delivered and accepted by the State shall be at the contract price. Payment for the protection and preservation of property shall be in an amount agreed upon by the contractor and Director; if the parties fail to agree, the Director shall set an amount subject to the contractor's rights under chapter 3-126, HAR. The State may withhold from amounts due the contractor such sums as the Director deems to be necessary to protect the State against loss because of outstanding liens or claims of former lien holders and to reimburse the State for the excess costs incurred in procuring similar goods and services.

3. Excuse for nonperformance or delayed performance. Except with respect to defaults of subcontractors, the contractor shall not be in default by reason of any failure in performance of this contract in accordance with its terms, including any failure by the contractor to make progress in the prosecution of the work hereunder which endangers such performance, if the contractor has notified the Director within fifteen (15) days after the cause of the delay and the failure arises out of causes such as: acts of God; acts of the public enemy; acts of the State and any other governmental body in its sovereign or contractual capacity; fires; floods; epidemics; quarantine restrictions; strikes or other labor disputes; freight embargoes; or unusually severe weather. If the failure to perform is caused by the failure of a subcontractor to perform or to make progress, and if such failure arises out of causes similar to those set forth above, the contractor shall not be

deemed to be in default, unless the goods or services to be furnished by the subcontractor were unreasonably obtained from other sources in sufficient time to permit the contractor to meet the contract requirements. Upon request of the contractor, the Director shall ascertain the facts and extent of such failure, and if such officer determines that any failure to perform was occasioned by any one or more of the excusable causes, and that, but for the excusable cause, the contractor's progress and performance would have met the terms of the contract, the delivery schedule shall be revised accordingly, subject to the rights of the State under the clause entitled "Termination for Convenience". As used in this paragraph of this clause, the term "subcontractor" means subcontractor at any tier.

4. Erroneous termination for default. If, after notice of termination of the contractor's right to proceed under the provisions of this clause, it is determined for any reason that the contractor was not in default under the provisions of the clause, or that the delay was excusable under the provisions of paragraph (3), Excuse for nonperformance or delayed performance of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the State, be the same as if the notice of termination had been issued pursuant to such clause.

5. Additional rights and remedies. The rights and remedies provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

B. Termination for convenience. The Director may, when the interests of the State so require, terminate this contract in whole or in part, for the convenience of the State. The Director shall give written notice of the termination to the contractor specifying the part of the contract terminated and when termination becomes effective.

1. Contractor's obligation. The contractor shall incur no further obligations in connection with the terminated work and on the dates set in the notice of termination the contractor will stop work to the extent specified. The contractor shall also terminate outstanding orders and subcontracts as they relate to the terminated work. The contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders connected with the terminated work. The Director

may direct the contractor to assign the contractor's right, title, and interest under terminated orders or subcontracts to the State. The contractor must still complete the work not terminated by the notice of termination and may incur obligations as are necessary to do so.

2. Right to goods. The Director may require the contractor to transfer title and deliver to the State in the manner and to the extent directed by the procurement officer:

a. Any completed goods; and

b. The partially completed goods and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights hereinafter called "manufacturing material," as the contractor has specifically produced or specially acquired for the performance of the terminated part of this contract.

The contractor shall, upon direction of the Director, protect and preserve property in the possession of the contractor in which the State has an interest. If the Director does not exercise this right, the contractor shall use the contractor's best efforts to sell such goods and manufacturing materials. Use of this section in no way implies that the State has breached the contract by exercise of the termination for convenience clause.

3. Compensation:

a. The contractor shall submit a termination claim specifying the amounts due because of the termination for convenience together with cost or pricing data to the extent required by subchapter 15, chapter 3-122, HAR, bearing on such claim. If the contractor fails to file a termination claim within one (1) year from the effective date of termination, the Director may pay the contractor, if at all, an amount set in accordance with subparagraph c. below.

b. The Director and the contractor may agree to settlement provided the contractor has filed a termination claim supported by cost or pricing data to the extent required by subchapter 15, chapter 3-122, HAR, and that the settlement does not exceed the total contract price plus settlement costs reduced by payments previously made by the State, the

proceeds of any sales of goods and manufacturing materials under paragraph (2) of this clause, and the contract price of the work not terminated.

c. Absent complete agreement under subparagraph b above, the Director shall pay the contractor the following amounts, provided payments agreed to under subparagraph b. shall not duplicate payments under this subparagraph for the following:

(i) Contract prices for goods or services accepted under the contract;

(ii) Costs incurred in preparing to perform and performing the terminated portion of the work plus a fair and reasonable profit on such portion of the work, such profit shall not include anticipatory profit or consequential damages, less amounts paid or to be paid for accepted goods or services; provided that if it appears that the contractor would have sustained a loss if the entire contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss;

(iii) Costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to paragraph (1) of this clause. These costs must not include costs paid in accordance with subparagraph (ii) above.

(iv) The reasonable settlement costs of the contractor including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to the terminated portion of this contract. The total sum to be paid the contractor under this subparagraph shall not exceed the total contract price plus the reasonable settlement cost of the contractor reduced by the amount of

payments otherwise made, the proceeds of any sales of supplies and manufacturing materials under subparagraph b. of this paragraph, and the contract price of work not terminated.

d. Cost claimed, agreed to, or established under subparagraphs b. and c. shall be in accordance with chapter 3-123, H.A.R. bearing on such claim.

8.5 TERMINATION OF CONTRACTOR'S RESPONSIBILITY - The contract will be considered complete when all work has been completed, the work accepted by the Director, and the final estimate paid. The Contractor will then be released from further obligation except as set forth in the contract and bond, when applicable.

SECTION 9 - PAYMENT

9.1 PAYMENT - The Contractor's bid price shall be inclusive of all costs, direct or indirect, including all taxes, required for the fulfillment of this contract.

Contract payments to the Contractor by the State shall be full payment, for furnishing all labor, and for furnishing and delivering all equipment, materials, supplies and other incidentals to the location(s) designated in these specifications.

9.2 PROGRESS PAYMENTS - If more than one shipment is required under these specifications, progress payments may be made to the Contractor after each shipment, provided the equipment materials, supplies, etc., furnished and delivered have satisfactorily met the requirements of these specifications. Five per cent (5%) of the amount of each progress payment shall be retained by the Department until the final acceptance of the work.

To expedite processing of all payments, for item(s) furnished and delivered to the Department, the Contractor shall forward an original and one copy of invoice with each shipment made to the recipient office.

Each invoice shall contain the following:

A. Vendor's name, address and phone number.

B. Contract or Purchase Order No.

C. Description of item, the quantity, unit or lump sum price, sub-total and total.

9.3 FINAL ACCEPTANCE AND FINAL PAYMENT - Final acceptance means the acceptance in writing by the Director of the satisfactory completion of the work as provided under Section 8.5 followed by final payment in accordance with the Director's final estimate. The Department shall make final acceptance and payment promptly after the contract has been satisfactorily completed and final inspection made.

No payment will be made for any work which was not authorized by the Director in writing.

Final payment shall be made only after the issuance of the notice of final acceptance and after the Contractor has filed with the Director the following:

A. Consent of the Contractor's surety, when applicable, of the final payment;

B. Satisfactory evidence by affidavit that all debts resulting from the contract have been fully paid or satisfactorily secured;

C. A current "Certificate of Vendor Compliance" issued by the Hawaii Compliance Express (HCE). The Certificate of Vendor Compliance is used to certify the Contractor's compliance with (a) Section 103D-328, HRS (for all contracts $25,000 or more) which requires a current tax clearance certificate issued by the Hawaii State Department of Taxation and the Internal Revenue Service; (b) Chapters 383, 386, 392, and 393, HRS; and (c) Subsection 103D-310(c), HRS. The State reserves the right to verify that compliance is current prior to the issuance of final payment. Contractors are advised that non-compliance status will result in final payment being withheld until compliance is attained.

The filing of willfully false affidavits will disqualify the Contractor from bidding on future work of the Department.

SECTION 10 – GENERAL SPECIFICATIONS

10.1 GENERAL DESCRIPTION – The work to be performed by the Contractor under this Section 10 shall be the furnishing and delivery of ONE (1) PIERCE MULTI-PURPOSE STRUCTURAL PUMP VEHICLE to the Kahului Airport, Island of Maui and ONE (1) PIERCE MULTI-PURPOSE STRUCTURAL PUMP VEHICLE to the Daniel K. Inouye International Airport, Island of Oahu. This is restrictive specifications, and no substitution or equal are allowed. The term "vehicle" shall refer to the aircraft rescue firefighting truck in all parts of the general and detailed specifications listed herein.

10.2 GENERAL SPECIFICATIONS – In addition to Detailed Vehicle Specifications listed in Section 11, the following requirements shall form a part of the Specifications:

A. Quality of Equipment.

1. All equipment offered shall meet NFPA, ANSI, EPA, Underwriters Laboratory, OSHA safety requirements, and any other Federal and State safety requirements. If applicable and when requested, equipment shall bear a label or written documentation indicating approval of safety requirements from a bona fide testing laboratory.

2. All vehicles and equipment furnished under these provisions and specifications shall be new and of the best quality of its respective kind; and shall be completely assembled and free of defects which may render them unfit for use.

3. Vehicle and Equipment offered shall include any other standard features not listed herein but detailed in manufacturer's brochures or specifications literature and deemed necessary for the proper and safe operation of equipment.

4. No payment, whether partial or final, shall be construed to be an acceptance of defective equipment.

5. The State may, at any time by written order, stop delivery of equipment not conforming to these specifications. Such stop order shall not relieve the Contractor of his/her obligation to complete his/her contract time limits, nor shall it in any

way terminate, cancel or abrogate the contract or any part thereof.

B. Submittals. Upon delivery, Contractor shall provide the following:

1. Two (2) copies each of owner-operator manual and one (1) copy each of service and parts manual.

2. Manufacturer's recommended maintenance schedule.

3. List of factory-trained and authorized vendors and personnel able to provide service support.

4. List of identifying items and systems which require factory authorized vendors and/or personnel to install and maintain; and also stock all necessary parts for same.

C. Delivery.

1. Vehicle and Equipment furnished under these specifications shall be delivered within 1,095 calendar days from date of Notice to Proceed from the Department of Transportation at the following location:

Address	Airports Fire Chief
Kahului Airport 1 Keolani Place Kahului, Hawaii 96732	Martinez Jacobs (808) 834-5351
Daniel K. Inouye International Airport 300 Rodgers Boulevard Honolulu, Hawaii 96819	Martinez Jacobs (808) 834-5351

2. Representatives of both the Contractor and the State shall be present at the delivery site for purposes of visual inspection and, if necessary, for instructions in the use of equipment.

3. Prior to delivery, Contractor must contact the State representative at the location indicated to coordinate delivery arrangements.

D. Delivery Extension.

1. Contractor shall complete delivery within the time allowed in the contract.

2. Contractor shall not be responsible for delay due to reasons beyond his control, provided that as soon as a delay is identified, he notifies the Director of Transportation for such delay and the reasons for such delays and requests an extension delivery time.

3. REQUESTS FOR EXTENSIONS WILL NOT BE CONSIDERED WITHOUT A COPY OF THE FACTORY ORDER AND A COPY OF THE FACTORY CONFIRMATION OF ORDER WITHOUT DOCUMENTS SUBSTANTIATING THAT THE CAUSE(S) FOR DELAY IS, IN FACT, BEYOND THE CONTROL OF THE CONTRACTOR. The State shall be the sole judge whether such delay is truly beyond the control of the Contractor and whether an extension will be granted.

E. Certificates Required. Certificates listed below shall be provided by the Contractor (if applicable) at the time of delivery of the equipment. The following certificates are essential for the proper registration and licensing of new vehicles:

1. City and County of Honolulu, Department of Customer Services, Division of Motor Vehicle, Licensing & Permits "Application for Registration of Passenger Carrying Motor Vehicle" card CS-L (MVR)1 (REV. 9/15, DD) or its latest revision.

2. Hawaii Safety Inspection Certificate (in duplicate) and decal.

3. Odometer Certificate for passenger cars (and certain other vehicles as required by the Division of Motor Vehicle and Licensing).

4. Notarized Certificate of Bill of Sale (not required for Oahu dealership).

5. Certificate of Weight and Measures (required if factory-furnished vehicle weight is unavailable, e.g., vehicles with post-factory modifications or alterations). Certificate must include make, model

number, year, and vehicle identification number. Verified weight in pounds must be officially machine-stamped; handwritten weight will not be acceptable.

6. The Contractor shall submit the Application for Registration to the City and County, Division of Motor Vehicle, Licensing & Permits. Upon receipt of license plates, Contractor shall install the license plates on each vehicle to be delivered. The Contractor shall be responsible to cover all costs for registering and licensing of vehicles in the county of delivery.

7. Acceptance of and payment for new vehicles will not be made without submittal of necessary certificates. The State shall be responsible for registering and licensing of vehicles; this procedure shall be conducted in the City and County of Honolulu. Contractor shall provide temporary license plates to be used during the interim period prior to securing of State of Hawaii license plates.

F. Warranty.

1. Local warranty service for all components must be made available on the Island of Oahu for Daniel K. Inouye International Airport and Island of Maui for Kahului Airport.

2. Warranty period shall begin from the date equipment is accepted by the State at the manufacturer's facility.

3. Warranty period shall begin from the date equipment is accepted and placed in service.

4. Warranty and documents shall be delivered with equipment and shall detail manufacturer’s obligation and warranty procedures to include any accessory equipment.

5. Contractor shall replace or repair defective material and/or workmanship at no cost to the State for parts and labor during the warranty period, such defects are not due to abuse or negligence on the part of the State.

G. Invoicing.

1. Contractor shall submit original and three (3) copies of the invoice to the delivery address.

2. Invoice should reference the contract number.

SECTION 11 – TECHNICAL SPECIFICATIONS AND REQUIREMENTS

11.1 **SCOPE OF WORK** – The work consists of furnishing and delivering of one (1) Pierce Multi-Purpose Structural Fire Fighting Vehicle to the Kahului Airport, Island of Maui and one (1) Pierce Multi-Purpose Structural Fire Fighting Vehicle to Daniel K. Inouye International Airport, Island of Oahu. This is restrictive specifications and no substitution or equal are allowed.

11.2 The Contractor shall present the equipment complete, ready to use and fully operational.

11.3 The Multi-Purpose Structural Fire Fighting vehicle specifications shall include, but not limited to, the following:

GENERAL DESIGN AND CONSTRUCTION

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

QUALITY AND WORKMANSHIP

All steel welding shall follow American Welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding shall follow American Welding society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding shall follow American welding Society B2.1-2000 requirements for structural welding of sheet metal. Flux core arc welding shall use alloy rods, type 7000 and perform to American Welding Society standards A5.20-E70T1.

Work shall be performed by welders that are tested and certified to meet the American welding Society codes and inspected by an American Welding Society certified welding inspector in plant during working hours to monitor weld quality.

DELIVERY

The apparatus shall be delivered under its own power to ensure proper break-in of all components while the apparatus is still under warranty. A qualified delivery representative shall deliver the apparatus and remain for a sufficient length of time to instruct

personnel in proper operation, care and maintenance of the equipment delivered. The manufacturer shall retain ownership, provide insurance, and obtain temporary registration and other documents needed to legally drive the trucks from the factory to the shipping docks on the west coast. HDOT shall not accept the trucks until they are in Hawaii.

MANUAL AND SERVICE INFORMATION

At time of delivery, complete operation and maintenance manuals covering the apparatus shall be provided. A permanent plate shall 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.

PERFORMANCE TESTS

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

NFPA 2024 STANDARDS

Vehicles shall comply with the NFPA standards effective January 1, 2024, except for fire department directed exceptions. These exceptions shall be set forth in the Statement of Exceptions.

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

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and designated access paths to destination points shall be identified on the customer approval print and are shown as approximate. Actual location(s) shall 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 shall require the operation of devices and equipment such as the aerial device or ladder rack.

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

The manufacturer shall have programs in place for training, proficiency testing and performance for any staff involved with certifications.

An official of the company shall designate, in writing, who is qualified to witness and certify test results.

NFPA COMPLIANCY

Apparatus proposed by the bidder shall 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 shall be indicated in the proposal as "non-NFPA".

PUMP TEST

Underwriters Laboratory (UL) shall test, approved, and certify the pump. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the pump manufacturer's record of pump construction details shall be forwarded to the Fire Department.

GENERATOR TEST

If the unit has a generator, Underwriters Laboratory (UL) shall test, approved, and certify the generator. The test results shall be provided to the Fire Department at the time of delivery.

BREATHING AIR TEST

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

VEHICLE INSPECTION PROGRAM CERTIFICATION

To assure the vehicle is built to current NFPA 1900 standards, the apparatus, in its entirety, shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition. The certification includes: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus.

A placard shall 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.

INSPECTION TRIP(S)

The bidder shall provide two (2) factory inspection trip(s) for (3) three ARFF personnel customer representatives for each truck, if timelines for the manufacturing of the trucks are different. Pre-Construction and Final Acceptance. customer representative(s). The inspection trip(s) shall be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals shall be the responsibility of the bidder.

APPROVAL DRAWING

A drawing of the proposed apparatus shall be prepared and provided to the purchaser for approval before construction begins. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

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

ELECTRICAL WIRING DIAGRAMS

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

CHASSIS

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

WHEELBASE

The wheelbase of the vehicle shall be 195.00.

GVW RATING

The gross vehicle weight rating shall be 46,500.

FRAME

The chassis frame shall 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 shall 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 shall 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 shall be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

FRAME REINFORCEMENT

In addition, a mainframe internal liner shall be provided. The liner shall be an internal "C" design that steps to an internal "L" design over the rear axle. It shall be heat-treated steel measuring 12.50" x 3.00" x 0.25" through the front portion of the liner, stepping to 9.38" x 3.00" x 0.25" through the rear portion of the liner. Each liner shall have a section modulus of 13.58 cubic inches, yield strength of 110,000 psi, and rbm of 1,494,042 in-lb. Total rbm at wheelbase center shall be 4,391,869 in-lb.

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

FRONT NON DRIVE AXLE

The Oshkosh TAK-4® front axle shall be of the independent suspension design with a ground rating of 22,800 lb. Upper and lower control arms shall be used on each side of the axle. Upper control arm castings shall be made of 100,000-psi yield strength 8630 steel and the lower control arm casting shall be made of 55,000-psi yield ductile iron.

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

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

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

The upper control arm shall 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.

Camber at load shall be zero degrees for optimum tire life.

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

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

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

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

The axle shall have a turning angle of up to 45 degrees.

FRONT SUSPENSION

Front Oshkosh TAK-4™ independent suspension shall be provided with a minimum ground rating of 22,800 lb.

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

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

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

The torsion bar anchor lock system shall allow for simple lean adjustments, without the use of shims.

FRONT SHOCK ABSORBERS

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

FRONT OIL SEALS

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

FRONT TIRES

Front tires shall be Goodyear 425/65R22.50 radials, 20 ply Armor Max MSA, rated for 22,800 lb maximum axle load and 68 mph maximum speed.

The tires shall be mounted on Alcoa 22.50" x 12.25" polished aluminum disc type wheels with a ten (10) stud, 11.25" bolt circle.

REAR AXLE

The rear axle shall be a Meritor™, Model RS-30-185, with a capacity of 31,000 lb.

TOP SPEED OF VEHICLE

A rear axle ratio shall be furnished to allow the vehicle to reach a top speed of 60 mph/96KPH.

REAR SUSPENSION

The rear suspension shall be Standens, semi-elliptical, 3.00" wide x 52.50" long, with a ground rating of 31,000 lbs. The spring hangers shall be castings.

The two (2) top leaves shall wrap the forward spring hanger pin, and the rear of the spring shall be a slipper style end that shall ride in a rear slipper hanger.

A steel encased rubber bushing shall be used in the spring eye. The steel encased rubber bushing shall be maintenance free and require no lubrication.

SHOCK ABSORBERS

Heavy-duty telescoping Koni shock absorbers shall be provided on the rear axle.

REAR OIL SEALS

Oil seals shall be provided on the rear axle(s).

DRIVER CONTROL DIFFERENTIAL LOCK (DCDL)

A rear axle shall be equipped with a driver controlled differential lock (DCDL).

The control shall be located within easy reach of the driver. An indicator light shall be provided next to the control switch.

REAR TIRES

Rear tires shall be four (4) Goodyear 315/80R22.50 radials with load range L, all position, G751 MSA, rated for 33,080 lb maximum axle load and 68 mph maximum speed.

The tires shall be mounted on Alcoa 22.50" x 9.00" polished aluminum disc wheels with a ten (10) stud 11.25" bolt circle.

TIRE BALANCE

All tires shall be balanced with Counteract balancing beads. The beads shall be inserted into the tire and eliminate the need for wheel weights.

TIRE PRESSURE MANAGEMENT

A RealWheels LED AirSecure™ tire alert pressure management system shall be provided to monitor each tire's pressure. A sensor shall be provided on the valve stem of each tire for a total of six (6) tires.

The sensor shall calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor shall activate an integral battery operated LED when the pressure of that tire drops 5 to 8 psi.

Removing the cap from the sensor shall indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED shall immediately start to flash.

LUG NUT COVERS

Stainless steel lug nut covers shall be installed on all lug nuts.

FRONT HUB COVERS

Stainless steel hub covers shall be provided on the front axle. An oil level viewing window shall be provided.

REAR HUB COVERS

A pair of stainless steel high hat hub covers shall be provided on rear axle hubs.

MUD FLAPS

Mud flaps shall be installed behind the front and rear wheels.

WHEEL CHOCKS

There shall be one (1) pair of folding Ziamatic, Model SAC-44-E, aluminum alloy, Quick-Choc wheel blocks, with easy-grip handle provided.

Wheel Chock Brackets

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

ELECTRONIC STABILITY CONTROL

A vehicle control system shall be provided as an integral part of the ABS brake system from Meritor Wabco.

The system shall 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 shall 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 shall 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 shall selectively apply brakes to the individual wheel ends of the front and rear axles to bring the vehicle back to its intended direction.

ANTI-LOCK BRAKE SYSTEM

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

AUTOMATIC TRACTION CONTROL

An anti-slip feature shall be included with the ABS. The Automatic Traction Control shall be used for traction in poor road and weather conditions. The Automatic Traction Control shall act as an electronic differential lock that shall not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) shall work with the engine ECU, sharing information

concerning wheel slip. Engine ECU shall 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.

