**ARKANSAS STATE HIGHWAY COMMISSION**
**ARDOT-EQUIPMENT AND PROCUREMENT DIVISION**
**BID INVITATION**

Contract Number: H-20-276R

Bid Opening Date: June 2, 2020 Time: 11:00 a.m.

**BID OPENING LOCATION:**
ARDOT Equipment and Procurement Division
11302 West Baseline Road
Little Rock, AR 72209

**MAIL TO:**
ARDOT Equipment and Procurement Division
P.O. Box 2261
Little Rock, AR 72203

**DELIVER TO:**
ARDOT Equipment and Procurement Division
11302 West Baseline Road
Little Rock, AR 72209

Sealed bids for furnishing the commodities and/or services described below, subject to the Standard Bid Conditions of this Bid Invitation will be received at the above-noted mail and delivery locations until the above-noted bid opening date and time, and then publicly opened at the above-noted bid opening location. **Bids must be submitted on this form, with attachments when appropriate, or bids will be rejected. Late bids and unsigned bids will not be considered.**

In compliance with this Bid Invitation and subject to all the Conditions thereof, the undersigned offers and agrees to furnish any and all items upon which prices are quoted, at the price set opposite each item.

Company Name:_____

Address:_____

_____

City:_____ State:_____ Zip:_____

Federal Tax ID or Social Security No.:_____

Name (Type or Print):_____

Title:_____

Phone:_____ Fax:_____

E-Mail:_____

**Signature:**_____
Signature must be legible, original (not photocopied) and in ink.
Unsigned bids will be rejected.

## Cab & Chassis, Dump Trucks

Bid prices shall include any applicable labor cost as well as delivery of all Equipment to ARDOT at the F.O.B. location(s) shown on attached Bid Sheet.

Contract may be renewed or extended upon mutual agreement of the parties, but shall not exceed limitations allowed by Arkansas State Procurement Law.

All bidders should complete and return the Eligible Bidder Certification (Attachment A) and Disclosure Form (see Page 2 of Standard Bid Conditions – Item 18) and Restriction of Boycott of Israel Certification issued with this bid. A current copy of the DFA Illegal Immigrant Contractor Disclosure Certification (see Page 1 of Standard Bid Conditions – Item 17) should also be submitted with bid. These forms are kept on file and remain current for one year from date of submission. Forms do not need to be submitted again, during that time, unless there is a status change.

**Literature Submittals – Item A2 of Bid Specifications shall supersede Item #11 of Standard Bid Conditions.**

**Bid Bond** in the amount of $1,000 required of all bidders at time of bid opening or bid will be rejected. **Personal and company checks are not acceptable as Bid Bonds.** See Condition 4 on page 1of Standard Bid Conditions.
**Performance Bond** in the amount of 5% of the total awarded to the respective bidders must be furnished within 10 days after receipt of notice of intent to award as a guarantee of delivery in accordance with the specifications and within the time established in the bid. **Personal and company checks are not acceptable as Performance Bonds.** See Condition 4 on page 1 of Standard Bid Conditions.

Bidder shall specify guaranteed delivery date for all vehicles/equipment in the space provided under each item number for which a price is being submitted. Successful bidder shall furnish Warranty Data for each vehicle/equipment delivered. The Warranty Data shall contain all necessary information such as motor and/or serial numbers and shall be signed by the selling dealer at the time vehicle/equipment is delivered to the Department of Transportation. Certificate of Origin, Federal Excise Tax Exemption Certificates, Odometer Disclosure Statement and five (5) copies of the Invoice for each vehicle/equipment to be furnished to Equipment & Procurement Division, P.O. Box 2261, Little Rock, AR 72203.

The successful bidder will be required to complete delivery within 180 days after award.

Bids and Specifications are available on-line by going to the ARDOT Web Site – www.ardot.gov and clicking on "Commodities and Services Bids/Contracts Information". Tabulations will also be available at this site after award of bid/contract. If you have any questions, call this office at 501-569-2667.

**ARKANSAS STATE HIGHWAY COMMISSION**
**ARDOT-EQUIPMENT AND PROCUREMENT DIVISION**

**BID SHEET**

**Contract No.: H-20-276R** **BIDDER:** _____

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1. **1** - Cab & Chassis, 68,000 GVWR, Tandem Axle, Diesel, Eaton UltraShift Transmission, 144' CA with 15' Dump Body, Central Hydraulics, Chemical Spreader Rate Control System, Belly Mount Plow and Tri-Axle Conversion Kit, to meet ARDOT Spec. 20-72-037.

   FOB: 1 ea. - ARDOT District 6 Headquarters, 8900 Mablevale Pike, Little Rock, AR 72209

   Bid Price (Do not include any Local, State or Federal Taxes) Each $_____

   Total for **1** Cab & Chassis $_____

   **Cab & Chassis proposed as meeting specifications**:

   Make _____ Model_____ Warranty _____

   Guaranteed Delivery Date _____

   Additional Units may be purchased at the same pricing and

   conditions through _____

   (Date)

2. **3** - Cab & Chassis, 68,000# GVWR, 68,000 GVWR, Tandem Axle, Diesel, Eaton UltraShift Transmission, 144' CA with 15' Dump Body, Central Hydraulics, Chemical Spreader Rate Control System, Belly Mount Plow and Tri-Axle Conversion Kit, to meet ARDOT Spec. 20-72A-037.

   FOB: 3 ea. - ARDOT District 9 Headquarters, 4590 Highway 65 South, Harrison, AR 72601

   Bid Price (Do not include any Local, State or Federal Taxes) Each $_____

   Total for **3** Cab & Chassis $_____

   **Cab & Chassis proposed as meeting specifications**:

   Make _____ Model_____ Warranty _____

   Guaranteed Delivery Date _____

   Additional Units may be purchased at the same pricing and

   conditions through _____

   (Date)

**ARKANSAS STATE HIGHWAY COMMISSION**
**ARDOT-EQUIPMENT AND PROCUREMENT DIVISION**

**BID SHEET**

**Contract No.: H-20-276R** **BIDDER:** _____

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3. **4** - Cab & Chassis, 58,000# GVWR, Tandem Axle, Diesel, Automatic Transmission, 118" CA with 12 CY Dump Body, Central Hydraulics, Chemical Spreader Rate Control Systems to meet ARDOT Spec. 20-67-038.

   FOB: 2 ea. - ARDOT District 1 Headquarters, 2701 Highway 64 West, Wynne, AR 72396
   FOB: 2 ea. - ARDOT District 7 Headquarters, 2245 California Avenue, Camden, AR 71701

   Bid Price (Do not include any Local, State or Federal Taxes) Each $_____

   Total for **4** Cab & Chassis $_____

   **Cab & Chassis proposed as meeting specifications**:

   Make _____ Model_____ Warranty _____

   Guaranteed Delivery Date _____

   Additional Units may be purchased at the same pricing and conditions through _____
   (Date)

4. **5** - Cab & Chassis, 58,000# GVWR, Tandem Axle, Diesel, Eaton UltraShift Transmission, 118" CA with 12 CY Dump Body, Central Hydraulics with Chemical Spreader Rate Control Systems, to meet ARDOT Spec. 20-69-038.

   FOB: 2 ea. - ARDOT District 2 Headquarters, 4900 Highway 65 South, Pine Bluff, AR 71611
   FOB: 3 ea. - ARDOT District 8 Headquarters, 372 Aspen Lane, Russellville, AR 72801

   Bid Price (Do not include any Local, State or Federal Taxes) Each $_____

   Total for **5** Cab & Chassis $_____

   **Cab & Chassis proposed as meeting specifications**:

   Make _____ Model_____ Warranty _____

   Guaranteed Delivery Date _____

   Additional Units may be purchased at the same pricing and conditions through _____
   (Date)

# ARKANSAS STATE HIGHWAY COMMISSION

## ARDOT - STANDARD BID CONDITIONS

1. **GENERAL:** Any special terms and conditions included in the invitation for bid override these standard terms and conditions. The standard terms and conditions and any special terms and conditions become part of any contract entered into if any or all parts of the bid are accepted by the Arkansas Department of Transportation (ARDOT).

2. **ACCEPTANCE AND REJECTION:** ARDOT reserves the right to reject any or all bids, to accept bids in whole or in part (unless otherwise indicated by bidder), to waive any informalities in bids received, to accept bids on materials or equipment with variations from specifications where efficiency of operation will not be impaired, and to award bids to best serve the interest of the State.

3. **PRICES:** Unless otherwise stated in the Bid Invitation, the following will apply: (1) unit prices shall be bid, (2) prices should be stated in units of quantity specified (feet, each, lbs., etc.), (3) prices must be F.O.B. destination specified in bid, (4) prices must be firm and not subject to escalation, (5) bid must be firm for acceptance for 30 days from bid opening date. In case of errors in extension, unit prices shall govern. Discounts from bid price will not be considered in making awards.

4. **BID BONDS AND PERFORMANCE BONDS**: If required, a **Bid Bond** in the form of a cashier's check, certified check, or surety bond issued by a surety company, in an amount stated in the Bid Invitation, must accompany bid. **Personal and company checks are not acceptable as Bid Bonds**. Failure to submit a Bid Bond as required will cause a bid to be rejected. The Bid Bond will be forfeited as liquidated damages if the successful bidder fails to provide a required Performance Bond within the period stipulated by ARDOT or fails to honor their bid. When a bidder claims and can show clear and convincing evidence that a material mistake was made in the bid and was not the bid intended, the bidder may be permitted to withdraw their bid prior to award without forfeiture of bid bond. Cashier's checks and certified checks submitted as Bid Bonds will be returned to unsuccessful bidders; surety bonds will be retained. The successful bidder will be required to furnish a **Performance Bond** in an amount stated in the Bid Invitation and in the form of a cashier's check, certified check, or surety bond issued by a surety company, unless otherwise stated in the Bid Invitation, as a guarantee of delivery of goods/services in accordance with the specifications and within the time established in the bid. **Personal and company checks are not acceptable as Performance Bonds**. In some cases, a cashier's check or certified check submitted as a Bid Bond will be held as the Performance Bond of the successful bidder. Cashier's checks or certified checks submitted as Performance Bonds will be refunded shortly after payment has been made to the successful bidder for completion of all terms of the bid; surety bonds will be retained. Surety bonds must be issued by a surety company that is authorized to do business in the State of Arkansas and that is listed on the current United States Department of the Treasury Listing of Approved Sureties. Surety bonds must be executed by a resident or non-resident agent who is licensed by the Arkansas State Insurance Commissioner to represent the surety company executing the bond, and the resident or non-resident agent shall file with the bond the power of attorney of the agent to act on behalf of the bonding company. Certain bids involving labor will require Performance Bonds in the form of surety bonds only (no checks of any kind allowed). These bonds shall not only serve to guarantee the completion of the work, but also to guarantee the excellence of both workmanship and material until the work is finally accepted and the provisions of the Plans, Specifications, and Special Provisions fulfilled. In such cases, the company issuing the surety bond must comply with all stipulations herein and must be named in the U. S. Treasury listing of companies holding Certificates of Authority as acceptable sureties on Federal Bonds and as acceptable reinsuring companies. Any excess between the face amount of the bond and the underwriting limitation of the bonding company shall be protected by reinsurance provided by an acceptable reinsuring company. Annual Bid and Performance Bonds on file with E & P Division must have sufficient unencumbered funds to meet current bonding requirements, or the bid will be rejected, unless the balance is submitted as set forth above, prior to bid opening.

5. **TAXES:** The ARDOT is not exempt from Arkansas State Sales and Use Taxes, or local option city/county sales taxes, when applicable, and bidders are responsible to the State Revenue Department for such taxes. These taxes should not be included in bid prices, but where required by law, will be paid by the ARDOT as an addition thereto, and should be added to the billing to the ARDOT. The ARDOT is exempt from Federal Excise Taxes on all commodities except motor fuels; and excise taxes should not be included in bid prices except for motor fuels. Where applicable, tax exemption certificates will be furnished by the ARDOT.

6. **"ALL OR NONE" BIDS:** Bidders who wish to bid "All or None" on two or more items shall so stipulate on the face of bid sheet; otherwise, bid may be awarded on an individual item basis.

7. **SPECIFICATIONS:** Complete specifications should be attached for any substitution or alternate offered, or where amplification is necessary. Bidder's name must be placed on all attachments to the bid.

8. **EXCEPTIONS TO SPECIFICATIONS:** Any exceptions to the bid specifications must be stated in the bid. Any exceptions to manufacturer's published literature must be stated in the bid, or it will be assumed that bidder is bidding exactly as stated in the literature.

9. **BRAND NAME REFERENCES:** All brand name references in bid specifications refer to that commodity or its equivalent, unless otherwise stated in Bid Invitation. Bidder should state brand or trade name of item being bid, if such name exists.

10. **FREIGHT:** All freight charges should be included in bid price. Any change in common carrier rates authorized by the Interstate Commerce Commission will be adjusted if such change occurs after the bid opening date. Receipted common carrier bills that reflect ICC authorized rate changes must be furnished.

11. **SAMPLES, LITERATURE, DEMONSTRATIONS:** Samples and technical literature must be provided free of any charge within 14 days of ARDOT request, and free demonstrations within 30 days, unless ARDOT extends time. Failure to provide as requested within this period may cause bid to be rejected. Samples, literature and demonstrations must be substantially the same as the item(s) being bid, unless otherwise agreed to by ARDOT. Samples that are not destroyed will be returned upon request at bidders expense. Samples from successful bidders may be retained for comparison with items actually furnished.

12. **GUARANTY:** Unless otherwise indicated in Bid Invitation, it is understood and agreed that any item offered or shipped on this bid shall be newly manufactured, latest model and design, and in first class condition; and that all containers shall be new, suitable for storage or shipment and in compliance with all applicable laws relating to construction, packaging, labeling and registration.

13. **BACKORDERS OR DELAY IN DELIVERY:** Backorders or failure to deliver within the time required may constitute default. Vendor must give written notice to the ARDOT, as soon as possible, of the reason for any delay and the expected delivery date. The ARDOT has the right to extend delivery if reasons appear valid. If reason or delivery date is not acceptable, vendor is in default.

14. **DEFAULT:** All commodities furnished will be subject to inspection and acceptance by ARDOT after delivery. Default in promised delivery or failure to meet specifications authorizes the ARDOT to cancel award or any portion of same, to reasonably purchase commodities or services elsewhere and to charge full increase, if any, in cost and handling to defaulting vendor. Applicable bonds may be forfeited.

15. **ETHICS:** *"It shall be a breach of ethical standards for a person to be retained, or to retain a person, to solicit or secure a State contract upon an agreement of understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies maintained by the contractor for the purpose of securing business."* (Arkansas Code, Annotated, Section 19-11-708).

16. **NOTICE OF NONDISCRIMINATION:** The Arkansas State Highway Commission, through ARDOT, complies with all civil rights provisions of federal statutes and related authorities that prohibit discrimination in programs and activities receiving federal financial assistance. Therefore, ARDOT does not discriminate on the basis of race, sex, color, age, national origin, religion (not applicable as a protected group under the Federal Motor Carrier Safety Administration Title VI Program), disability, Limited English Proficiency (LEP), or low-income status in the admission, access to and treatment in the ARDOT's programs and activities, as well as the ARDOT's hiring or employment practices. Complaints of alleged discrimination and inquiries regarding the ARDOT's nondiscrimination policies may be directed to Joanna P. McFadden Section Head – EEO/DBE (ADA/504/Title VI Coordinator), P. O. Box 2261, Little Rock, AR 72203, (501)569-2298, (Voice/TTY 711), or the following email address: **joanna.mcfadden@ahtd.ar.gov.** Free language assistance for Limited English Proficient individuals is available upon request. This notice is available from the ADA/504/Title VI Coordinator in large print, on audiotape and in Braille.

17. **PROHIBITION OF EMPLOYMENT OF ILLEGAL IMMIGRANTS:** Pursuant to Arkansas Code Annotated 19-11-105, all bidders must certify prior to award of a contract that they **do not** employ or contract with any illegal immigrant(s) in its contract with the state. Bidders shall certify online at https://www.ark.org/dfa/immigrant/index.php.

18. **DISCLOSURE:** Failure to make any disclosure required by Governor's Executive Order 98-04, or any violation of any rule, regulation, or policy adopted pursuant to that order, **shall** be a material breach of the terms of this contract. Any contractor, whether an individual or entity, who fails to make the required disclosure or who violates any rule, regulation, or policy **shall** be subject to all legal remedies available to the agency.

# ILLEGAL IMMIGRANT CERTIFICATION

Pursuant to Arkansas Code Annotated § 19-11-105, Contractor(s) **shall** certify with OSP that they do not employ or contract with illegal immigrants.

By signing below, the Contractor agrees and certifies that they do not employ illegal immigrants and will not employ illegal immigrants during the remaining aggregate term of the contract.

| | |
|---|---|
| Bid Number/Contract Number | |
| AASIS Number | N/A |
| Description | |
| **Contractor name** | |

Contractor Signature: _____ Date: _____

Signature must be hand written, in ink

# RESTRICTION OF BOYCOTT OF ISRAEL CERTIFICATION

Pursuant to Arkansas Code Annotated § 25-1-503, a public entity **shall not** enter into a contract valued at $1,000 or greater with a company unless the contract includes a written certification that the person or company is not currently engaged in, and agrees for the duration of the contract not to engage in, a boycott of Israel.

By signing below, the Contractor agrees and certifies that they do not currently boycott Israel and will not boycott Israel during any time in which they are entering into, or while in contract, with any public entity as defined in § 25-1-503* If at any time after signing this certification the contractor decides to engage in a boycott of Israel, the contractor must notify the contracting public entity in writing.

If a company does boycott Israel, see Arkansas Code Annotated § 25-1-503.

| | |
|---|---|
| Name of public entity | Arkansas Department of Transportation |
| Description of product or service | |
| Contractor name | |

Contractor Signature: _____ Date: _____
Signature must be hand written, in ink

"Public Entity" means the State of Arkansas, or a political subdivision of the state, including all boards, commissions, agencies, institutions, authorities, and bodies politic and corporate of the state, created by or in accordance with state law or regulations, and does include colleges, universities, a statewide public employee retirement system, and institutions in Arkansas as well as units of local and municipal government.

ATTACHMENT A

**ELIGIBLE BIDDER CERTIFICATION**

The Bidder represents and warrants for itself, its employees and its subcontractors and certifies they:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

2. Have not within a three-year period preceding thus Bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph two (2) of this Certification;

4. Have not within a one-year period preceding this application/Bid had one or more public transactions (Federal, State, or local) terminated for cause or default; and

The Bidder represents, warrants and acknowledges the understanding that restrictions placed on the employment of labor or on the scale of pay for the work on a contract will be the requirements of the Fair Labor Standards Act (Federal Wage-Hour Law) of 1938, 28 USC §201 et seq., and other applicable labor laws.

The person executing this Certification further represents, warrants and affirms the truthfulness and accuracy of the contents of the statements submitted on or with this Certification and understands that the provisions of 31 USC §3801 et seq. are applicable thereto.

_____

BIDDER NAME

BY:_____
Signature

TITLE:_____

# CONTRACT AND GRANT DISCLOSURE AND CERTIFICATION FORM

Failure to complete all of the following information may result in a delay in obtaining a contract, lease, purchase agreement, or grant award with any Arkansas State Agency.

SUBCONTRACTOR: SUBCONTRACTOR NAME:

☐ Yes ☐ No

IS THIS FOR:

TAXPAYER ID NAME: ☐ Goods? ☐ Services? ☐ Both?