An "off road traction" switch shall be provided on the instrument panel. Activation of the switch shall allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

BRAKES

The service brake system shall be full air type.

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

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

The rear brakes shall be Meritor™ 16.50" x 8.63" cam operated with automatic slack adjusters. Dust shields cannot be provided.

BRAKE SYSTEM AIR COMPRESSOR

The air compressor shall be a Cummins/WABCO with 18.7 cubic feet per minute output.

BRAKE SYSTEM

The brake system shall include:

- Brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system minimum capacity of 5,376 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve
- A parking "brake on" indicator light on instrument panel
- 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
- 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)

- 1/4 turn drain valves on each air tank

The air tank shall be primed and painted to meet a minimum 750 hour salt spray test.

The air tanks shall be painted black #98.

To reduce the effects of corrosion, the air tank shall be mounted with stainless steel brackets.

BRAKE SYSTEM AIR DRYER

The air dryer shall be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

BRAKE LINES

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

AIR INLET

One (1) air inlet with 3D series male coupling shall be provided. It shall allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet shall be located forward in the driver side lower step well of cab. A check valve shall be provided to prevent reverse flow of air. The inlet shall discharge into the "wet" tank of the brake system. A mating female fitting shall also be provided with the loose equipment.

ENGINE

The chassis shall be powered by an electronically controlled engine as described below:

Make:	Cummins®
Model:	X15
Power:	525 hp at 1700 rpm
Torque:	1850 lb-ft at 1150 rpm
Governed Speed:	2100 rpm
Emissions Level:	EPA 2027
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	912 cubic inches (14.9L)
Starter:	Delco 39MT+™
Fuel Filters:	Frame mounted spin-on style filter from Cummins®.

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

The engine shall be filled with FA-4 10W30 oil as required by Cummins.

REMOTE MOUNTED ENGINE FILTERS

The engine fuel and oil filters shall be remote mounted for ease of maintenance.

HIGH IDLE

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

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

ENGINE BRAKE

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

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

The engine brake shall activate when the system is on and the throttle is released.

The high setting of the brake application shall activate and work simultaneously with the variable geometry turbo (VGT) provided on the engine.

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

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

CLUTCH FAN

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

One (1) indicator light shall be provided on the cab instrument panel to indicate clutch fan engagement.

ENGINE AIR INTAKE

The engine air intake shall be located above the engine cooling package. It shall draw fresh air from the front of the apparatus through the radiator grille.

The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine.

The ember separator shall be easily accessible by tilting the cab.

EXHAUST SYSTEM

The exhaust system shall be stainless steel from the turbo to the engine's aftertreatment device. The exhaust system shall include an aftertreatment device to meet current EPA standards. An insulation wrap shall be provided on all exhaust pipe between the turbo and the aftertreatment device to minimize the transfer of heat to the cab.

The exhaust shall terminate vertically ahead of the water tank to a point above the body. The exhaust pipes shall be aluminized steel.

There shall be an aluminized steel exhaust diffuser with a standard straight tip on the end provided to reduce the temperature of the exhaust as it exits. Heat deflector shields shall be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

RADIATOR

The radiator and the complete cooling system shall meet or exceed the current edition of applicable NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core shall be constructed using long life aluminum alloy. The radiator core shall consist of aluminum fins, having a serpentine design, brazed to aluminum tubes.

The radiator core shall have a minimum front area of 1060 square inches.

The radiator shall be compatible with commercial antifreeze solutions.

The radiator assembly shall be isolated from the chassis frame rails with rubber isolators to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven terrain.

The radiator shall include a de-aeration/expansion tank. For visual coolant level inspection, the radiator shall have a built-in sight glass. The radiator shall be equipped with a 15 psi pressure relief cap.

A drain port shall 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.

Shields or baffles shall be provided to prevent recirculation of hot air to the inlet side of the radiator.

COOLANT LINES

Gates, or Goodyear, rubber hose shall be used for all engine coolant lines installed by Pierce Manufacturing.

Hose clamps shall be stainless steel constant torque type to prevent coolant leakage. They shall expand and contract according to coolant system temperature thereby keeping a constant clamping pressure on the hose.

FUEL TANK

A 65 gallon fuel tank shall be provided and mounted at the rear of the chassis. The tank shall be constructed of 12-gauge, hot rolled steel.

It shall be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank shall be mounted with stainless steel straps.

A 0.75" drain plug shall be located in a low point of the tank for drainage.

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

A 0.50" diameter vent shall be installed from tank top to just

below fuel fill inlet.

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

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

DIESEL EXHAUST FLUID TANK

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

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

A fill inlet shall be provided and marked "Diesel Exhaust Fluid Only". The fill inlet shall be located adjacent to the engine fuel inlet behind a common hinged, spring loaded, polished stainless steel door on the driver side of the vehicle.

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

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

The stainless steel flip door for selecting between DEF fill and the diesel fill shall be spring loaded to default to covering the DEF fill.

FUEL PRIMING PUMP

A Cummins automatic electronic fuel priming pump shall be integrated as part of the engine.

FUEL COOLER

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

FUEL SEPARATOR

The engine shall be equipped with a Racor in-line spin-on fuel and water separator in addition to the engine fuel filters.

TRANSMISSION

An Allison 6th generation, Model EVS 4000P, electronic, torque converting, automatic transmission shall be provided.

The transmission shall be equipped with prognostics to monitor oil

life, filter life, and transmission health. A wrench icon on the shift selector's digital display shall indicate when service is due.

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

A transmission temperature gauge with an amber light and buzzer shall be installed on the cab instrument panel.

TRANSMISSION SHIFTER

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

The transmission ratio shall 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

TRANSMISSION PROGRAMMING

The transmission shall be programmed to automatically shift the transmission to neutral when the parking brake is set to simplify operation and increase operational safety.

TRANSMISSION COOLER

A Modine plate and fin transmission oil cooler shall be provided using engine coolant to control the transmission oil temperature.

TRANSMISSION FLUID

The transmission shall be provided with TranSynd, or other Allison approved TES-668 heavy duty synthetic transmission fluid.

DRIVELINE

Drivelines shall be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints.

The shafts shall be dynamically balanced before installation.

A splined slip joint shall be provided in each driveshaft where the

driveline design requires it. The slip joint shall be coated with Glidecoat® or equivalent.

STEERING

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

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

STEERING WHEEL

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

BUMPER

A one (1)-piece, ten (1) gauge, 304-2B type polished stainless steel bumper, a minimum of 10.00" high, shall be attached to a bolted modular extension frame constructed of 50,000 psi tensile steel "C" channel mounted directly behind it to provide adequate support strength.

The bumper shall be extended 19.00" from front face of cab.

Gravel Pan

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

CENTER HOSE TRAY

A hose tray, constructed of aluminum, shall be placed in the center of the bumper extension.

The tray shall have a capacity of 125' of 1.75" double jacket cotton-polyester hose.

Black rubber grating shall be provided at the bottom of the tray. Drain holes are also provided.

Center Hose Tray Cover

A bright aluminum treadplate cover shall be provided over the

center hose tray.

The cover shall be "notched" allowing the hose to be pre connected to hose connection.

The cover shall be attached with a stainless steel hinge.

A D-ring latch shall secure the cover in the closed position and a pneumatic stay arm shall hold the cover in the open position. The arm shall be located the notch shall be on the driver side of the tray cover.

RIGHT SIDE HOSE TRAY

A hose tray shall be placed in the right side of the extended bumper.

The tray shall have a capacity of 25' of 5.00" double jacket cotton-polyester hose.

Black rubber grating shall be provided at the bottom of the tray. Drain holes shall be provided.

Right Side Hose Tray Cover

A bright aluminum treadplate cover shall be provided over the right side hose tray.

The cover shall be attached with a stainless steel hinge.

A D-ring latch shall secure the cover in the closed position and a pneumatic stay arm shall hold the cover in the open position.

LIFT AND TOW MOUNTS

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

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

TOW HOOKS

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

CAB

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

The cab shall be built by the apparatus manufacturer in a facility

located on the manufacturer's premises.

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

The cab shall 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 shall be constructed of solid A356-T5 aluminum castings. The B-pillar and C-pillar shall be constructed from 0.13" wall extrusions. The rear wall shall be constructed of two (2) 2.00" x 2.00" outer aluminum extrusions and two (2) 2.00" x 1.00" inner aluminum extrusions. All main vertical structural members shall run from the floor to 4.625" x 3.864" x 0.090" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.25" thick corner casting at each of the front corners of the roof assembly.

The front of the cab shall be constructed of a 0.13" firewall plate, covered with a minimum 0.090" front skin thickness, and reinforced with a full width x 0.50" thick cross-cab support located just below the windshield and fully welded to the engine tunnel. The cross-cab support shall run the full width of the cab and weld to each A-pillar, the 0.13" firewall plate, and the front skin.

The cab floors shall be constructed of 0.125" thick aluminum plate and reinforced at the firewall with an additional 0.375" thick cross-floor support providing a total thickness of 0.50" of structural material at the front floor area. The front floor area shall also be supported with two (2) triangular 0.30" wall extrusions that also provides the mounting point for the cab lift. This tubing shall run from the floor wireway of the cab to the engine tunnel side plates, creating the structure to support the forces created when lifting the cab.

The cab shall be 96.00" wide (outside door skin to outside door skin) to maintain maximum maneuverability.

The centerline of front axle to the rear of the cab shall be 70.00" long.

The forward cab section shall have an overall height (from the cab roof to the ground) of approximately 99.00". The crew cab section shall have a 10.00" raised roof, with an overall cab height of

approximately 109.00". The overall height listed shall be calculated based on a truck configuration with the lowest suspension weight rating, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension shall increase the overall height listed.

The floor to ceiling height inside the crew cab shall be 63.50" in the forward facing outboard positions and 54.50" in the forward facing center position.

The crew cab floor shall measure 46.00" from the rear wall to the back side of the rear facing seat risers.

The medium block engine tunnel, at the rearward highest point (knee level), shall measure 61.50" to the rear wall. The big block engine tunnel shall measure between 45.00" and 51.50" to the rear wall.

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

The cab shall be a full tilt cab style.

A 3-point cab mount system with rubber isolators shall improve ride quality by isolating chassis vibrations from the cab.

CAB ROOF DRIP RAIL

For enhanced protection from inclement weather, a drip rail shall be furnished on the sides of the cab. The drip rail shall be painted to match the cab roof, and bonded to the sides of the cab. The drip rail shall extend the full length of the cab roof.

CAB PUMP ENCLOSURE

The rear of the cab shall be made to house the fire pump below the forward facing crew cab seats. The cab side panels shall be notched to accommodate the pump panel.

FENDER LINERS

Full circular inner fender liners in the wheel wells shall be provided.

PANORAMIC WINDSHIELD

A one (1)-piece safety glass windshield shall be provided with over 2,775 square inches of clear viewing area. The windshield shall be full width and shall provide the occupants with a panoramic view. The windshield shall consist of three (3) layers: outer light, middle

safety laminate, and inner light. The outer light layer shall provide superior chip resistance. The middle safety laminate layer shall prevent the windshield glass pieces from detaching in the event of breakage. The inner light shall provide yet another chip resistant layer. The cab windshield shall be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern shall be applied on the outside perimeter of the windshield for a finished automotive appearance.

WINDSHIELD WIPERS

Three (3) electric windshield wipers with washer shall be provided that meet FMVSS and SAE requirements.

The washer reservoir shall be able to be filled without raising the cab.

ENGINE TUNNEL

Engine tunnel side walls shall be constructed of 0.375" aluminum. The top shall be constructed of 0.125" aluminum and shall be tapered at the top to allow for more driver and passenger elbow room.

The engine tunnel shall be insulated for protection from heat and sound. Perforated foil faced insulation shall be over a 1.00" thick closed cell foam affixed with pressure sensitive adhesive and further secured with mechanical fasteners. Thermal rating for this insulation shall be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The noise insulation keeps the dBA level within the limits stated in the current edition of applicable NFPA standards.

The engine tunnel shall be no higher than 18.00" off the crew cab floor.

INTERIOR CAB INSULATION

The cab shall include 1.00" insulation in the ceiling, 1.50" insulation in the side walls, a minimum of 1.00" insulation in the crew cab floor, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab shall be overlaid with brushed stainless steel except for areas that are not typically visible when the cab is lowered.

CAB LIFT

A hydraulic cab lift system shall be provided consisting of an

electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

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

The cab shall be capable of tilting 43 degrees to accommodate engine maintenance and removal.

The cab shall be locked down by a 2-point normally closed spring loaded hook type latch that fully engages after the cab has been lowered.
The system shall be hydraulically actuated to release the normally closed locks when the cab lift control is in the raised position and cab lift system is under pressure. When the cab is completely lowered and system pressure has been relieved, the spring loaded latch mechanisms shall return to the normally closed and locked position.

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

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

Cab Lift Interlock

The cab lift system shall be interlocked to the parking brake. The cab tilt mechanism shall 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 shall be disabled.

GRILLE

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

DOOR JAMB SCUFFPLATES

All cab door jambs shall be furnished with a 1.00" polished stainless steel scuffplate, mounted on the striker side of the jamb.

MIRRORS

A Retrac, Model 613423, dual vision, motorized, west coast style mirror, with chrome finish, shall be mounted on each side of the

front cab door with spring loaded retractable arms. The flat glass and convex glass shall be heated and adjustable with remote control within reach of the driver.

DOORS

To enhance entry and egress to the cab, the forward cab door openings shall be a minimum of 37.50" wide x 63.37" high. The crew cab doors shall be located on the sides of the cab and shall be constructed in the same manner as the forward cab doors. The crew cab door openings shall be a minimum of 34.30" wide x 73.25" high.

The forward cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of 0.093". The exterior door skins shall be constructed from 0.090" aluminum.

A customized, vertical, pull-down type door handle shall be provided on the exterior of each cab door. The finish of the door handle shall be chrome/black. The exterior handle shall be designed specifically for the fire service to prevent accidental activation, and shall provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands.

Each door shall also be provided with an interior flush, open style paddle handle that shall be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles shall provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

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

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

A chrome grab handle shall be provided on the inside of each cab door for ease of entry.

A red webbed grab handle shall be installed on the crew cab door stop strap. The grab handles shall be securely mounted.

The bottom cab step at each cab door location shall be located

below the cab doors and shall be exposed to the exterior of the cab.

Door Panels

The inner cab door panels shall be constructed out of brushed stainless steel.

ELECTRIC OPERATED CAB DOOR WINDOWS

All four (4) cab doors shall be equipped with electric operated windows with one (1) flush mounted automotive style switch on each door. The driver's door shall have four (4) switches, one (1) to control each door window.

Each switch shall allow intermittent or auto down operation for ease of use. Auto down operation shall be actuated by holding the window down switch for approximately 1 second.

ELECTRIC CAB DOOR LOCKS

The front driver and officer doors shall have a door lock master switch that shall control all front and rear crew cab door locks. Each rear crew cab door shall have its own lock control.

There shall be one (1) concealed switch located in an easily accessible chassis specific location that shall unlock all the doors.

CAB STEPS

The forward cab and crew cab access steps shall be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps shall be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps shall be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps shall be a minimum 25.00" wide, and the crew cab steps shall be 21.65" wide with a 10.00" minimum depth. The inside cab steps shall not exceed 16.50" in height.

The vertical surfaces of the step well shall be brushed stainless steel.

CAB EXTERIOR HANDRAILS

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

STEP LIGHTS

There shall be six (6) white LED step lights with chrome housing installed for cab and crew cab access steps.

- One (1) light for the left side cab access steps.
- Two (2) lights for the left side crew cab access steps.
- Two (2) lights for the right side crew cab access steps.
- One (1) light for the right side cab access step.

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

The lights shall be activated when the battery switch is on and the adjacent door is opened.

FENDER CROWNS

Stainless steel fender crowns shall be installed at the cab wheel openings.

CAB DASH

The driver side dash, switch panel located to the right of the driver, and center console shall be constructed of metal and painted to match the cab interior.

The officer side dash shall be a flat top design with an upper beveled edge to provide easy maintenance and shall be constructed out of aluminum and painted to match the cab interior.

The instrument gauge cluster shall be surrounded with a high impact ABS plastic contoured to the same shape of the instrument gauge cluster.

CAB INTERIOR

The cab interior shall be constructed of primarily metal (painted aluminum) to withstand the severe duty cycles of the fire service. The engine tunnel shall be padded and covered, on the top and sides, with black 36 ounce leather grain vinyl resistant to oil, grease, and mildew.

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

The headliner shall be installed in both forward and rear cab

sections. Headliner material shall be vinyl. A sound barrier shall be part of its composition. Material shall be installed on aluminum sheet and securely fastened to interior cab ceiling.

Forward portion of cab headliner shall permit easy access for service of electrical wiring or other maintenance needs.

All wiring shall be placed in metal raceways.

CAB INTERIOR UPHOLSTERY

The cab interior upholstery shall be 36 oz black vinyl.

CAB INTERIOR PAINT

The cab interior metal surfaces, excluding the rear heater panels, shall be painted fire smoke gray, vinyl texture paint.

The rear heater panels shall be painted black, vinyl textured paint.

CAB FLOOR

A small blister shall be provided at the rear of the engine tunnel for chassis components.

The cab and crew cab floor areas shall 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.

DEFROST/AIR CONDITIONING SYSTEM

A ceiling mounted combination heater, defroster and air conditioning system shall be installed in the cab above the engine tunnel area.

Cab Defroster

A 54,000 BTU heater-defroster unit with 690 SCFM of air flow shall be provided inside the cab. The heater-defrost shall be installed in the

forward portion of the cab ceiling. Air outlets shall be strategically located in the cab header extrusion per the following:

- One (1) adjustable outlet directed towards the left side cab window.
- One (1) adjustable outlet directed towards the right side cab

window.

- Six (6) fixed outlets directed at the windshield.

The defroster shall 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 shall meet or exceed SAE J382 requirements.

Cab/Crew Auxiliary Heater

There shall be no auxiliary heater provided in the rear facing seat risers.

Air Conditioning

A 19.10 cubic inch compressor shall be installed on the engine.

A roof-mounted condenser with a 78,000 BTU output at 2,400 SCFM that meets and exceeds the performance specification shall be installed on the cab roof. The condenser cover to be painted to match the cab roof.

The air conditioning system shall be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 75 degrees Fahrenheit at 50 percent relative humidity within 30 minutes. The cooling performance test shall be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

The evaporator unit shall be installed in the rear portion of the cab ceiling over the engine tunnel. The evaporator shall include one (1) high performance heating core, one (1) high performance cooling core with (1) plenum directed to the front and one (1) plenum directed to the rear of the cab. The rear plenum shall be covered with a metal cover painted to match the cab interior.

The evaporator unit shall have a 52,000 BTU at 690 SCFM rating that meets and exceeds the performance specifications.

Adjustable air outlets shall be strategically located on the forward plenum cover per the following:

- Four (4) outlets directed towards the seating position on the left side of the cab.
- Four (4) outlets directed towards the seating position on the right side of the cab.

Adjustable air outlets shall be strategically located on the evaporator cover per the following:

- Minimum of five (5) outlets directed towards crew cab area.

A high efficiency particulate air (HEPA) filter shall be included for the system. Access to the filter cover shall be secured with four (4) screws.

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

Climate Control

An automotive style controller shall be provided to control the heat and air conditioning system within the cab. The controller shall have three (3) functional knobs for fan speed, temperature, and air flow distribution (front to rear) control.

The system shall control the temperature of the cab and crew cab automatically by pushing the center of the fan speed control knob. Rotate the center temperature control knob to set the cab and crew cab temperature.

The AC system shall be manually activated by pushing the center of the temperature control knob. Pushing the center of the air flow distribution knob shall engage the AC for max defrost, setting the fan speeds to 100 percent and directing all air flow to the overhead forward position.

The system controller shall be located within panel position #12.

Gravity Drain Tubes

Two (2) condensate drain tubes shall be provided for the air conditioning evaporator. The drip pan shall have two (2) drain tubes plumbed separately to allow for the condensate to exit the drip pan. No pumps shall be provided.

SUN VISORS

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

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

GRAB HANDLES

A black rubber covered grab handle shall be mounted on the door post of the driver and officer's side cab door to assist in entering the cab. The grab handles shall be securely mounted to the post area

between the door and windshield.

ENGINE COMPARTMENT LIGHT

An engine compartment light shall be installed under the engine tunnel, of which the switch is an integral part. Light shall have a 0.125" diameter hole in its lens to prevent moisture retention.

ACCESS TO ENGINE DIPSTICKS

For access to the engine oil and transmission fluid dipsticks, there shall be a door on the engine tunnel, inside the crew cab. The door shall be on the rear wall of the engine tunnel, on the vertical surface.

The engine oil dipstick shall allow for checking only. The transmission dipstick shall allow for both checking and filling.

The door shall have a rubber seal for thermal and acoustic insulation. One (1) Southco C2 chrome raised trigger lever latch shall be provided on the access door.

GLOVE BOXES AND CUP HOLDERS

There shall be a storage console provided on the engine tunnel. It shall be mounted in the center of engine tunnel accessible by both the driver and officer.

The overall size of the storage area shall be 24.75" wide x 19.00" long x 4.00" deep. The storage area shall be divided into multiple areas separated by partitions to prevent items from entering other areas.

On the front, at each end, there shall be a 3.75" diameter cup holder provided. A space for a handle shall be provided to the outboard side of each cup holder. Between the cup holders shall be a bin 14.50" wide x 4.00" long x 3.00" deep. Behind each cup holder shall be an open area for radio storage. To the rear of the radio storage shall be glove box storage. The radio storage area shall be 5.50" wide x 3.00" long x 4.00" deep. The glove box storage shall be 5.50" wide x 10.50" long x 4.00" deep. The glove boxes shall be set in place with access to the gloves from the top. Between the gloves in the center shall be a bin that is 13.25" wide x 14.50" long x 4.00" deep.

The box shall be constructed of aluminum and painted to match the cab interior. The corners and edges shall be welded and caulked prior to paint in order to provide a smooth finished appearance.

STORAGE BOX

There shall be four (4) storage box(es) designed to hold and dispense boxes of latex gloves provided.

Each box shall be constructed of aluminum and located TBA.

Each storage box shall be 10.00" wide x 5.00" high x 3.50" deep and painted to match the cab interior. A slot shall be provided on the top of each box to dispense the gloves.

MAP BOX

A map box with six (6) bins, open at top, shall be installed. The location required shall be TBA. The map box shall be divided into six(6) bins, each bin shall slant 30 degrees from horizontal. The map box shall be constructed of .125" aluminum and shall be painted to match the cab interior. Two (2) rows of three (3) slots shall measure 12.00" long x 3.00" wide.

SEATING CAPACITY

The seating capacity of the vehicle (including tiller cab and belted seat positions in the rescue body) shall be five (5).

DRIVER SEAT

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

The seat shall be furnished with a 3-point, shoulder type seat belt.

OFFICER SEAT

A seat shall be provided in the cab for the passenger. The seat shall be a fixed type with no suspension. For optimal comfort, the seat shall be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders.

Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

RADIO COMPARTMENT

A radio compartment shall be provided under the officer's seat.

The inside compartment dimensions shall be 14.00" wide x 7.50" high x 15.00" deep, with the back of the compartment angled up to match the cab structure.

A drop-down door with one (1) flush lift and turn latch shall be provided for access.

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

REAR FACING LEFT SIDE CABINET

A rear facing cabinet shall be provided in the crew cab at the left side outboard position.

The cabinet shall be 23.00" wide x 39.00" high x 26.75" deep with one (1) Amdor rollup door with anodized finish, non-locking. The frame to frame opening shall be 16.00" wide x 33.75" high. The minimum clear door opening of the cabinet shall be 13.25" wide x 27.87" high.

The cabinet shall also provide access from outside the cab with one (1) double pan door painted to match the cab exterior with a non-locking D-ring latch. A pneumatic stay arm shall be provided as a door stop.
The door shall be located on the side of the cab over the wheel well. The clear door opening shall be 17.00" wide x 34.00" high.

The cabinet shall include one (1) infinitely adjustable shelf with a 1.25" up-turned lip painted to match the cab interior. The exterior access shall be provided with a polished stainless steel scuffplate on the lower door frame.

The cabinet shall be constructed of smooth aluminum and painted to match the cab interior.

Cabinet Light

There shall be one (1) white LED strip light installed on the right side of the interior cabinet door opening and one (1) white LED strip

light installed on the left side of the interior cabinet door opening. The lights shall be controlled by an automatic door switch.

REAR FACING RIGHT SIDE CABINET

A rear facing cabinet shall be provided in the crew cab at the right side outboard position.

The cabinet shall be 22.00" wide x 39.00" high x 26.75" deep with one (1) Amdor rollup door with anodized finish, non-locking. The frame to frame opening shall be 15.00" wide x 33.75" high. The minimum clear door opening of the cabinet shall be 12.25" wide x 27.87" high.

The cabinet shall include one (1) infinitely adjustable shelf with a 1.25" up-turned lip painted to match the cab interior.

The cabinet shall also provide access from outside the cab with one (1) double pan door painted to match the cab exterior with a non-locking D-ring latch. A pneumatic stay arm shall be provided as a door stop.

The exterior clear door opening shall be 17.00" wide x 34.00" high.

The exterior access shall be provided with a polished stainless steel scuffplate on the lower door frame.

The cabinet shall be constructed of smooth aluminum, and painted to match the cab interior.

Cabinet Light

There shall be one (1) white LED strip light installed on the right side of the interior cabinet door opening and one (1) white LED strip light installed on the left side of the interior cabinet door opening. The lights shall be controlled by an automatic door switch.

FORWARD FACING LEFT SIDE OUTBOARD SEAT

There shall be one (1) forward facing seat provided at the left side outboard position in the crew cab. For optimal comfort, the seat shall be provided with a 17.00" deep foam cushion designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA style with 95 degree back. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

FORWARD FACING CENTER SEAT

There shall be one (1) forward facing seat provided at the center position in the crew cab. For optimal comfort, the seat shall be provided with a 17.00" deep foam cushion designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA style with 95 degree back. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

FORWARD FACING RIGHT SIDE OUTBOARD SEAT

There shall be one (1) forward facing seat provided at the right side outboard position in the crew cab. For optimal comfort, the seat shall be provided with a 17.00" deep foam cushion designed with EVC (elastomeric vibration control).

The seat back shall be an SCBA style with 95 degree back. The SCBA cavity shall be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity shall be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat shall be furnished with a 3-point, shoulder type seat belt.

FORWARD FACING OVERHEAD STORAGE COMPARTMENT

There shall be an overhead forward facing storage compartment installed at the raised roof within the crew cab. The compartment shall be approximately 88.00" wide x 10.00" high x 16.34" deep. A false floor shall be added to the bottom of the compartment to create a sweep out floor.

The compartment shall include two (2) lift up compartment doors. Non-locking latch and gas operated stay arms shall be provided.

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

Compartment Light

The storage compartment lighting shall consist of one (1) white LED strip light installed horizontally above each compartment door

opening.

SEAT UPHOLSTERY

All seat upholstery shall be leather grain 36 oz black vinyl resistant to oil, grease and mildew. The cab and tiller cab (if applicable) shall have five (5) seating positions.

AIR BOTTLE HOLDERS

All SCBA type seats in the cab shall have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket shall 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 shall constrain the SCBA bottle in the seat and shall exceed the NFPA standard of 9G.

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

SEAT BELTS

All cab and tiller cab (if applicable) seating positions shall have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length shall meet or exceed the current edition of applicable NFPA and CAN/ULC - S515 standards.

The 3-point shoulder type seat belts shall include height adjustment. This adjustment shall optimize the belts effectiveness and comfort for the seated firefighter. The 3-point shoulder type seat belts shall be furnished with dual automatic retractors that shall provide ease of operation in the normal seating position.

The 3-point shoulder type belts shall 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.

Any flip up seats shall include a 3-point shoulder type belts only.

To ensure safe operation, the seats shall be equipped with seat belt sensors in the seat cushion and belt receptacle that shall activate an alarm indicating a seat is occupied but not buckled.

HELMET STORAGE PROVIDED BY FIRE DEPARTMENT

NFPA 1900, 2024 edition, section 11.1.8.4.1 and CAN/ULC 515:2024 edition, section 5.2, requires a location for helmet storage be provided.

There is no helmet storage on the apparatus as manufactured. The fire department shall provide a location for storage of helmets.

CAB DOME LIGHTS

There shall be four (4) Weldon, 808* series, dual LED dome lights with black bezels provided. Two (2) lights shall be mounted above the inside shoulder of the driver and officer and two (2) lights shall be installed and located, one (1) on each side of the crew cab.

The color of the LED's shall be red and white.

The white LED's shall be controlled by the door switches and the lens switch.

The color LED's shall be controlled by the lens switch.

ENHANCED SOFTWARE FOR CAB AND CREW CAB DOME LIGHTS

The cab and crew cab dome lights shall remain on for 10 seconds for improved visibility after the doors are closed.

The dome lights shall dim after 10 seconds or immediately if the vehicle's transmission is put into gear.

ADDITIONAL OVERHEAD MAP LIGHT

There shall be two (2) additional rectangular based adjustable map light(s) with white LEDs installed in the cab and located overhead driver and officer .

Each light shall include a switch on the light housing.

The light switch(es) shall be connected directly to the ignition switched power.

CAB SPOTLIGHT

There shall be two (2) Golight® Stryker ST™, Model 30**4ST, white LED spotlights located on the cab roof, DS and PS cab roof. The spotlights shall be mounted on painted Z brackets.

These lights may be load managed when the parking brake is applied.

Spotlight Controller

There shall be one (1) wired dash mounted remote provided for each spotlight.

Spotlight Controller Locations

The remotes to control the spotlights shall be located one (1) within reach of the driver and one (1) within reach of the officer.

HAND HELD LIGHT

There shall be four (4) Streamlight, Vulcan 180, Item #44305, lights with 12 volt DC charging cord, Direct wire charging rack and strap mounted TBA.

The housing color shall be yellow.

CAB INSTRUMENTATION

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

Gauges

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

- Voltmeter gauge (volts):
  - Low volts (11.8 VDC)
    - Amber caution indicator on the information center with intermittent alarm
      - Amber caution light on gauge assembly
  - High volts (15.5 VDC)
    - Amber caution indicator on the information center with intermittent alarm
      - Amber caution light on gauge assembly
  - Very low volts (11.3 VDC)
    - Red warning indicator on the information center with a steady alarm

        - Amber caution light on gauge assembly
    - Very high volts (16.0 VDC)
        - Red warning indicator on the information center with a steady alarm
        - Amber caution light on gauge assembly
- Engine Tachometer (RPM)
- Speedometer MPH (Major Scale), KM/H (Minor Scale)
- Fuel level gauge (Empty - Full in fractions):
    - Low fuel (1/8 full)
        - Amber caution indicator on the information center with intermittent alarm
        - Amber caution light on gauge assembly
    - Very low fuel (1/32 full)
        - Red caution indicator on the information center with steady alarm
        - Amber caution light on gauge assembly
- Engine Oil pressure Gauge (PSI):
    - Low oil pressure to activate engine warning lights and alarms
        - Red caution indicator on the information center with steady alarm
        - Amber caution light on gauge assembly
- Front Air Pressure Gauges (PSI):
    - Low air pressure to activate warning lights and alarm
        - Red warning indicator on the information center with a steady alarm
        - Amber caution light on gauge assembly
- Rear Air Pressure Gauges (PSI):
    - Low air pressure to activate warning lights and alarm
        - Red warning indicator on the information center with a steady alarm
        - Amber caution light on gauge assembly
- Transmission Oil Temperature Gauge (Fahrenheit):
    - High transmission oil temperature activates warning lights and alarm
        - Amber caution indicator on the information center with intermittent alarm
        - Amber caution light on gauge assembly

- Engine Coolant Temperature Gauge (Fahrenheit):
    - High engine temperature activates an engine warning light and alarms
        - Amber caution indicator on the information center with intermittent alarm
        - Amber caution light on gauge assembly
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
    - Low fluid (1/8 full)
        - Amber indicator light in gauge dial

All gauges shall perform prove out at initial power-up to ensure proper performance.

Indicator Lamps

To promote safety, the following telltale indicator lamps shall be located on the instrument panel in clear view of the driver. The indicator lamps shall be "dead-front" design that is only visible when active. The colored indicator lights shall have descriptive text or symbols.

The following amber telltale lamps shall be present:

- Low coolant
- Trac cntl (traction control) (where applicable
- Check engine
- Check trans (check transmission
- Aux brake overheat (Auxiliary brake overheat
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel
- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HET (engine high exhaust temperature) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Side roll fault (where applicable)
- Front air bag fault (where applicable)

The following red telltale lamps shall be present:

- Warning (stop sign symbol)
- Seat belt
- Parking brake
- Stop engine
- Rack down

The following green telltale lamps shall be provided:

- Left turn
- Right turn
- Battery on

The following blue telltale lamp shall be provided:

- High beam

Alarms

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

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

Alarm silence: Any active audible alarm shall 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 shall intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp shall act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition shall enable the steady or pulsing tones respectively.

Indicator Lamp and Alarm Prove-Out

A system shall be provided which automatically tests telltale indicator lights and alarms located on the cab instrument panel. Telltale indicators and alarms shall perform prove-out at initial power-up to ensure proper performance.

Control Switches

For ease of use, the following controls shall be provided immediately adjacent to the cab instrument panel within easy reach of the driver. All switches shall have backlit labels for low light applications.

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

Panel back lighting intensity control switch: A three (3)-position momentary rocker switch shall be provided. Pressing the top half of the switch, "Panel Up" increases the panel back lighting intensity and pressing the bottom half of the switch, "Panel Down" decreases the panel back lighting intensity. Pressing the half or bottom half of the switch several times shall allow back lighting intensity to be gradually varied from minimum to maximum intensity level for ease of use.

Ignition switch: A three (3)-position maintained/momentary rocker switch shall be provided. The first switch position shall turn off and deactivate vehicle ignition. The second switch position shall activate vehicle ignition and shall perform prove-out on the telltale indicators and alarms for 3 to 5 seconds after the switch is turned on. A green indicator lamp is activated with vehicle ignition. The third momentary position shall temporarily silence all active cab alarms. An alarm "chirp" may continue as long as alarm condition exists.
Switching ignition to off position shall terminate the alarm silence feature and reset function of cab alarm system.

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

Hazard switch shall be provided on the instrument panel or on the steering column.

Heater, defroster, and air conditioning control panel.

Windshield wiper control shall include low, high and intermittent modes.

Turn signal arm: A self-canceling turn signal with high beam headlight shall be provided.

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

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

High idle engagement switch: A momentary rocker switch with integral indicator lamp shall be provided. The switch shall activate and deactivate the high idle function. 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 shall indicate when the high idle function is engaged.

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

Emergency switching shall be controlled by multiple individual warning light switches for various groups or areas of emergency warning lights. An Emergency Master switch provided on the instrument panel that enables or disables all individual warning light switches is included.

An additional "Emergency Master" button shall be provided on the lower left hand corner of the gauge panel to allow convenient control of the "Emergency Master" system from inside the driver's door when standing on the ground.

Custom Switch Panels

The design of cab instrumentation shall allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There shall be positions for up to four (4) switch panels in the lower instrument console and up to six (6) switch panels in the overhead visor console. All switches have backlit labels for low light conditions.

Diagnostic Panel

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

The diagnostic panel shall include the following:

- Engine diagnostic port

- Transmission diagnostic port
- ABS diagnostic port
- Roll sensor diagnostic port
- Command Zone USB diagnostic port
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

Cab LCD Display

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

The upper right section shall display the following, along with other configuration specific information:

- Odometer
- Trip mileage
- PTO hours
- Fuel consumption
- Engine hours

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

AIR RESTRICTION INDICATOR

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

"DO NOT MOVE APPARATUS" INDICATOR

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

The same circuit that activates the Do Not Move Apparatus indicator

shall activate a pulsing alarm when the parking brake is released.

DO NOT MOVE TRUCK MESSAGES

Messages shall 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 shall designate the item or items not in the stowed for vehicle travel position (parking brake disengaged).

The following messages shall be displayed (where applicable):

- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- DS Ladder Rack Down (Driver Side Ladder Rack Down)
- PS Ladder Rack Down (Passenger Side Ladder Rack Down)
- Deck Gun Not Stowed
- Lt Tower Not Stowed (Light Tower Not Stowed)
- Fold Tank Not Stowed (Fold-A-Tank Not Stowed)
- 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 shall be displayed as a caution message after the parking brake is disengaged.

SWITCH PANELS

The emergency light switch panel shall have a master switch for ease of use plus individual switches for selective control. Each switch panel shall contain eight (8) membrane-type switches each rated for one million (1,000,000) cycles. Panels containing less than eight (8) switch assignments shall include non-functioning black appliqués. The built-in switch panels shall be located in the lower console or

overhead console of the cab.

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

The switches shall be membrane-type and also act as an integral indicator light. For quick, visual indication the entire surface of the switch shall be illuminated white whenever back lighting is activated and illuminated green whenever the switch is active. An active illuminated switch shall 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 shall be placed in the center of the switch. The label shall allow light to pass through the letters for ease of use in low light conditions.

WIPER CONTROL

Wiper control shall consist of a two (2)-speed windshield wiper control with intermittent feature and windshield washer controls. The control shall be located on the left side of the center instrument panel.

CAB USB

There shall be four (4) USB terminations with a combination USB type A & C, wired to switched battery power, provided per the following:

- One (1) within reach of the driver
- One (1) within reach of the passenger
- Two (2) on the rear of the engine tunnel, one (1) each side. This circuit may be load managed.

SPARE CIRCUIT

There shall be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The wires shall have the following features:

- The positive wire shall be connected directly to the isolated battery.
- The negative wire shall be connected to ground.
- Wires shall be capable of carrying 15 amps.
- Power and ground shall terminate front passenger side engine tunnel (MDT).
- Termination shall be with heat shrinkable butt splicing.

- Wires shall be protected to meet the NFPA Automotive Fire Apparatus standard.

Battery direct loads cannot be Load Managed.

SPARE CIRCUIT

There shall be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The wires shall have the following features:

- The positive wire shall be connected directly to the battery switched power.
- The negative wire shall be connected to ground.
- Wires shall be capable of carrying 15 amps.
- Power and ground shall terminate officer side dash area.
- Termination shall be with 15 amp, power point plug with rubber cover.
- Wires shall be protected to meet the NFPA Automotive Fire Apparatus standard.

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

INFORMATION CENTER

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

The information center shall have the following specifications:

- Operate in temperatures from -40 to 158 degrees Fahrenheit
- LCD optically bonded to hardened AR glass 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 shall be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

General Screen Design

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

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

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

Home/Transit Screen

This screen shall display the following:

- Vehicle Mitigation (if equipped)
- Water Level (if the water level system includes compatible communications to the information center)
- Foam Level (if the foam level system includes compatible communications to the information center)
- Seat Belt Monitoring Screen
- Tire Pressure Monitoring (if equipped)
- Digital Speedometer
- Active Alarms

On Scene Screen

This screen shall display the following and shall 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

Virtual Buttons

There shall be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

Page Screen

The page screen shall 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)
    - Load Manager
        - A list of items to be load managed shall be provided. The list shall provide a description of the load.
        - The lower the priority numbers the earlier the device shall be shed should a low voltage condition occur.
        - The screen shall indicate if a load has been shed (disabled) or not shed.
        - "At a glance" color features are utilized on this screen.
    - Systems
        - Command Zone
            - Module type and ID number
            - Module Version

                - Input or output number
                - Circuit number connected to that input or output
                - Status of the input or output
                - Power and Constant Current module diagnostic information
            - Foam (if equipped)
            - Pressure Controller (if equipped)
            - Generator Frequency (if equipped)
        - Live Data
            - General Truck Data
- Maintenance
    - Engine oil and filter
    - Transmission oil and filter
    - Pump oil (if equipped)
    - Foam (if equipped)
    - Aerial (if equipped)
- Setup
    - Clock Setup
    - Date & Time
        - 12 or 24 hour format
        - Set time and date
    - Backlight
        - Daytime
        - Night time
        - Sensitivity
    - Unit Selection
    - Home Screen
    - Virtual Button Setup
    - On Scene Screen Setup
    - Configure Video Mode
        - Set Video Contrast
        - Set Video Color
        - Set Video Tint
- Do Not Move
    - The screen shall indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices shall be

indicated
    - 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
    - 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.

VEHICLE DATA RECORDER

There shall 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 shall be available to download on-line.

The vehicle data recorder shall 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
- Internal clock syncs the time and date when a laptop is connected

Seat Belt Monitoring System

A seat belt monitoring system (SBMS) shall be provided on the Command Zone™ color display and in the center overhead of the cab instrument panel. The SBMS shall 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
- FAULT = Blue LED indicator illuminated

The seat belt monitoring screen shall 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 shall be activated.

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

INTERCOM SYSTEM

A Setcom, model 1350 dual radio interface intercom system shall be provided. Intercom stations shall be located at the driver, officer, two (2) outboard crew cab positions, one center forward facing crew cab position and a pump panel position. The MS-1350 master station shall provide dual Radio Interface (Two Radio Transmit Circuits) & Listen Only for 3rd Radio Heavy-Duty, Three-Position Push-to-Talk

Toggle Switch: Center for "Monitor, Right for Radio A & Left for Radio B
Two Twist Lock Conxall Ports for Remote Stations (RS-13 l O Product Group)
Full Duplex Intercom
Separate Volume Controls for Each Radio and for the Intercom
Internal Fire and Tower Radio audio level adjustments
(does not require RA-1310 units) Audio On-Off Switch for Each Radio
Uses JS-1350 for Intercom-only Headset position
DVR Recording Outputs for Fire/Tower/Intercom Audio (uses 25-5080 Cable Assembly)

There shall be one (1) RS-1310-6 remote station with an ES-1310A-20 extension station.

There shall be two (2) ES-1310A-20 extension stations for radio transmit headset.

There shall be One (1) RS-1310D/L-4 Headset for Exterior Station
With Push-On/ Push-Off switch for Microphone

There shall be one (1) CSB-1310R-1 right side radio transmit headset and one (1) CSB-1310L-1 left side radio transmit headset.

There shall be one (1) CSB-1310JSL-1 left side Intercom only headsets.

There shall be one (1) CSB-1310JSR-1 right side Intercom only headsets. Radio Transmit Headset, System 1310 Dual Ear Muff, Behind-the-Head, Split Audio Headset
Primary Radio (Tower) Heard In Right Cup
Secondary Radio (Fire) & Intercom Heard In Left Cup
In-Line Radio Push-to-Talk Button For Use With Weatherproof Remote Station (RS-131OW/2) Which Has
Two-Position Locking Radio Select Toggle Volume Controls For Radios & Intercom Located on Remote Station
Push On/Push Off Button For Microphone In Headset Cup
Left Cable Dress 15' Coil-Cord
Gel Filled Ear Muffs for Greater Comfort

There shall be two (2) CSB13 IOJSR-8 Headset, System 1310 Intercom-Only
There shall be one (1) CSB-1310JSL-8 Headset, System 1310 Intercom-Only
There shall be three (3) JS-1350 Intercom Station for MS-1350
There shall be one (1) RC-15MU4K Radio cable Overmolded Conxall

15' Radio Cable, System 900, 1310, or
1600
For Motorola APX/XTL series of mobile radios, dash-mount or remote-mount versions, also for PM1500 Radios.

There shall be one (1) MAC-7AYY-6 Overrnolded Conxall
6' Microphone Adapter Cable, System 1310 And 1600
For Icom A200 (Requires MB53 Mounting Kit & Cables) & A200B Radios
Radio Interface for Hand Microphone Jack Includes Toggle to Switch Between Hand Microphone & System 13l O (or 1600) Includes Jack for an External Cabin Speaker

RADIO INTERFACE NOT REQUIRED

The apparatus manufacturer shall not provide a radio/intercom interface.

HEADSET HANGERS

There shall 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) shall meet the current edition of applicable NFPA and ULC standards for equipment mounting.

RADIO ANTENNA MOUNT

There shall be three (3) standard 1.125", 18 thread antenna-mounting base(s) installed match drawing locations on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the overhead switch area. A weatherproof cap shall be installed on the mount.

VEHICLE CAMERA SYSTEM

There shall be a color vehicle camera system provided with the following:

- One (1) Standard Definition (SD) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse.

The camera images shall be displayed on the left side vehicle information center display. Audio from the microphone on the rear camera shall be emitted by an amplified speaker with volume control located behind the driver seat.

The following components shall be included:

- One (1) SV-CW134639CAI Camera
- All necessary cables

Camera Switcher

A camera switcher is not required.