YOUR LAST NAME: FIRST NAME: M.I.:

ADDRESS:

CITY: STATE: ZIP CODE: COUNTY:

***AS A CONDITION OF OBTAINING, EXTENDING, AMENDING, OR RENEWING A CONTRACT, LEASE, PURCHASE AGREEMENT, OR GRANT AWARD WITH ANY ARKANSAS STATE AGENCY, THE FOLLOWING INFORMATION MUST BE DISCLOSED:***

## FOR INDIVIDUALS*

Indicate below if: you, your spouse or the brother, sister, parent, or child of you or your spouse is a current or former: member of the General Assembly, Constitutional Officer, State Board or Commission Member, or State Employee:

| Position Held | Mark ( ✓) | | Name of Position of Job Held | For How Long? | | What is the person(s) name and how are they related to you? (i.e., Jane Q. Public, spouse, John Q. Public, Jr., child, etc.) | |
|---|---|---|---|---|---|---|---|
| | Current | Former | (senator, representative, name of board/ commission, data entry, etc.) | From MM/YY | To MM/YY | Person's Name(s) | Relation |
| General Assembly | | | | | | | |
| Constitutional Officer | | | | | | | |
| State Board or Commission Member | | | | | | | |
| State Employee | | | | | | | |

☐ **None of the above applies**

## FOR AN ENTITY (BUSINESS)*

Indicate below lf any of the following persons, current or former, hold any position of control or hold any ownership interest of 10% or greater in the entity: member of the General Assembly, Constitutional Officer, State Board or Commission Member, State Employee, or the spouse, brother, sister, parent, or child of a member of the General Assembly, Constitutional Officer, State Board or Commission Member, or State Employee. Position of control means the power to direct the purchasing policies or influence the management of the entity.

| Position Held | Mark ( ✓) | | Name of Position of Job Held | For How Long? | | What is the person(s) name and what is his/her % of ownership interest and/or what is his/her position of control? | | |
|---|---|---|---|---|---|---|---|---|
| | Current | Former | (senator, representative, name of board/ commission, data entry, etc.) | From MM/YY | To MM/YY | Person's Name(s) | Ownership Interest (%) | Position of Control |
| General Assembly | | | | | | | | |
| Constitutional Officer | | | | | | | | |
| State Board or Commission Member | | | | | | | | |
| State Employee | | | | | | | | |

☐ **None of the above applies**

# Contract and Grant Disclosure and Certification Form

***Failure to make any disclosure required by Governor's Executive Order 98-04, or any violation of any rule, regulation, or policy adopted pursuant to that Order, shall be a material breach of the terms of this contract. Any contractor, whether an individual or entity, who fails to make the required disclosure or who violates any rule, regulation, or policy shall be subject to all legal remedies available to the agency.***

**As an additional condition of obtaining, extending, amending, or renewing a contract with a state agency I agree as follows:**

1. Prior to entering into any agreement with any subcontractor, prior or subsequent to the contract date, I will require the subcontractor to complete a **CONTRACT AND GRANT DISCLOSURE AND CERTIFICATION FORM**. Subcontractor shall mean any person or entity with whom I enter an agreement whereby I assign or otherwise delegate to the person or entity, for consideration, all, or any part, of the performance required of me under the terms of my contract with the state agency.

2. I will include the following language as a part of any agreement with a subcontractor:

   Failure to make any disclosure required by Governor's Executive Order 98-04, or any violation of any rule, regulation, or policy adopted pursuant to that Order, shall be a material breach of the terms of this subcontract. The party who fails to make the required disclosure or who violates any rule, regulation, or policy shall be subject to all legal remedies available to the contractor.

3. No later than ten (10) days after entering into any agreement with a subcontractor, whether prior or subsequent to the contract date, I will mail a copy of the CONTRACT AND GRANT DISCLOSURE AND CERTIFICATION FORM completed by the subcontractor and a statement containing the dollar amount of the subcontract to the state agency.

Signature _____ Title _____ Date _____

Vendor Contact Person _____ Title _____ Phone No. _____

Agency Use Only

Agency Number _____ Agency Name _____ Agency Contact Person _____ Contact Phone No. _____ Contract or Grant No. _____

**ARKANSAS DEPARTMENT OF TRANSPORTATION**

**SPECIFICATION 20-72-037**

**FOR**

# MULTI-AXLE CAB AND CHASSIS 68,000 POUND GVWR WITH WESTERN STYLE 15' DUMP BODY PUSHER AXLE, UNDERBODY SCRAPER 10' SNOWPLOW AND CHEMICAL SPREADER

## 1. General Specifications

A. Current Model: Units furnished under this specification shall be the latest improved model in current production, as offered to commercial trade, built for the U.S. market, and shall be of quality workmanship and material. Units manufactured for foreign markets will not be accepted. All equipment offered under this specification shall be new. Used, reconditioned, shopworn, demonstrator, prototype or discontinued models are not acceptable. Manufacturers of the units supplied must have been in the business of producing operational units for at least two years and must have recently sold similar units to domestic governmental agencies. The model furnished must have been in production for a minimum of one year, or be the latest version of a previous model. Bidder(s) will be required to submit documentation substantiating the aforementioned requirements. A list of user references may also be required.

B. Literature: Manufacturers literature, verifying adherence of proposed unit to each line item addressed in this specification, shall be submitted with the bid. If any literature and/or specifications of items conflict with ARDOT specifications, the conflict(s) shall be specifically noted, corrected and submitted with the bid.

C. Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that equipment offered is in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet. However, no implication is made by the Arkansas Department of Transportation that deviations will be acceptable.

D. Units shall be assembled, adjusted and made ready for continuous operation at time of delivery.

E. Manuals: The successful bidder shall furnish one (1) Operator's Instruction Manual with each unit delivered and one (1) copy each of Shop Repair Manual and Parts Book to each FOB point.

The successful bidder may provide Shop Repair Manuals and Parts Manuals on computer media (CD, DVD, USB Drive, etc.) in lieu of printed manuals.

F. All parts, accessories and tools necessary for satisfactory operation of unit shall be furnished whether or not they are specifically mentioned in this specification (including standard equipment as regularly furnished by manufacturer as shown on printed literature and specifications - unless specifically excluded by this specification).

G. Parts Inventory & Service Facilities: The successful bidder shall maintain a representative inventory of replacement parts and service facilities for servicing equipment bid on.

H. Demonstration: The Arkansas Department of Transportation reserves the right to require a demonstration, under actual working conditions, of equipment bid under this specification before award is made. The demonstration would be performed (free of any charge) by the bidder or an authorized representative at a mutually acceptable location. If requested, the bidder should be prepared to demonstrate the equipment within thirty (30) days after notification. Failure of the bidder to perform a satisfactory demonstration within the specified time may be grounds for rejection of the bid.

I. Drawings: Professional quality drawings which depict the layout of the chassis will be provided with the bid.

J. Inspection: The ARDOT reserves the right to inspect bodies during manufacture, or prior to their installation, for compliance with specifications and to inspect hydraulics installation during work in progress. Location of hoists on truck chassis shall be approved by ARDOT prior to installation. All workmanship shall be first class (no welding on truck frame to install dump body hoist). Any unit delivered under this specification is subject to rejection if there is evidence of poor workmanship by either the vendor or the original manufacturer.

K. Due to the nature of work performed by ARDOT, body-hoist combinations furnished under this specification may be subject to use under adverse conditions such as dumping on road shoulders at a slight angle and spot dumping of loads. The design and strength characteristics of the entire dump unit shall be such that the unit structural members and the hoisting system shall suffer no deformation, damage or structural failure resulting from raising a full payload under these conditions.

L. Delivery Requirements: It will be the responsibility of the Successful Bidder to guarantee delivery of the cab & chassis as specified, including items or equipment installed by a third party contractor, within the quoted time.

M. Cooperative Purchasing: Other tax-supported entities* in Arkansas (cities, counties, state agencies, school districts, etc.) may purchase from this Contract on an individual basis under the same specifications and conditions, and at the pricing set forth by each vendor, all at the discretion of each vendor in each case. Prices could be reduced by a vendor for minor alterations in conditions (changing order quantities, deleting options, etc.) as agreed by both parties, but could not be raised above the contract bid price except for any additional freight charges. Vendors would not be required to sell to any such entity under this contract, and those entities would not be obligated to purchase from the contract.

Each entity wishing to purchase from the contract must make contact directly with the appropriate vendor(s). The Highway Department shall remain "out of the loop" for such transactions: all contact, orders, invoices, payments, etc. regarding such transactions must take place exclusively between the tax-supported entity and the vendor. The Department shall be held harmless of any and all liability arising from such transactions.

* Tax-supported entities are defined as those receiving more than half of total funding from appropriated tax funds.

## 2. Unit Specifications:

A. General: This specification is designed to provide the Arkansas Department of Transportation with multi-axle trucks for maintenance operations. The truck's uses will consist of material hauling, trailer towing, and operation of hydraulically controlled 15' material spreader, front mount snowplow and mid-mount underbody scraper.

B. Cab and Chassis:

1. GVWR: 68,000 pounds, minimum.

2. Cab to Axle: Nominal effective CA of 144".

3. Front Tires and Wheels: Two (2) 315/80R22.5 steel belted tubeless radials - load range "L" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 9" rim section. All tires must have speed restriction that exceeds 65 MPH.

4. Rear Tires and Wheels: Nine (9) 11R22.5 steel belted tubeless radials - load range "H" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 8.25" rim section. All tires must have speed restriction that exceeds 65 MPH.

5. Engine: Liquid cooled 4 cycle diesel with a minimum piston displacement of 11.8 liters. Shall have an advertised rating of no less than 430 SAE gross horsepower and a minimum of 1,550 lb. ft. SAE gross torque. Governed speed shall be no less than 2,000 RPM. Shall have full flow oil filter(s), fuel filters, dry type air cleaner, 12-volt electrical equipment with no less than 160-amp alternator and maintenance free batteries as regularly furnished with engine specified. Engine shall be equipped with a block heater rated at no less than 1,000 watts which will operate on 120 volts AC.

6. Emissions: The engine emission control system shall be programed to allow regeneration to occur even if the truck is being used in an urban or low speed highway applications.

7. Engine Brake: Jacobs engine brake, or equal, designed to use engine compression to retard engine speed. Shall be capable of utilizing all engine cylinders for braking effect.

8. Front Power Take-Off: Engine to be equipped with provision for front PTO drive. Shall include the necessary crankshaft adapter for attaching a shaft type drive and any other items required for this provision. If the PTO driveshaft passes through the radiator, charge air cooler, and/or air conditioning condenser it shall be shielded by a steel encasement of sufficient strength to prevent damage to surrounding components in the event of driveshaft failure.

9. Cooling System: As recommended and regularly furnished by the manufacturer for use with the engine size and PTO provision specified above with anti-freeze protection to -20° F, or lower. If optional corrosion resistant radiator coating or treatment is available, it must be provided.

10. Exhaust System: Vertical exhaust stack with curved outlet. Exhaust stack to be equipped with a heat shield. If the DPF is part of the exhaust stack, the clearance to the dump body must be pre-approved. Exhaust system design and/or components shall not hinder the installation of under-frame snow removal equipment behind the cab.

11. Engine Shutdown: Engine safety shutdown system with manual or automatic override to include the following features: Low oil pressure warning bell/buzzer plus shutdown, high coolant temperature warning bell/buzzer plus shutdown and low coolant level warning bell/buzzer plus light or shutdown.

12. Throttle Control: Engine shall be equipped with an in-cab throttle control for use with PTO. Shall be electronic control type.

13. Transmission: Eaton Fuller Ultra-Shift FO-16E308LL-VCS.

14. Clutch: Heavy-duty type with torque capacity for engine furnished.

15. Steering: Hydraulic actuated power steering as regularly offered by manufacturer.

16. Front Axle: I Beam Type with wet seals, outboard mounted drums and a minimum capacity of 18,000 pounds. Set forward only, axle set-back not to exceed 32".

17. Front Springs: As required to meet axle capacity specified above.

18. Rear Axle and Suspension: Tandem with power divider, inter-axle differential lock out control and Hendrickson RT or RTE equalizing beam type suspension. Shall be full floating with wet seals, outboard mounted drums and have a minimum capacity of 40,000 pounds. Shall have a ratio of 4.56, 4.63, 4.78 or 4.88 to 1. Alternate ratio may be provided if approved by ARDOT prior to delivery. (Axle ratio should provide a maximum theoretical geared speed of no less than 69 MPH and still provide acceptable startability.)

19. Pusher Axle: Rigid type to be mounted forward of the trucks tandem axles. Shall provide no less than 20,000 lbs. capacity and be equipped with air ride suspension. Shall have factory installed air operated two shoe type brakes with automatic slack adjusters and dust shields. Brake system shall be controlled by the chassis for signal to brake only. Pusher axle shall include an auxiliary air tank mounted to the axle assembly. Unit shall be capable of lifting axle assembly a minimum of 8" when in the travel position. Shall have an air control system mounted inside the cab that is easily accessible to the operator. Shall be Watson and Chalin Manufacturing, Inc AL-2200 or approved equivalent. During the winter months the pusher axle will be removed and an underbody scraper installed. The pusher axle and suspension shall be unitized. Holes drilled in the frame for mounting of the pusher axle shall be positioned, as much as possible, to allow for their use in mounting of the underbody scraper. The airlines to the pusher axle from the chassis shall be attached by means of DOT approved quick couplers.

20. Air System: Air compressor shall have a minimum capacity of 15 cfm and draw air through the engine air cleaner. Air system shall be equipped with a heated air dryer.

21. Brakes: Factory installed full air operated two shoe type with automatic slack adjusters and dust shields on front and rear. Rear brakes shall have spring set parking brakes. Brake chambers on the drive axles must be located inside the rear tire envelope to prevent chambers from interfering with pull-type asphalt spreader rollers. Location of the air tanks and/or dryer shall not inhibit the installation of snow removal equipment underneath the truck between the cab and front tandem (clear frame).

22. Trailer Controls: Shall be equipped with full trailer brake controls providing air brake and electrical hookup for straight truck with trailer applications. Shall include hand control valve, tractor protection valve and trailer anti-lock provisions. Air lines and 7-wire electric cable shall be routed to end of frame. Air lines to be equipped with glad hands and tethered removable covers. Electric cable shall be equipped with 7-wire receptacle.

23. Frame: Section modulus and yield strength of frame material shall provide a minimum RBM of 2,500,000. Shall have 20" minimum integral front frame extension.

24. Ground Clearance: Frame mounted components (fuel tanks and fuel tank brackets, steps, air tank, battery boxes, etc.) shall have a minimum of 13" ground clearance. Components located within the operational area of the belly mount scraper shall have sufficient ground clearance to allow for mounting and operation of a scraper equipped with a 17" moldboard.

25. Cab: Conventional cab as regularly furnished by manufacturer, complete with insulation and all interior trim. Cab glass shall include windshield, roll-up windows in doors and rear cab glass as a minimum. Shall have key type lock on right and left doors, factory installed fresh air heater-defroster unit, grab handle on each side, right and left sun shades and fitted rubber floor mats.

    a. Cab Mounts: Air suspension type rear cab mounts.

b. Instruments: Shall include the following as a minimum:

(1) Speedometer/odometer

(2) Electric tachometer

(3) Ammeter or volt meter

(4) Oil pressure gauge

(5) Coolant temperature gauge

(6) Air brake pressure gauge

c. Air Conditioning: Factory installed air conditioning. Shall include tinted glass all around.

d. Tilt Steering Column: Factory installed.

e. Windshield Wipers: Dual electric intermittent windshield wipers with washers.

f. Plow Light Harness: Factory installed wiring harness with connector for installation of snowplow lights. Harness must provide circuits for high and low beam headlights, marker lights and turn signals with factory installed dash mounted switch.

g. Two-way Radio Harness: Factory installed wiring and circuit protection for two-way radio shall be installed with wiring terminating in the overhead console. Wire ends shall be factory sealed to prevent accidental grounding. One circuit to be continuously hot with 20-amp protection, one circuit to be hot with ignition on, with 5-amp protection.

h. Ground Speed Harness: Factory installed wiring harness to provide the body builder a connection for ground speed signal. Body builder connection point to be located inside the cab.

i. Auxiliary Switches: Shall be equipped with a minimum of six (6) rocker switches mounted in the instrument panel for use by bodybuilder or end user to supply power to work lights, warning lights and other auxiliary electrical devices.

j. Seats: Air suspension driver's seat and non-suspension passenger's seat. Shall include driver and passenger side seat belts.

k. Radio: Factory installed electronic AM/FM/WB radio.

l. Heated Mirrors: Dual Heated West Coast Sr. type mirrors no less than 7" x 16" with adjustable brackets and auxiliary convex mirrors, 8" round or 6" x 6" rectangular.

m. Air Horn: Single or dual trumpet air horn.

24. Hood: Tilting fiberglass or composite hood and fenders with stationary grille and tilt assist mechanism.

25. Front Bumper: Delete.

26. Lights: Shall be equipped with factory installed dual beam headlights, parking lights, clearance lights, directional turn signals with column mounted switch and hazard flasher switch. Rear signals to be wired for stop and taillights in addition to directional signals.

27. Auxiliary Snowplow Headlights: (If factory installed snowplow lights or a suitable factory installed bracket is available, it may be submitted for approval)

a. Front auxiliary halogen headlights shall be Truck-Lite model 645 or approved equivalent.

b. Auxiliary headlights shall not obstruct the driver's vision and be mounted approximately 64" from ground level and at approximately the same width apart as truck's headlamps.

c. Light shall be secured to a fender mounted 3-point assembly bracket. Bracket shall be made from stainless steel.

d. All fasteners attaching the bracket to the fender shall be stainless steel and be secured using locknuts.

e. Reinforced rubber washers or grommets shall insulate the bracket from the hood. Fasteners attaching the bracket to the hood shall be insulated from the hood by a 2" minimum diameter rubber washer or grommet and 2" minimum diameter plated washer.

f. Auxiliary headlights shall be grounded back to chassis' ground using a minimum 14-gauge wire.

28. Backup Alarm: Shall be equipped with an electric backup alarm meeting the requirements of SAE J994 with a minimum sound level output of 97 decibels.

29. Fuel Tank(s): Single fuel tank with instrument panel fuel gauge. Tank shall have a minimum fuel capacity of 100 gallons and be mounted on the left side of the truck under the cab. The bottom of the tank and tank mounting brackets shall have sufficient ground clearance to allow for mounting and operation of a belly mount snowplow with a 17-inch moldboard.

30. Color: Cab, hood, fenders and wheels shall be Sherwin Williams F8W2030 Frost White Acrylic Enamel, or equal. Grill, bumper and mirrors shall be as regularly furnished by manufacturer.

C. Dump Body:

1. General: Shall be Western Style crossmemberless and capable of accommodating a material spreader with a 15' hopper body and attached liquid storage tanks. The floor, sides and main long sill are to be full length with no cross-splices. All boxed areas of the dump body shall be sealed. Hinge pins shall be removable. All grease zerks shall be threaded. Drive-in zerks are not acceptable. All threaded holes for grease zerks shall be of sufficient depth to prevent the zerk from bottoming out when tightened. All welds shall be continuous. All welds, areas of slag deposits or torch cut areas shall be ground to produce a smooth surface. Metal that has been cut with a torch shall be ground to remove slag and other deficiencies. When welding on the truck, areas that could be damaged by splatter such as wiring harnesses, grills, and mirrors shall be covered for protected.

   a. Capacity: Shall be a minimum 12 cubic yards struck measure.

   b. Inside Length: Shall be 15 foot.

   c. Inside Width: No less than 86 inches.

   d. Outside Width: 95 inches – 100 inches.

   e. Side Height: No less than 36 inches with raised ends.

   f. Tailgate Height: No more than 36 inches.

2. Material: The dump body main long sills and top rail shall be constructed using high strength steel tubing or approved equivalent.

   a. Main Long Sills: ¼ inch.

   b. Floor: ¼ inch (AR-450).

   c. Tailgate: ¼ inch (AR-450).

   d. Sides: 3/16 inch (AR-450).

   e. Front: 3/16 inch (AR-450).

   f. Formed Top Rail: 3/16 inch.