RECESS REAR CAMERA

A rear camera recess shall be provided in the center at the rear.

ELECTRICAL POWER CONTROL SYSTEM

The primary power distribution shall 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 shall be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers shall be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers shall be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays shall be easily accessible.

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

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

Solid-State Control System

A solid-state electronics based control system shall be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network shall consist of electronic modules, electronic control modules to include black housings, a power indicator and status indicator located near their point of use to reduce harness lengths and improve reliability. The control system shall comply with SAE J1939-11 recommended practices.

The control system shall operate as a master-slave system whereas the main control module instructs all other system components. The system shall contain patented Mission Critical software that maintains

critical vehicle operations in the unlikely event of a main controller error. The system shall 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 shall 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 programmable to accommodate changes to the vehicle's operating parameters

To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules shall meet the following specifications:

- Module circuit board shall meet SAE J771 specifications
- Operating temperature from -40 degrees Celsius to +70 degrees Celsius (-40 degrees Fahrenheit to +158 degrees Fahrenheit)
- Storage temperature from -40 degrees Celsius to +70 degrees Celsius (-40 degrees Fahrenheit to +158 degrees Fahrenheit)
- 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 32 volts DC

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

Circuit Protection and Control Diagram

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

On-Board Electrical System Diagnostics

The on-board information center shall 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

Advanced diagnostic feature shall be provided in this control system. From the Command Zone display or connected wireless device, these features allow the user to monitor the real-time status of every input or output on the vehicle. It also allows users logged in as an administrator to force on inputs or outputs to assist the troubleshooting process.

TCU Module with WiFi

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

The module shall 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 shall allow vehicle monitoring of the vehicle and firefighting systems on the apparatus. The technician level shall allow diagnostic access to inputs and outputs installed on the Command Zone™, control and information system.

The TCU capability shall record faults from the engine, transmission, ABS and Command Zone™, control and information systems as they occur. No other data shall be recorded at the time the fault occurs. The

data TCU shall provide up to 2 Gigabytes of data storage.

The TCU shall provide a means to download the TCU information and update software in the device.

Indicator Light and Alarm Prove-Out System

A system shall be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

Voltage Monitor System

A voltage monitoring system shall be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system shall provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm shall activate if the system falls below 11.8 volts DC for more than two (2) minutes.

Dedicated Radio Equipment Connection Points

There shall be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment. The studs shall 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 shall also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

EMI/RFI Protection

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

The apparatus shall have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system shall 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, shall provide EMC testing reports from testing conducted on an entire apparatus and shall 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.

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

ELECTRICAL SYSTEM PROGNOSTICS

There shall be a software based vehicle tool provided to predict remaining life of the vehicles critical fluid and events.

The system shall send automatic indications to the Command Zone™ information center and/or wireless enabled devices to proactively alert of upcoming service intervals.

Prognostics shall include the following:

- Engine oil and filter
- Transmission oil and filter

TELEMATICS SYSTEM

Your vehicle shall include a cellular-based vehicle telematics system including a telematic control unit with external cellular Wi-Fi and GPS antenna. Pierce shall provide access to a web-based user interface portal that shall allow users to access vehicle data collected as part of the system, allow users to configure monitoring tools, provide a global view of the location of each vehicle that has the system, provide a summary of fleet data, etc. The web-based user interface portal or certain features thereof may be provided on a subscription basis.

The telematic control unit shall be fully integrated into the electrical system of the vehicle, shall monitor the vehicle through the CAN data bus, and shall transmit data through a secure AT&T 4G LTE cellular connection, and be provided with a 3 year subscription.

The web-based user interface portal shall provide, among other features:

- User defined interval notifications
- User defined fault alerts
- Remote access to Command Zone™ diagnostics
- Vehicle analytics and activity monitoring
- Vehicle system status

ELECTRICAL

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

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

1. All holes made in the roof shall be caulked with silicon. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.
2. Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.
3. Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these devices. Also a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.
4. Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All non-

waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).

5. All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.
6. All electrical terminals in exposed areas shall have silicon applied completely over the metal portion of the terminal.

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

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

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

BATTERY SYSTEM

There shall be four (4) 12 volt Stryten/Exide®, Model 31S950X5W, batteries that include the following features shall be provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Group 31
- Rating of 3800 CCA at 0 degrees Fahrenheit
- 760 minutes of reserve capacity
- Threaded stainless steel studs

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

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

BATTERY SYSTEM

There shall be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

MASTER BATTERY SWITCH

There shall be a master battery switch provided within the cab within easy reach of the driver to activate the battery system.

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

BATTERY COMPARTMENTS

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

Heavy-duty, 2/0 gauge, color coded battery cables shall be provided. Battery terminal connections shall be coated with anti-corrosion compound.

Battery solenoid terminal connections shall be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS

One (1) set of battery jumper studs with plastic color-coded covers shall be included on the battery compartments.

BATTERY CHARGER

There shall be an IOTA, Model DLS 75, 75 amp battery charger with IQ4 controller provided.

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

The battery charger shall be located in LS3, left side body compartment, mounted on the left wall as high as practical.

REMOTE CONTROL PANEL - BATTERY CHARGER

There shall be a Kussmaul™, Model 091-94-12 universal display panel included. It shall be wired directly to the chassis batteries.

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

KUSSMAUL AUTO EJECT FOR SHORELINE

There shall be one (1) Kussmaul Model 091-20WP-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) shall include black weatherproof flip up cover(s).

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

The shoreline(s) shall be connected to Freedom battery charger/invertor.

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

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

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

The shoreline receptacle shall be located on the driver side exterior of cab, behind crew cab door.

STAINLESS STEEL BATTERY TRAYS

Stainless steel battery trays shall be provided for the batteries to sit in. Drain holes shall be provided.

ALTERNATOR

A Delco Remy®, Model 55SI, alternator shall be provided. It shall have a rated output current of 430 amps, as measured by SAE method J56.
The alternator shall 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 shall be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

ELECTRONIC LOAD MANAGER

An electronic load management (ELM) system shall 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 shall 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 shall not be allowed.

The system shall include the following features:

- System voltage monitoring.
- A shed load shall 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:
        - "Load Man Hi-Idle On" shall display on the information center.
        - Hi-Idle shall 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.

The information center, where applicable, includes a "Load Manager" screen indicating the following:

- Load managed items list, with priority levels and item condition.
- Individual load managed item condition:
    - ON = not shed
    - SHED = shed

SEQUENCER

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

For improved reliability and ease of use, the load sequencing system

shall 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 shall not be allowed.

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

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

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

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

HEADLIGHTS

There shall be a HiViz, P/N FT-4X6-4KIT, that includes four (4) 4.00" high x 6.00" long rectangular LED lights with parking lamp illumination around the outside of the lamps mounted in the front quad style, chrome housing on each side of the cab grille:

- The outside lamp on each side shall contain P/N FT-4X6-HL with low beam LEDs.
- The inside lamp on each side shall contain P/N FT-4X6-H with high beam LEDs.
- The lights shall be controlled through the headlight switch.

DIRECTIONAL LIGHTS

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

The color of the lenses shall be clear.

INTERMEDIATE LIGHT

There shall be two (2) Truck-Lite®, part number 30375Y, 2.24" diameter lights with amber LEDs, grommet mount and chrome cover furnished, one
(1) each side in the rear fender panel. The light shall double as a turn signal and marker light.

CAB CLEARANCE/MARKER/ID LIGHTS

There shall be seven (7) Truck-Lite, Model 19036Y kit, amber LED lights with chrome mount provided to indicate the presence and overall width of the vehicle in the following locations:

- Three (3) amber LED identification lights shall be installed in the center of the cab above the windshield.
- Two (2) amber LED clearance lights shall be installed, one (1) on each outboard side of the cab above the windshield.
- Two (2) amber LED marker lights shall be installed, one (1) on each side above the cab doors.

FRONT CAB SIDE DIRECTIONAL/MARKER LIGHTS

There shall be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights shall activate as marker lights with the headlight switch and directional lights with the corresponding directional circuit.

REAR CLEARANCE/MARKER/ID LIGHTING

There shall be three (3) Truck-Lite®, Model 26250R, 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

There shall be two (2) Truck-Lite, Model 26250R, 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

There shall be two (2) Truck-Lite, Model 26250R, 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

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

There shall 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.

REAR FMVSS LIGHTING

The rear stop/tail and directional lighting shall include the following:

- Two (2) Whelen®, Model M62BTT, 4.30" high x 6.70" wide x 1.40" deep brake/tail lights with red LEDs
- Two (2) Whelen, Model M62T, 4.30" high x 6.70" wide x 1.40" deep directional lights with amber LEDs. The directional lights shall be set to Steady On (Arrow) flash pattern.
- The lens color(s) to be clear.
- The lights to include chrome trim.

There shall be two (2) Whelen® Model M62BU, 4.31" high x 6.75" wide x 1.37" deep backup lights with white LEDs, clear lenses and chrome trim provided.

LICENSE PLATE BRACKET

One (1) license plate bracket constructed of stainless steel shall be provided at the rear of the apparatus.

One (1) white LED light with chrome housing shall be provided to illuminate the license plate. A stainless steel light shield shall be provided over the light that shall direct illumination downward, preventing white light to the rear.

BACK-UP ALARM

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

CAB PERIMETER SCENE LIGHTS

There shall be four (4) Amdor, Model AY-LB-12HW0**, white LED strip lights provided, one (1) for each cab door that shall meet NFPA ground lighting requirements.

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

PUMP HOUSE PERIMETER LIGHTS

There shall be two (2) Amdor, Model AY-LB-12HW012, 190 lumens each, 12.00" LED weatherproof strip lights with brackets provided under the pump panel running boards, centered front to rear as much as possible, one (1) each side.

The lights shall be activated when the battery switch is on, and controlled by the same means as the body perimeter lights.

BODY PERIMETER SCENE LIGHTS

There shall be two (2) Amdor, Model AY-LB-12HW012, 190 lumens each, 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.

The perimeter scene lights shall be activated when the parking brake is applied.

ENHANCED SOFTWARE FOR PERIMETER LIGHTS

All perimeter lights shall be deactivated when the parking brake is released unless alternate control is selected.

The cab and crew cab perimeter lights shall remain on for ten (10) seconds for improved visibility after the doors closed.

STEP LIGHTS

There shall be four (4) white LED step lights provided at the rear to illuminate the tailboard/step area.

These step lights shall be actuated with the perimeter scene lights.

All other steps on the apparatus shall be illuminated per the current edition of applicable NFPA standards.

12 VOLT LIGHTING

There shall be one (1) Whelen® Model P*H2*, 17,750 lumens 12 volt DC light(s) with a combination of flood and spot optics provided on the front visor, centered.

The housing(s) painted parts of this light assembly to be white.

The light(s) shall be controlled by a switch at the driver's side switch panel and by a switch at the passenger's side switch panel.

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

12 VOLT LIGHTING

There shall be two (2) Whelen® Model P*H2*, 17,750 lumens 12 volt DC LED light(s) with a combination of flood and spot optics installed on the apparatus, located passenger inboard of the Whelen warning lights. match 35975.

The painted parts of this light assembly to be white.

The light(s) to be installed in a 15 degree vertical recessed bracket. The lights shall be controlled by a switch at the driver's side switch panel.

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

12 VOLT LIGHTING

There shall be two (2) Whelen® Model P*H2*, 17,750 lumens 12 volt DC LED light(s) with a combination of flood and spot optics installed on the apparatus, located Driver side inboard of the warning lights.

The painted parts of this light assembly to be white.

The light(s) to be installed in a 15 degree vertical recessed bracket.

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

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

12 VOLT LIGHTING

There shall be one (1) Whelen® Model P*H2*, 17,750 lumens 12 volt DC LED light(s) with a combination of flood and spot optics installed on the apparatus located, high on the drivers side rear body bulkhead.

The painted parts of this light assembly to be white.

The light(s) to be installed in a 15 degree vertical recessed bracket.

The lights shall be controlled by a switch in a recessed cup located at the driver's side rear bulkhead.

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

ADDITIONAL DECK LIGHT

There shall be two (2) Whelen®, Model PFBP12C, 1,000 lumens, white 12 volt DC LED swivel mount floodlight(s) with black housing and chrome rear cover provided at the rear of the hose bed, one (1) each side.

There shall be an on/off push button switch provided on each light.

The light(s) shall be controlled by a switch in a recessed cup located on the back of the passenger's side crew cab.

HOSE BED LIGHTS

There shall be white 12 volt DC LED light strips with stainless steel protective cover, provided to light the hose bed area. Hose Bed lights shall meet the photometric levels listed in the current edition of applicable NFPA standards for Hose Bed lighting requirements.

- Light strip(s) shall be installed along the upper edge of the left side of the hose bed.
- Light strip(s) shall be installed along the upper edge of the right side of the hose bed.

The lights shall be activated by a switch located near the water tank fill dome and by a cup switch at the rear of the apparatus no more than 72.00" from the ground.

REAR WORK AREA LIGHTS

There shall be two (2) Whelen®, part number 01-066C520-10, 3.00" x

7.00" white LED scene lights installed at the rear of the vehicle, with a 15 Degree bracket under the tailboard, facing the rear. The lights shall have 12 white LEDs and have no internal optics. The lights shall be mounted on brackets below the truck so as to not interfere with the angle of departure.

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

WALKING SURFACE LIGHTS

There shall be white 12 volt DC LED light strips with stainless steel protective cover, provided to light the cargo area.

- One (1) light strip shall be installed the entire length of the driver's side of the cargo area.
- One (1) light strip shall be installed the entire length of the passenger's side of the cargo area.

The light shall be activated when the body step lights are on.

WATER TANK

Booster tank shall have a capacity of 750 gallons and be constructed of UV stabilized ultra high impact polypropylene plastic by a manufacturer with a minimum of 20 years experience building tanks, is ISO 9001:2000 certified in all its manufacturing facilities, and has over 50,000 tanks in service.

The booster tank shall be a form-fitting design that serves to keep the tank height as low as possible. The tank shall be no wider than 39.00" at the base to allow for greater compartment depth and no wider than 53.00" at the top.

Tank joints and seams shall be nitrogen welded inside and out.

Tank shall be baffled in accordance with the current edition of applicable NFPA standards.

Baffles shall have vent openings at both the top and bottom to permit movement of air and water between compartments.

Longitudinal partitions shall be constructed of .38" polypropylene plastic and shall extend from the bottom of the tank through the top cover to allow for positive welding.

Transverse partitions shall extend from 4.00" off the bottom of the tank to the underside of the top cover.

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

Tank top shall be constructed of .50" polypropylene. It shall be recessed .38" and shall be welded to the tank sides and the longitudinal partitions.

Tank top shall be sufficiently supported to keep it rigid during fast filling conditions.

Construction shall include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels shall be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump that shall be sized dependent on the tank to pump plumbing shall be provided at the bottom of the water tank.

Sump shall include a drain plug and the tank outlet.

Tank shall be installed in a fabricated cradle assembly constructed of structural steel.

Sufficient crossmembers shall be provided to properly support bottom of tank. Crossmembers shall be constructed of steel bar channel or rectangular tubing.

Tank shall "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, shall be placed on all horizontal surfaces that the tank rests on.

Stops or other provision shall be provided to prevent an empty tank from bouncing excessively while moving vehicle.

Mounting system shall be approved by the tank manufacturer.

Fill tower shall be constructed of 0.50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long.

Fill tower shall be furnished with a 0.25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, shall be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

SLEEVE PLUMBING THROUGH TANK

Two (2) sleeves shall be provided in the water tank for a 3.00" pipe to the rear.

ELKHART UBEC-1AT AUTOMATIC DIRECT TANK FILL SYSTEM

There shall be one (1) Elkhart UBEC-1AT automatic water tank fill system connection installed on the LS lower pump panel. A 2.50" (F)NST chrome swivel shall be located at the inlet. A check valve shall be installed at the pump panel connection to prevent water from running out of the piping. An electrically controlled 2.50" full flow ball valve with 2.50" piping shall be located in the pump enclosure area. Piping, for the fill, shall be routed through the front wall of the tank and include a flow deflector to break up the stream of water entering the water tank.

The Elkhart UBEC-1AT automatic water tank fill control module shall be installed on the pump operator's panel. The automatic tank fill control module shall have manual or automatic controls built into the control module. The electric valve shall be wired to the water level gauge. When the water level falls to a point of approximately 50%, the valve shall automatically open. When the water level returns to the point of 95% full mark, the valve shall close.

A 2.50" chrome plated 30 degree elbow and plug with VLH automatic pressure relieving thread technology shall be provided for the tank fill connection.

BODY HEIGHT

The height of the body shall be 92.00" from the bottom of the body to the top of the body.

HOSE BED

The hose bed shall be fabricated of .125"-5052 aluminum with a nominal 38,000 psi tensile strength.

Flooring of the hose bed shall be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats shall be a minimum of 0.50" x 4.50" with spacing between slats for hose ventilation.

The hose bed walls shall be unpainted.

Hose bed shall accommodate #1 Reverse Lay 500', 3" x 2 ½" #2 LDH Hose 4", 800' - 1000' #3 Forward Lay 750' 3' x 2 ½" #4 Forward Lay 400? 1.75".

HOSE BED DIVIDER

Three (3) hosebed dividers shall be furnished for separating hose.

Each divider shall be constructed of a .125" brushed aluminum sheet fitted and fastened into a slotted, 1.50" diameter radiused extrusion along the top, bottom, and rear edge.

Divider shall be fully adjustable by sliding in tracks, located at the front and rear of the hose bed.

Divider shall be held in place by tightening bolts, at each end.

Acorn nuts shall be installed on all bolts in the hose bed which have exposed threads.

HOSE BED COVER

A two (2) section hose bed cover, constructed of .125" bright aluminum treadplate shall be furnished. The cover shall be hinged with full length stainless steel piano hinge. The sides shall be slanted down. A stationary bridgework support assembly shall be provided at the rear to support the cover.

The cover shall be reinforced so that it can support the weight of a man walking on the cover.

The cover is designed with the left cover opening first.

If access to the water tank fill tower is blocked by the hose bed cover, then a hinged door shall be provided in it so that the tank may be filled without raising cover doors.

Chrome grab handles and four (4) gas filled cylinders shall be provided to assist in opening and closing the cover. A handrail is to be provided at the rear, in the center of the support, to assist in opening the cover. Two (2) rubber latches shall be provided to

hold the cover in the stowed position.

The hose bed cover shall be connected to the Do Not Move Truck indicator. The light shall be activated if the cover is not in the stowed position and the parking brake is released.

HOSE BED RESTRAINT, REAR

The hose in the hose bed shall be restrained by heavy duty 2.00" black nylon webbing with a 1.50" x 4.00" box pattern. The webbing shall be installed at the rear of the hose bed with Velcro strap and footman loop at the top. At the bottom of the webbing, Velcro strap and footman loop shall be provided.

RUNNING BOARDS

A running board shall be provided on each side of the front body to allow access to the backboard/crosslay storage area. The running boards shall be designed with a grip pattern punched into .125" bright aluminum treadplate material providing support, slip resistance, and drainage.

The running board shall have a flip out section design that allows easier access to the full width equipment area above. The flip out section shall be tied to the "do not move truck indicator" with a sensor when it is flipped out. There shall be a latch provided that secures the flip out section when not in use.

TAILBOARD

The tailboard shall be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.

The tailboard area shall be 16.00" deep and full width of the body. The outboard sides of the tailboard shall 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.

The exterior side shall be flanged down and in for increased rigidity of tailboard structure.

REAR WALL, BODY MATERIAL, PUC

The rear wall shall be smooth and the same material as the body.

The rear wall body material shall be painted. Unpainted aluminum overlays shall be provided to allow for chevron application and to provide continuously smooth rear wall panels.

The outboard edges of the rear wall shall be trimmed in polished stainless steel.

TOW BAR

A tow bar shall be installed under the tailboard at center of truck.

Tow bar shall be fabricated of 1.00" CRS bar rolled into a 3.00" radius.

Tow bar assembly shall be constructed of .38" structural angle. When force is applied to the bar, it shall be transmitted to the frame rail.

Tow bar assembly shall 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.

Tow bar design shall have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

COMPARTMENTATION

The apparatus body shall be built of aluminum construction using a minimum of 0.125" thick, 5052-H32 aluminum.

The body panel assembly shall be constructed in a fixture and consist of formed sheet metal for the front and rear bulkheads, door frames, floors, ceilings, and back walls. These parts shall be welded together to ensure greatest longevity with no visible welds in compartment interior.

Welded construction shall consist of 1.00" x 0.38" engineered plug weld holes that control the size, location, and the amount of weld required. The bodies shall be assembled and welded from engineered prints that call out the size, location, and type of weld required.

In structural areas the sheet metal components shall have flanges for welding. No butt joints shall be allowed. Gussets and support posts shall be provided for additional strength where needed.

The fender panel shall be an integral part of the complete welded body assembly. All light and compartment holes are pre punched prior to construction to provide accuracy and rounded corners to prevent stress risers in the material.

Circular fender liners shall be provided. For prevention of paint chips and ease of suspension maintenance the fender liners shall be formed from brush finished 304L stainless steel, be unpainted, and

removable for suspension maintenance.

Side compartment flooring shall be of the sweep out design with the floor minimum of 1.00" higher than the compartment door lip.

Drip protection shall be provided above the doors by means of aluminum extrusion, or formed bright aluminum treadplate.

The top of the compartment shall be sheet metal and covered with bright aluminum treadplate rolled over the edges on the front, and rear.
These covers shall have the corners welded.

The aluminum treadplate covers shall not make up the ceiling of the compartment.

All screws and bolts, which are not Grade 8, shall be stainless steel and where they protrude into a compartment shall have acorn nuts on the ends to prevent injury.

UNDERBODY SUPPORT SYSTEM

Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load shall be provided.

The backbone of the body support system shall begin with the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads. The support system shall include lateral frame rail extensions that are formed from 0.375" 80k high strength steel and bolted to the chassis frame rails with 0.625" diameter Grade 8 bolts.

The vertical and horizontal members of the frame rail extensions are to be reinforced with welded gussets and extend to the outside edge of the body. The lateral frame extensions shall be electro-coated for superior corrosion resistance.

The floating substructure shall be separated from the lateral frame extensions with neoprene elastomer isolators. These isolators shall reduce the natural flex stress of the chassis from being transmitted to the body, and absorb road shock and vibration.

The isolators shall 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.