3. Mounting:

   a. Pivot Pin: Rear edge of pivot pin shall be no more than 1 inch forward from the rear face of the rear hitch plate.

   b. Dump Body Pivot: Shall be 12 inches from the centerline of the pivot pin to the rear face of the dump body not including the tailgate. Pivots shall facilitate thorough greasing. Bushings shall have an internal radial groove aligned with the grease fitting. Pivot pins shall be drilled and cross-drilled.

   c. The distance from the rear face of the rear hitch plate to the center line of the rear drive axle shall be no less than 21" or no more than 22". Rear drive axle tires shall not extend past the rear face of the rear hitch plate.

d. Dump Body: Shall be mounted a minimum of 3" from the hydraulic tank, excluding the sub frame of the tank and hoist.

e. Ground Strap: A 4-gauge battery cable ground strap shall be installed from the dump body to the truck frame. The strap shall be attached to the truck frame by no less than a 5/16" cadmium plated bolt with star washers on both sides of the strap eye to insure a good ground.

4. Body Props: A storable body prop shall be provided for each side of the dump body. Pivots for the body props shall be greasable and body props shall be designed to withstand the down-pressure of the hoist without damaging the dump body, chassis, or any related components. Body props shall be designed to hold the dump body at a minimum angle of 22 degrees when deployed.

5. Cab Protector: The three quarter (3/4) cab protector shall not interfere with the cab mounted vertical exhaust pipe. The cab protector shall be mounted, welded, and gusseted to prevent flexing or vibration. The side plates shall be constructed using high strength steel with a minimum thickness of 7-gauge. The outer front corners shall be angled at 45 degrees in order to provide mounting spaces for the installation of Whelen 5V3A Series or approved equivalent in each front corner. The lights shall be visible from both the front and the side of the cab protector.

6. Sides: Sides shall have a formed, debris shedding top rail. Sides shall have no provision for extension boards. Each side of the body shall have a walk rail of approximately 1/4" x 1-1/2" flat steel. Top of walk rail shall be approximately 12" from bottom of body.

7. Shovel Rack: A steel shovel rack shall be welded to the driver's side of the dump body. The holder shall be spring loaded and formed to clamp down on the shovel handle and hold it securely to the side of the dump body while the truck is traveling at road speed.

8. Tailgate: The tailgate shall be double acting, and vertically straight with offset hinges for positive closure. The latching mechanism for the tailgate control hooks shall be air operated. Tailgate shall have boxed upper, lower, side, and intermediate horizontal rib supports. Tailgate shall be equipped with chains and hooks (or keyhole eyes) for lowering to any position. Lift handles shall be welded on each side just above the bottom support rib. When tailgate is lowered parallel to body floor, the inside surface of the tailgate shall provide a smooth level joint between the tailgate and the body floor.

   a. Removal: A hinged "D" ring shall be mounted top and center of the tailgate to provide a lifting hook for removal.

   b. Anchor Points: Anchor points for the tailgate chains shall be made from 3/8 inch thick steel and be lapped on the outside of the dump body with a minimum of 1-inch overlap. Keyhole slot in anchor points shall be configured so that when installed, the link of the tailgate chain nested in the anchor is no more than 1 inch away from the rear face of the dump body at the farthest point.

   c. Top Hinge Pins: The top hinge pins shall be minimum 1-inch diameter and pivot through a greasable bushing. One end shall be tapered approximately 30 degrees for ease of alignment. 30-degree taper shall be no less than 1/8 inch or no more than ¼ inch in length.

   d. Lower Pins: The lower pins shall be a minimum of 1-1/8 inch diameter. Tailgate shall, without assistance from the locking device, seal against the floor and side sheets of the dump body, with no more than a 1/16 inch gap at any point. With the tailgate closed and the locking device open, tailgate lower pins shall have no less than 1/8 inch or more than ¼ inch gap between the forward edge of the pin and the forward edge of the cradle.

   e. License Plate Bracket: A license plate bracket shall be welded on the left hand side of the tailgate, at approximately half the height of the tailgate.

   f. Tailgate Latch:

      (1) An over-center locking device on each side of the dump body shall hold the tailgate securely closed. Latching arms shall be forged steel.

      (2) The locking device shall be operated by a 3 1/2" diameter air cylinder, which shall be mounted between the long sills. Air cylinder shall be controlled by the chassis air accessory power supply.

      (3) Locking device shall be adjustable at each side of the dump body.

      (4) The tailgate latch cross shaft assembly shall be supported on each end by bushings.

(5) Lubrication points on the tailgate latch cross shaft shall facilitate easier greasing by means of grooved bushings and/or shafts.

(6) Grease fittings at each end of the tailgate cross shaft shall be visible and accessible from the outside face of the dump body.

9. Ladder: Each side of the body shall have a built-in ladder between the top and bottom rail. Ladder shall consist of two formed handrails constructed of at least 3/16" steel. Ladder shall have two anti-skid metal steps welded between the hand rails. Aligned with each of these units shall be a pull out style two-rung ladder. Location of the ladders shall be such that operator does not have to climb over the tarp bow when the tarp is retracted. Ladders shall be a minimum of 14" wide.

10. Toolbox: A toolbox measuring approximately 18" x 18" x 24" shall be installed on the right hand outside frame rail. The toolbox and mount shall be installed in a manner which allows for removal in the event insufficient room exists to allow the toolbox to remain mounted to the chassis while the pusher axle is attached.

11. Hoist:

    a. Hoist shall be a forward set, trunnion mount, head lift, double-acting cylinder.

    b. The hoist should be designed to accept a Model CS 140-5.5-3DA MAILHOT cylinder or approved equivalent. The cylinder sleeves shall be nitride coated. Sub-frame or dog house mounted hoists will not be accepted.

    c. A flared body bracket will be attached to either the hoist frame or body understructure to align body in position and keep from moving side to side.

12. Brake, Turn and Tail Lights: Lighting shall meet all Federal and State DOT specifications, which requires an independent running light on the rear corners.

    a. All lights shall be LED and mounted in shockproof rubber grommets.

    b. All lights shall be connected to a one piece wiring harness with molded connectors.

    c. Each rear corner post shall have a Whelen series 400 weldment equipped with rectangular stop/turn taillight and backup light. Suitable make and model is Whelen 400 Series, or approved equivalent.

13. Raised Body Indicator: A sealed proximity switch shall be mounted near the hoist assembly to control a raised body indicator light and buzzer. The light and buzzer shall be powered by the chassis electric accessory power supply. A dash or console mounted indicator light shall be provided and be plainly visible to the seated operator. The indicator light shall be red and flash when the dump body is raised. The buzzer shall be of sufficient decibel level to be plainly audible by the driver while in transit.

14. Mud Flaps: Friction type mud flap brackets to be attached to the underside of the dump body at the rear. Brackets shall allow replacement of the mud flap by removing only one fastener. Mud flaps shall be 24" wide and long enough to satisfy FMVSS. Front mud flap brackets to be attached to underside of bed. Front mud flaps shall be 24' wide, anti-sail and long enough to keep rear tires from throwing debris on the back of the cab. All mud flaps shall have no dealer or manufacturer advertisements.

15. Hydraulic Couplers: The driver's side of the dump body shall have three (3) male couplers for the spreader. The female half of each hydraulic quick coupler set shall be provided.

16. Hydraulic Tubing: The driver's side rear corner post of the dump body shall have an access plate, forward facing, with male bulkhead fittings. Appropriately sized hydraulic tubing shall extend from the bulkhead fitting down the inside of the corner post and exit at a point which allows connection with the spreader hydraulic hoses from the valve body. Hydraulic tubing shall be routed in a manner as to not interfere or contact the tailgate latching mechanism.

17. Tarp: A fully automatic two (2) arm type tarp system shall be installed. It shall be an electric system operated from the cab. The arms and tarp protecting windshield shall be aluminum and form arches that provide maximum clearance and fit for loading material into body. The tarp shall be designed for hot asphalt. The width of the tarp shall be within 4" of the inside width of the dump body. The arm springs shall be adjustable and designed for side mounting on the dump body. The elbows of the tarp arms shall be bolted to the arms. The tarp arms shall have a 45 degree swept angle. The tarp shall be controlled by the chassis electric accessory power supply. Shall be Aero Series 575 or approved equivalent. Tarp system shall include a twin arm tarp tensioning device that attaches to the primary arms and pivots to the forward end of the dump body when the tarp is deployed to prevent sailing. Shall be Aero 0311-980042 or approved equivalent.

18. Paver Lip: A paver or asphalt lip shall be bolted on the rear of the dump body apron using no less than ten (10), ½ inch, grade eight bolts. Paver lip shall be mounted at an angle no less than 24 degrees but no more than 28 degrees. Paver lip length shall be such as to provide approximately 20" of overhang, measured from the rear face of the rear hitch plate to the rear edge of the paver lip.

19. Rear Hitch Plate and Pintle Hitch:

    a. A ¾" thick steel rear hitch plate shall be securely welded and gusseted to rear of frame rails.

    b. Plate shall have service and emergency trailer glad hands positioned away from the center of the rear hitch plate to prevent interference with a trailer tongue when making tight turns. Glad hands shall be mounted to a bulkhead fitting installed in the plate and have tethered removable covers.

    c. The seven (7) pin trailer connection furnished with the chassis shall be mounted through the rear hitch plate in a suitable location.

    d. A four (4) pin female electric connector shall be mounted through the rear hitch plate in a suitable location. Connector shall be a Hopkins Model 52004 or approved equivalent.

    e. Two (2) Buyers Products B50 or approved equivalent DOT "D" rings, with 20 ton capacity each shall be securely welded to the rear hitch plate.

    f. All items mounted on the rear hitch plate (except the pintle hitch) shall be mounted as high as practical, leaving a smooth, clear area when the pintle hitch is removed.

    g. A Buyers Products PH30 rigid pintle hitch or approved equivalent shall be installed on the rear hitch plate using grade eight (8) hardware. Hitch shall be adjustable in height. Settings shall be 24", 26 ¼", 28 ½", 30 ¾" centerline height above the ground plus or minus 1".

    h. A rear chipper bar shall be installed on the pintle plate flange. Unit must bolt on with a minimum of four (4) 5/8" grade eight (8) bolts per side. Unit shall be constructed of 3 ½" x 4" angle or 4" channel and 1 ¾" cold roll bar stock. Width of the bar shall be 17". Hitch height shall be 14" from the ground to the center of chipper bar. There shall be a minimum of 6" clearance between the top of the chipper bar and the bottom of the rear hitch plate.

20. LED Warning Light System: Truck shall be equipped with an LED warning light system. System shall emit light that is amber in color and shall provide 360 degrees of visibility in a horizontal plane around the truck. Lights shall be mounted in rubber grommets and independently programmable. Wiring harness for warning lights shall be without splices. Lights shall operate with the key switch in the on and off position while capable of automatically shutting off after 12 hours of operation with the key switch in the off position. Dash or console mounted LED indicator lights shall illuminate when the warning lights are operating. Lights shall operate by two (2) position bi-stable switch. The lighting system shall consist of the following as a minimum.

    a. Two (2) lights recessed into the front corners of the body's cab shield at a 45-degree angle. Lights shall be Whelen 5V3A, 5 Grommet Series.

    b. One (1) Whelen Series 400 light weldment shall be recessed into each of the dump body's rear corner posts. Weldments shall be equipped with Whelen Series part number *DOT-3404D, ADD 4 TIR3* warning lights. Weldments shall also include Whelen LED backup lights and stop/turn/ tail lights. Tail light height shall not exceed 72".

21. Electrical and Illumination Installation:

    a. All installed wiring must be of adequate size to handle the anticipated loads of all electrical components. All wiring must be uninterrupted and complete with no splices.

    b. All wiring must be color coded.

    c. All wire terminal ends (spade, ring, etc.) shall be crimped, soldered to the wires and heat shrank or weatherproof connectors. Scotch-Loc fasteners and/or crimp butt connectors are not acceptable for any connection.

    d. All electrical connections shall be protected with dielectric silicone grease.

    e. All wiring shall be enclosed in a protective wiring loom, conduit or wrapped harness.

    f. The edges of all holes through which wiring must pass shall be protected with a grommet.

g. Low current circuits, such as the spreader light or relay activation circuits shall be controlled by the chassis electric accessory power supply.

h. High current circuits, such as the tarp motor circuit shall be powered directly from the battery and protected by a master resettable breaker or a fusible link.

i. Body Builder installed wiring going to the rear of the frame and dump body shall be grouped together and bound. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

j. All wiring to lamps shall be stress relieved within 6" of the lamp.

k. Wiring routed through the hydraulic enclosure sides shall be routed through a sealed compression type strain relief or a molded bulkhead fitting.

l. A four wire electric cable shall be routed from the cab auxiliary switches to the four pin electrical connector mounted on the rear hitch plate. The electric cable shall contain one ground wire and three switch controlled wires. One wire to control each of the following spreader functions: strobe light, work light and electric pump motor.

22. Air Powered Accessory Installation:

a. All lines shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All lines shall be routed or shielded to protect them from heat sources.

c. Air lines shall be colored, identifying individual circuits with each circuit being a different color.

d. Body Builder installed accessory air lines going to the rear of the frame and dump body shall be grouped together and bound with the Body Builder installed wiring going to the rear of the frame and dump body. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

e. All air powered accessories shall be controlled by the chassis air accessory power supply.

23. Color: Dump Body, hitch plate and other associated metal components shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Painting shall be accomplished by industries best practices; aerosol paint is not acceptable in this application. Finish painting of the inside bottom of the body is not necessary.

D. Hydraulic System:

1. Hydraulic Tank:

a. The hydraulic tank shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. The tank shall be mounted to provide no less than 3" of clearance between the cab and tank.

c. Tank shall come complete with all mounting hardware including but not limited to, frame mounting angles, bolts with poly locknuts and springs.

d. Tank shall be a minimum 30-gallon capacity with full baffle to prevent sloshing.

e. Tank and baffle shall be constructed of 10-gauge stainless steel.

f. Tank shall have a screened filler neck with a breather cap.

g. A sight/temperature gauge shall be mounted on the outside of the tank, and be easily visible. Sight/temperature gauge housing shall be all aluminum.

h. Tank bottom shall have a 3" NPT port for suction.

i. Suction strainer shall be 2" NPT with a 3-5 psi built in bypass, and have a full flow ball valve installed at the tank suction fitting. A heavy plastic wire tie shall be installed to insure the ball valve remains in the open position unless it is intentionally closed.

j. Tank shall have ¾" NPT port with a magnetic plug for draining the tank.

k. Tank shall have a ¾" NPT port for the pump case drain.

l. Tank back shall have 3/8" NPT port for the solenoid drain.

m. Tank back shall have a ½" NPT port for the low oil sensor.

n. Tank top shall come with provision for a tank-mounted filter on the passenger side.

2. Hydraulic Return Filter Assembly: Assembly shall be mounted on the top of the hydraulic reservoir with a 10-micron replaceable cartridge element and a built in bypass and a bypass condition indicator. The bypass condition indicator shall be installed so its face can be seen from the driver's seat. The assembly shall have a minimum capability of 80 GPM and contain one (1) 1 ¼" NPT port. All return oil shall pass through a return filter.

3. Hydraulic Pump:

a. Pump shall be crankshaft driven.

b. The piston pump shall be load sensing type with a minimum capability of 48 GPM and 3000 PSI at 2500 RPM.

c. Pump shall have side ports in order to avoid multiple 90-degree bends in suction lines. Rear ports are not acceptable.

d. The case drain shall be positioned as high as possible and directed back to the reservoir without passing through the return line filter.

e. The pump shall have an option for an internal bleed down compensator, a 1 ¼" keyed shaft drilled and tapped, a 1" split flange pressure port and a 2" split flange suction port.

f. A normally closed 12VDC low oil shut down valve shall mount directly to the pump pressure port and be activated by the low oil level switch in the tank.

g. The pump must have a pressure gauge port integral to the rear cover of the pump.

h. Pump shall be Sauer-Danfoss Model JRL075, or approved equivalent.

4. Hydraulic Pump Drive:

a. The driveline shall be 1280/1310 series solid shaft type and be installed according to manufacturer's instructions to assure proper alignment.

b. Pump shall be driven off the engine crankshaft.

c. Pump shaft shall have a companion flange that unbolts from the driveshaft for easy belt replacement and come complete with all crosses, pump end yoke and flange for engine.

d. All hardware used for installation of pump driveshaft shall meet or exceed driveline manufacturer's specification. Manufacturer's torque specifications shall be adhered to on all driveshaft installation hardware.

5. Hydraulic Function Control Valves:

a. The valve shall be load sensing type with a mobile stackable design.

b. The valve shall be all cast iron design and all sections must be of the same valve series.

c. The valve shall be capable of a nominal 35 GPM with published flow curves to 40 GPM.

d. The valve shall be pressure and flow compensated.

e. Inlet and outlet ports shall be ¾" O-ring, all working ports shall be minimum 5/8" O-ring.

f. The valve shall be equipped with a 0 -3000 psi gauge installed in inlet.

g. Valve shall be arranged as follows:

(1) Inlet cap with top ported pressure and tank, load sensing ports.

(2) Double acting cylinder spool for hoist 0-32 GPM proportional 12VDC operated, with spring return to neutral. Section shall have manual handle overrides with stroke limiters and 500 PSI down side load sense relief.

(3) Single acting cylinder spool for plow lift, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-15 GPM main spool. Section shall have manual handle overrides and stroke limiters. Plow float shall be incorporated and controlled by console.

(4) Double acting cylinder spool for plow left/right, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(5) Double acting cylinder spool for scraper up/down with 500 PSI load sense relief and shock valve for down, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(6) Double acting cylinder spool for scraper left/right, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(7) Single acting 0-15 GPM spool for auger, proportional 12VDC spring to center with manual override.

(8) Single acting 0-7 GPM spool for spinner, proportional 12VDC spring to center with manual override.

(9) Single acting 0-7 GPM spool for pre-wet, proportional 12VDC spring to center with manual override.

(10) Spreader and pre-wet sections shall be part of a manifold assembly that has a pressure reducing valve and solenoid drain and has the ability to have a cartridge added for ice control applications.

6. Hydraulic Function Control Valve Enclosure:

a. The hydraulic function control valve enclosure shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. Hydraulic valve shall be mounted in a weather tight enclosure.

c. Hydraulic valve enclosure shall consist of three (3) pieces, the enclosure body, valve mounting plate and the lid.

d. Enclosure body and valve plate shall be constructed of 3/16" stainless steel minimum.

e. The lid shall be constructed of 10-gauge stainless steel with a minimum 1" lip all around to help seal.

f. The sides of the body shall have formed mounting angles as an integral part.

g. Valve plate shall go to the inside of the enclosure for ease of mounting.

h. There shall be a formed Buna gasket to seal the valve plate to the enclosure.

i. The top and front of the enclosure shall be open with the lid off.

j. The valve shall be bulkhead fitting mounted to valve plate and ports will exit through the front of the enclosure.

k. Outside lip of enclosure shall have a gasket all the way around for weatherproofing when lid is installed.

l. Lid shall be held on with two (2) tension latches on each side.

m. Lid shall have two (2) lifting handles.

n. Shall have multiport electric board to connect to each valve coil that must be plug-and-play with an IP68 rating. Having to install connectors will not be acceptable.

o. If sufficient room exist between the cab and dump body the hydraulic valve enclosure shall be mounted parallel to the frame. If there is not enough room for parallel mounting of the enclosure, it may be mounted at a 90-degree angle to the frame and should be centered between the cab and dump body.

7. Snowplow Cushion Valve:

a. A double relief cushion valve shall be installed for front snowplow angle and scraper left/right.

b. The valve shall be set at 2000 PSI and have #8 SAE O-ring ports.

c. The valve shall be constructed of a high-tensile cast iron body with ball and spring type relief with hardened seats.

d. The valve shall be installed at the front bumper/snowplow hitch.

e. Valve shall consist of O-ring thread ports.

8. Hydraulic Hoses:

a. Suction hose from the reservoir to the pump shall be SAE 100R4 type of adequate size for the displacement of the pump. Hose shall be connected to the pump and reservoir ball valve with a king nipple, and double clamped with T-bolt type stainless steel super clamps.

b. All hoses, with the exception of the suction hose, shall be rated for a minimum working pressure of 3000 PSI.

c. All hoses, with the exception of the suction hose, shall have swivel ends or swivel adapters.

d. Hoses connecting to valve assembly shall have 90 degree female JIC swivel ends.

e. Pressure hose shall be 1" ID and rated at a minimum 2000 PSI with female JIC swivels at both ends.

f. Return hose shall be 1 ¼" SAE 100R4 type with female JIC swivels at both ends.

g. Hoist hoses shall be 1" ID with female JIC swivels at both ends.

h. Snowplow hoses shall be 3/8" ID with female JIC swivels at both ends.

i. Auger hose to the left rear corner of the dump body shall be ¾" ID with female JIC swivels at both ends. The auger circuit shall have a capped "tee" installed at the valve enclosure, enabling later installation of another hose routed to the front of the truck.

j. Spinner hose to the left rear corner of the dump body shall be ½" ID with female JIC swivels at both ends.

k. Spreader return hose to the left rear corner of the dump body shall be 1" ID with female JIC swivels at both ends. The spreader return circuit shall have a capped "tee" installed at the return filter assembly, enabling later installation of another hose routed to the front of the truck.

l. Pump case drain shall be ¾" ID minimum with female JIC swivels at both ends, and also have a ¾" NPT ball valve installed at the reservoir.

m. Load sense line shall be 3/8" ID with female JIC swivels at both ends.

9. Hydraulic Quick Disconnect Couplings: *(See Dump Body section for detailed layout and mounting of couplers).* For each hydraulic quick disconnect installed on the truck, whether male or female, the mating end of the coupling shall be provided.

a. All hydraulic couplers shall be full flow Aeroquip FD45, Parker 60 Series or approved equivalent. A dust cap or plug shall be furnished with every male and female quick coupler.

b. The front snowplow lift circuit shall be equipped with a male 3/8" coupler installed in the front bumper. A 34" x 3/8" ID hose with a female 3/8" coupler shall be installed on the hydraulic lift cylinder.

c. The snowplow cushion valve shall be equipped with a male 3/8" coupler and a 34" x 3/8" ID hose with a female 3/8" coupler.

d. The spinner circuit shall have a ½" male coupler at the left rear corner of the dump body.

e. The auger circuit shall have a ¾" male coupler at the left rear corner of the dump body.

f. The spreader return circuit shall have a 1" male coupler at the left rear corner of the dump body.

10. Hydraulic Pre-Wet System:

a. Liquid pumping system shall come complete with all plumbing, pumps, enclosure and mounting hardware.

b. The spray system shall be completely controlled by a Freedom 2.1 or approved equivalent ground speed spreader control system.

c. System shall run off a section in valve stack.

d. Liquid pump shall be a corrosion resistant bronze design.

e. Pump shall be self priming, pulse free, positive displacement design.

f. Unit shall come with a precision machined stainless steel shaft.

g. Pump shall have oil-less carbon graphite bushings oversized for increased durability and longevity.

h. Pump shall have flush port for pre-fill or flush of mechanical seal chamber.

i. Pump shall come with a long wearing, drip-less mechanical shaft seal.

j. Pump shall also come with bronze gears for good durability.

k. Pump shall come with a built in 45 PSI relief valve to protect against excessive pressurization.

l. Pump shall have a continuous duty rating of 125 PSI.

m. Pump shall be plumbed through a 0-15 GPM flow meter which is constructed of non-corrosive material.

n. Pump shall be capable of 9 GPM at 45 PSI.

o. Hydraulic connections shall be bulkhead type, mounted in bottom of enclosure.

p. All hydraulics inside enclosure shall be hard plumbed.

q. Pumps shall be mounted in a Nema 4x style weather tight enclosure.

r. All plumbing shall be included for a four (4) nozzle system with check valves.

s. The pre-wet pump, enclosure and mounting brackets shall be mounted in such a manner as to allow for removal during the summer months. The hydraulic hoses supplying fluid to the pre-wet system from the hydraulic function control valve shall be attached to a bulkhead located between the frame rails and behind the bed cylinder. The hydraulic supply hoses for the pre-wet system shall attach to the bulkhead by the use of quick couplers.

11. "TPE" Wiring Specification:

a. Wiring and harness system shall meet ISO rating IP68 and NEMA 6.

b. The connectors shall be zinc die cast E-coated. (Similar to a MIL spec. connector)

c. Each shall have three (3) sealing points, the lock ring itself, a raised portion of the molded plastic around each pin and a viton o-ring that seals the whole connector.

d. The cable jacket shall be TPE thermoplastic elastomer and molded to the connectors.

e. Connectors and harness shall be rated and tested for a temperature range from -30C degrees to +70C degrees.

f. Connectors shall be tested to be water tight when submerged in 6' of water for 24 hours, in 275' of water for 1 hour and when subjected to a 1000 PSI pressure wash.

g. The connectors shall be designed to have no corrosion after 500 hours in a 35C degree salt spray.

h. Cabling shall be rated excellent in low temperature flexibility and in its resistance to oxidation, heat, oil, weather, sun, ozone, abrasion, electrical priorities, flame, water, acid, alkali, gasoline, benzol, toluol, degreaser solvents and weld slag.

i. All cabling for the hydraulic and pre-wet systems shall be this type.

12. Spreader Control:

a. Control shall have three (3) PWM output channels.

b. One (1) channel shall be ground speed oriented conveyor/spreader, one (1) channel for spinner and one (1) channel for a liquid function.

c. Liquid function shall be programmable for either a pre-wet or ice control function.

d. Control shall have a simple operator interface of 3 buttons, two knobs and an interactive touch screen.

e. Knobs shall be rotary encoders with no maximum or minimum limit position.

f. Programming of unit shall not require the use of an ancillary device.

g. Touch screen shall be used for calibration of unit.

h. There shall be a minimum 2.0 USB port on the unit for downloading data and upgrading software or capabilities of the system.

i. To prevent glare at night, there shall be a "night mode" for the touch screen.

j. The front panel shall be backlit for night viewing.

k. The unit shall be supplied with a minimum of 8MB of RAM and 4MB of memory.

l. There shall be a field replaceable fuse which is easily accessible to protect the system.

m. Help screens for trouble shooting and calibration shall be embedded in the on board software.

n. The system shall support remote blast and remote pause functions.

o. Control shall be open loop with no feedback sensor.

p. PWM circuits shall be current regulated to reduce hysteresis.

q. There shall be an input to sense a stall of the spreader.

r. A float input circuit shall be provided to automatically turn off liquid system at low level.

s. Storm totals shall be available either on screen or via USB download.

t. Spreader control shall be mounted in a factory made control console that also controls the functions for body, plow and scraper.

13. Console Design: (Certified Power SG07010*** or approved equivalent)

a. Shall be totally modular control arm design for a variety of joystick controls, spreader controls and switch configurations.

b. Unit shall be provided with three (3) fully proportional joysticks, one (1) each for hoist, front mount snow plow and belly mounted snow plow control.

c. Shall have a single axis control with dead man switch for hoist.

d. Shall have a dual axis "+" design for snowplow up/down, and left/right control.

e. Shall have a dual axis "+" design with dead man switch for scraper up/down, and left/right control.

f. Scraper joystick shall be 12VDC dual axis fully proportional with dead man control.

g. Armrest style console shall be fully adjustable to accommodate automatic or manual transmissions and mount like it is part of the driver's seat.

h. Unit shall be fully adjustable left and right.

i. Auxiliary switches shall be the "Touch Guard" type.

j. Switches shall control items similar to the following:

- Strobe lights
- Work lights
- Low oil indicator
- Body up indicator
- Change filter indicator

- Plow float indicator

k. Switches shall be capable of being backlit in two colors. One color when the system is powered on and an alternative color when activated.

l. Switches shall be programmable for either maintained or momentary without changing the switch itself.

m. Switches shall be capable of sensing a ground fault with the circuit running.

n. Unit shall come with full schematic documentation.

o. All indicators shall be on the in cab display and show up in English stating the function. Indicator lights will not be accepted.

14. Hydraulic Installation:

a. All hoses shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All hoses shall be routed or shielded to protect them from heat sources.

c. Teflon tape shall not be used in the hydraulic system.

d. Hydraulic hoses shall not be secured to any factory installed chassis wiring, cables, hoses or lines.

e. Hydraulic hoses shall not be secured in the same bundle with any electrical wiring.

f. Hydraulic hoses shall be bundled together and routed by themselves.

g. Hoses shall be adequately supported and securely fastened to withstand snow and icing conditions.

h. Hydraulic hoses running to the rear of the truck shall be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

i. Each hose going to the dump body shall have a 90-degree bulkhead mounted JIC elbow installed at the rear of the truck frame near the dump body hinge. These elbows shall split each hose going to the dump body into two (2) hoses allowing for easier routing and replacement.

j. Hydraulic ports shall be O-ring type unless otherwise specified.

E. Underbody Scraper:

1. General: An underbody scraper with power reversing moldboard shall be mounted to the frame behind the cab and in front of the tandems. The underbody scraper requires a minimum of 92 inches of clearance, below the frame, between the front of the front tandems and any obstruction forward. Scraper shall be mounted and adjusted according to manufacturer recommendations to prevent contact with other chassis components whether in stowed or work position.

2. Moldboard: Curved moldboard constructed of no less than 1" thick steel plate, 10' in length and 17" in height**.** Shall have a minimum cutting angle adjustment of 35$^{o}$ and be equipped with spring safety trip. Cutting edge shall be a minimum 7/8" x 6" high carbon steel with holes AASHTO spaced. Cutting edge shall have a WC Grade tungsten carbide insert. Cushioning of the moldboard shall be accomplished by two heavy duty steel spring canister assemblies.

3. Scraper Hydraulics: Shall consist of:

a. Two double acting lift cylinders.

b. Two double acting angle cylinders which act as a locking mechanism to maintain the moldboard angle while in use.

c. All necessary hoses and fittings for complete installation.

d. Crossover relief valve for protection of the hydraulic system.

e. Pressure relief valve preset to limit down pressure on the moldboard.

4. Scraper functions are to be integrated into the hydraulic system of the truck and controlled from the operator's console in the cab.

5. Scraper Light: LED work lights shall be mounted on both sides of the chassis in such a manner as to illuminate the driver's and passenger's side of the underbody scraper, regardless of the angle of the blade. The light shall be controlled by an auxiliary rocker switch located in the instrument panel. Suitable make and model is Truck-Lite model 81360 or approved equivalent.

6. Removal: During the summer months the underbody scraper will be removed and a pusher axle installed. The underbody scraper shall be installed in a manner that allows removal of all components. Holes drilled in the frame for mounting of the underbody scraper shall be positioned, as much as possible, to allow for their use in mounting of the pusher axle. The hydraulic hoses supplying fluid to the scraper from the hydraulic function control valve shall be attached to a bulkhead located between the frame rails and behind the bed cylinder. The hydraulic supply hoses for the scraper shall attach to the bulkhead by the use of quick couplers.

F. Snowplow: 432-mm009

1. General: Snowplow with power reversing moldboard, for use on a truck equipped with central hydraulics. The snowplow provided shall be designed and approved by the manufacturer for installation on a truck which has a front gross axle weight rating of 18,000 pounds.

2. Reversing Frame & Front Push Tube: Shall be constructed using a minimum 5" x 5" x 0.38" or 6" x 4" x 0.38 structural steel tubing properly reinforced to withstand severe snow plowing conditions. Front push tube shall be a minimum of 116" in length. Front push tube shall have a minimum of ten welded ears to attach the moldboard assembly. Ears shall be made of minimum 5/8" thick steel. All joints shall be continuously welded and reinforced.

3. A-Frame: Shall be engineered and constructed to be an integral component of the push frame. Shall contain two (2) double acting heavy duty power reversing hydraulic cylinders with a minimum 4" diameter bore. Cylinders shall be equipped with a minimum 2" diameter rod. Cylinder rod shall be nitride coated. The reversing cylinders shall maintain the angle of the moldboard once the desired plowing angle is reached. The unit shall be equipped with a hydraulic cushion valve to protect hydraulic cylinders in the event of an impact with a fixed object. Cylinders shall be equipped with hydraulic lines of sufficient length to connect to supply lines on the front bumper of the truck. The mounting plate that attaches the snowplow push frame to the truck hitch shall be equipped with mounting flanges made of 1" metal. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins.

4. Moldboard: Curved moldboard no less than ten (10) feet in length. Shall be constructed of no less than 3/16" steel with a minimum of eight (8) vertical ribs. Moldboard shall be equipped with full length horizontal ribs according to manufacturer's standard for plow size and type. Moldboard height shall be no less than 36" but shall not exceed 42". Shall be extended curve design to prevent snow from coming over the top of moldboard at high speed. Shall have multi-position adjustment for lay-back to achieve optimal plowing angle. When set at the optimal plowing angel the top of the moldboard curve shall extend forward of the cutting edge by no less than twelve (12) inches. Shall have mailbox ends equipped with sight markers at least 36" in height. Shall have cutting angle adjustment of no less than 35° left and right of center. Shall be equipped with two (2) compression type spring safety trips capable of at least three (3) attack angle settings ranging from 10 to 30 degrees. Shall include stops attached to the moldboard assembly which contact the reversing frame front push tube before the trip springs becomes fully compressed. The moldboard assembly shall be capable of tripping at least 15 degrees past vertical before contacting the stops, at any attack angle. Shall have a minimum of five (5) hinge points. There shall be a minimum of 116" between the outer most hinge points with a minimum of three more hinge points spaced between.

5. Snow Shield: The moldboard shall be equipped with a full length rubber snow shield mounted on the top forward edge. Shall be made of a minimum of two ply rubber matting no less than 1/4" thick. Snow shield shall be affixed to the moldboard using a minimum 0.25" x 2" metal strip and an adequate number of bolts to secure it in position.

6. Cutting Edge: Cutting edge shall be a minimum 3/4" x 6" high carbon steel with holes AASHTO spaced. Cutting edge shall be equipped with a minimum of two (2) wear blocks behind the cutting edge. Each wear block shall have a minimum of 26 square inches of wear surface. Wear blocks shall be made of a material with a minimum Brinell hardness of 181-240.

7. Level Lifting Device: Snowplow shall be equipped with a level lifting device that keeps the moldboard level when lifted or when being reversed. Device shall be complete with all chains, hooks, clevises and hardware necessary for proper operation.

8. Truck Hitch: Low profile, front frame mounted universal plow hitch with fold down and adjustable lift arm. Shall be capable of self-storing lift cylinder. The lift cylinder shall be a minimum 4" diameter bore and of sufficient length to properly lift snowplow. Hitch shall be capable of carrying plows from 10' to 14' in length. The lift arm mounting frame shall be constructed using a minimum of ½" x 3" angle welded to a 10" structural channel which forms the lift frame. Cheek plates shall be ½" x 12" tapered. Rocker angles and plates shall be utilized above and below the truck frame to

keep the hitch from loosening and moving forward. The cheek plates and rocker plates will be welded to the truck hitch by the upfitter. Lift arm bracket and lower drop bar retaining/connecting lugs shall be fabricated from ¾" thick plate. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins. (Hitches using braces running from the lift frame to the front axle of the vehicle are not acceptable).

9. Bumper: Two (2) bumper wings (right side and left side) shall be provided as an integral portion of the plow hitch. Each bumper wing shall be constructed using 10" HD structural channel. The wings shall be approximately the same height as the truck manufacturer's standard front bumper and shall be swept back to conform to the vehicle front hood and fenders. The bumper wings sections shall be bolted to the vehicle through the hitch cheek plate and the truck frame.

10. Jack: The snowplow shall be equipped with a screw type adjustable jack to assist in the instillation and removal of the unit from the truck hitch.

11. Weight: Snowplow assembly shall weigh a minimum of 2,000 pounds.

12. Color: Front Bumper, Snowplow Hitch and Lift Assembly shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Manufacturer's standard color is acceptable on the reversing frame, A-frame and moldboard

F. Chemical Spreader: 360-mm094-10.5 SS SP TS

1. General: This specification is intended to cover a 10.5 cubic yard minimum struck capacity hydraulic driven chemical and material spreader for use in ARDOT dump trucks. The spreader shall also be equipped with a liquid calcium chloride spray system designed to operate in conjunction with the hydraulically driven chemical pump mounted on the truck.

2. Type: Shall be designed for mounting in dump body with spinner at the rear and below floor of dump body. The spreader shall be a self-contained unit with hopper type body, conveyor system, hydraulic drive, spinner and all necessary components integrally mounted as single unit. Shall have the capacity to spread material to a maximum width of no less than 24'.

3. Hopper Body: Hopper shall have a minimum struck capacity of 10.5 cubic yards. Shall be electrically welded construction, adequately reinforced, with no less than 10 gauge 304 stainless steel sides and ends. The hopper body shall be 15' in length with sides to slope approximately 45 degrees to allow material to feed into conveyor by gravity. Bottom shall be constructed of no less than 7 gauge 304 stainless steel. All hopper hardware shall be stainless steel. In addition, any long sills, crossmembers or side supports used in the design of the spreader shall be constructed of 304 stainless steel.

4. Top Screen: A top screen to keep oversize material from entering hopper shall be provided with the spreader.

5. Conveyor: Shall have a minimum overall width of 24" and be designed to handle sand, cinders and de-icing chemicals discharging material to spinner at rear of spreader. Shall be equipped with spring loaded idler adjusters to maintain proper conveyor tension.

6. Drive: Conveyor and spinner shall be driven by hydraulic motors. Drive to conveyor and spinner assembly to be as regularly furnished by manufacturer. Shall be designed to operate on a closed center hydraulic system with a minimum output of 15 gpm at 1,500 psi. (Hydraulic pump will be furnished by ARDOT.)

7. Spinner Assembly: Spreader shall be equipped with a "Urethane Spinner" consisting of a one-piece polyurethane disc with a minimum of four (4) molded fins. Spinner disc shall have a minimum diameter of 18" and have a vertical adjustment of no less than 12". Spinner shaft shall be mounted to the hydraulic spinner motor output shaft. The spinner chute shall be constructed of no less than 10 gauge 304 stainless steel. Unit shall have a minimum of three (3) adjustable material deflectors to help regulate spreading pattern. Spinner assembly shall be designed so that it may be hinged up for storage or to discharge material that may be left in the spreader.

8. Feed Gate: Material discharge to spinner chute to be controlled by an adjustable discharge gate with positive locking device.

9. Mounting: Spreader shall be designed for mounting in a dump body which is devoid of hydraulic cylinder hoist housing in the front of the body. Body has an inside length of 180", an inside width of 86" and is mounted on a tandem axle truck with 144" cab to axle measurement. Hold down equipment for dump body mounting shall be furnished. Spreader shall be equipped with lifting bails.

10. Front Bearing Grease Extensions: Shall have front bearing grease extension tubes to allow greasing of front bearings. The grease tubes shall either extend to the rear of the spreader or approximately 40" above the dump body floor, and be

flexible enough so greasing will not interfere with normal bearing adjustment. The tubes shall be attached to the sides of the spreader with straps made of nylon or a similar material.

11. Liquid Spray System Components: The spray system components provided shall work in conjunction with a pre-existing hydraulically driven chemical pump and control system on the truck. The system shall include a hose kit with a minimum of two (2) spray nozzles and reservoirs. The kit shall also include all necessary hoses and fittings to connect the spray system to the truck mounted pumping system located at the rear of the trucks dump body on the driver's side. Spray system shall be capable of continuous spraying of calcium and magnesium chloride, glycol, liquid urea, or other liquid de-icing solutions directly onto the material as it leaves the conveyor and before it reaches the spinner. All parts that come in contact with liquid de-icing solutions shall be corrosion resistant. All components shall be rated at no less than 150 psi working pressure.