The neoprene isolators shall be installed in a modified V three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body. Two (2) 3.50" diameter isolators are provided at the front of the body near the centerline of the vehicle above the chassis frame. A minimum of eight (8) - 2.55" diameter isolators shall be provided, two (2) under each front compartment and two (2) under each rear side compartment. A minimum of four (4) 3.50" diameter isolators shall be provided under the rear compartment.

AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of the current NFPA standards. Documentation of the material meeting the standard shall be provided at time of delivery.

LOUVERS

All body compartments shall have a minimum of one (1) set of automotive style, dust resistant louvers pressed into a wall. The louvers shall incorporate a one (1)-way rubber valve that provides airflow out of the compartment and prevents water and dirt from gaining access to the compartment. Compartments over the wheel shall not have louvers.

TESTING OF BODY DESIGN

Body structural analysis shall be fully tested. Proven engineering and test techniques such as finite element analysis and strain gauging have been performed with special attention given to fatigue life and structural integrity of the body and substructure.

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

The criteria used during the testing procedure shall include:

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

Evidence of the actual testing techniques shall be made available

upon request.

FEA shall have been performed on all substructure components.

LEFT SIDE COMPARTMENTATION

The left side compartmentation shall consist of four rollup door compartments.

A full height, rollup door compartment near the front of the body, ahead of the rear wheels, shall be provided. The pump operator's panel shall be located in this compartment. The interior dimensions of this compartment shall be 31.00" wide x 59.75" high x 11.00" deep. The clear door opening shall be a minimum of 28.25" wide x 53.63" high.

A full height, rollup door compartment ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 50.25" wide x 53.63" high x 26.00" deep. The clear door opening shall be a minimum of 47.75" wide x 53.63" high.

A roll-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 60.00" wide x 22.88" high x 26.00" deep. The clear door opening shall be a minimum of
57.25" wide x 22.88" high.

A full height, rollup door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 51.75" wide x 54.63" high x 26.00" deep. The clear door opening shall be a minimum of 49.25" wide x 54.63" high.

The roll up door spool shall be installed in a recess above the compartment ceiling. All compartments shall include a drip pan below the roll of the door. The drip pan shall be installed level with the compartment ceiling. The interior height of the compartments shall be measured from the compartment floor to the ceiling. The depth of the compartments shall be measured from the back wall to the inside of the door frame.

Closing of the doors shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

RIGHT SIDE COMPARTMENTATION

The right side compartmentation shall consist of four rollup door compartments.

A full height, rollup door compartment near the front of the body, ahead of the rear wheels, shall be provided. The interior dimensions of this compartment shall be 41.75" wide x 54.63" high x 26.00" deep. The clear door opening shall be a minimum of 39.25" wide x 54.63" high.

A full height, rollup door compartment ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 41.75" wide x 54.63" high x 26.00" deep. The clear door opening shall be a minimum of 39.25" wide x 54.63" high.

A roll-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 60.00" wide x 22.88" high x 26.00" deep. The clear door opening shall be a minimum of 57.25" wide x 22.88" high.

A full height, rollup door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 51.75" wide x 54.63" high x 26.00" deep. The clear door opening shall be a minimum of 49.25" wide x 54.63" high.

The rollup door spool shall be installed in a recess above the compartment ceiling. All compartments shall include a drip pan below the roll of the door. The drip pan shall be installed level with the compartment ceiling. The interior height of the compartments shall be measured from the compartment floor to the ceiling. The depth of the compartments shall be measured from the back wall to the inside of the door frame.

Closing of the doors shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

SIDE COMPARTMENT ROLLUP DOOR(S)

There shall be eight (8) 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.

Door(s) shall be constructed using 1.00" extruded double wall aluminum slats which shall feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats shall be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain shall be done with a clip system that connects

the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats shall be mounted in reusable slat shoes with positive snap-lock securement.

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

The doors shall 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.

Bottom panel flange of rollup door shall be equipped with two (2) cut-outs to allow for easier access with gloved hands.

A polished stainless steel lift bar to be provided for each roll-up door. The lift bar shall be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers shall 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.

All injection molded rollup door wear components shall be constructed of Type 6 nylon.

Each rollup door shall have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

The header for the rollup door assembly shall not exceed 4.00".

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

REAR COMPARTMENTATION

A roll-up door compartment above the rear tailboard shall be provided.

The interior dimensions of this compartment shall be 37.00" wide x 43.50" high x 25.88" deep in the lower 34.00" of the compartment and 15.00" deep in the remaining upper portion. The clear door opening shall be a minimum of 33.88" wide x 33.63" high.

A removable access panel shall be furnished on the back wall of the compartment.

The rear compartment shall be open into the rear side compartments. The transverse opening shall be a minimum of 22.00" wide x 29.00" high.

A drip pan shall be installed below the roll of the door. A guard shall be installed behind the roll of the door. The interior height of the compartment shall be measured from the floor to the ceiling. The depth of the compartment shall be measured from the back wall to the inside of the door frame.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

ROLL-UP REAR COMPARTMENT DOOR

The rear compartment shall have a roll-up door.

The door shall be double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™ brand roll-up doors.

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

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

The door shall 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.

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

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 shall be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers shall 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.

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

The door shall have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

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

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

SCUFFPLATE

Brushed stainless steel shall be provided on the front bulkhead areas of the body. Both sides of the front bulkhead areas shall have brushed stainless steel in place of aluminum treadplate.

COMPARTMENT LIGHTING

There shall be seven (7) compartments with Pierce LED compartment light strips. The strips shall be centered vertically along each side of the door framing. The compartments with these strip lights shall be located RS1, RS2, RS3, LS1, LS2, LS3, B1.

Opening the compartment door shall automatically turn the compartment lighting on.

HATCH COMPARTMENTS

Hatch compartments with two (2) lift-up, top opening hatch doors shall be provided above the left and right side body compartments. Each hatch compartment shall extend the full length of the side body compartmentation x 21.00" wide x 22.00" maximum depth. The compartments shall extend the full length of the side body compartmentation except for a 20.00" recessed step area at the rear of the compartment on the access side.

Sides of the compartments shall be constructed of the same material as the body and painted job color on the outside panels. A chrome and black vinyl molding shall be provided to cover the seam between the top of the body panel and the bottom of the hatch compartment. The

vertical outboard seam at the center of the compartment shall have a 1.00" wide painted aluminum extrusion.

Top of the compartments shall be constructed of bright aluminum treadplate.

Two (2) lift-up, bright aluminum treadplate doors shall be provided on the top of each hatch compartment. Each door shall have a lever handle with a slam style latch to hold the doors in the closed position.

These double pan doors shall have lipped edges with a rubber seal for weather resistance.

Doors shall be hinged on the outboard side and shall be held open with pneumatic stay arms.

The compartments shall have a 3/4" drain that extends to below the body. Black rubber matting shall be provided to help prevent stored equipment in pooled water.

Handrails shall be provided at the step area to the rear of the hatch compartment. One (1) curved handrail shall be mounted on the outboard side of the step area at the rear and curve over the top. One (1) straight handrail shall be mounted vertically along the inboard side of the step area.

HATCH COMPARTMENT LIGHTING

There shall be LED strip lights mounted full length on the interior, hinged side of each compartment.

Opening the hatch compartment door shall automatically turn the hatch compartment lighting on.

CARGO/DUNNAGE AREA LIGHTING

There shall be two (2), 12 volt DC strips lights with white LEDs and stainless steel protective cover, provided to illuminate the cargo area.

- One (1) light strip shall be installed the entire length of the left side of the cargo area.
- One (1) light strip shall be installed the entire length of the right side of the cargo area.

The light(s) shall be activated by the same switch control that has been selected for the hose bed light(s).

MOUNTING TRACKS

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

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

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

ADJUSTABLE SHELVES

There shall be one (1) shelf with a capacity of 500 lb provided.

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

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

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

The location(s) shall be in LS1 at the depth transition point.

ADJUSTABLE SHELVES

There shall be one (1) shelf with a capacity of 500 lb provided. The shelf construction shall consist of 0.188" aluminum painted spatter gray. Each shelf shall be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves shall be held in place by 0.12" thick stamped plated brackets and bolts.

The location shall be LS3.

The side height of the shelf/shelves shall be as follows:

- Front: 2.00" high
- Rear: 2.00" high
- Left & Right Sides: 2.00" high

SLIDE-OUT ADJUSTABLE HEIGHT TRAY

There shall be three (3) slide-out trays provided.

Each tray shall have 2.00" high sides and a minimum capacity rating of 500 lb in the extended position.

Each tray shall be constructed of aluminum painted spatter gray.

Each tray shall be mounted on a pair of side mounted slides. The slide mechanisms shall have ball bearings for ease of operation and years of dependable service. The slides shall be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock shall be provided for both the in and out tray positions. The lock trip mechanism shall be located at the front of the tray and shall be easily operated with a gloved hand.

The location(s) shall be in RS1 in the lower third, in RS3 in the lower third and in LS1 in the lower third

SLIDE-OUT/TILT-DOWN TRAY

There shall be one (1) slide-out tray provided.

The bottom of each tray shall be constructed of 0.188" thick aluminum painted spatter gray while special aluminum extrusions shall be utilized for the tray sides, ends, and tracks. The corners shall be welded to form a rigid unit.

A spring loaded lock shall be provided on each side at the front of the tray. Releasing the locks shall allow the tray to slide out approximately two-thirds (2/3) of its length from the stowed position and tip 30 degrees down from horizontal. The tray shall be equipped with ball bearing rollers for smooth operation.

Rubber padded stops shall be provided for the tray in the extended position.

The capacity rating of the tray shall be a minimum of 215 lb in the extended position.

The vertical position of the tray within the compartment shall be adjustable.

The location(s) shall be in RS2 centered between the floor and the ceiling.

SLIDE-OUT FLOOR MOUNTED TRAY

There shall be four (4) floor mounted slide-out tray(s) with 2.00" sides provided RS1 RS3 LS1 R1. Each tray shall be rated for up to 500lb in the extended position. The tray(s) shall be constructed of
.19" aluminum with non-welded corners. The finish shall be painted

spatter gray.

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

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

To ensure years of easy operation, the slides shall 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 shall have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance shall be provided upon request.

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

SWING OUT TOOLBOARD

A swing out aluminum tool board shall be provided. It shall be a minimum of .188" thick aluminum.
Pac Trac tool mount material shall be provided on both sides of the tool board.

A 1.00" x 1.00" aluminum tube frame shall be welded to the edge of the pegboard.

The board shall 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 shall be 400 pounds.

The board shall have positive lock in the stowed and extended position.

The board shall have a D-ring handle to secure it in the stowed position.

The board shall be mounted on adjustable tracks from front to back within the compartment.

There shall be One (1) tool board(s) provided and installed LS2.

MATTING, COMPARTMENT FLOOR

Dri-Deck rubber compartment matting shall be provided in two (2) compartments on the compartment floor. The locations are, LS1, RS2.

The Dri-Deck shall be black and .562" thick with holes in the decking to allow air to flow. The leading edge of the matting shall include the beveled edge.

MATTING, COMPARTMENT TRAYS AND SHELVES

Dri-Deck rubber compartment matting shall be provided in the compartments on 12 compartment trays and shelves. The compartment trays and shelves locations shall be: LS1, LS2.LS3, B1, RS1, RS2, RS3.

The Dri-Deck shall be black, and .562" thick with holes in the decking to allow air to flow.

RUB RAIL

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

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

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

Rub rails shall be attached with bolts and spaced from the body with isolators that shall help to absorb any moderate impact without damaging the body.

BODY FENDER CROWNS

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

A fender liner constructed of aluminum painted to match the lower body color shall be provided to avoid paint chipping. The liners shall be removable to aid in the maintenance of rear suspension components.

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

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

HARD SUCTION HOSE

Two (2) lengths of 6.00" corrugated hard suction hose, 10' in length, shall be provided. The hose shall be equipped with a long handle female coupling on one (1) end and a rocker lug male coupling on the other end. Couplings shall be hard coated aluminum.

HOSE TROUGHS

A quantity of two (2) hard suction hose troughs shall be provided inside the hatch compartment, mounted side by side, located on the right side.

Troughs shall be constructed of stainless steel.

One (1) brushed stainless steel door with a Southco C2 chrome raised trigger lever latch hinged on the top, shall be provided at the rear of the compartment.

an aluminum floor above the length of the hard suction hose and a vertical partition the height of the compartment is provided in relation to the hard suction hose in the hatch compartment to allow for storage of additional equipment.

HANDRAILS

The handrails shall be 1.25" diameter knurled aluminum to provide a positive gripping surface.

Chrome plated end stanchions shall support the handrail. Plastic gaskets shall be used between end stanchions and any painted surfaces.

Drain holes shall be provided in the bottom of all vertically mounted handrails.

Handrails shall be located on the front of the body in positions needed to meet NFPA requirements.

Two (2) vertical handrails shall be located at the rear, one (1) on each side of the rear compartment.

ADDITIONAL HANDRAIL

One (1) handrail shall be mounted drivers rear bulkhead for the step to meet UL certification. The handrail(s) shall be constructed out of knurled aluminum.

AIR BOTTLE STORAGE (TRIPLE)

A quantity of two (2) air bottle compartments designed to hold (3) air bottles up to 7.25" in diameter x 26.00" deep shall be provided on the right side forward of the rear wheels and on the right side rearward of the rear wheels. A polished stainless steel door with a Southco raised trigger C2 chrome lever latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black Dura-Surf friction reducing material shall be provided.

Air Bottle Compartment Strap

A strap shall be provided in the air bottle compartment(s) to help contain the air bottles when the vehicle is parked on an incline. The strap shall wrap around the neck and attach to the wall of the compartment.

AIR PACK STORAGE

A total of one (1) air pack compartment(s) shall be provided and located on the left side forward of the rear wheels. The air pack compartment(s) shall be tapered to match the profile of the space available in the fender. The compartment(s) shall be approximately 15.50" wide at the top and 5.00" wide at the bottom for the wheel cutout. The compartment(s) shall be 15.50" tall at the body side compartment and 6.00" tall at the wheel cutout. The compartment(s) shall be 26.00" deep and have a drain hole.

Inside the compartment, black Dura-Surf friction reducing material shall be provided.

A polished stainless steel hinged door with a Southco raised trigger C2 chrome lever latch shall be provided to contain the air pack. A dielectric barrier shall be provided between the door hinge, hinge fasteners and the body sheet metal.

EXTENSION LADDER

There shall be a 24' two-section aluminum Duo-Safety Series 900-A extension ladder provided.

ROOF LADDER

There shall be a 14' aluminum Duo-Safety Series 775-A roof ladder provided.

LADDER STORAGE

The ladders shall be stored in a tunnel through the water tank and

accessed at the rear.

Ladder shall be stored horizontally stacked and banked. The tunnel shall include poly blocks to space the ladders apart.

If the ladders extend beyond the length of the water tank, the portion of the ladders that extend into the pump area shall be enclosed. The tunnel shall extend to within a few inches of the rear wall. The gap between the rear wall and tunnel shall be enclosed with a rubber seal.

Ladders shall be secured from moving forward during travel.

Rear of ladder storage area shall have a(n) smooth aluminum lift up door with two (2) stay arms with a pair of Southco raised trigger C2 chrome latches for access to the ladders.

FOLDING LADDER

One (1) 10.00' aluminum, Series 585-A, Duo-Safety folding ladder shall be installed.

FOLDING LADDER/LONG TOOL COMPARTMENT

A compartment shall be provided, recessed in the upper, inside part of body compartment on the left side. The compartment shall be equipped with a stainless steel trough for the folding ladder and storage for long handle tools.

A door constructed of smooth aluminum and hinged along the outboard edge shall be provided at the rear with a Southco C2 chrome flush latch.

10' PIKE POLE

One (1) pike pole Fire Hooks Unlimited, Model RH-10, 10' long roof hook with a steel handle shall be provided and located "Right Side long tool storage"..

8' PIKE POLE

One (1) pike pole, Fire Hooks Unlimited, Model RH8, 8' long roof hook, with pry end and steel handle shall be provided and located "Right Side long tool storage"..

PIKE POLE PROVIDED BY FIRE DEPARTMENT

The pike poles are not on the apparatus as manufactured. The fire department shall provide and mount the pike poles.

There shall be one (1) pike pole(s) provided. The pike pole(s) shall

be a Duo-Safety 8' pike pole.

PIKE POLE STORAGE

A aluminum tube with a no notch for an 8' or longer pike pole shall be provided in the upper body compartment on the right side. Two (2) pike poles shall require a tube provided in this location.

6 FT PIKE POLE

There shall be one (1) Fire Hooks Unlimited APH-6, 6 foot pike pole(s) with fiberglass "D" handles provided.

PIKE POLE STORAGE

A aluminum trough for a 6' pike pole shall be provided in the upper body compartment on the left side.

LONG ITEM STORAGE COMPARTMENT

One (1) compartment shall be provided, recessed in the upper, inside part of body compartment on the right side for storage of long handle tools. The door shall be made of smooth aluminum and have a Southco C2 chrome raised trigger lever latch. The door shall be hinged along the outboard edge.

LADDER, TOP ACCESS

A wide easy climbing access ladder, constructed of aluminum rungs and extruded aluminum rails, shall be provided on the right side at the rear of the apparatus. The inside climbing area of the ladder shall be
13.75" wide.

The lower section of the ladder shall be retractable into the upper section to eliminate interference with the rear FMVSS lights. When lowered the bottom rung shall be lower than the body, approximately 16.00" to 20.00" from the ground to allow a lower first step height.

The ladder shall be slanted when in use for easy access, and fold against the body for storage to reduce the overall length. Corrosion resistant, stainless steel spring-loaded locks shall hold the ladder in place.

There shall be a "do not move truck" indicator activated in the cab if the ladder is not in the stowed position when the parking brake is disengaged.

ADDITIONAL STEP

An 8.00" deep, full width bright aluminum treadplate step shall be provided at the rear of the body.

PUMP CONTROL PANELS (LEFT SIDE CONTROL)

Pump controls and gauges shall be located midship at the left side of the apparatus and properly identified.

The main pump operator's control panel shall be completely enclosed and located in the forward section of the body compartment, to protect against road debris and weather elements. The pump operator's panels shall be no more than 31.00" wide, and made in four (4) sections with the center section easily removable with simple hand tools. For the safety of the pump operator, there shall be no discharge outlets or pump inlets located on the main pump operators panel.

Layout of the pump control panel shall be ergonomically efficient and systematically organized. The upper section shall contain the master gauges. This section shall be angled down for easy visibility. The center section shall contain the pump controls aligned in two horizontal rows. The pressure control device, engine monitoring gauges, electrical switches, and foam controls (if applicable) shall be located on or adjacent to the center panel, on the side walls for easy operation and visibility. The lower section shall contain the outlet drains.

Manual controls shall be easy moving 8" long lever style controls that operate in a vertical, up and down swing motion. These handles shall have a 2.25" diameter knob and be able to lock in place to prevent valve creep under any pressure. Bright finish bezels shall encompass the opening, be securely mounted to the pump operator's panel, and shall incorporate the discharge gauge bezel. Bezels shall be bolted to the panel for easy removal and gauge service. The left side discharges shall be controlled directly at the valve. There shall be no push-pull style control handles.

Identification tags for the discharge controls shall be recessed within the same bezel. The discharge identification tags shall be color coded, with each discharge having its own unique color.

All remaining identification tags shall be mounted on the pump panel in chrome-plated bezels.

All discharge outlets shall be color coded and labeled to correspond with the discharge identification tag.

The pump panels for the midship discharge and intake ports shall be located ahead of the body compartments with no side discharge or

intake higher than the frame rail. The pump panels shall be easily removable with simple hand tools.

A recessed cargo area shall be provided at the front of the body, ahead of the water tank above the plumbing.

PUMP

Pump shall be a Pierce, low profile, 2000 gpm single stage midship mounted centrifugal type, mounted below the cab. The pump shall have a
15 percent reserve capacity to allow for extended time between pump rebuild. To ensure efficient pump/vehicle design the capacity to weight ratio shall not be less than 1.5:1.

The pump casing shall consist of three (3) discharge outlets, one (1) to each side in line with the impeller and one (1) to the rear. The pump casing shall incorporate two (2) water strippers to maintain radial balance.

Pump shall be the Class A type.

Pump shall be certified to deliver the percentage of rated discharge from draft at pressure indicated below:

- 100 percent of rated capacity at 150 psi net pump pressure
- 70 percent of rated capacity at 200 psi net pump pressure
- 50 percent of rated capacity at 250 psi net pump pressure

The pump shall have the capacity to deliver the percentage of rated discharge from a pressurized source as indicated below:

- 135 percent of rated capacity at 100 psi net pump pressure from a 5 psi source

Pump body shall be fine-grained gray iron. Pump shall incorporate a heater/cooling jacket integral to the pump housing.

The impeller shall be high strength vacuum cast bronze alloy accurately machine balanced and splined to a ten 10) spline stainless steel pump shaft for precision fit, exceptional durability, and efficiency.
Double replaceable reverse flow labyrinth type bronze wear ring design shall help to minimize end thrust. The impeller shall be a twisted vane design to create higher lift. No keyed shafts shall be acceptable.

The pump shall include O-ring gaskets throughout the pump.

Deep groove radial type oversize ball bearings shall be provided. The bearings shall be protected at the openings from road dirt and water with an oil seal and water slinger.

The pump shall have a flat, patterned area on the top of the pump intake wye to allow standing for plumbing maintenance. The main inlet manifold shall be 6.00" in diameter and shall have a low profile design to facilitate low crosslays and high flows.

For ease of service, the pump housing, intake wye, impeller, mechanical seal, and gear case shall be accessible from above the chassis frame by tilting the cab. Removal of the main inlet wyes shall provide access to the impeller, mechanical seal, and wear ring.

The tank to pump line and the primary discharge line shall be the only piping required to be removed for overhaul.

For ease of service and overhaul there shall be no piping or manifolding located directly over the pump.

PUMP MOUNTING

Pump shall be mounted to the chassis frame rails directly below the crew cab, to minimize wheelbase and facilitate service, using rubber isolators in a modified V pattern that include one (1) central mounted isolator located between the frame rails and one (1) on each side outside the frame rails. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump. Each isolator shall be 2.55" in total outside diameter and shall be rated at 490 lb.
The pump shall be completely accessible by tilting the cab with no piping located directly above the pump.