    A. Sprayer Reservoirs: A minimum of two (2) reservoirs with a capacity of no less than 150 gallons each shall be provided. Reservoirs shall be molded polyethylene construction and be complete with replaceable screen line strainer, shut-off valves and mounting hardware. The reservoirs shall be angle formed to allow for mounting to the sides of the chemical and material spreader specified above. (Sides of spreader are to have an approximate $45^{o}$ slope). The reservoirs shall be designed so that one (1) reservoir is mounted on each side of the spreader with all fill openings, shut-off valves, etc. readily accessible. Reservoirs shall be plumbed together with a minimum 1-1/2" ID hose with a tee located on the left rear corner of the spreader.

    B. Nozzles: There shall be a minimum of two (2) spray nozzles equipped with necessary cores, discs and mounting hardware.

12. Color: 304 stainless steel components to be unpainted. Non-stainless steel parts to be painted black or aluminum.

I. Warranty:

1. Cab and chassis shall have truck manufacturer's regular warranty and service as regularly furnished on new vehicles sold to the public. Warranty data shall be furnished with each unit.

2. The dump body, hydraulic system, and all other incidental equipment furnished under this specification shall be warranted against defective material and workmanship for a minimum period of (12) months (365 days) from date unit is placed in operation by ARDOT.

    (a) Warranty should include all parts, labor and transportation costs to the location of equipment.

    (b) If equipment cannot be repaired on location, warranty shall include cost of transport to the facility where the repair work will be done.

3. Warranty repairs are to be performed by any authorized dealership of the manufacturer; however, the Successful Bidder will be ultimately responsible for coordinating repairs and insuring that warranty repairs are completed in a timely manner.

4. If any warranty literature submitted with the bid conflicts with ARDOT warranty requirements, the conflict(s) shall be specifically noted, corrected and included with the bid or the conflict(s) will be considered an exception to warranty specifications and the bid rejected.

5. Recent prior failure to provide warranty-work, parts, replacement parts or service, in a timely manner, for equipment from the same manufacturer or dealer shall be grounds for the rejection of any submitted bid, or for the denial of any otherwise qualified low bidder, whether such failure is attributable to the manufacturer or the dealer of the equipment. For the purposes of this paragraph "timely manner" means a period of time not exceeding thirty (30) calendar days to provide requested warranty-work, parts, replacement parts, or service. For the purposes of this paragraph "manufacturer" means the original manufacturer of the equipment and its successor or successors, regardless of number, and whether acquired by sale, merger, or otherwise. For the purposes of this paragraph "replacement part" means a part redesigned by a manufacturer to correct a design or engineering defect and which replacement part is capable of providing dependable performance in normal operation conditions for its normal service life without failure. Such bid or bids may be rejected by the Department until such failure or failures have been remedied to the satisfaction of the Department and until such manufacturer or dealer is providing such warranty-work, parts, replacement parts, and service in a timely manner.

**ARKANSAS DEPARTMENT OF TRANSPORTATION**

**SPECIFICATION 20-72A-037**

**FOR**

# MULTI-AXLE CAB AND CHASSIS 68,000 POUND GVWR WITH WESTERN STYLE 15' DUMP BODY PUSHER AXLE, UNDERBODY SCRAPER 12' SNOWPLOW AND CHEMICAL SPREADER

## 1. General Specifications

A. Current Model: Units furnished under this specification shall be the latest improved model in current production, as offered to commercial trade, built for the U.S. market, and shall be of quality workmanship and material. Units manufactured for foreign markets will not be accepted. All equipment offered under this specification shall be new. Used, reconditioned, shopworn, demonstrator, prototype or discontinued models are not acceptable. Manufacturers of the units supplied must have been in the business of producing operational units for at least two years and must have recently sold similar units to domestic governmental agencies. The model furnished must have been in production for a minimum of one year, or be the latest version of a previous model. Bidder(s) will be required to submit documentation substantiating the aforementioned requirements. A list of user references may also be required.

B. Literature: Manufacturers literature, verifying adherence of proposed unit to each line item addressed in this specification, shall be submitted with the bid. If any literature and/or specifications of items conflict with ARDOT specifications, the conflict(s) shall be specifically noted, corrected and submitted with the bid.

C. Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that equipment offered is in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet. However, no implication is made by the Arkansas Department of Transportation that deviations will be acceptable.

D. Units shall be assembled, adjusted and made ready for continuous operation at time of delivery.

E. Manuals: The successful bidder shall furnish one (1) Operator's Instruction Manual with each unit delivered and one (1) copy each of Shop Repair Manual and Parts Book to each FOB point.

The successful bidder may provide Shop Repair Manuals and Parts Manuals on computer media (CD, DVD, USB Drive, etc.) in lieu of printed manuals.

F. All parts, accessories and tools necessary for satisfactory operation of unit shall be furnished whether or not they are specifically mentioned in this specification (including standard equipment as regularly furnished by manufacturer as shown on printed literature and specifications - unless specifically excluded by this specification).

G. Parts Inventory & Service Facilities: The successful bidder shall maintain a representative inventory of replacement parts and service facilities for servicing equipment bid on.

H. Demonstration: The Arkansas Department of Transportation reserves the right to require a demonstration, under actual working conditions, of equipment bid under this specification before award is made. The demonstration would be performed (free of any charge) by the bidder or an authorized representative at a mutually acceptable location. If requested, the bidder should be prepared to demonstrate the equipment within thirty (30) days after notification. Failure of the bidder to perform a satisfactory demonstration within the specified time may be grounds for rejection of the bid.

I. Drawings: Professional quality drawings which depict the layout of the chassis will be provided with the bid.

J. Inspection: The ARDOT reserves the right to inspect bodies during manufacture, or prior to their installation, for compliance with specifications and to inspect hydraulics installation during work in progress. Location of hoists on truck chassis shall be approved by ARDOT prior to installation. All workmanship shall be first class (no welding on truck frame to install dump body hoist). Any unit delivered under this specification is subject to rejection if there is evidence of poor workmanship by either the vendor or the original manufacturer.

K. Due to the nature of work performed by ARDOT, body-hoist combinations furnished under this specification may be subject to use under adverse conditions such as dumping on road shoulders at a slight angle and spot dumping of loads. The design and strength characteristics of the entire dump unit shall be such that the unit structural members and the hoisting system shall suffer no deformation, damage or structural failure resulting from raising a full payload under these conditions.

L. Delivery Requirements: It will be the responsibility of the Successful Bidder to guarantee delivery of the cab & chassis as specified, including items or equipment installed by a third party contractor, within the quoted time.

M. Cooperative Purchasing: Other tax-supported entities* in Arkansas (cities, counties, state agencies, school districts, etc.) may purchase from this Contract on an individual basis under the same specifications and conditions, and at the pricing set forth by each vendor, all at the discretion of each vendor in each case. Prices could be reduced by a vendor for minor alterations in conditions (changing order quantities, deleting options, etc.) as agreed by both parties, but could not be raised above the contract bid price except for any additional freight charges. Vendors would not be required to sell to any such entity under this contract, and those entities would not be obligated to purchase from the contract.

Each entity wishing to purchase from the contract must make contact directly with the appropriate vendor(s). The Highway Department shall remain "out of the loop" for such transactions: all contact, orders, invoices, payments, etc. regarding such transactions must take place exclusively between the tax-supported entity and the vendor. The Department shall be held harmless of any and all liability arising from such transactions.

* Tax-supported entities are defined as those receiving more than half of total funding from appropriated tax funds.

## 2. Unit Specifications:

A. General: This specification is designed to provide the Arkansas Department of Transportation with multi-axle trucks for maintenance operations. The truck's uses will consist of material hauling, trailer towing, and operation of hydraulically controlled 15' material spreader, front mount snowplow and mid-mount underbody scraper.

B. Cab and Chassis:

1. GVWR: 68,000 pounds, minimum.
2. Cab to Axle: Nominal effective CA of 144".
3. Front Tires and Wheels: Two (2) 315/80R22.5 steel belted tubeless radials - load range "L" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 9" rim section. All tires must have speed restriction that exceeds 65 MPH.
4. Rear Tires and Wheels: Nine (9) 11R22.5 steel belted tubeless radials - load range "H" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 8.25" rim section. All tires must have speed restriction that exceeds 65 MPH.
5. Engine: Liquid cooled 4 cycle diesel with a minimum piston displacement of 11.8 liters. Shall have an advertised rating of no less than 430 SAE gross horsepower and a minimum of 1,550 lb. ft. SAE gross torque. Governed speed shall be no less than 2,000 RPM. Shall have full flow oil filter(s), fuel filters, dry type air cleaner, 12-volt electrical equipment with no less than 160-amp alternator and maintenance free batteries as regularly furnished with engine specified. Engine shall be equipped with a block heater rated at no less than 1,000 watts which will operate on 120 volts AC.
6. Emissions: The engine emission control system shall be programed to allow regeneration to occur even if the truck is being used in an urban or low speed highway applications.
7. Engine Brake: Jacobs engine brake, or equal, designed to use engine compression to retard engine speed. Shall be capable of utilizing all engine cylinders for braking effect.
8. Front Power Take-Off: Engine to be equipped with provision for front PTO drive. Shall include the necessary crankshaft adapter for attaching a shaft type drive and any other items required for this provision. If the PTO driveshaft passes through the radiator, charge air cooler, and/or air conditioning condenser it shall be shielded by a steel encasement of sufficient strength to prevent damage to surrounding components in the event of driveshaft failure.
9. Cooling System: As recommended and regularly furnished by the manufacturer for use with the engine size and PTO provision specified above with anti-freeze protection to -20° F, or lower. If optional corrosion resistant radiator coating or treatment is available, it must be provided.
10. Exhaust System: Vertical exhaust stack with curved outlet. Exhaust stack to be equipped with a heat shield. If the DPF is part of the exhaust stack, the clearance to the dump body must be pre-approved. Exhaust system design and/or components shall not hinder the installation of under-frame snow removal equipment behind the cab.

11. Engine Shutdown: Engine safety shutdown system with manual or automatic override to include the following features: Low oil pressure warning bell/buzzer plus shutdown, high coolant temperature warning bell/buzzer plus shutdown and low coolant level warning bell/buzzer plus light or shutdown.

12. Throttle Control: Engine shall be equipped with an in-cab throttle control for use with PTO. Shall be electronic control type.

13. Transmission: Eaton Fuller Ultra-Shift FO-16E308LL-VCS.

14. Clutch: Heavy-duty type with torque capacity for engine furnished.

15. Steering: Hydraulic actuated power steering as regularly offered by manufacturer.

16. Front Axle: I Beam Type with wet seals, outboard mounted drums and a minimum capacity of 18,000 pounds. Set forward only, axle set-back not to exceed 32".

17. Front Springs: As required to meet axle capacity specified above.

18. Rear Axle and Suspension: Tandem with power divider, inter-axle differential lock out control and Hendrickson RT or RTE equalizing beam type suspension. Shall be full floating with wet seals, outboard mounted drums and have a minimum capacity of 40,000 pounds. Shall have a ratio of 4.56, 4.63, 4.78 or 4.88 to 1. Alternate ratio may be provided if approved by ARDOT prior to delivery. (Axle ratio should provide a maximum theoretical geared speed of no less than 69 MPH and still provide acceptable startability.)

19. Pusher Axle: Rigid type to be mounted forward of the trucks tandem axles. Shall provide no less than 20,000 lbs. capacity and be equipped with air ride suspension. Shall have factory installed air operated two shoe type brakes with automatic slack adjusters and dust shields. Brake system shall be controlled by the chassis for signal to brake only. Pusher axle shall include an auxiliary air tank mounted to the axle assembly. Unit shall be capable of lifting axle assembly a minimum of 8" when in the travel position. Shall have an air control system mounted inside the cab that is easily accessible to the operator. Shall be Watson and Chalin Manufacturing, Inc AL-2200 or approved equivalent. During the winter months the pusher axle will be removed and an underbody scraper installed. The pusher axle and suspension shall be unitized. Holes drilled in the frame for mounting of the pusher axle shall be positioned, as much as possible, to allow for their use in mounting of the underbody scraper. The airlines to the pusher axle from the chassis shall be attached by means of DOT approved quick couplers.

20. Air System: Air compressor shall have a minimum capacity of 15 cfm and draw air through the engine air cleaner. Air system shall be equipped with a heated air dryer.

21. Brakes: Factory installed full air operated two shoe type with automatic slack adjusters and dust shields on front and rear. Rear brakes shall have spring set parking brakes. Brake chambers on the drive axles must be located inside the rear tire envelope to prevent chambers from interfering with pull-type asphalt spreader rollers. Location of the air tanks and/or dryer shall not inhibit the installation of snow removal equipment underneath the truck between the cab and front tandem (clear frame).

22. Trailer Controls: Shall be equipped with full trailer brake controls providing air brake and electrical hookup for straight truck with trailer applications. Shall include hand control valve, tractor protection valve and trailer anti-lock provisions. Air lines and 7-wire electric cable shall be routed to end of frame. Air lines to be equipped with glad hands and tethered removable covers. Electric cable shall be equipped with 7-wire receptacle.

23. Frame: Section modulus and yield strength of frame material shall provide a minimum RBM of 2,500,000. Shall have 20" minimum front frame extension.

24. Ground Clearance: Frame mounted components (fuel tanks and fuel tank brackets, steps, air tank, battery boxes, etc.) shall have a minimum of 13" ground clearance. Components located within the operational area of the belly mount scraper shall have sufficient ground clearance to allow for mounting and operation of a scraper equipped with a 17" moldboard.

25. Cab: Conventional cab as regularly furnished by manufacturer, complete with insulation and all interior trim. Cab glass shall include windshield, roll-up windows in doors and rear cab glass as a minimum. Shall have key type lock on right and left doors, factory installed fresh air heater-defroster unit, grab handle on each side, right and left sun shades and fitted rubber floor mats.

    a. Cab Mounts: Air suspension type rear cab mounts.

b. Instruments: Shall include the following as a minimum:

(1) Speedometer/odometer

(2) Electric tachometer

(3) Ammeter or volt meter

(4) Oil pressure gauge

(5) Coolant temperature gauge

(6) Air brake pressure gauge

c. Air Conditioning: Factory installed air conditioning. Shall include tinted glass all around.

d. Tilt Steering Column: Factory installed.

e. Windshield Wipers: Dual electric intermittent windshield wipers with washers.

f. Plow Light Harness: Factory installed wiring harness with connector for installation of snowplow lights. Harness must provide circuits for high and low beam headlights, marker lights and turn signals with factory installed dash mounted switch.

g. Two-way Radio Harness: Factory installed wiring and circuit protection for two-way radio shall be installed with wiring terminating in the overhead console. Wire ends shall be factory sealed to prevent accidental grounding. One circuit to be continuously hot with 20-amp protection, one circuit to be hot with ignition on, with 5-amp protection.

h. Ground Speed Harness: Factory installed wiring harness to provide the body builder a connection for ground speed signal. Body builder connection point to be located inside the cab.

i. Auxiliary Switches: Shall be equipped with a minimum of six (6) rocker switches mounted in the instrument panel for use by bodybuilder or end user to supply power to work lights, warning lights and other auxiliary electrical devices.

j. Seats: Air suspension driver's seat and non-suspension passenger's seat. Shall include driver and passenger side seat belts.

k. Radio: Factory installed electronic AM/FM/WB radio.

l. Heated Mirrors: Dual Heated West Coast Sr. type mirrors no less than 7" x 16" with adjustable brackets and auxiliary convex mirrors, 8" round or 6" x 6" rectangular.

m. Air Horn: Single or dual trumpet air horn.

24. Hood: Tilting fiberglass or composite hood and fenders with stationary grille and tilt assist mechanism.

25. Front Bumper: Delete.

26. Lights: Shall be equipped with factory installed dual beam headlights, parking lights, clearance lights, directional turn signals with column mounted switch and hazard flasher switch. Rear signals to be wired for stop and taillights in addition to directional signals.

27. Auxiliary Snowplow Headlights: (If factory installed snowplow lights or a suitable factory installed bracket is available, it may be submitted for approval)

a. Front auxiliary halogen headlights shall be Truck-Lite model 645 or approved equivalent.

b. Auxiliary headlights shall not obstruct the driver's vision and be mounted approximately 64" from ground level and at approximately the same width apart as truck's headlamps.

c. Light shall be secured to a fender mounted 3-point assembly bracket. Bracket shall be made from stainless steel.

d. All fasteners attaching the bracket to the fender shall be stainless steel and be secured using locknuts.

e. Reinforced rubber washers or grommets shall insulate the bracket from the hood. Fasteners attaching the bracket to the hood shall be insulated from the hood by a 2" minimum diameter rubber washer or grommet and 2" minimum diameter plated washer.

f. Auxiliary headlights shall be grounded back to chassis' ground using a minimum 14-gauge wire.

28. Backup Alarm: Shall be equipped with an electric backup alarm meeting the requirements of SAE J994 with a minimum sound level output of 97 decibels.

29. Fuel Tank(s): Single fuel tank with instrument panel fuel gauge. Tank shall have a minimum fuel capacity of 100 gallons and be mounted on the left side of the truck under the cab. The bottom of the tank and tank mounting brackets shall have sufficient ground clearance to allow for mounting and operation of a belly mount snowplow with a 17-inch moldboard.

30. Color: Cab, hood, fenders and wheels shall be Sherwin Williams F8W2030 Frost White Acrylic Enamel, or equal. Grill, bumper and mirrors shall be as regularly furnished by manufacturer.

C. Dump Body:

1. General: Shall be Western Style crossmemberless and capable of accommodating a material spreader with a 15' hopper body and attached liquid storage tanks. The floor, sides and main long sill are to be full length with no cross-splices. All boxed areas of the dump body shall be sealed. Hinge pins shall be removable. All grease zerks shall be threaded. Drive-in zerks are not acceptable. All threaded holes for grease zerks shall be of sufficient depth to prevent the zerk from bottoming out when tightened. All welds shall be continuous. All welds, areas of slag deposits or torch cut areas shall be ground to produce a smooth surface. Metal that has been cut with a torch shall be ground to remove slag and other deficiencies. When welding on the truck, areas that could be damaged by splatter such as wiring harnesses, grills, and mirrors shall be covered for protected.

   a. Capacity: Shall be a minimum 12 cubic yards struck measure.

   b. Inside Length: Shall be 15 foot.

   c. Inside Width: No less than 86 inches.

   d. Outside Width: 95 inches – 100 inches.

   e. Side Height: No less than 36 inches with raised ends.

   f. Tailgate Height: No more than 36 inches.

2. Material: The dump body main long sills and top rail shall be constructed using high strength steel tubing or approved equivalent.

   a. Main Long Sills: ¼ inch.

   b. Floor: ¼ inch (AR-450).

   c. Tailgate: ¼ inch (AR-450).

   d. Sides: 3/16 inch (AR-450).

   e. Front: 3/16 inch (AR-450).

   f. Formed Top Rail: 3/16 inch.

3. Mounting:

   a. Pivot Pin: Rear edge of pivot pin shall be no more than 1 inch forward from the rear face of the rear hitch plate.

   b. Dump Body Pivot: Shall be 12 inches from the centerline of the pivot pin to the rear face of the dump body not including the tailgate. Pivots shall facilitate thorough greasing. Bushings shall have an internal radial groove aligned with the grease fitting. Pivot pins shall be drilled and cross-drilled.

   c. The distance from the rear face of the rear hitch plate to the center line of the rear drive axle shall be no less than 21" or no more than 22". Rear drive axle tires shall not extend past the rear face of the rear hitch plate.

d. Dump Body: Shall be mounted a minimum of 3" from the hydraulic tank, excluding the sub frame of the tank and hoist.

e. Ground Strap: A 4-gauge battery cable ground strap shall be installed from the dump body to the truck frame. The strap shall be attached to the truck frame by no less than a 5/16" cadmium plated bolt with star washers on both sides of the strap eye to insure a good ground.