MECHANICAL SEALS

Silicon carbide mechanical seals shall be provided. The seals shall be spring loaded and self-adjusting. The seals shall have a minimum thermal conductivity of 126 W/m*K to run cooler. Seals shall have a minimum hardness of 2800 kg/mm2 to be more resistant to wear, and have thermal expansion characteristics of no more than 4.0 X106mm/mm*K to be more resistant to thermal shock.

PUMP GEAR CASE

The integrated pump transmission gear case shall use a pressure-lubricated system to cool, lubricate, and filter the oil. The gear case shall be constructed of lightweight aluminum, and impregnated with resin in accordance to MIL Spec MIL-I-17563. A sight glass,

accessible by tilting the cab, shall be provided for easy fluid level checks.

The gear case shall consist of three (3) gears to drive the pump.

CLUTCH

There shall be a heavy-duty hydraulic clutch mounted directly to the integrated pump transmission to engage and disengage the pump without gear clash. The clutch shall be a multiple disc design for maximum torque. The clutch shall be fully self-adjusting to provide automatic wear compensation, and consistent torque throughout the life of the clutch. Positive engagement and disengagement shall be provided through a high efficient and dependable hydraulic system to assure superior performance.

LOW PRESSURE/HIGH TEMPERATURE LIGHTS

Lights shall be provided to indicate when a high temperature or low pressure situation occurs. Lights shall be provided next to the master gauges at the pump panel as well as on the control panel in the cab. A pair of lights shall be provided in each location. One (1) light shall be provided to indicate high temperature. The second light shall be provided to indicate a low pressure. All lights shall be labeled accordingly.

PUMPING MODE

Pump shall provide for both pump and roll mode and stationary pumping mode.

Stationary pumping mode shall be accomplished by stopping the vehicle, setting the parking brake and engaging the water pump switch on the cab switch panel. The transmission shall shift to "Neutral" range automatically when the parking brake is set. The "OK to Stationary Pump" indicator shall also illuminate when the parking brake is set.

If the vehicle is equipped with a suitable Husky foam system or Hercules CAFS system, these systems shall be engaged from the cab switch panel as well.

Pump and roll mode shall be accomplished by the use of the main pump and shall not require the use of a secondary pump. Pump and roll mode shall use the same operation sequence as stationary pumping mode with a few additional steps. After the vehicle is setup for stationary pumping, the operator shall leave the cab and setup the pump panel to discharge at the desired outlet(s). Upon returning to

the cab, the operator shall disengage the parking brake. An "OK to pump and roll" indicator shall illuminate on the cab switch panel. First gear on the transmission gear selector shall be selected by the operator for pump and roll operations. The operator as needed shall apply the foot throttle. pump and roll mode shall be maintained unless the transmission shifts out of first gear.

Stopping either stationary pumping mode or pump and roll mode shall be accomplished by pressing the "Water Pump" switch down to disengage the pump.

A pump pressure reading shall be displayed in view of the driver.

PUMP SHIFT

Pump shall be engaged in not more than two steps, by simply setting the parking brake, which shall automatically put the transmission into neutral, and activating a rocker switch in the cab. Switches in the cab shall also allow for water, foam, or CAFS if equipped, and activate the appropriate system to preset parameters. The engagement shall provide simple two-step operation, enhance reliability, and completely eliminate gear clash. The shift shall include the indicator lights as mandated by NFPA. A direct override switch shall be located behind a door in the pump operator's panel. The switch shall automatically disengage when the door is closed.

As the parking brake is applied, the pump panel throttle shall be activated and deactivate the chassis foot throttle for stationary operation.

TRANSMISSION LOCK UP

Transmission lock up is not required as transmission shall automatically shift to neutral as soon as the parking brake is set.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. A water-to-coolant heat exchanger shall be used.

INTAKE RELIEF VALVE - PUMP

One (1) Elkhart Style 40 relief valve(s) shall be installed on the suction side of the pump preset at 125 psig.

The relief valve(s) shall have a working range of 75 psi to 250 psi.

The outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.

The relief valve pressure control shall be located behind the right side pump panel with a stainless steel access door.

PIERCE PRESSURE CONTROLLER

A Pierce electronic pressure controller shall be provided.

A pressure transducer shall be installed in the discharge side of the water pump. The transducer continuously monitors pump pressure sending a signal to the electronic pressure controller.

The pressure controller can be used in two (2) modes of operation, RPM mode and pressure modes. The controller shall be programmed to turn on/default to Pressure Setting mode.

In the RPM mode, the controller can be activated after vehicle parking brake has been set. When in this mode, the controller shall maintain the set engine speed, regardless of engine load (within engine operation capabilities).

In the pressure mode, the controller can be activated after vehicle parking brake has been set. When in this mode, the controller shall automatically maintain the discharge pressure set by the operator

(within the discharge capabilities of the pump and water supply) regardless of flow.

A 2.00" diameter throttle control knob with no mechanical stops, a serrated grip, and a red idle push button in the center shall be a integrated/part of the pressure controller. The throttle control knob shall be programmed for Clockwise rotation to increase engine speed.

Individual LED indicators for ok to pump, throttle ready, pressure mode and rpm mode shall be located on the pressure controller for easy viewing.

A pump cavitation protection feature shall also be provided which shall return the engine to idle should the pump cavitate. Cavitation is sensed by the combination of pump pressure below 30 psi and engine speed above 2000 rpm for more than five (5) seconds.

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

The pressure controller LCD screen shall be 4.20" in size with a minimum brightness of 750 nits. The LCD screen and LED intensity shall automatically adjust for day and nighttime operation. The LCD screen intensity can also be manually adjusted if needed.

The following information shall be provided/displayed on the LCD screen:

- Engine RPM
- Check engine and stop engine warning indicators
- Engine oil pressure
- Engine coolant temperature
- Water pump transmission temperature
- Fuel Level
- Water tank level
- Battery voltage
- Operating mode (RPM or pressure)
- Pressure or RPM setting

On screen messaging show diagnostic and warning messages as they occur. It shall show apparatus information, stored data, and program options when selected by the operator. It shall monitor inputs outputs and support audible and visual warning alarms for the following conditions:

- High battery voltage
- Low battery voltage/engine off
- Low battery voltage/engine running
- High water pump temperature
- Low fuel
- Low engine oil pressure
- High engine coolant temperature
- Water tank out of water (visual alarm only)
- No engine response (visual alarm only)

The pressure controller shall store the accumulated operating hours for the pump and engine. These items are to be displayed within the pressure controller menu.

The pressure controller shall include a USB port on the back of the controller for easy software upgrades if needed.

PRIMING PUMP

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

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

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

THERMAL RELIEF VALVE

A Pierce thermal relief valve shall 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 140 Degrees F (49 C).

The thermal protection system shall include a amber warning light mounted on the pump operator panel.

The discharge line shall be 3/8 inch diameter tubing plumbed to ground.

PUMP MANUALS

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

PLUMBING, STAINLESS STEEL AND HOSE

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

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

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

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

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

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

FOAM SYSTEM PLUMBING

All piping that is in contact with the foam concentrate or foam/water solution shall be stainless steel. The fittings shall be stainless steel or brass. Cast iron pump manifolds shall be allowed.

MAIN PUMP INLETS

A 6.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

Main pump inlets shall not be located on the main operator's panel and shall maintain a low connection height by terminating below the top of the chassis frame rail.

INLET VALVES WITH INTAKE RELIEF VALVE

There shall be a Task Force Tips (TFT) AX Series AX1SP-NX with side handwheel aluminum ball intake valve(s) provided at both the left side and the right side main pump inlets . A matching cap shall be included.

If ball intake valve is to be controlled with a manual handwheel, the handwheel shall be controlled with a NFPA compliant slow-close hand wheel. A position indicator shall be provided to allow for a quick visualization of the status of the valve in the open, closed or transition position.

If the ball intake valve is to be electrically controlled, the ball intake valve shall be controlled by a remote panel-mounted push-button switch with LED lights for a quick visualization of the status of the valve in the open, closed or transition position. The push button switch shall be mounted on the pump operator's panel.

The ball intake valve shall be equipped with a standard adjustable pressure relief valve. The relief valve shall have a working range of 90 PSI to 300 PSI.

A 0.75" TFT bleeder/drain valve shall be provided on the ball intake valve to exhaust excess air or water from the valve.

For corrosion protection the aluminum casting shall have a hard coat anodized finish, with a powder coated internal and external finish. All the components facing the wet side of the valve shall be constructed from stainless steel.

MAIN PUMP INLET CAP

The main pump inlets shall have National Standard Threads with a long handle chrome cap.

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

VALVES

All ball valves shall be Elkhart Unibody series. Seats shall be self-adjusting for minimum operating torque and maximum abrasion resistance. The Elkhart valves shall have an automatic locking feature to hold the ball in any throttle position at any operating pressure. The valve body design shall allow any actuator to be mounted to the body.

The location of the valve for the two (2) inlets shall be recessed behind the pump panel.

INLET CONTROL

The side auxiliary inlet(s) shall incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism shall indicate the position of the valve.

LEFT SIDE INLET

There shall 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 shall be provided with a strainer, chrome swivel and plug.

ANODE, INLET

A pair of sacrificial zinc anodes shall be provided in the water pump inlets to protect the pump from corrosion.

FRONT INLET

A 5.00" inlet front inlet that terminates on top of the right side

bumper extension shall be provided.

The plumbing shall consist of 5.00" stainless steel and a 5.00" stainless steel Jamesbury butterfly valve. Only radius elbows shall be used in the piping, no mitered joints.

Drains shall be furnished in all the low points of piping and have .75" valves with T swing handle.

Bleeder valves shall be located near the threaded connection and the valve control.

Die cast zinc screens shall be provided at the front inlet connection.

FRONT INLET CONTROL

The front inlet shall be gated with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve or an indicator shall be provided to show when the valve is closed.

There shall be an electric valve controller provided. The control shall be momentary to allow the valve to be gated for ease of operation.
Indicator lights shall be provided to show if the valve is open or closed.

FRONT INLET INTAKE RELIEF VALVE

An Elkhart Brass Style 40 intake pressure relief valve shall be provided on the inlet side of the valve preset at 125 psig.

The pressure relief valve shall be adjustable from 75 to 250 psi.

The outlet shall be 2.50" National Standard hose thread and terminate below the frame rails and shall have a "do not cap" warning tag near the discharge outlet.

FRONT INLET ELBOW

The front inlet shall have a 5.00" inlet elbow with swivel, terminating with Male National Standard Hose Thread.

The swivel shall be Chrome.

A quarter-turn style of bleeder shall be provided on the front inlet elbow.

FRONT INLET CAP PROVIDED BY FIRE DEPARTMENT

NFPA 1900, 2024 edition, section 13.6.8 requires intakes to be provided with caps, plugs, or closures capable of withstanding a hydrostatic gauge pressure of 500 psi (3400 kPa).

The front inlet cap is not on the apparatus as manufactured. The fire department shall provide a cap for the front inlet.

LARGE DIAMETER REAR INLET

A 5.00" inlet with screen shall be provided using 5.00" piping and a 5.00" butterfly valve.

The screen shall provide cathodic protection against corrosion in the piping.

The piping shall contain only large radiused elbows, no mitered joints.

The plumbing shall be routed to the rear below the water tank, between the frame rails, up the rear wall of the tank and into the left side rear compartment.

The inlet shall terminate at the left side rear bulkhead.

Bleeder valves shall be located near the threaded connection and the valve control.

REAR INLET CONTROL

The rear inlet shall be gated with an electric operated control at the pump operator's panel. The control shall be momentary to allow the valve to be gated for ease of operation. Indicator lights shall be provided to show if the valve is open or closed.

REAR INLET ELBOW & CAP

The rear 5.00" inlet shall be furnished with a 5.00" (F) National Standard hose thread x 4.00" Storz elbow adapter with a Storz cap.

REAR INLET INTAKE RELIEF VALVE

An Elkhart Brass Style 40 intake pressure relief valve shall be provided on the inlet side of the valve preset at 125 psig .

The pressure relief valve shall be adjustable from 75 to 250 psi.

The outlet shall be 2.50" National Standard hose thread and terminate below the frame rails and shall have a "do not cap" warning tag near the discharge outlet.

5.00" FNST X 4.00" STORZ ADAPTER

There shall be a 5.00" FNST x 4.00" Storz rigid adapter provided on

the front inlet plumbing.

INLET BLEEDER VALVE

A 0.75" bleeder valve shall be provided for each side gated inlet.

The valves shall be located behind the panel with a "T" swing style handle control extended to the outside of the panel.

The handles shall be chrome plated and provide a visual indication of valve position. The swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage.

The water discharged by the bleeders shall be routed below the chassis frame rails.

TANK TO PUMP

The booster tank shall be connected to the intake side of the pump with heavy duty 4.00" piping and a quarter turn 3.00" full flow line valve with the control located at the operator's panel. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

TANK REFILL

A 1.50" combination tank refill and pump re-circulation line shall be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

DISCHARGE OUTLET CONTROLS

The discharge outlets shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve or an indicator shall be provided to show when the valve is closed.

The right side discharges shall be controlled by an Elkhart Apex electric valve controller with the manual override located on the right side pump panel. The controller unit shall provide position feedback with a LED display that indicates closed to fully open status. The controller shall be completely sealed with two (2) button open and close valve position. In addition to valve position, each controller shall include a pressure display.

All other outlets shall have manual swing handles that operate in a

vertical up and down motion. These handles shall be able to lock in place to prevent valve creep under pressure.

LEFT SIDE DISCHARGE OUTLETS

There shall be two (2) discharges with a 2.50" valves on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter. Discharges shall be located below the cab, and shall be no higher than the top of the chassis frame rail. Discharges shall not be located on the pump operator's panel. Lever controls shall be provided at the valve.

RIGHT SIDE DISCHARGE OUTLET

There shall be one (1) discharge with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter. The discharge shall be located below the crew cab, and shall be no higher than the top of the chassis frame rail.

The valve shall be controlled with an Elkhart Apex electric valve controller provided on the pump operators panel. The electric control must be of a true position feedback design, requiring no clutches in the motor or current limiting. The controller shall have momentary open, close as well as programmable preset valve positions. The controller shall provide position indication on a full color, backlit LCD display. It shall have manual adjustment of the brightness as well as an auto dimming option.

In addition to valve position, each controller shall include a pressure display.

LARGE DIAMETER DISCHARGE OUTLET

There shall be an Elkhart 4.00" flat ball valve with 4.00" plumbing terminating with a 4.00" MNST chrome adapter on the right side pump panel.

The valve shall be controlled with a(n) Elhart Apex 200 with pressure located at the pump operators panel.

LARGE DIAMETER OUTLET CAP

The large diameter outlet shall have a National Standard hose thread adapter with a 4.00" rocker lug chrome plated cap and chain.

The cap shall be the Pierce VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected.

FRONT DISCHARGE OUTLET

There shall be one (1) 2.50" discharge outlet piped to the front of the apparatus and located on the top of the left side of the front bumper.

Plumbing shall consist of 3.00" piping and flexible hose with a 3.00" full flow valve with control at the pump operator's panel. A fabricated weldment made of stainless steel pipe shall be used in the plumbing where appropriate. The piping shall terminate with a 2.50" NST with 90 degree stainless steel swivel.

There shall be T swing handle drains provided at all low points of the piping.

Any 3.00 inch or larger discharge valve shall be a slow-operating valve in accordance with NFPA 13.7.5.3.

REAR DISCHARGE OUTLET

There shall be One (1) discharge outlet piped to the rear of the hose bed, on left side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 3.00" piping along with a 3.00" full flow ball valve with the control from the pump operator's panel. Discharge shall terminate with 2.50" NST thread. Discharge piping shall be schedule 10 304L welded or formed stainless steel and routed through the water tank.

Any 3.00 inch or larger discharge valve shall be a slow-operating valve in accordance with NFPA 13.7.5.3.

REAR OUTLET ELBOWS

The 2.50" discharge outlets located at the rear of the apparatus shall be furnished with a 2.50" (F) National Standard hose thread x 2.50"
(M) National Standard hose thread, chrome plated, 45 degree elbow.

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

REAR DISCHARGE OUTLET

There shall be One (1) discharge outlet piped to the rear of the hose bed, on left side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 3.00" piping along with a 2.50" full flow ball valve with the control from the pump operator's panel. Discharge shall terminate with 2.50" NST thread.

Discharge piping shall be schedule 10 304L welded or formed stainless steel and routed through the water tank.

ADDITIONAL REAR OUTLET ELBOWS

Two (2) discharge outlets 2.50" discharge outlets, located at the rear of the apparatus, shall be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

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

DISCHARGE CAPS/ INLET PLUGS

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

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

The caps and plugs shall incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

OUTLET BLEEDER VALVE

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

The valves shall be located behind the panel with a T swing style handle control extended to the outside of the side pump panel.

The handles shall be chrome plated and provide a visual indication of valve position.

The T swing handle shall provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage.

Bleeders shall be located at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to.

The water discharged by the bleeders shall be routed below the chassis frame rails.

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. A 2.50" valve shall be provided. The deluge riser shall allow flow for 1000 GPM.

TELESCOPIC PIPING

The deluge riser piping shall include a 18.00" Task Force Model XG18 Extend-A-Gun extension.

This extension shall be telescopic to allow the deluge gun to be raised 18.00" increasing the range of operation.

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.

MONITOR

An Elkhart Brass, Cobra EXM2 7250 electric monitor shall be provided on the deluge riser.

The monitor shall be constructed from durable, hard anodized, lightweight Elk-O-Lite® material with a variable cross-sectional and vaned waterway for flows up to 1500 gpm (Model 7250).

This monitor shall include two (2) 12 volt DC gear motors that allow for simultaneous vertical and horizontal adjustment.

A EXM2 panel mount controller and EXM2 wireless handheld controller (7015X2) shall be furnished and mounted deluge .

Electric controls shall be NEMA 4 rated and allow for programmable horizontal center position, vertical and horizontal stops, stow and deploy positions, keep out zones, and motor speeds fast or slow; electric control shall allow for horizontal and vertical oscillation, electric control shall be CAN compatible; shall be compatible with both 12VDC and 24VDC power supply; shall include auxiliary output for driving an external device (i.e. light or camera).

The monitor shall feature an integrated Wi-Fi communication system that allows for configuration and diagnostics via a Wi-Fi capable device.

The monitor shall be painted to match the body.

NOZZLE

An Elkhart #SM-1500E electrically controlled Select-O-Matic master stream nozzle shall be provided.

The deluge riser shall have male National Pipe Threads for mounting the monitor.

CROSSLAY MODULE

The crosslay module shall be full width of the rear body.

The forward, upper corners of the module shall have full body corners.

The crosslay module shall be manufactured for installation of roll up doors on each side.

ROLL-UP DOOR, CROSSLAY ENDS, PUC

All compartment doors shall be roll-up style double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™. The crosslay enclosure shall be full width of the body.

The track shall be the flanged track with the screws installed to the rear of the track guide.

The slats shall be double wall box frame extrusion. The exterior surface shall be flat and the interior surface shall be concave to help loose equipment fall to the ground and prevent it from jamming the door.

Between each slat shall be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments.

Each door shall have a 4.00" counter balance to assist in lifting.

A polished stainless steel lift bar to be provided for each roll-up door. The lift bar shall be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers shall 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.

The crosslays shall have a standard drip pan below the roll of the door.

CROSSLAY COMPARTMENT LIGHTING

There shall be two (2) 12 volt DC light strips with white LEDs and mechanical fasteners, provide behind the front door frame on the crosslay compartments per the following:

- One (1) strip light for the left side crosslay compartment door
- One (1) strip light for the right side crosslay compartment door

The lights shall be activated when the battery switch is on and the respective door is opened.

LOWER CROSSLAY

There shall be two (2) lower crosslays provided.

1.50" Crosslay

There shall be two (2) 1.50" crosslays plumbed with 2.00" welded or formed schedule 10 304L stainless steel pipe.

The crosslays shall be low mounted with the bottom of both crosslay trays no more than 11.00" above the frame rails for simple, safe reloading and deployment.

There shall be a 1.50" National Standard hose thread 90-degree swivel provided in each hose bed, so that the hose may be removed from either side of apparatus. The swivel shall be as far outbound as possible for ease of changing hose.

Each crosslay shall be gated with a 2.00" quarter turn ball valve with the controls located at the pump operator's panel.

Each hose bed shall be capable of carrying 200' of 1.75" double jacket hose.

Crosslay Hose Tray

A removable tray shall be provided for each crosslay hose bed. The crosslay tray shall be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes shall be in the floor and additional hand holes shall be provided in the sides for easy removal and installation from the compartment. The floor of the trays shall be perforated to allow for drainage and hose drying.

Trays shall be held in place by a mechanical spring-loaded stainless-steel latch that automatically deploys upon loading the trays to hold the trays in place during transit.

UPPER CROSSLAY

There shall be one (1) upper crosslay provided.

2.50" Crosslay

There shall be one (1) 2.50" crosslay plumbed with 2.50" welded or formed schedule 10 304L stainless steel pipe.

There shall be a 2.50" National Standard hose thread 90-degree swivel provided in each hose bed, so that hose may be removed from either side of apparatus. The swivel shall be as far outbound as possible for ease of changing hose.

Each crosslay shall be gated with a 2.50" quarter turn ball valve with the controls located at the pump operator's panel.

Each hose bed shall be capable of carrying 200' of 2.50" double jacket hose.

Crosslay Hose Trays

A removable tray shall be provided for each crosslay hose bed. The crosslay tray shall be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes shall be in the floor and additional hand holes shall be provided in the sides for easy removal and installation from the compartment. The floor of the trays shall be perforated to allow for drainage and hose drying.

Trays shall be held in place by a mechanical spring-loaded stainless-steel latch that automatically deploys upon loading the trays to hold the trays in place during transit.

BACKBOARD STORAGE

Mounting shall be provide for Two (2) backboard(s) located in the upper crosslay module. The backboard(s) shall be enclosed and removable from either side of the truck. A Velcro® strap shall be provided on each end of the storage. The backboard(s) to be stored shall be 72"x18"x1.75".

FOAM SYSTEM

A Trident FoamMate 2.1 around-the-pump foam proportioner shall be installed on the intake side of the pump.

The foam system shall be a single agent foam system capable of handling Class "B" foam concentrates.

A metering valve shall be included, with an instruction chart and piping schematic, allowing the operator to select the proper setting

at any flow within the operating range.

The rated capacity of this system shall be 2000 gpm at 1%, 2000 gpm at 3%, and 1000 gpm at 6%.

Controls for the foam system shall be located on the pump operator's panel and labeled with tags for easy identification. The controls for the foam supply and the water flush shall be full electric to allow for an ergonomically designed control panel and simplified operation.

All piping coming in direct contact with the foam concentrate shall be immune to the foam concentrate, so deterioration of the plumbing shall be avoided.

FOAM REFILL PUMP

A 12v pump shall be permanently mounted in the pump compartment. A male quick disconnect fitting shall be provided on the Left Pump Panel and a pick-up wand with a 6' tube and mating female fitting shall be provided loose.

The control switch for the pump shall be located on the pump panel adjacent to the quick disconnect fitting. The pump shall be plumbed to the foam tank allowing the user to refill the foam tank from the ground.

FOAM INLET/AUXILIARY PICK-UP

There shall be one (1) foam inlet/auxiliary pick-up system installed on the on the left side pump panel. The foam inlet/auxiliary pick-up shall be plumbed to the directly to the foam tank with a minimum of 1.00" S/S piping or flexible hose capable of resisting the corrosion caused by all foam concentrates. The foam inlet/auxiliary pick-up shall have a 1.00" inline brass ball valve with the control handle located near the foam inlet/auxiliary pick-up. The foam inlet/auxiliary pick-up shall terminate with a 0.75" connection.

A 0.25" brass ball valve shall be provided for the foam inlet/auxiliary pick-up to allow flushing of the entire foam inlet/auxiliary pick-up piping. The valve control handle shall be located near the foam inlet/auxiliary pick-up connection.

The foam inlet/auxiliary pick-up shall terminate with a S/S cam-lock style of quick disconnect male fitting with a matching female S/S dust cap.

A 6ft long, 1.00", clear/reinforced foam inlet/auxiliary pick-up hose assembly shall be supplied in loose equipment for connecting to the

foam inlet/auxiliary pick-up system. The hose assembly shall have a 1.00" female S/S cam-lock fitting with locking levers installed on one end of the hose with the other end of the hose having a wand style of fitting for insertion into foam containers/pails.

The foam inlet/auxiliary pick-up shall not be able to pick-up foam by the means of an on-board pumping system/source.

FOAM SYSTEM TRAINING

The fire department shall order one (1) vehicle with this foam system. A demonstration shall be provided at the apparatus manufacturers facility on the operation of the foam system.

This demonstration shall include:

- A review of the foam system manual emphasizing key areas
- A walk around review of the system components on the finished truck
- A hands-on foam system start-up and foam discharge session
- Instructions on the use of the manual overrides
- The proper way to shut down and flush the foam system.

FOAM TANK

The foam tank shall be an integral portion of the polypropylene water tank. The cell shall have a capacity of 100 gallons of foam with the intended use of Class B foam. The brand of foam stored in this tank shall be National Green 3x3 AR Florine Free. The foam cell shall not reduce the capacity of the water tank. The foam cell shall have a screen in the fill dome and a breather in the lid.

FOAM TANK DRAIN

The foam tank drain shall be a 1.00" drain valve located inside the pump compartment accessible through a door on the right side pump panel.

The following drawing(s) shall be provided for approval by the customer. The drawing(s) shall be made for up 37471 apparatus and/or similar Pierce job number.

PUMP OPERATOR'S PANEL DRAWING

A detailed drawing to scale of the pump operator's panel shall be provided for the customer to review. The drawing shall include all of the gauges, controls, switching, etc.., located on the pump operator's panel. The customer shall be allowed to make changes

and/or mark-ups to this approval drawing. The fire apparatus manufacturer shall make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump operator's panel drawing shall become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items shall NOT be shown on any pump panel approval drawing(s). These item(s) shall be placed on pump panel(s) at the fire apparatus manufacturer discretion.

REMAINING PUMP PANEL(S)

Detailed drawing(s) to scale of the remaining pump panel(s) shall be provided for the customer to review. The drawing(s) shall include all of the gauges, controls, switching, etc.., located on the pump panel(s). The customer shall be allowed to make changes and/or mark-ups to these approval drawing(s). The fire apparatus manufacturer shall make revisions (If needed) to the drawing(s) per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump panel drawing(s) shall become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items shall NOT be shown on any pump panel approval drawing(s). These item(s) shall be placed on pump panel(s) at the fire apparatus manufacturer discretion.

COLOR CODED TAGS

A detailed drawing/chart of the colors used on all of the inlet(s) and outlet(s) shall be provided for the customer to review. The customer shall be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer shall make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the colors shall become part of the contract documents.

SPECIAL TEXT/VERBIAGE TAGS

A detailed drawing/chart of the text/verbiage used on all of the inlet(s) and outlet(s) shall be provided for the customer to review. The customer shall be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer shall make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the text/verbiage shall become part of the contract documents.

PUMP PANEL CONFIGURATION

The pump panel configuration shall be arranged and installed in an organized manner that shall provide user-friendly operation.

PUMP AND GAUGE PANEL

The pump operator's panel and gauge panels shall be brushed stainless steel finish.

The side panels shall be brushed stainless steel finish.

PUMP AND PLUMBING ACCESS

Simple access to the plumbing shall be provided through the front of the body area by raising the cab for complete plumbing service and valve maintenance. Access to valves shall not require removal of operator panels or pump panels. Access for rebuilding of the pump shall not require removal of more than the tank to pump line and a single discharge line. This access shall allow for fast, easy valve or pump rebuilding, making for reduced out of service times. Steps shall be provided for access to the top of the pump.

Access to the pump shall be provided by raising the cab. The pump shall be positioned such that all maintenance and overhaul work can be performed above the frame and under the tilted cab. The service and overhaul work on the pump shall not require the removal of operator panels or pump panels. Complete pump casing and gear case removal shall require no more than removal of the intake and discharge manifolds, driveline, coolers and a single discharge line. The pump case and gear case shall be able to be removed by lifting upward without interference from piping and be removable in less than 3 hours.

PUMP COMPARTMENT LIGHT

A pump compartment light shall be provided inside the right side pump

enclosure and accessible through a door on the pump panel.

A 0.125" weep hole shall be provided in each light lens, preventing moisture retention.

Engine monitoring graduated LED indicators shall be incorporated with the pressure controller.

THROTTLE READY GREEN INDICATOR LIGHT

There shall be a green indicator light integrated with the pressure governor and/or engine throttle installed on the pump operators panel that is activated when the pump is in throttle ready mode.

AIR HORN SWITCH

An air horn control switch shall be provided at the pump operator's control panel. This switch shall be momentary red and properly labeled. The switch shall be located within easy reach of the operator in the electrical switch panel.

VACUUM AND PRESSURE GAUGES

The pump vacuum and pressure gauges shall be liquid filled and manufactured by Class 1 Incorporated.

The gauges shall be a minimum of 4.00" in diameter and shall have white faces with black lettering, with a pressure range of 30.00"-0-600#.

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

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

Test port connections shall be provided at the pump operator's panel. One (1) shall be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They shall have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They shall be marked with a label. This gauge shall include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

PRESSURE GAUGES

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

They shall be a minimum of 2.00" in diameter and have white faces

with black lettering.

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

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

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

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

MASTER FLOWMETER

A master pump flowmeter display shall be provided the operator's panel. The flowmeter shall contain solid state electronics with LED readout of total flow of the pump.

An FRC X-FLC flow conditioner shall be installed in the plumbing for better flow readings.

WATER LEVEL GAUGE

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

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

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

There shall be a water level gauge provided on the Command Zone™, color display in the cab.

There shall be a light driver module with this installation to power additional water level gauge(s) included on the apparatus.

WATER LEVEL GAUGE

A water level gauge system shall be provided at one each side of the crew cab to match previous truck 35975 Honolulu Airport. Each shall be provided with four (4) Whelen, Model M4*C LED lights with chrome flanges. The total quantity of the water level gauge systems to be provided shall be one (1).

The lights shall be vertically mounted and indicate the following:

- Top green light with green lens - water level full
- Next blue light with blue lens - water level 3/4 full
- Next amber light with amber lens - water level 1/2 full
- Bottom red light with red lens - water level 1/4 full when solid and shall flash when empty.

The above system shall function similar to the standard five (5) light at the pump panel.

The lights shall be activated parking brake is applied.

CLASS "A" FOAM LEVEL GAUGE

A Fire Research TankVision Pro, Model WLA360-A00, cell/tank level indicator kit shall be installed on the pump operator's panel. The kit shall include an electronic indicator module, a pressure sensor, a 10' sensor cable and a tank vent. The indicator shall show the volume of Class "A" foam concentrate in the cell/tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of Polycarbonate/Nylon material and have a distinctive green label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display cell/tank volume, adjustable brightness control levels and a data link to connect remote indicators. Low foam level warnings shall include flashing LEDs at 1/4 cell/tank and down chasing LEDs when the cell/tank is almost empty.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the foam cell/tank near the bottom. No probe shall be placed on the interior of the cell/tank. Wiring shall be weather resistant and have automotive type plug-in connectors.

SIDE CONTROL PUMP OPERATOR'S/PUMP PANEL LIGHTING

Illumination shall be provided for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. Internal and external lights on the apparatus shall be illuminated per the current edition of applicable NFPA standards.

The pump panels shall be illuminated by two (2) Truck-Lite, Model 60354C, 6.00" x 2.00" oval white LED lights with Model 60700, grommets and chrome covers installed on the back of the cab, one (1) on the driver's side and one (1) on the passenger's side.

The pump operator's panel shall utilize the same LED strip lighting at the forward doorframe as all other compartment lighting.

There shall be a small white LED pump engaged indicator light installed overhead.

AIR HORN SYSTEM

One (1) Hadley round air horn with 6.00" bell shall be recessed in the front bumper. The air horn system shall be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve shall be installed to prevent the loss of air in the brake system.

Air Horn Location

The air horn shall be located on the left side of the bumper, just outside of the frame rail.

Air Horn Control

The air horn(s) shall be activated by the following:

- Left side foot switch
- Right side chrome push button switch

ELECTRONIC SIREN

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone shall be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Electronic siren head shall be located in the center console.

ELECTRONIC SIREN CONTROL

The electronic siren shall be activated by the following:

- Controlled by siren head only
- The right side push button.
- The steering wheel horn ring with siren/horn selector switch.
- The control to be available when the emergency master switch is on.

SPEAKER

There shall be one (1) Whelen®, Model SA315P, black nylon composite, 100-watt, speaker with through bumper mounting brackets and polished stainless steel grille provided. The speaker shall be connected to the siren amplifier.

The speaker(s) shall be recessed in the center of the front bumper.

AUXILIARY MECHANICAL SIREN

There shall be a Federal Signal Model Q2B mechanical siren furnished and installed in the front of the apparatus.

The Q2B shall be chrome finish.

The siren shall have a 2-gauge cable connected to a power solenoid that is connected by a 2-gauge cable ran battery direct to the primary chassis batteries and shall be labeled Q2B+ at the battery. The power solenoid shall only be enabled when the emergency master switch is on.

The siren shall have a 2-gauge ground wire connected to the chassis battery stud. The cable shall be labeled Q2B- at the battery.

The mechanical siren shall be recessed in the front bumper on the left side. The siren shall be properly supported using the bumper framework.

MECHANICAL SIREN CONTROL

The mechanical siren shall be activated by the following:

- Left side chrome push button switch.
- Right side chrome push button switch.

A momentary chrome push button switch shall be included in the left side dash panel to activate the siren brake.

A momentary chrome push button switch shall be included in the right side dash panel to activate the siren brake.

FRONT ZONE UPPER WARNING LIGHTS

There shall be one (1) 81.00" Whelen® Freedom IV™ lightbar mounted on the cab roof.

The lightbar shall include the following:

- One (1) red flashing LED module in the driver's side end position.

- One (1) red flashing LED module in the driver's side front corner position.
- One (1) red flashing LED module in the driver's side first front position.
- One (1) red flashing LED module in the driver's side second front position.
- One (1) white flashing LED module in the driver's side third front position.
- One (1) red flashing LED module in the driver's side fourth front position.
- One (1) red steady burning LED module in the driver's side fifth front position.
- One (1) red flashing LED module in the driver's side sixth front position.
- One (1) 795 LED traffic light controller set to national standard high priority in the center positions.
- One (1) red flashing LED module in the passenger's side sixth front position.
- One (1) red steady burning LED module in the passenger's side fifth front position.
- One (1) red flashing LED module in the passenger's side fourth front position.
- One (1) white flashing LED module in the passenger's side third front position.
- One (1) red flashing LED module in the passenger's side second front position.
- One (1) red flashing LED module in the passenger's side first front position.
- One (1) red flashing LED module in the passenger's side front corner position.
- One (1) red flashing LED module in the passenger's side end position.

There shall be clear lenses included on the lightbar.

The following switches may be a installed in the cab on the switch panel to control the lightbar:

- a switch to control the flashing LED modules.
- the traffic light controller with the emergency master switch only.
- a driver's side momentary cab switch with no emergency master control to activate the traffic light controller.

The white flashing LED modules and the traffic light controller shall be disabled when the parking brake is applied.

The eight (8) red flashing LED modules in the front positions may be load managed when the parking brake is applied.

WARNING LIGHT

There shall be one (1) Whelen, Model L31H*F LED warning beacon(s) surface mounted on the cab roof located as far rearward as possible to meet NFPA 414 - visible 360 degrees all sides of vehicle.

The color of the LED's shall be amber.
The color of the lens shall be clear.
The light(s) shall be activated with a separate switch in cab.

Any flashing amber light shall be activated when the parking brake is applied.

FRONT ZONE LOWER LIGHTS

There shall be two (2) pair of Whelen, Model M6**, LED lights installed on the cab face above the headlights, in a common bezel matching the one for the headlamps. The housing to be polished and the trim shall be chrome.

- The driver's side front outside warning light to be red
- The driver's side front inside warning light to be red
- The passenger's side front inside warning light to be red
- The passenger's side front outside warning light to be red
- The color of the lenses shall be clear

There shall be a switch located in the cab on the switch panel to control the lights.

SIDE ZONE LOWER LIGHTING

There shall be six (6) Whelen®, Model M6*C, flashing LED warning lights with chrome trim installed per the following:

- Two (2) lights, one (1) each side on the bumper extension. The side front lights to be red.
- Two (2) lights, one (1) each side of cab rearward of crew cab doors. The side middle lights to be red.
- Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.
- The lights shall include clear lenses.

There shall be a switch in the cab on the switch panel to control the lights.

SIDE WARNING LIGHTS

There shall be four (4) Whelen®, Model M6**, 4.31" high x 6.75" wide x 1.37" deep flashing LED warning light(s) with chrome trim provided, install 2 each side on the upper side sheets between the corners of the body and the Whelen PCP2 scene lights..

The light(s) to include red flashing LEDs.
The warning light lens color(s) to be clear.
There shall be a switch in the cab on the switch panel to control the lights.

White LEDs shall be deactivated when the parking brake is applied.

Amber, blue, green and red LEDs may be load managed when the parking brake is applied.

REAR ZONE LOWER LIGHTING

There shall be two (2) Whelen®, Model M6* LED warning lights with chrome trim located at the rear lower of the apparatus per the following:

- The left side rear warning light to include red LEDs
- The right side rear warning light to include red LEDs
- The lens color(s) to be clear

There shall be a switch located in the cab on the switch panel to control the lights.

WARNING LIGHTS (REAR AND SIDE UPPER ZONES)

There shall be four (4) Whelen®, Model M6**, 5.31" high x 6.75" wide x 1.37" deep flashing LED warning lights with chrome trim provided at the rear of the apparatus per the following:

- The side upper rear light on the left side to include red flashing LEDs
- The rear upper light on the left side to include red flashing LEDs
- The rear upper light on the right side to include red flashing LEDs
- The side upper rear light on the right side to include red flashing LEDs
- The warning light lens color(s) to be clear

There shall be a switch in the cab on the switch panel to control the lights.

ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT

The following guidelines shall apply to the 120/240 VAC system installation:

General

Any fixed line voltage power source producing alternating current (ac) line voltage shall produce electric power at 60 cycles plus or minus 3 cycles.

Except where superseded by the requirements of the current edition of applicable NFPA standards, all components, equipment and installation procedures shall conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus shall be listed and installed in accordance with the manufacturer's instructions. All products shall be used only in the manner for which they have been listed.

Grounding

Grounding shall be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems shall not be used. Only stranded or braided copper conductors shall be used for grounding and bonding.

An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall 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 shall be permitted to be used.

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

Operation

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Provisions shall be made for quickly and easily placing the power source into operation. The control shall be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train shall be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label shall be permanently attached to the apparatus near the operator's control station. The label shall provide the operator with the following information:

- Rated voltage(s) and type (ac or dc)
- Phase
- Rated frequency
- Rated amperage
- Continuous rated watts
- Power source engine speed

Direct drive (PTO) and portable generator installations shall

comply with Article 445 (Generators) of the NEC.

Overcurrent protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144.00" (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly shall 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).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device shall be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

Wiring Methods

Fixed wiring systems shall be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)
- or
- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit shall 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 shall be run as follows.

- Separated by a minimum of 12.00" (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit shall 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 shall be made of nonmetallic materials or corrosion protected metal. All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the vehicle.

Wiring Identification

All line voltage conductors located in the main panel board shall be individually and permanently identified. The identification shall reference the wiring schematic or indicate the final

termination point. When prewiring for future power sources or devices, the unterminated ends shall be labeled showing function and wire size.

Wet Locations

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, shall 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.

All receptacles located in a wet location shall be not less than 24.00" (610 mm) from the ground. Receptacles on off-road vehicles shall be a minimum of 30.00" (762 mm) from the ground.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle shall be installed in a face up position.

Dry Locations

All receptacles located in a dry location shall be of the grounding type. Receptacles shall be not less than 30.00" (762 mm) above the interior floor height.

All receptacles shall 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 shall be so marked.

Listing

All receptacles and electrical inlet devices shall be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages shall be rated for the appropriate service.

Electrical System Testing

The wiring and associated equipment shall be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test shall 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 shall be conducted after all body work has been completed.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

Operational Test per Current Edition NFPA Standard

The apparatus manufacturer shall 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 shall be witnessed and the results certified by an independent third-party certification organization.

The prime mover shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source shall 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 edition of applicable NFPA standards.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current edition of applicable NFPA standards shall be applied to the low voltage electrical system during the operational test.

GENERATOR

The apparatus shall be equipped with a complete electrical power system. The generator shall be a Harrison, Model MCR Stealth 10.0 kW hydraulic unit. The wiring and generator installation shall conform to the present National Electrical Codes Standards of the National Fire Protection Association. The installation shall be designed for continuous operation without overheating and undue stress on components.

Generator Performance

- Continuous Duty Rating: 10,000 watts
- Nominal Volts: 120/240
- Amperage: 80 @ 120 volts, 40 @ 240 volts
- Phase: Single
- Cycles: 60 hertz
- Engine Speed at Engagement: Idle
- RPM range: 900 to 3,000 (hydraulic pump)

The output of the generator shall be controlled by an internal

hydraulic system. An electrical instrument gauge panel shall be provided for the operator to monitor and control all electrical operations and output.

The generator shall be driven by a transmission power take off unit, through a hydraulic pump and motor.

The generator shall include an electrical control inside the cab. The hydraulic engagement supply shall be operational at any time (no interlocks).

An electric/hydraulic valve shall supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

Generator Instruments and Controls

To properly monitor the generator performance a digital meter panel shall be furnished and mounted next to the circuit breaker panel. The meter shall indicate the following items:

- Voltage
- Amperage for both lines
- Frequency
- Generator run hours
- Over current indication
- Over temperature indication
- "Power On" indication
- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The meter and indicators shall be installed near eye level in the compartment. Instruments shall be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used shall be accurate within +/- two (2) percent.

Generator Wiring

The system shall be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the domestic market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components shall be the minimum acceptable quality standards for this apparatus:

Wiring

All electrical wiring shall be fine stranded copper type. The wire shall be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The cable shall be run in corner areas and extruded aluminum pathways built into the body for easy access.

Load Center

The main load center shall be a Cutler Hammer with circuit breakers rated to load demand.

Circuit Breakers

Individual breakers shall be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

GENERATOR LOCATION

The generator shall be mounted in the cargo area at the front of the body in in the cargo area space to be determined at pre-construction meeting. The flooring in this area shall be either reinforced or constructed, in such a manner, that it shall handle the additional weight of the generator.

GENERATOR START

A switch shall be located on the cab instrument panel and at the pump panel area to engage the generator. The single switch in both locations shall engage the generator PTO and the electric field simultaneously.

CIRCUIT BREAKER PANEL

A Square D, Q-O series circuit breaker panel shall be provided.

The circuit breaker panel shall be located LS4 left high wall in the drivers side forward brass compartment.

"POWER ON" INDICATOR LIGHT

A green "power-on" indicator light shall be provided. The light shall indicate when the generator is producing power to the load center. The light shall be installed near the load center.

SUB FEED CIRCUIT BREAKER PANEL

There shall be a shoreline to generator transfer switch powered sub feed circuit breaker panel installed in the LS4. A directory for each breaker shall be provided adjacent to the circuit breaker panel.

Identification of circuits shall be done in a durable manner that provides years of service.

ELECTRIC CORD REEL

Furnished with the AC electrical system shall be a Hannay, Series 1600, cord reel wired for a four (4) conductor cord. The reel shall be provided with a 12-volt electric rewind switch that is guarded to prevent accidental operation and labeled for its intended use. The push button switch shall be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

The exterior finish of the reel(s) shall be painted job color matching the lower body.

A captive roller assembly to be provided to aid in the payout and loading of the reel. A ball stop shall be provided to prevent the cord from being wound on the reel.

A label shall be provided in a readily visible location adjacent to the reel. The label shall indicate current rating, current type, phase, voltage and total cable length.

A total of one (1) cord reel shall be provided one (1) over compartment RS4 in the hatch compartment, forward.

CORD

Provided for electric distribution shall be one (1) length installed on the reel of 200 feet of yellow 10/4 electrical cord. A Hubbell L14-20, 20 amp, 120/240 volt, twist lock connector body shall be installed on the end of the cord.

PORTABLE JUNCTION BOX

There shall be one (1) Akron EJBX electric junction box(es) provided.

There shall be a cable strain relief and direct connection, no plug provided for each box.

Each box shall be provided with the following:

- four (4) 20 amp 120 volt AC twist lock receptacles with flip up covers
- a 120 volt AC light inside the box

There shall be two (2) receptacles powered by line 1 and the other two (2) receptacles powered by line 2 with a common neutral.