4. Body Props: A storable body prop shall be provided for each side of the dump body. Pivots for the body props shall be greasable and body props shall be designed to withstand the down-pressure of the hoist without damaging the dump body, chassis, or any related components. Body props shall be designed to hold the dump body at a minimum angle of 22 degrees when deployed.

5. Cab Protector: The three quarter (3/4) cab protector shall not interfere with the cab mounted vertical exhaust pipe. The cab protector shall be mounted, welded, and gusseted to prevent flexing or vibration. The side plates shall be constructed using high strength steel with a minimum thickness of 7-gauge. The outer front corners shall be angled at 45 degrees in order to provide mounting spaces for the installation of Whelen 5V3A Series or approved equivalent in each front corner. The lights shall be visible from both the front and the side of the cab protector.

6. Sides: Sides shall have a formed, debris shedding top rail. Sides shall have no provision for extension boards. Each side of the body shall have a walk rail of approximately 1/4" x 1-1/2" flat steel. Top of walk rail shall be approximately 12" from bottom of body.

7. Shovel Rack: A steel shovel rack shall be welded to the driver's side of the dump body. The holder shall be spring loaded and formed to clamp down on the shovel handle and hold it securely to the side of the dump body while the truck is traveling at road speed.

8. Tailgate: The tailgate shall be double acting, and vertically straight with offset hinges for positive closure. The latching mechanism for the tailgate control hooks shall be air operated. Tailgate shall have boxed upper, lower, side, and intermediate horizontal rib supports. Tailgate shall be equipped with chains and hooks (or keyhole eyes) for lowering to any position. Lift handles shall be welded on each side just above the bottom support rib. When tailgate is lowered parallel to body floor, the inside surface of the tailgate shall provide a smooth level joint between the tailgate and the body floor.

   a. Removal: A hinged "D" ring shall be mounted top and center of the tailgate to provide a lifting hook for removal.

   b. Anchor Points: Anchor points for the tailgate chains shall be made from 3/8 inch thick steel and be lapped on the outside of the dump body with a minimum of 1-inch overlap. Keyhole slot in anchor points shall be configured so that when installed, the link of the tailgate chain nested in the anchor is no more than 1 inch away from the rear face of the dump body at the farthest point.

   c. Top Hinge Pins: The top hinge pins shall be minimum 1-inch diameter and pivot through a greasable bushing. One end shall be tapered approximately 30 degrees for ease of alignment. 30-degree taper shall be no less than 1/8 inch or no more than ¼ inch in length.

   d. Lower Pins: The lower pins shall be a minimum of 1-1/8 inch diameter. Tailgate shall, without assistance from the locking device, seal against the floor and side sheets of the dump body, with no more than a 1/16 inch gap at any point. With the tailgate closed and the locking device open, tailgate lower pins shall have no less than 1/8 inch or more than ¼ inch gap between the forward edge of the pin and the forward edge of the cradle.

   e. License Plate Bracket: A license plate bracket shall be welded on the left hand side of the tailgate, at approximately half the height of the tailgate.

   f. Tailgate Latch:

      (1) An over-center locking device on each side of the dump body shall hold the tailgate securely closed. Latching arms shall be forged steel.

      (2) The locking device shall be operated by a 3 1/2" diameter air cylinder, which shall be mounted between the long sills. Air cylinder shall be controlled by the chassis air accessory power supply.

      (3) Locking device shall be adjustable at each side of the dump body.

      (4) The tailgate latch cross shaft assembly shall be supported on each end by bushings.

(5) Lubrication points on the tailgate latch cross shaft shall facilitate easier greasing by means of grooved bushings and/or shafts.

(6) Grease fittings at each end of the tailgate cross shaft shall be visible and accessible from the outside face of the dump body.

9. Ladder: Each side of the body shall have a built-in ladder between the top and bottom rail. Ladder shall consist of two formed handrails constructed of at least 3/16" steel. Ladder shall have two anti-skid metal steps welded between the hand rails. Aligned with each of these units shall be a pull out style two-rung ladder. Location of the ladders shall be such that operator does not have to climb over the tarp bow when the tarp is retracted. Ladders shall be a minimum of 14" wide.

10. Toolbox: A toolbox measuring approximately 18" x 18" x 24" shall be installed on the right hand outside frame rail. The toolbox and mount shall be installed in a manner which allows for removal in the event insufficient room exists to allow the toolbox to remain mounted to the chassis while the pusher axle is attached.

11. Hoist:

    a. Hoist shall be a forward set, trunnion mount, head lift, double-acting cylinder.

    b. The hoist should be designed to accept a Model CS 140-5.5-3DA MAILHOT cylinder or approved equivalent. The cylinder sleeves shall be nitride coated. Sub-frame or dog house mounted hoists will not be accepted.

    c. A flared body bracket will be attached to either the hoist frame or body understructure to align body in position and keep from moving side to side.

12. Brake, Turn and Tail Lights: Lighting shall meet all Federal and State DOT specifications, which requires an independent running light on the rear corners.

    a. All lights shall be LED and mounted in shockproof rubber grommets.

    b. All lights shall be connected to a one piece wiring harness with molded connectors.

    c. Each rear corner post shall have a Whelen series 400 weldment equipped with rectangular stop/turn taillight and backup light. Suitable make and model is Whelen 400 Series, or approved equivalent.

13. Raised Body Indicator: A sealed proximity switch shall be mounted near the hoist assembly to control a raised body indicator light and buzzer. The light and buzzer shall be powered by the chassis electric accessory power supply. A dash or console mounted indicator light shall be provided and be plainly visible to the seated operator. The indicator light shall be red and flash when the dump body is raised. The buzzer shall be of sufficient decibel level to be plainly audible by the driver while in transit.

14. Mud Flaps: Friction type mud flap brackets to be attached to the underside of the dump body at the rear. Brackets shall allow replacement of the mud flap by removing only one fastener. Mud flaps shall be 24" wide and long enough to satisfy FMVSS. Front mud flap brackets to be attached to underside of bed. Front mud flaps shall be 24' wide, anti-sail and long enough to keep rear tires from throwing debris on the back of the cab. All mud flaps shall have no dealer or manufacturer advertisements.

15. Hydraulic Couplers: The driver's side of the dump body shall have three (3) male couplers for the spreader. The female half of each hydraulic quick coupler set shall be provided.

16. Hydraulic Tubing: The driver's side rear corner post of the dump body shall have an access plate, forward facing, with male bulkhead fittings. Appropriately sized hydraulic tubing shall extend from the bulkhead fitting down the inside of the corner post and exit at a point which allows connection with the spreader hydraulic hoses from the valve body. Hydraulic tubing shall be routed in a manner as to not interfere or contact the tailgate latching mechanism.

17. Tarp: A fully automatic two (2) arm type tarp system shall be installed. It shall be an electric system operated from the cab. The arms and tarp protecting windshield shall be aluminum and form arches that provide maximum clearance and fit for loading material into body. The tarp shall be designed for hot asphalt. The width of the tarp shall be within 4" of the inside width of the dump body. The arm springs shall be adjustable and designed for side mounting on the dump body. The elbows of the tarp arms shall be bolted to the arms. The tarp arms shall have a 45 degree swept angle. The tarp shall be controlled by the chassis electric accessory power supply. Shall be Aero Series 575 or approved equivalent. Tarp system shall include a twin arm tarp tensioning device that attaches to the primary arms and pivots to the forward end of the dump body when the tarp is deployed to prevent sailing. Shall be Aero 0311-980042 or approved equivalent.

18. Paver Lip: A paver or asphalt lip shall be bolted on the rear of the dump body apron using no less than ten (10), ½ inch, grade eight bolts. Paver lip shall be mounted at an angle no less than 24 degrees but no more than 28 degrees. Paver lip length shall be such as to provide approximately 20" of overhang, measured from the rear face of the rear hitch plate to the rear edge of the paver lip.

19. Rear Hitch Plate and Pintle Hitch:

    a. A ¾" thick steel rear hitch plate shall be securely welded and gusseted to rear of frame rails.

    b. Plate shall have service and emergency trailer glad hands positioned away from the center of the rear hitch plate to prevent interference with a trailer tongue when making tight turns. Glad hands shall be mounted to a bulkhead fitting installed in the plate and have tethered removable covers.

    c. The seven (7) pin trailer connection furnished with the chassis shall be mounted through the rear hitch plate in a suitable location.

    d. A four (4) pin female electric connector shall be mounted through the rear hitch plate in a suitable location. Connector shall be a Hopkins Model 52004 or approved equivalent.

    e. Two (2) Buyers Products B50 or approved equivalent DOT "D" rings, with 20 ton capacity each shall be securely welded to the rear hitch plate.

    f. All items mounted on the rear hitch plate (except the pintle hitch) shall be mounted as high as practical, leaving a smooth, clear area when the pintle hitch is removed.

    g. A Buyers Products PH30 rigid pintle hitch or approved equivalent shall be installed on the rear hitch plate using grade eight (8) hardware. Hitch shall be adjustable in height. Settings shall be 24", 26 ¼", 28 ½", 30 ¾" centerline height above the ground plus or minus 1".

    h. A rear chipper bar shall be installed on the pintle plate flange. Unit must bolt on with a minimum of four (4) 5/8" grade eight (8) bolts per side. Unit shall be constructed of 3 ½" x 4" angle or 4" channel and 1 ¾" cold roll bar stock. Width of the bar shall be 17". Hitch height shall be 14" from the ground to the center of chipper bar. There shall be a minimum of 6" clearance between the top of the chipper bar and the bottom of the rear hitch plate.

20. LED Warning Light System: Truck shall be equipped with an LED warning light system. System shall emit light that is amber in color and shall provide 360 degrees of visibility in a horizontal plane around the truck. Lights shall be mounted in rubber grommets and independently programmable. Wiring harness for warning lights shall be without splices. Lights shall operate with the key switch in the on and off position while capable of automatically shutting off after 12 hours of operation with the key switch in the off position. Dash or console mounted LED indicator lights shall illuminate when the warning lights are operating. Lights shall operate by two (2) position bi-stable switch. The lighting system shall consist of the following as a minimum.

    a. Two (2) lights recessed into the front corners of the body's cab shield at a 45-degree angle. Lights shall be Whelen 5V3A, 5 Grommet Series.

    b. One (1) Whelen Series 400 light weldment shall be recessed into each of the dump body's rear corner posts. Weldments shall be equipped with Whelen Series part number *DOT-3404D, ADD 4 TIR3* warning lights. Weldments shall also include Whelen LED backup lights and stop/turn/ tail lights. Tail light height shall not exceed 72".

21. Electrical and Illumination Installation:

    a. All installed wiring must be of adequate size to handle the anticipated loads of all electrical components. All wiring must be uninterrupted and complete with no splices.

    b. All wiring must be color coded.

    c. All wire terminal ends (spade, ring, etc.) shall be crimped, soldered to the wires and heat shrank or weatherproof connectors. Scotch-Loc fasteners and/or crimp butt connectors are not acceptable for any connection.

    d. All electrical connections shall be protected with dielectric silicone grease.

    e. All wiring shall be enclosed in a protective wiring loom, conduit or wrapped harness.

    f. The edges of all holes through which wiring must pass shall be protected with a grommet.

g. Low current circuits, such as the spreader light or relay activation circuits shall be controlled by the chassis electric accessory power supply.

h. High current circuits, such as the tarp motor circuit shall be powered directly from the battery and protected by a master resettable breaker or a fusible link.

i. Body Builder installed wiring going to the rear of the frame and dump body shall be grouped together and bound. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

j. All wiring to lamps shall be stress relieved within 6" of the lamp.

k. Wiring routed through the hydraulic enclosure sides shall be routed through a sealed compression type strain relief or a molded bulkhead fitting.

l. A four wire electric cable shall be routed from the cab auxiliary switches to the four pin electrical connector mounted on the rear hitch plate. The electric cable shall contain one ground wire and three switch controlled wires. One wire to control each of the following spreader functions: strobe light, work light and electric pump motor.

22. Air Powered Accessory Installation:

a. All lines shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All lines shall be routed or shielded to protect them from heat sources.

c. Air lines shall be colored, identifying individual circuits with each circuit being a different color.

d. Body Builder installed accessory air lines going to the rear of the frame and dump body shall be grouped together and bound with the Body Builder installed wiring going to the rear of the frame and dump body. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

e. All air powered accessories shall be controlled by the chassis air accessory power supply.

23. Color: Dump Body, hitch plate and other associated metal components shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Painting shall be accomplished by industries best practices; aerosol paint is not acceptable in this application. Finish painting of the inside bottom of the body is not necessary.

D. Hydraulic System:

1. Hydraulic Tank:

a. The hydraulic tank shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. The tank shall be mounted to provide no less than 3" of clearance between the cab and tank.

c. Tank shall come complete with all mounting hardware including but not limited to, frame mounting angles, bolts with poly locknuts and springs.

d. Tank shall be a minimum 30-gallon capacity with full baffle to prevent sloshing.

e. Tank and baffle shall be constructed of 10-gauge stainless steel.

f. Tank shall have a screened filler neck with a breather cap.

g. A sight/temperature gauge shall be mounted on the outside of the tank, and be easily visible. Sight/temperature gauge housing shall be all aluminum.

h. Tank bottom shall have a 3" NPT port for suction.

i. Suction strainer shall be 2" NPT with a 3-5 psi built in bypass, and have a full flow ball valve installed at the tank suction fitting. A heavy plastic wire tie shall be installed to insure the ball valve remains in the open position unless it is intentionally closed.

j. Tank shall have ¾" NPT port with a magnetic plug for draining the tank.

k. Tank shall have a ¾" NPT port for the pump case drain.

l. Tank back shall have 3/8" NPT port for the solenoid drain.

m. Tank back shall have a ½" NPT port for the low oil sensor.

n. Tank top shall come with provision for a tank-mounted filter on the passenger side.

2. Hydraulic Return Filter Assembly: Assembly shall be mounted on the top of the hydraulic reservoir with a 10-micron replaceable cartridge element and a built in bypass and a bypass condition indicator. The bypass condition indicator shall be installed so its face can be seen from the driver's seat. The assembly shall have a minimum capability of 80 GPM and contain one (1) 1 ¼" NPT port. All return oil shall pass through a return filter.

3. Hydraulic Pump:

a. Pump shall be crankshaft driven.

b. The piston pump shall be load sensing type with a minimum capability of 48 GPM and 3000 PSI at 2500 RPM.

c. Pump shall have side ports in order to avoid multiple 90-degree bends in suction lines. Rear ports are not acceptable.

d. The case drain shall be positioned as high as possible and directed back to the reservoir without passing through the return line filter.

e. The pump shall have an option for an internal bleed down compensator, a 1 ¼" keyed shaft drilled and tapped, a 1" split flange pressure port and a 2" split flange suction port.

f. A normally closed 12VDC low oil shut down valve shall mount directly to the pump pressure port and be activated by the low oil level switch in the tank.

g. The pump must have a pressure gauge port integral to the rear cover of the pump.

h. Pump shall be Sauer-Danfoss Model JRL075, or approved equivalent.

4. Hydraulic Pump Drive:

a. The driveline shall be 1280/1310 series solid shaft type and be installed according to manufacturer's instructions to assure proper alignment.

b. Pump shall be driven off the engine crankshaft.

c. Pump shaft shall have a companion flange that unbolts from the driveshaft for easy belt replacement and come complete with all crosses, pump end yoke and flange for engine.

d. All hardware used for installation of pump driveshaft shall meet or exceed driveline manufacturer's specification. Manufacturer's torque specifications shall be adhered to on all driveshaft installation hardware.

5. Hydraulic Function Control Valves:

a. The valve shall be load sensing type with a mobile stackable design.

b. The valve shall be all cast iron design and all sections must be of the same valve series.

c. The valve shall be capable of a nominal 35 GPM with published flow curves to 40 GPM.

d. The valve shall be pressure and flow compensated.

e. Inlet and outlet ports shall be ¾" O-ring, all working ports shall be minimum 5/8" O-ring.

f. The valve shall be equipped with a 0 -3000 psi gauge installed in inlet.

g. Valve shall be arranged as follows:

(1) Inlet cap with top ported pressure and tank, load sensing ports.

(2) Double acting cylinder spool for hoist 0-32 GPM proportional 12VDC operated, with spring return to neutral. Section shall have manual handle overrides with stroke limiters and 500 PSI down side load sense relief.

(3) Single acting cylinder spool for plow lift, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-15 GPM main spool. Section shall have manual handle overrides and stroke limiters. Plow float shall be incorporated and controlled by console.

(4) Double acting cylinder spool for plow left/right, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(5) Double acting cylinder spool for scraper up/down with 500 PSI load sense relief and shock valve for down, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(6) Double acting cylinder spool for scraper left/right, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(7) Single acting 0-15 GPM spool for auger, proportional 12VDC spring to center with manual override.

(8) Single acting 0-7 GPM spool for spinner, proportional 12VDC spring to center with manual override.

(9) Single acting 0-7 GPM spool for pre-wet, proportional 12VDC spring to center with manual override.

(10) Spreader and pre-wet sections shall be part of a manifold assembly that has a pressure reducing valve and solenoid drain and has the ability to have a cartridge added for ice control applications.

6. Hydraulic Function Control Valve Enclosure:

a. The hydraulic function control valve enclosure shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. Hydraulic valve shall be mounted in a weather tight enclosure.

c. Hydraulic valve enclosure shall consist of three (3) pieces, the enclosure body, valve mounting plate and the lid.

d. Enclosure body and valve plate shall be constructed of 3/16" stainless steel minimum.

e. The lid shall be constructed of 10-gauge stainless steel with a minimum 1" lip all around to help seal.

f. The sides of the body shall have formed mounting angles as an integral part.

g. Valve plate shall go to the inside of the enclosure for ease of mounting.

h. There shall be a formed Buna gasket to seal the valve plate to the enclosure.

i. The top and front of the enclosure shall be open with the lid off.

j. The valve shall be bulkhead fitting mounted to valve plate and ports will exit through the front of the enclosure.

k. Outside lip of enclosure shall have a gasket all the way around for weatherproofing when lid is installed.

l. Lid shall be held on with two (2) tension latches on each side.

m. Lid shall have two (2) lifting handles.

n. Shall have multiport electric board to connect to each valve coil that must be plug-and-play with an IP68 rating. Having to install connectors will not be acceptable.

o. If sufficient room exist between the cab and dump body the hydraulic valve enclosure shall be mounted parallel to the frame. If there is not enough room for parallel mounting of the enclosure, it may be mounted at a 90-degree angle to the frame and should be centered between the cab and dump body.

7. Snowplow Cushion Valve:

a. A double relief cushion valve shall be installed for front snowplow angle and scraper left/right.

b. The valve shall be set at 2000 PSI and have #8 SAE O-ring ports.

c. The valve shall be constructed of a high-tensile cast iron body with ball and spring type relief with hardened seats.

d. The valve shall be installed at the front bumper/snowplow hitch.

e. Valve shall consist of O-ring thread ports.