REEL FEED THROUGH HATCH FLOOR

A captive roller assembly shall be provided through the floor of the hatch compartment, into the compartment below, to assist with the pay out of the cord. A flange shall be provided around the roller assembly to assist in keeping water from running into the compartment. A ball stop shall be provided on the cord to stop the cord at the roller assembly.

A total of one (1) shall be installed.

JUNCTION BOX HOLDER

There shall be a stainless steel junction box holder installed adjacent to the cord reel. A total of one (1) shall be installed.

Location shall be RS4.

120 VOLT RECEPTACLE

There shall be one (1), 15/20 amp 120 volt AC three (3) wire straight blade duplex receptacle(s) with interior stainless steel wall plate(s), installed behind officers seat. The NEMA configuration for the receptacle(s) shall be 5-20R.

The receptacle(s) shall be powered from the onboard generator to 120 volt AC power inverter.

There shall be a label installed near the receptacle(s) that state the following:

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

120 VOLT RECEPTACLE

There shall be two (2), 4-place receptacle box(es) with four (4) 15/20 amp 120 volt AC three (3) wire straight blade receptacles with an interior stainless steel wall plate installed RS1 and LS1. The NEMA configuration for the receptacles shall be 5-20R.

The receptacle(s) shall be powered from the shoreline inlet.

There shall be a label installed near the receptacle(s) that state

the following:

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

LOOSE EQUIPMENT

The following equipment shall 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.

NFPA LOOSE EQUIPMENT

NFPA Required Loose Equipment Provided by Fire Department

The following loose equipment as outlined in NFPA 1900, 2024 edition, table 8.1 and CAN/ULC 515:2024 edition, section 5.2 shall be provided by the fire department:

- 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.

NFPA Loose Equipment That Should be Considered

The following loose equipment as outlined in NFPA 1900, 2024 edition, appendix table A.8.4 (a) and CAN/ULC 515:2024 edition, section 5.2 should be considered:

- 800 ft (60 m) of 2.50" (65 mm) or larger fire hose.
- 400 ft (120 m) of 1.50" (38 mm), 1.75" (45 mm), or 2.00" (52 mm)

fire hose.

- One (1) handline nozzle, 200 gpm (750 L/min) minimum.
- Two (2) handline nozzles, 95 gpm (360 L/min) minimum.
- One (1) smooth bore or combination nozzle with shutoff and with 2.50" (65 mm) inlet that flows a minimum of 250 gpm (950 L/min).
- Four (4) SCBA apparatus
- Four (4) SCBA spare cylinders
- One (1) first aid kit.
- Four (4) combination spanner wrenches.
- Two (2) hydrant wrenches.
- One (1) double female 2.50" (65 mm) adapter with national hose (NH) threads.
- One (1) double male 2.50" (65 mm) adapter with national hose (NH) threads.
- One (1) rubber mallet, for use on suction hose connections.
- Two (2) salvage covers each a minimum size of 12 ft × 18 ft (3.7 m × 5.5 m).
- One (1) automatic external defibrillator (AED).

SOFT SUCTION HOSE

There shall be no soft suction hose provided.

- One (1)-6.00" National Standard hose thread barrel strainer, chrome plated

DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

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

WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

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

FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT

The axe is not on the apparatus as manufactured. The fire department shall provide and mount the axe.

PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT

The axe is not on the apparatus as manufactured. The fire department

shall provide and mount the axe.

PAINT PROCESS

The exterior custom cab and body painting procedure shall consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body shall be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces shall be removed and sanded to a smooth finish. Exterior seams shall be sealed before painting. Exterior surfaces that shall not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.
2. Chemical Cleaning and Pretreatment - All surfaces shall be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces shall be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces shall 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.
3. Surfacer Primer - The Surfacer Primer shall 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 shall 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 shall be applied. The Basecoat shall be applied to a thickness that shall achieve the proper color match. The Basecoat shall be used in conjunction with a

urethane clear coat to provide protection from the environment.

7. Clear Coat - Two (2) coats of Clear Coat shall 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 shall be Clear Coated to match the body. Paint warranty for the roll-up doors shall be provided by the roll-up door manufacturer.

After the cab and body are painted, the color shall be verified to make sure that it matches the color standard. Electronic color measuring equipment shall be used to compare the color sample to the color standard entered into the computer. Color specifications shall be used to determine the color match. A Delta E reading shall be used to determine a good color match within each family color.

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

The paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) are to meet or exceed Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels are to meet or exceed the #6 A.C.T. standard in critical areas. The manufacture's written paint standards shall be available upon request.

Environmental Impact

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

- Topcoats and primers shall be chrome and lead free.
- Metal treatment chemicals shall be chrome free. The wastewater generated in the metal treatment process shall be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations shall have a 99.99 percent efficiency factor.
- Particulate emissions from painting operations shall be collected by a dry filter or water wash process. If the dry filter is used, it shall have an efficiency rating of 98

percent. Water wash systems shall be 99.97 percent efficient.

- Water from water wash booths shall be reused. Solids shall be removed on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers shall be recycled to recover the metal.
- Solvents used in clean-up operations shall be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus shall not be manufactured with or contain products that have ozone depleting substances. Contractor shall, 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.

TWO-TONE CAB PAINT

The cab shall be painted two-tone with the upper section painted #10 white and the lower section painted Lime Green #436. There shall be a standard two-tone cab paint break provided.

There shall be a standard cab shield provided.

BODY PAINT

The body shall be painted to match the lower section of the cab.

PAINT CHASSIS FRAME ASSEMBLY

The chassis frame assembly shall be finished with a single system black top coat 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 shall be painted (unless otherwise stated in a secondary option) 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
- Steel 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 shall meet the technical properties shown.

AXLE HUB PAINT

All axle hubs shall be painted to match lower job color.

CORROSION PROTECTION

All non-painted metal surfaces on the exterior of the vehicle shall be sprayed with a corrosion protective coating provided by Carwell. The coating can be removed with soap and water. The coating is made of a linseed oil base and is biodegradable.

The underside non-painted metal surfaces shall also be coated with a corrosion protective coating.

COMPARTMENT INTERIOR PAINT

The interior of all compartments shall be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

REFLECTIVE STRIPES

Three (3) reflective stripes shall be provided across the front of the vehicle and along the sides of the body. The reflective band shall consist of a 1.00" gold stripe at the top with a 1.00" gap then a 6.00" white stripe with a 1.00" gap and a 1.00" gold stripe on the bottom.

The reflective band provided on the cab face shall be at the headlight level.

REAR CHEVRON STRIPING

There shall be alternating chevron striping located on the rear-

facing vertical surface of the apparatus. The rear surface, excluding the rear roll up door, shall be covered.

The colors shall be red and fluorescent yellow green diamond grade. Each stripe shall be 6.00" in width.
This shall meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface shall be covered with chevron striping.

JOG(S) IN REFLECTIVE BAND

The reflective band located on each side of the apparatus body shall contain one (1) jog(s) and shall be angled at approximately 45 degrees when installed.

REFLECTIVE STRIPE OUTLINE

A black outline shall be applied on the top and the bottom of the reflective band. There shall be three (3) set of outline stripes required.

CAB DOOR REFLECTIVE STRIPE

A 6.00" x 16.00" white reflective stripe shall be provided across the interior of each cab door. The stripe shall be located approximately 1.00" up from the bottom, on the door panel.

This stripe shall meet the current edition of applicable NFPA standards.

CAB STRIPE

There shall be a genuine gold leaf stripe provided on both sides of the cab in place of the chrome molding.

LETTERING

There shall be printed effect gold leaf lettering, 3.00" high, with outline and shade provided. There shall be 33 letters provided.

LETTERING

One (1) to twenty (20) printed effect gold leaf lettering, 5.00" high, with outline and shade shall be provided.

LETTERING

There shall be reflective lettering, 24.00" high, with no outline or shade provided. There shall be three (3) letters provided.

LETTERING

Sixty-one (61) to eighty (80) printed effect gold leaf lettering, 5.00" high, with outline and shade shall be provided.

LETTERING

There shall be printed effect gold leaf lettering, 6.00" high, with outline and shade provided. There shall be six (6) letters provided.

LETTERING

There shall be reflective lettering, 12.00" high, with outline and shade provided. There shall be three (3) letters provided.

MALTESE CROSS INSTALLATION

There shall be one (1) pair of maltese crosses, comprised of printed effect gold leaf material, provided and installed Located on cab doors..

CAB GRILLE DESIGN

An waving Hawaiian flag design shall be painted on the cab grille.

UNDERCOATING, CAB & BODY

The underside of the apparatus shall be undercoated with an asphalt petroleum based material, dark in color.

The undercoating material utilized on the apparatus shall be formulated to resist corrosion and deaden unwanted sound or road noise.

Coating texture shall appear firm, flexible, and resistant to abrasion. Minimum dry film thickness shall be in the range of 8.00 to 12.00 mils.

The material shall be applied to the following areas:

Body and cab wheel well fender liners, on the back side only. Underside of body and cab sheet metal, and structural components. Underside and vertical sides of all sheet metal compartmentation, including support angles.

Structural support members under running boards, rear platforms, battery boxes, walkways, etc.

Inside surfaces of the pump heat enclosure, (when installed).

Steel components used in construction of commercial or custom chassis

cabs.

FIRE APPARATUS PARTS MANUAL

There shall be one (1) custom parts manual(s) in USB flash drive format for the complete fire apparatus provided.

The manual(s) shall 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

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

Service Parts Internet Site

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

CHASSIS SERVICE MANUALS

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

The manual shall contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires

- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

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

MANUALS, CHASSIS OPERATION

Two (2) chassis operation manuals shall be provided. Manuals shall be in the English language.

WARRANTIES

A list of all warranties shall be included in the proposal. Warranty certificates shall be provided at delivery.

PERFORMANCE CERTIFICATIONS

Cab Air Conditioning

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 shall cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 78 degrees Fahrenheit in 30 minutes. The bidder shall certify that a substantially similar cab has been tested and has met these criteria.

Cab Defroster

Visibility during inclement weather is essential to safe apparatus performance. The defroster system shall 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 shall certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

Cab Auxiliary Heater

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

AMP DRAW REPORT

The bidder shall 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 shall provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which shall include the following:
    - The nameplate rating of the alternator.
    - The alternator rating under the conditions specified per:
        - Current edition of applicable NFPA standards.
    - The minimum continuous load of each component that is specified per:
        - Current edition of applicable NFPA standards.
    - 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 shall be provided by the bidder per the current edition of applicable NFPA standards.

PROPOSAL

PROPOSAL TO

THE STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS

PROJECT:	Furnishing and Delivery of One (1) Multi-Purpose Structural Fire Fighting Vehicle at Kahului Airport, Kahului, Maui, Hawaii and Furnishing and Delivery of One (1) Multi-Purpose Structural Fire Fighting Vehicle at Daniel K. Inouye International Airport, Honolulu, Oahu, Hawaii.
PROJECT NUMBER:	FS1219-26
DELIVERY SCHEDULE:	Deliver within ONE THOUSAND NINETY-FIVE (1095) CALENDAR DAYS from date of Notice to Proceed to the Department of Transportation at the Kahului Airport and Daniel K. Inouye International Airport
PROJECT MANAGER	Martinez Jacobs Airports Fire Chief Telephone No.: (808) 840-5351 Email: martinez.jacobs@hawaii.gov
ELECTRONIC SUBMITTAL:	**Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. See SPECIAL PROVISIONS 2.3 DELIVERY OF PROPOSALS for complete details. FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.**
NOTES:	Bid, Performance and Payment Bonds are NOT required for this Project.

Director of Transportation
Aliiaimoku Hale
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

The undersigned bidder declares the following:

1. It has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal.

2. It has not been assisted or represented on this matter by any individual who has, in a State capacity, been involved in the subject matter of this contract within the past two years.

3. It has not and will not, either directly or indirectly offered or given a gratuity (i.e. an entertainment or gift) to any State or County employee to obtain a contract or favorable treatment under a contract.

The undersigned bidder further agrees to the following:

1. If this proposal is accepted, it shall execute a contract with the Department to provide all necessary labor, machinery, tools, equipment, apparatus and any other means of construction, to do all the work and to furnish all the materials specified in the contract in the manner and within the time therein prescribed in the contract, and that it shall accept in full payment therefore the sum of the unit and/or lump sum prices as set forth in the attached proposal schedule for the actual quantities of work performed and materials furnished and furnish satisfactory security in accordance with Section 103D-324, Hawaii Revised Statutes, within 10 days after the award of the contract or within such time as the Director of Transportation may allow after the undersigned has received the contract documents for execution, and is fully aware that non-compliance with the aforementioned terms will result in the forfeiture of the full amount of the bid guarantee required under Section 103D-323, Hawaii Revised Statutes.

2. That the quantities given in the attached proposal schedule are approximate only and are intended principally to serve as a guide in determining and comparing the bids.

3. That the Department does not either expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the Director of Transportation, and that all increased or decreased quantities of work shall be performed at the unit prices set forth in the attached proposal schedule except as provided for in the specifications.

4. In case of a discrepancy between unit prices and the totals in said Proposal Schedule, the unit prices shall prevail.

5. Agrees to begin work within 10 working days after the date of notification to commence with the work, which date is in the notice to proceed, and shall finish the entire project within the time prescribed.

6. The Director of Transportation reserves the right to reject any or all bids and to waive any defects when in the Director's opinion such rejections or waiver will be for the best interest of the public.

Receipt is hereby acknowledged and complete examination is hereby expressly guaranteed of the following listed items: the specifications, the notice to bidders, the special provisions, if any, the proposal, the plans, if any, and the contract form.

The undersigned acknowledges receipt of any addendum, issued by recording in the space below the date of receipt.

Addendum No. 1_____ Addendum No. 3_____

Addendum No. 2_____ Addendum No. 4_____

The undersigned hereby certifies that the bid prices contained in the attached proposal schedule have been carefully checked and are submitted as correct, final and are net prices.

_____
Bidder (Company Name)

By_____
Authorized Signature

_____
Print Name and Title

_____

_____
Business Address

_____ _____
Business Telephone Email

_____
Date

_____
Contact Person (If different from above)

Phone:_____ Email:_____

*Hawaii General Excise Tax License No. _____

NOTE:

If bidder is a CORPORATION, the legal name of the corporation shall be set forth above, the corporate seal affixed, together with the signature(s) of the officer(s) authorized to sign contracts on behalf of the corporation. Please attach to this page current (not more than six months old) evidence of the authority of the officer(s) to sign on behalf of the corporation.

If bidder is a PARTNERSHIP, the true name of the partnership shall be set forth above with the signature(s) of the general partner(s) authorized to sign contracts on behalf of the partnership. Please attach to this page current (not more than six months old) evidence of the authority of the partner(s) to sign on behalf of the partnership.

If bidder is an INDIVIDUAL, the bidder's signature shall be placed in the space provided therefore on page PF-4.

If signature is by an agent, other than an officer of a corporation or a partner of a partnership, a POWER OF ATTORNEY must be on file with the Department prior to the opening of bids or submitted with the bid; otherwise, the bid may be rejected as irregular and unauthorized.

*Bidder will be considered an out-of-state vendor if Hawaii General Excise Tax License No. is not indicated. See Section 2.8 Out-of-State Bidders of the Specifications.

PROPOSAL SCHEDULE
FURNISHING AND DELIVERY OF
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT KAHULUI AIRPORT, KAHULUI, MAUI, HAWAII
AND
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT DANIEL K. INOUYE INTERNATIONAL AIRPORT,
HONOLULU, OAHU, HAWAII

PROJECT NO. FS1219-26

SCHEDULE A

ITEM	DESCRIPTION
1	**ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE AT KAHULUI AIRPORT,** as described in Section 11 of the specifications**.**

Pierce Model Name: _____

Pierce Model No.: _____

a. Unit Bid Price: $ _____

b. Applicable Taxes: $ _____

c. Truck Pre-Delivery Inspection Trip: $ _____

TOTAL AMOUNT FOR COMPARISON
OF BIDS − SCHEDULE A $ _____
(a + b + c)

PROPOSAL SCHEDULE
FURNISHING AND DELIVERY OF
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT KAHULUI AIRPORT, KAHULUI, MAUI, HAWAII
AND
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT DANIEL K. INOUYE INTERNATIONAL AIRPORT,
HONOLULU, OAHU, HAWAII

PROJECT NO. FS1219-26

SCHEDULE B

ITEM	DESCRIPTION
2	**ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE AT DANIEL K. INOUYE INTERNATIONAL AIRPORT,** as described in Section 11 of the specifications.

Pierce Model Name: _____

Pierce Model No.: _____

d. Unit Bid Price: $ _____

e. Applicable Taxes: $ _____

f. Truck Pre-Delivery Inspection Trip: $ _____

TOTAL AMOUNT FOR COMPARISON
OF BIDS − SCHEDULE B $ _____
(d+ e + f)

PROPOSAL SCHEDULE
FURNISHING AND DELIVERY OF
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT KAHULUI AIRPORT, KAHULUI, MAUI, HAWAII
AND
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT DANIEL K. INOUYE INTERNATIONAL AIRPORT,
HONOLULU, OAHU, HAWAII

PROJECT NO. FS1219-26

PROPOSAL SCHEDULE SUMMARY

TOTAL AMOUNT FOR COMPARISON OF BIDS
SCHEDULE A $ _____

TOTAL AMOUNT FOR COMPARISON OF BIDS
SCHEDULE B $ _____

FURNISHING AND DELIVERY OF
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT KAHULUI AIRPORT, KAHULUI, MAUI, HAWAII
AND
ONE (1) MULTI-PURPOSE STRUCTURAL FIRE FIGHTING VEHICLE
AT DANIEL K. INOUYE INTERNATIONAL AIRPORT,
HONOLULU, OAHU, HAWAII

The attention of out-of-state bidders is directed to Section 2.10 of the Special Provisions. An out-of-state bidder is required to answer the following statements:

State of Hawaii General Excise and Use Taxes are included in all bid prices.

_____

Write "Yes" or "No"

If the above state is left unanswered, it will be considered a "No" answer by the State.

NOTES:

1. Bids shall include all Federal, State, County and other applicable taxes and fees.

2. The TOTAL AMOUNT FOR COMPARISON OF BIDS shall be used to determine the lowest responsible bidder.

3. Bidders shall complete all unit prices and amounts. Failure to do so shall be grounds for rejection of bid.

4. If a discrepancy occurs between unit bid price and the bid price, the unit bid price shall govern.

5. **Bidders shall submit and upload the complete proposal to HIePRO prior to the bid opening date and time. Proposals received after said due date and time shall not be considered. Any additional support documents explicitly designated as confidential and/or proprietary shall be uploaded as a separate file to HIePRO. Bidders shall not include confidential and/or proprietary documents with the proposal. The record of each bidder and respective bid shall be open to public inspection.** Original (wet ink, hard copy) proposal documents are not required to be submitted. **Contract award shall be based on evaluation of proposals submitted and uploaded to HIePRO.**

   FAILURE TO UPLOAD THE COMPLETE PROPOSAL TO HIePRO SHALL BE GROUNDS FOR REJECTION OF THE BID.

   If there is a conflict between the specification document and the HIePRO solicitation, the specifications shall govern and control, unless otherwise specified.

6. Bidders may bid on any or all items. If a bidder is determined the lowest bidder for multiple items, one combined contract will be awarded.

7. If the lowest TOTAL AMOUNT FOR COMPARISON OF BIDS is less than or approximately equal to the funds available for this project, an award will be made to the lowest responsible and responsive bidder.

8. If the TOTAL AMOUNT FOR COMPARISON OF BIDS exceeds the funds available for the project, then the State reserves the right to negotiate with the lowest, responsive, responsible bidder as permitted under Section 103D-302, Hawaii Revised Statutes (HRS), to further reduce the scope of work and award a contract thereafter.

F O R M S

C O N T R A C T

THIS AGREEMENT, made this day _____, by and between the STATE OF HAWAII, by its Director of Transportation, hereinafter referred to as "STATE", and «CONTRACTOR», «STATE_OF_INCORPORATON», whose business and/or mailing address is «ADDRESS», hereinafter referred to as CONTRACTOR";

WITNESSETH: That for and in consideration of the payments hereinafter mentioned, the CONTRACTOR hereby covenants and agrees with the STATE to complete in place, furnish and pay for all labor and materials necessary for "«PROJECT_NAME_AND_NO»", or such a part thereof as shall be required by the STATE, the total amount of which labor, material and construction shall be computed at the unit and/or lump sum prices set forth in the attached proposal schedule and shall be the sum of «BASIC»-----DOLLARS ($«BASIC_NUMERIC») as follows:

TOTAL AMOUNT FOR COMPARISON OF BIDS ……$«BASIC_NUMERIC»

which sum shall be provided from STATE funds, all in accordance with the specifications, the special provisions, if any, the notice to bidders, the instructions to bidders, the proposal and plans for «PROJECT_NO_ONLY» and any supplements thereto, on file in the office of the Director of Transportation. These documents, together with all alterations, amendments, and additions thereto and deductions therefrom, are attached hereto or incorporated herein by reference and made a part of this contract.

The CONTRACTOR hereby covenants and agrees to complete such work from the date indicated in the Notice to Proceed issued by the STATE within «WORKING_DAYS», subject, however, to such extensions as may be provided for in writing under the specifications.

For and in consideration of the covenants, undertakings and agreements of the CONTRACTOR herein set forth and upon the full and faithful performance thereof by the CONTRACTOR, the STATE hereby agrees to pay the CONTRACTOR the sum of «BASIC»-----DOLLARS ($«BASIC_NUMERIC») in lawful money, but not more than such part of the same as is actually earned according to the STATE's determination of the actual quantities of work performed and materials furnished by the CONTRACTOR at the unit or lump sum prices set forth in the attached proposal schedule. Such payment, including any extras, shall be made, subject to such additions or deductions hereto or hereafter made in the manner and at the time prescribed in the specifications and this contract. An additional sum of -----«EXTRAS»----- «STATE_EXTRAS»DOLLARS ($«EXTRA_NUMERIC») is hereby provided for extra work and shall be provided from State funds.

All words used herein in the singular shall extend to and include the plural. All words used in the plural shall extend to and include the singular. The use of any gender shall extend to and include all genders.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be duly executed the day and year first above written.

STATE OF HAWAII

_____
Director of Transportation

«CONTRACTOR»

_____
Signature

_____
Print name

_____
Print Title

_____
Date