8. Hydraulic Hoses:

a. Suction hose from the reservoir to the pump shall be SAE 100R4 type of adequate size for the displacement of the pump. Hose shall be connected to the pump and reservoir ball valve with a king nipple, and double clamped with T-bolt type stainless steel super clamps.

b. All hoses, with the exception of the suction hose, shall be rated for a minimum working pressure of 3000 PSI.

c. All hoses, with the exception of the suction hose, shall have swivel ends or swivel adapters.

d. Hoses connecting to valve assembly shall have 90 degree female JIC swivel ends.

e. Pressure hose shall be 1" ID and rated at a minimum 2000 PSI with female JIC swivels at both ends.

f. Return hose shall be 1 ¼" SAE 100R4 type with female JIC swivels at both ends.

g. Hoist hoses shall be 1" ID with female JIC swivels at both ends.

h. Snowplow hoses shall be 3/8" ID with female JIC swivels at both ends.

i. Auger hose to the left rear corner of the dump body shall be ¾" ID with female JIC swivels at both ends. The auger circuit shall have a capped "tee" installed at the valve enclosure, enabling later installation of another hose routed to the front of the truck.

j. Spinner hose to the left rear corner of the dump body shall be ½" ID with female JIC swivels at both ends.

k. Spreader return hose to the left rear corner of the dump body shall be 1" ID with female JIC swivels at both ends. The spreader return circuit shall have a capped "tee" installed at the return filter assembly, enabling later installation of another hose routed to the front of the truck.

l. Pump case drain shall be ¾" ID minimum with female JIC swivels at both ends, and also have a ¾" NPT ball valve installed at the reservoir.

m. Load sense line shall be 3/8" ID with female JIC swivels at both ends.

9. Hydraulic Quick Disconnect Couplings: *(See Dump Body section for detailed layout and mounting of couplers).* For each hydraulic quick disconnect installed on the truck, whether male or female, the mating end of the coupling shall be provided.

a. All hydraulic couplers shall be full flow Aeroquip FD45, Parker 60 Series or approved equivalent. A dust cap or plug shall be furnished with every male and female quick coupler.

b. The front snowplow lift circuit shall be equipped with a male 3/8" coupler installed in the front bumper. A 34" x 3/8" ID hose with a female 3/8" coupler shall be installed on the hydraulic lift cylinder.

c. The snowplow cushion valve shall be equipped with a male 3/8" coupler and a 34" x 3/8" ID hose with a female 3/8" coupler.

d. The spinner circuit shall have a ½" male coupler at the left rear corner of the dump body.

e. The auger circuit shall have a ¾" male coupler at the left rear corner of the dump body.

f. The spreader return circuit shall have a 1" male coupler at the left rear corner of the dump body.

10. Hydraulic Pre-Wet System:

a. Liquid pumping system shall come complete with all plumbing, pumps, enclosure and mounting hardware.

b. The spray system shall be completely controlled by a Freedom 2.1 or approved equivalent ground speed spreader control system.

c. System shall run off a section in valve stack.

d. Liquid pump shall be a corrosion resistant bronze design.

e. Pump shall be self priming, pulse free, positive displacement design.

f. Unit shall come with a precision machined stainless steel shaft.

g. Pump shall have oil-less carbon graphite bushings oversized for increased durability and longevity.

h. Pump shall have flush port for pre-fill or flush of mechanical seal chamber.

i. Pump shall come with a long wearing, drip-less mechanical shaft seal.

j. Pump shall also come with bronze gears for good durability.

k. Pump shall come with a built in 45 PSI relief valve to protect against excessive pressurization.

l. Pump shall have a continuous duty rating of 125 PSI.

m. Pump shall be plumbed through a 0-15 GPM flow meter which is constructed of non-corrosive material.

n. Pump shall be capable of 9 GPM at 45 PSI.

o. Hydraulic connections shall be bulkhead type, mounted in bottom of enclosure.

p. All hydraulics inside enclosure shall be hard plumbed.

q. Pumps shall be mounted in a Nema 4x style weather tight enclosure.

r. All plumbing shall be included for a four (4) nozzle system with check valves.

s. The pre-wet pump, enclosure and mounting brackets shall be mounted in such a manner as to allow for removal during the summer months. The hydraulic hoses supplying fluid to the pre-wet system from the hydraulic function control valve shall be attached to a bulkhead located between the frame rails and behind the bed cylinder. The hydraulic supply hoses for the pre-wet system shall attach to the bulkhead by the use of quick couplers.

11. "TPE" Wiring Specification:

a. Wiring and harness system shall meet ISO rating IP68 and NEMA 6.

b. The connectors shall be zinc die cast E-coated. (Similar to a MIL spec. connector)

c. Each shall have three (3) sealing points, the lock ring itself, a raised portion of the molded plastic around each pin and a viton o-ring that seals the whole connector.

d. The cable jacket shall be TPE thermoplastic elastomer and molded to the connectors.

e. Connectors and harness shall be rated and tested for a temperature range from -30C degrees to +70C degrees.

f. Connectors shall be tested to be water tight when submerged in 6' of water for 24 hours, in 275' of water for 1 hour and when subjected to a 1000 PSI pressure wash.

g. The connectors shall be designed to have no corrosion after 500 hours in a 35C degree salt spray.

h. Cabling shall be rated excellent in low temperature flexibility and in its resistance to oxidation, heat, oil, weather, sun, ozone, abrasion, electrical priorities, flame, water, acid, alkali, gasoline, benzol, toluol, degreaser solvents and weld slag.

i. All cabling for the hydraulic and pre-wet systems shall be this type.

12. Spreader Control:

a. Control shall have three (3) PWM output channels.

b. One (1) channel shall be ground speed oriented conveyor/spreader, one (1) channel for spinner and one (1) channel for a liquid function.

c. Liquid function shall be programmable for either a pre-wet or ice control function.

d. Control shall have a simple operator interface of 3 buttons, two knobs and an interactive touch screen.

e. Knobs shall be rotary encoders with no maximum or minimum limit position.

f. Programming of unit shall not require the use of an ancillary device.

g. Touch screen shall be used for calibration of unit.

h. There shall be a minimum 2.0 USB port on the unit for downloading data and upgrading software or capabilities of the system.

i. To prevent glare at night, there shall be a "night mode" for the touch screen.

j. The front panel shall be backlit for night viewing.

k. The unit shall be supplied with a minimum of 8MB of RAM and 4MB of memory.

l. There shall be a field replaceable fuse which is easily accessible to protect the system.

m. Help screens for trouble shooting and calibration shall be embedded in the on board software.

n. The system shall support remote blast and remote pause functions.

o. Control shall be open loop with no feedback sensor.

p. PWM circuits shall be current regulated to reduce hysteresis.

q. There shall be an input to sense a stall of the spreader.

r. A float input circuit shall be provided to automatically turn off liquid system at low level.

s. Storm totals shall be available either on screen or via USB download.

t. Spreader control shall be mounted in a factory made control console that also controls the functions for body, plow and scraper.

13. Console Design: (Certified Power SG07010*** or approved equivalent)

a. Shall be totally modular control arm design for a variety of joystick controls, spreader controls and switch configurations.

b. Unit shall be provided with three (3) fully proportional joysticks, one (1) each for hoist, front mount snow plow and belly mounted snow plow control.

c. Shall have a single axis control with dead man switch for hoist.

d. Shall have a dual axis "+" design for snowplow up/down, and left/right control.

e. Shall have a dual axis "+" design with dead man switch for scraper up/down, and left/right control.

f. Scraper joystick shall be 12VDC dual axis fully proportional with dead man control.

g. Armrest style console shall be fully adjustable to accommodate automatic or manual transmissions and mount like it is part of the driver's seat.

h. Unit shall be fully adjustable left and right.

i. Auxiliary switches shall be the "Touch Guard" type.

j. Switches shall control items similar to the following:

- Strobe lights
- Work lights
- Low oil indicator
- Body up indicator
- Change filter indicator

- Plow float indicator

k. Switches shall be capable of being backlit in two colors. One color when the system is powered on and an alternative color when activated.

l. Switches shall be programmable for either maintained or momentary without changing the switch itself.

m. Switches shall be capable of sensing a ground fault with the circuit running.

n. Unit shall come with full schematic documentation.

o. All indicators shall be on the in cab display and show up in English stating the function. Indicator lights will not be accepted.

14. Hydraulic Installation:

a. All hoses shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All hoses shall be routed or shielded to protect them from heat sources.

c. Teflon tape shall not be used in the hydraulic system.

d. Hydraulic hoses shall not be secured to any factory installed chassis wiring, cables, hoses or lines.

e. Hydraulic hoses shall not be secured in the same bundle with any electrical wiring.

f. Hydraulic hoses shall be bundled together and routed by themselves.

g. Hoses shall be adequately supported and securely fastened to withstand snow and icing conditions.

h. Hydraulic hoses running to the rear of the truck shall be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

i. Each hose going to the dump body shall have a 90-degree bulkhead mounted JIC elbow installed at the rear of the truck frame near the dump body hinge. These elbows shall split each hose going to the dump body into two (2) hoses allowing for easier routing and replacement.

j. Hydraulic ports shall be O-ring type unless otherwise specified.

E. Underbody Scraper:

1. General: An underbody scraper with power reversing moldboard shall be mounted to the frame behind the cab and in front of the tandems. The underbody scraper requires a minimum of 92 inches of clearance, below the frame, between the front of the front tandems and any obstruction forward. Scraper shall be mounted and adjusted according to manufacturer recommendations to prevent contact with other chassis components whether in stowed or work position.

2. Moldboard: Curved moldboard constructed of no less than 1" thick steel plate, 10' in length and 17" in height**.** Shall have a minimum cutting angle adjustment of 35$^{o}$ and be equipped with spring safety trip. Cutting edge shall be a minimum 7/8" x 6" high carbon steel with holes AASHTO spaced. Cutting edge shall have a WC Grade tungsten carbide insert. Cushioning of the moldboard shall be accomplished by two heavy duty steel spring canister assemblies.

3. Scraper Hydraulics: Shall consist of:

a. Two double acting lift cylinders.

b. Two double acting angle cylinders which act as a locking mechanism to maintain the moldboard angle while in use.

c. All necessary hoses and fittings for complete installation.

d. Crossover relief valve for protection of the hydraulic system.

e. Pressure relief valve preset to limit down pressure on the moldboard.

4. Scraper functions are to be integrated into the hydraulic system of the truck and controlled from the operator's console in the cab.

5. Scraper Light: LED work lights shall be mounted on both sides of the chassis in such a manner as to illuminate the driver's and passenger's side of the underbody scraper, regardless of the angle of the blade. The light shall be controlled by an auxiliary rocker switch located in the instrument panel. Suitable make and model is Truck-Lite model 81360 or approved equivalent.

6. Removal: During the summer months the underbody scraper will be removed and a pusher axle installed. The underbody scraper shall be installed in a manner that allows removal of all components. Holes drilled in the frame for mounting of the underbody scraper shall be positioned, as much as possible, to allow for their use in mounting of the pusher axle. The hydraulic hoses supplying fluid to the scraper from the hydraulic function control valve shall be attached to a bulkhead located between the frame rails and behind the bed cylinder. The hydraulic supply hoses for the scraper shall attach to the bulkhead by the use of quick couplers.

F. Snowplow: 20-435-mm009

1. General: Snowplow with power reversing moldboard, for use on a truck equipped with central hydraulics. The snowplow provided shall be designed and approved by the manufacturer for installation on a truck which has a front gross axle weight rating of 18,000 pounds.

2. Reversing Frame & Front Push Tube: Shall be constructed using a minimum 5" x 5" x 0.38" or 6" x 4" x 0.38 structural steel tubing properly reinforced to withstand severe snow plowing conditions. Front push tube shall be a minimum of 116" in length. Front push tube shall have a minimum of ten welded ears to attach the moldboard assembly. Ears shall be made of minimum 5/8" thick steel. All joints shall be continuously welded and reinforced.

3. A-Frame: Shall be engineered and constructed to be an integral component of the push frame. Shall contain two (2) double acting heavy duty power reversing hydraulic cylinders with a minimum 4" diameter bore. Cylinders shall be equipped with a minimum 2" diameter rod. Cylinder rod shall be nitride coated. The reversing cylinders shall maintain the angle of the moldboard once the desired plowing angle is reached. The unit shall be equipped with a hydraulic cushion valve to protect hydraulic cylinders in the event of an impact with a fixed object. Cylinders shall be equipped with hydraulic lines of sufficient length to connect to supply lines on the front bumper of the truck. The mounting plate that attaches the snowplow push frame to the truck hitch shall be equipped with mounting flanges made of 1" metal. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins.

4. Moldboard: Curved moldboard no less than twelve (12) feet in length. Shall be constructed of no less than 3/16" steel with a minimum of ten (10) vertical ribs. Moldboard shall be equipped with full length horizontal ribs according to manufacturer's standard for plow size and type. Moldboard height shall be no less than 36" but shall not exceed 42". Shall be extended curve design to prevent snow from coming over the top of moldboard at high speed. Shall have multi-position adjustment for lay-back to achieve optimal plowing angle. When set at the optimal plowing angel the top of the moldboard curve shall extend forward of the cutting edge by no less than twelve (12) inches. Shall have mailbox ends equipped with sight markers at least 36" in height. Shall have cutting angle adjustment of no less than 35° left and right of center. Shall be equipped with two (2) compression type spring safety trips capable of at least three (3) attack angle settings ranging from 10 to 30 degrees. Shall include stops attached to the moldboard assembly which contact the reversing frame front push tube before the trip springs becomes fully compressed. The moldboard assembly shall be capable of tripping at least 15 degrees past vertical before contacting the stops, at any attack angle. Shall have a minimum of five (5) hinge points. There shall be a minimum of 116" between the outer most hinge points with a minimum of three more hinge points spaced between.

5. Snow Shield: The moldboard shall be equipped with a full length rubber snow shield mounted on the top forward edge. Shall be made of a minimum of two ply rubber matting no less than 1/4" thick. Snow shield shall be affixed to the moldboard using a minimum 0.25" x 2" metal strip and an adequate number of bolts to secure it in position.

6. Cutting Edge: Cutting edge shall be a minimum 3/4" x 6" high carbon steel with holes AASHTO spaced. Cutting edge shall be equipped with a minimum of two (2) wear blocks behind the cutting edge. Each wear block shall have a minimum of 26 square inches of wear surface. Wear blocks shall be made of a material with a minimum Brinell hardness of 181-240.

7. Level Lifting Device: Snowplow shall be equipped with a level lifting device that keeps the moldboard level when lifted or when being reversed. Device shall be complete with all chains, hooks, clevises and hardware necessary for proper operation.

8. Truck Hitch: Low profile, front frame mounted universal plow hitch with fold down and adjustable lift arm. Shall be capable of self-storing lift cylinder. The lift cylinder shall be a minimum 4" diameter bore and of sufficient length to properly lift snowplow. Hitch shall be capable of carrying plows from 10' to 14' in length. The lift arm mounting frame shall be constructed using a minimum of ½" x 3" angle welded to a 10" structural channel which forms the lift frame. Cheek plates shall be ½" x 12" tapered. Rocker angles and plates shall be utilized above and below the truck frame to

keep the hitch from loosening and moving forward. The cheek plates and rocker plates will be welded to the truck hitch by the upfitter. Lift arm bracket and lower drop bar retaining/connecting lugs shall be fabricated from ¾" thick plate. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins. (Hitches using braces running from the lift frame to the front axle of the vehicle are not acceptable).

9. Bumper: Two (2) bumper wings (right side and left side) shall be provided as an integral portion of the plow hitch. Each bumper wing shall be constructed using 10" HD structural channel. The wings shall be approximately the same height as the truck manufacturer's standard front bumper and shall be swept back to conform to the vehicle front hood and fenders. The bumper wings sections shall be bolted to the vehicle through the hitch cheek plate and the truck frame.

10. Jack: The snowplow shall be equipped with a screw type adjustable jack to assist in the instillation and removal of the unit from the truck hitch.

11. Weight: Snowplow assembly shall weigh a minimum of 2,000 pounds.

12. Color: Front Bumper, Snowplow Hitch and Lift Assembly shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Manufacturer's standard color is acceptable on the reversing frame, A-frame and moldboard

F. Chemical Spreader: 20-360-mm094-10.5 SS SP TS

1. General: This specification is intended to cover a 10.5 cubic yard minimum struck capacity hydraulic driven chemical and material spreader for use in ARDOT dump trucks. The spreader shall also be equipped with a liquid calcium chloride spray system designed to operate in conjunction with the hydraulically driven chemical pump mounted on the truck.

2. Type: Shall be designed for mounting in dump body with spinner at the rear and below floor of dump body. The spreader shall be a self-contained unit with hopper type body, conveyor system, hydraulic drive, spinner and all necessary components integrally mounted as single unit. Shall have the capacity to spread material to a maximum width of no less than 24'.

3. Hopper Body: Hopper shall have a minimum struck capacity of 10.5 cubic yards. Shall be electrically welded construction, adequately reinforced, with no less than 10 gauge 304 stainless steel sides and ends. The hopper body shall be 15' in length with sides to slope approximately 45 degrees to allow material to feed into conveyor by gravity. Bottom shall be constructed of no less than 7 gauge 304 stainless steel. All hopper hardware shall be stainless steel. In addition, any long sills, crossmembers or side supports used in the design of the spreader shall be constructed of 304 stainless steel.

4. Top Screen: A top screen to keep oversize material from entering hopper shall be provided with the spreader.

5. Conveyor: Shall have a minimum overall width of 24" and be designed to handle sand, cinders and de-icing chemicals discharging material to spinner at rear of spreader. Shall be equipped with spring loaded idler adjusters to maintain proper conveyor tension.

6. Drive: Conveyor and spinner shall be driven by hydraulic motors. Drive to conveyor and spinner assembly to be as regularly furnished by manufacturer. Shall be designed to operate on a closed center hydraulic system with a minimum output of 15 gpm at 1,500 psi. (Hydraulic pump will be furnished by ARDOT.)

7. Spinner Assembly: Spreader shall be equipped with a "Urethane Spinner" consisting of a one-piece polyurethane disc with a minimum of four (4) molded fins. Spinner disc shall have a minimum diameter of 18" and have a vertical adjustment of no less than 12". Spinner shaft shall be mounted to the hydraulic spinner motor output shaft. The spinner chute shall be constructed of no less than 10 gauge 304 stainless steel. Unit shall have a minimum of three (3) adjustable material deflectors to help regulate spreading pattern. Spinner assembly shall be designed so that it may be hinged up for storage or to discharge material that may be left in the spreader.

8. Feed Gate: Material discharge to spinner chute to be controlled by an adjustable discharge gate with positive locking device.

9. Mounting: Spreader shall be designed for mounting in a dump body which is devoid of hydraulic cylinder hoist housing in the front of the body. Body has an inside length of 180", an inside width of 86" and is mounted on a tandem axle truck with 144" cab to axle measurement. Hold down equipment for dump body mounting shall be furnished. Spreader shall be equipped with lifting bails.

10. Front Bearing Grease Extensions: Shall have front bearing grease extension tubes to allow greasing of front bearings. The grease tubes shall either extend to the rear of the spreader or approximately 40" above the dump body floor, and be

flexible enough so greasing will not interfere with normal bearing adjustment. The tubes shall be attached to the sides of the spreader with straps made of nylon or a similar material.

11. Liquid Spray System Components: The spray system components provided shall work in conjunction with a pre-existing hydraulically driven chemical pump and control system on the truck. The system shall include a hose kit with a minimum of two (2) spray nozzles and reservoirs. The kit shall also include all necessary hoses and fittings to connect the spray system to the truck mounted pumping system located at the rear of the trucks dump body on the driver's side. Spray system shall be capable of continuous spraying of calcium and magnesium chloride, glycol, liquid urea, or other liquid de-icing solutions directly onto the material as it leaves the conveyor and before it reaches the spinner. All parts that come in contact with liquid de-icing solutions shall be corrosion resistant. All components shall be rated at no less than 150 psi working pressure.

    A. Sprayer Reservoirs: A minimum of two (2) reservoirs with a capacity of no less than 150 gallons each shall be provided. Reservoirs shall be molded polyethylene construction and be complete with replaceable screen line strainer, shut-off valves and mounting hardware. The reservoirs shall be angle formed to allow for mounting to the sides of the chemical and material spreader specified above. (Sides of spreader are to have an approximate $45^{o}$ slope). The reservoirs shall be designed so that one (1) reservoir is mounted on each side of the spreader with all fill openings, shut-off valves, etc. readily accessible. Reservoirs shall be plumbed together with a minimum 1-1/2" ID hose with a tee located on the left rear corner of the spreader.

    B. Nozzles: There shall be a minimum of two (2) spray nozzles equipped with necessary cores, discs and mounting hardware.

12. Color: 304 stainless steel components to be unpainted. Non-stainless steel parts to be painted black or aluminum.

I. Warranty:

1. Cab and chassis shall have truck manufacturer's regular warranty and service as regularly furnished on new vehicles sold to the public. Warranty data shall be furnished with each unit.

2. The dump body, hydraulic system, and all other incidental equipment furnished under this specification shall be warranted against defective material and workmanship for a minimum period of (12) months (365 days) from date unit is placed in operation by ARDOT.

    (a) Warranty should include all parts, labor and transportation costs to the location of equipment.

    (b) If equipment cannot be repaired on location, warranty shall include cost of transport to the facility where the repair work will be done.

3. Warranty repairs are to be performed by any authorized dealership of the manufacturer; however, the Successful Bidder will be ultimately responsible for coordinating repairs and insuring that warranty repairs are completed in a timely manner.

4. If any warranty literature submitted with the bid conflicts with ARDOT warranty requirements, the conflict(s) shall be specifically noted, corrected and included with the bid or the conflict(s) will be considered an exception to warranty specifications and the bid rejected.

5. Recent prior failure to provide warranty-work, parts, replacement parts or service, in a timely manner, for equipment from the same manufacturer or dealer shall be grounds for the rejection of any submitted bid, or for the denial of any otherwise qualified low bidder, whether such failure is attributable to the manufacturer or the dealer of the equipment. For the purposes of this paragraph "timely manner" means a period of time not exceeding thirty (30) calendar days to provide requested warranty-work, parts, replacement parts, or service. For the purposes of this paragraph "manufacturer" means the original manufacturer of the equipment and its successor or successors, regardless of number, and whether acquired by sale, merger, or otherwise. For the purposes of this paragraph "replacement part" means a part redesigned by a manufacturer to correct a design or engineering defect and which replacement part is capable of providing dependable performance in normal operation conditions for its normal service life without failure. Such bid or bids may be rejected by the Department until such failure or failures have been remedied to the satisfaction of the Department and until such manufacturer or dealer is providing such warranty-work, parts, replacement parts, and service in a timely manner.

**ARKANSAS DEPARTMENT OF TRANSPORTATION**

**SPECIFICATION 20-67-038**

**FOR**

**TANDEM AXLE CAB AND CHASSIS**
**58,000 POUNDS GVWR**
**WESTERN STYLE 13' DUMP BODY**
**WITH**
**AUTOMATIC TRANSMISSION**
**CENTRAL HYDRAULICS**
**10' SNOWPLOW AND CHEMICAL SPREADER**

## 1. General Specifications:

A. Current Model: Units furnished under this specification shall be the latest improved model in current production, as offered to commercial trade, built for the U.S. market, and shall be of quality workmanship and material. Units manufactured for foreign markets will not be accepted. All equipment offered under this specification shall be new. Used, reconditioned, shopworn, demonstrator, prototype or discontinued models are not acceptable. Manufacturers of the units supplied must have been in the business of producing operational units for at least two years and must have recently sold similar units to domestic governmental agencies. The model furnished must have been in production for a minimum of one year, or be the latest version of a previous model. Bidder(s) will be required to submit documentation substantiating the aforementioned requirements. A list of user references may also be required.

B. Literature: Manufacturers literature, verifying adherence of proposed unit to each line item addressed in this specification, shall be submitted with the bid. If any literature and/or specifications of items conflict with ARDOT specifications, the conflict(s) shall be specifically noted, corrected and submitted with the bid.

C. Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that equipment offered is in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet. However, no implication is made by the Arkansas Department of Transportation that deviations will be acceptable.

D. Manuals: The successful bidder shall furnish one (1) Operator's Instruction Manual with each unit delivered and one (1) copy each of Shop Repair Manual and Parts Book to each FOB point.

The successful bidder may provide Shop Repair Manuals and Parts Manuals on computer media (CD, DVD, USB Drive, etc.) in lieu of printed manuals.

E. All parts, accessories and tools necessary for satisfactory operation of unit shall be furnished whether or not they are specifically mentioned in this specification (including standard equipment as regularly furnished by manufacturer as shown on printed literature and specifications - unless specifically excluded by this specification).

F. Parts Inventory & Service Facilities: The successful bidder shall maintain a representative inventory of replacement parts and service facilities for servicing equipment bid on.

G. Demonstration: The Arkansas Department of Transportation reserves the right to require a demonstration, under actual working conditions, of equipment bid under this specification before award is made. The demonstration would be performed (free of any charge) by the bidder or an authorized representative at a mutually acceptable location. If requested, the bidder should be prepared to demonstrate the equipment within thirty (30) days after notification. Failure of the bidder to perform a satisfactory demonstration within the specified time may be grounds for rejection of the bid.

H. Drawings: Professional quality drawings which depict the layout of the chassis will be provided with the bid.

I. Inspection: The ARDOT reserves the right to inspect bodies during manufacture, or prior to their installation, for compliance with specifications and to inspect hydraulics installation during work in progress. Location of hoists on truck chassis shall be approved by ARDOT prior to installation. All workmanship shall be first class (no welding on truck frame to install dump body hoist). Any unit delivered under this specification is subject to rejection if there is evidence of poor workmanship by either the vendor or the original manufacturer.

J. Due to the nature of work performed by ARDOT, body-hoist combinations furnished under this specification may be subject to use under adverse conditions such as dumping on road shoulders at a slight angle and spot dumping of loads. The design

and strength characteristics of the entire dump unit shall be such that the unit structural members and the hoisting system shall suffer no deformation, damage or structural failure resulting from raising a full payload under these conditions.

K. Delivery Requirements: It will be the responsibility of the Successful Bidder to guarantee delivery of the cab & chassis as specified, including items or equipment installed by a third party contractor, within the quoted time.

L. Cooperative Purchasing: Other tax-supported entities* in Arkansas (cities, counties, state agencies, school districts, etc.) may purchase from this Contract on an individual basis under the same specifications and conditions, and at the pricing set forth by each vendor, all at the discretion of each vendor in each case. Prices could be reduced by a vendor for minor alterations in conditions (changing order quantities, deleting options, etc.) as agreed by both parties, but could not be raised above the contract bid price except for any additional freight charges. Vendors would not be required to sell to any such entity under this contract, and those entities would not be obligated to purchase from the contract.

Each entity wishing to purchase from the contract must make contact directly with the appropriate vendor(s). The Highway Department shall remain "out of the loop" for such transactions: all contact, orders, invoices, payments, etc. regarding such transactions must take place exclusively between the tax-supported entity and the vendor. The Department shall be held harmless of any and all liability arising from such transactions.

* Tax-supported entities are defined as those receiving more than half of total funding from appropriated tax funds.

## 2. Unit Specifications:

A. General: This specification is designed to provide the Arkansas Department of Transportation with tandem axle trucks for maintenance operations. The truck's uses will consist of material hauling, trailer towing, and operation of hydraulically controlled 13' material spreader and front mount snowplow.

B. Cab and Chassis:

1. GVWR: 58,000 pounds, minimum.

2. Cab to Axle: Nominal effective CA of 118" with vertical exhaust stack.

3. Intended Use: Twelve (12) cubic yard dump body.

4. Front Tires And Wheels: Two (2) 315/80R22.5 steel belted tubeless radials - load range "L" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 9" rim section. All tires must have speed restriction that exceeds 65 MPH.

5. Rear Tires And Wheels: Nine (9) 11R22.5 steel belted tubeless radials - load range "H" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 8.25" rim section. All tires must have speed restriction that exceeds 65 MPH.

6. Engine: Liquid cooled 4 cycle diesel with a minimum piston displacement of 11.8 liters. Shall have an advertised rating of no less than 350 SAE gross horsepower and a minimum of 1,350 lb. ft. SAE gross torque. Governed speed shall be no less than 2,000 RPM. Shall have full flow oil filter(s), fuel filters, dry type air cleaner, 12-volt electrical equipment with no less than 160-amp alternator and maintenance free batteries as regularly furnished with engine specified. Engine shall be equipped with a block heater rated at no less than 1,000 watts which will operate on 120 volts AC.

7. Emissions: The engine emission control system shall be programed to allow regeneration to occur even if the truck is being used in an urban or low speed highway applications.

8. Engine Brake: Jacobs engine brake, or equal. Designed to use engine compression to retard engine speed. Shall be capable of utilizing all engine cylinders for braking effect.

9. Front Power Take-Off: Engine to be equipped with provision for front PTO drive. Shall include the necessary crankshaft adapter for attaching a shaft type drive and any other items required for this provision. If the PTO driveshaft passes through the radiator, charge air cooler, and/or air conditioning condenser it shall be shielded by a steel encasement of sufficient strength to prevent damage to surrounding components in the event of driveshaft failure.

10. Cooling System: As recommended and regularly furnished by the manufacturer for use with the engine size and PTO provision specified above with anti-freeze protection to -20° F, or lower.

11. Exhaust System: Vertical exhaust stack with curved outlet. Exhaust stack to be equipped with a heat shield. If the DPF is part of the exhaust stack, the clearance to the dump body must be pre-approved.

12. Engine Shutdown: Engine safety shutdown system with manual or automatic override to include the following features: low oil pressure - warning bell/buzzer plus shutdown, high coolant temperature - warning bell/buzzer plus shutdown and low coolant level - warning bell/buzzer plus light or shutdown.

13. Throttle Control: Engine shall be equipped with an in-cab throttle control for use with PTO. Shall be electronic control type.

14. Transmission: Allison 4500 RDS automatic with six speed programming and PTO provision. Transmission shall have synthetic lubricant and be equipped with transmission oil cooler.

15. Steering: Hydraulic actuated power steering as regularly offered by manufacturer.

16. Front Axle: I Beam Type with wet seals, outboard mounted drums and a minimum capacity of 18,000 pounds.

17. Front Springs: As required to meet axle capacity specified above.

18. Rear Axle and Suspension: Tandem with power divider, inter-axle differential lock out control and Hendrickson RT or RTE equalizing beam type suspension. Shall be full floating with wet seals, outboard mounted drums and have a minimum capacity of 40,000 pounds. Ratio provided shall achieve a maximum theoretical electronic governed speed of no less than 69 MPH and still provide acceptable startability and gradeability under loaded conditions for on/off highway applications.

19. Air System: Air compressor shall have a minimum capacity of 15 cfm and draw air through the engine air cleaner. Air system shall be equipped with a heated air dryer.

20. Brakes: Factory installed full air operated two shoe type with automatic slack adjusters and dust shields on front and rear. Rear brakes shall have spring set parking brakes. Brake chambers on the drive axles must be located inside the rear tire envelope to prevent chambers from interfering with pull-type asphalt spreader rollers.

21. Trailer Controls: Shall be equipped with full trailer brake controls providing air brake and electrical hookup for straight truck with trailer applications. Shall include hand control valve and tractor protection valve. Air lines and 7-wire electric cable shall be routed to end of frame. Air lines to be equipped with glad hands and tethered removable covers. Electric cable shall be equipped with 7-wire receptacle.

22. Frame: Section modulus and yield strength of frame material shall provide a minimum RBM of 2,500,000. Shall have 20" minimum integral front frame extension.

23. Ground Clearance: Frame mounted components (fuel tanks and fuel tank brackets, steps, air tank, battery boxes, etc.) shall have a minimum of 13" ground clearance.

24. Cab: Conventional cab as regularly furnished by manufacturer, complete with insulation and all interior trim. Cab glass shall include windshield, roll-up windows in doors and rear cab glass as a minimum. Shall have key type lock on right and left doors, factory installed fresh air heater-defroster unit, grab handle on each side, right and left sun shades and fitted rubber floor mats.

    a. Cab Mounts: Air suspension type rear cab mounts.

    b. Instruments: Shall include the following as a minimum:

        (1) Speedometer/odometer

        (2) Electric tachometer

        (3) Ammeter or volt meter

        (4) Oil pressure gauge

        (5) Coolant temperature gauge

        (6) Transmission oil temperature gauge or warning light

        (7) Air brake pressure gauge

    c. Air Conditioning: Factory installed air conditioning. Shall include tinted glass all around.

    d. Tilt Steering Column: Factory installed.

e. Windshield Wipers: Dual electric intermittent windshield wipers with washers.

f. Plow Light Harness: Factory installed wiring harness with connector for installation of snowplow lights. Harness must provide circuits for high and low beam headlights, marker lights and turn signals with factory installed dash mounted switch.

g. Ground Speed Harness: Factory installed wiring harness to provide the body builder a connection for ground speed signal. Body builder connection point to be located inside the cab.

h. Auxiliary Switches: Shall be equipped with a minimum of six (6) rocker switches mounted in the instrument panel for use by bodybuilder or end user to supply power to work lights, warning lights and other auxiliary electrical devices.

i. Seats: Air suspension driver's seat and non-suspension passenger's seat. Shall include driver's and passenger's seat belts.

j. Radio: Factory installed electronic AM/FM/WB radio.

k. Heated Mirrors: Dual Heated West Coast Sr. type mirrors no less than 7" x 16" with adjustable brackets and auxiliary convex mirrors, 8" round or 6" x 6" rectangular.

l. Air Horn: Single or dual trumpet air horn.

25. Hood: Tilting fiberglass or composite hood and fenders with stationary grill and tilt assist mechanism.

26. Front Bumper: Delete

27. Lights: Shall be equipped with dual beam headlights, parking lights, clearance lights, automatic backup lights, directional turn signals with column mounted switch and hazard flasher switch. Rear signals to be wired for stop and tail lights in addition to directional signals.

28. Backup Alarm: Shall be equipped with an electric backup alarm meeting the requirements of SAE J994 with a minimum sound level output of 97 decibels.

29. Fuel Tank(s): Single or dual fuel tanks with instrument panel fuel gauge. Minimum fuel capacity of 100 gallons.

30. Color: Cab, hood, fenders and wheels shall be Sherwin Williams F8W2030 Frost White Acrylic Enamel, or equal. Grill, bumper and mirrors shall be as regularly furnished by manufacturer.

C. Dump Body:

1. General: Shall be Western Style crossmemberless and capable of accommodating a material spreader with a 13' hopper body and attached liquid storage tanks. The floor, sides and main long sill are to be full length with no cross-splices. All boxed areas of the dump body shall be sealed. Hinge pins shall be removable. All grease zerks shall be threaded. Drive-in zerks are not acceptable. All threaded holes for grease zerks shall be of sufficient depth to prevent the zerk from bottoming out when tightened. All welds shall be continuous. All welds, areas of slag deposits or torch cut areas shall be ground to produce a smooth surface. When welding, on the truck or chassis, areas that could be damaged by splatter or heat shall be protected.

   a. Capacity: Shall be 12 cubic yards struck measure.

   b. Inside Length: No more than 13 foot.

   c. Inside Width: No less than 86 inches.

   d. Outside Width: 95 inches – 100 inches.

   e. Side Height: No less than 42 inches.

   f. Tailgate Height: No more than 42 inches.

2. Material: The dump body main long sills and top rail shall be constructed using high strength steel tubing or approved equivalent.

   a. Main Long Sills: ¼ inch.

b. Floor: ¼ inch (AR-450).

c. Tailgate: ¼ inch (AR-450).

d. Sides: 3/16 inch (AR-450).

e. Front: 3/16 inch (AR-450).

f. Formed Top Rail: 3/16 inch.

3. Mounting:

a. Pivot Pin: Rear edge of pivot pin shall be no more than 1 inch forward from the rear face of the rear hitch plate.

b. Dump Body Pivot: Shall be 12 inches from the centerline of the pivot pin to the rear face of the dump body not including the tailgate. Pivots shall facilitate thorough greasing. Bushings shall have an internal radial groove aligned with the grease fitting. Pivot pins shall be drilled and cross-drilled.

c. The distance from the rear face of the rear hitch plate to the center line of the rear drive axle shall be no less than 21" or no more than 22". Rear drive axle tires shall not extend past the rear face of the rear hitch plate.

d. Dump Body: Shall be mounted a minimum of 3" from the hydraulic tank, excluding the sub frame of the tank and hoist.

e. Ground Strap: A 4-gauge battery cable ground strap shall be installed from the dump body to the truck frame. The strap shall be attached to the truck frame by no less than a 5/16" cadmium plated bolt with star washers on both sides of the strap eye to insure a good ground.

4. Body Props: A storable body prop shall be provided for each side of the dump body. Pivots for the body props shall be greasable and body props shall be designed to withstand the down-pressure of the hoist without damaging the dump body, chassis, or any related components. Body props shall be designed to hold the dump body at a minimum angle of 22-degrees when deployed.

5. Cab Protector: The three quarter (3/4) cab protector shall not interfere with the cab mounted vertical exhaust pipe. The cab protector shall be mounted, welded, and gusseted to prevent flexing or vibration. The side plates shall be constructed using high strength steel with a minimum thickness of 7-gauge. The outer front corners shall be angled at 45 degrees in order to provide mounting spaces for the installation of Whelen 5V3A or approved equivalent in each front corner. The lights shall be visible from both the front and the side of the cab protector.

6. Sides: Sides shall have a formed, debris shedding top rail. Sides shall have no provision for extension boards. Each side of the body shall have a walk rail of approximately 1/4" x 1-1/2" flat steel. Top of walk rail shall be approximately 12" from bottom of body.

7. Shovel Rack: A steel shovel rack shall be welded to the driver's side of the dump body. The holder shall be spring loaded and formed to clamp down on the shovel handle and hold it securely to the side of the dump body while the truck is traveling at road speed.

8. Tailgate: The tailgate shall be double acting, and vertically straight with offset hinges for positive closure. The latching mechanism for the tailgate control hooks shall be air operated. Tailgate shall have boxed upper, lower, side, and intermediate horizontal rib supports. Tailgate shall be equipped with chains and hooks (or keyhole eyes) for lowering to any position. Lift handles shall be welded on each side just above the bottom support rib. When tailgate is lowered parallel to body floor, the inside surface of the tailgate shall provide a smooth level joint between the tailgate and the body floor.

a. Removal: A hinged "D" ring shall be mounted top and center of the tailgate to provide a lifting hook for removal.

b. Anchor Points: Anchor points for the tailgate chains shall be made from 3/8 inch thick steel and be lapped on the outside of the dump body with a minimum of 1 inch overlap. Keyhole slot in anchor points shall be configured so that when installed, the link of the tailgate chain nested in the anchor is no more than 1 inch away from the rear face of the dump body at the farthest point.

c. Top Hinge Pins: The top hinge pins shall be minimum 1 inch diameter and pivot through a greasable bushing. One end shall be tapered approximately 30 degrees for ease of alignment. 30-degree taper shall be no less than 1/8 inch or no more than ¼ inch in length.

d. Lower Pins: The lower pins shall be a minimum of 1-1/8 inch diameter. Tailgate shall, without assistance from the locking device, seal against the floor and side sheets of the dump body, with no more than a 1/16 inch gap at any point. With the tailgate closed and the locking device open, tailgate lower pins shall have no less than 1/8 inch or more than ¼ inch gap between the forward edge of the pin and the forward edge of the cradle.

e. License Plate Bracket: A license plate bracket shall be welded on the left hand side of the tailgate, at approximately half the height of the tailgate.

f. Tailgate Latch:

(1) An over-center locking device on each side of the dump body shall hold the tailgate securely closed. Latching arms shall be forged steel.

(2) The locking device shall be operated by a 3 1/2" diameter air cylinder, which shall be mounted between the long sills. Air cylinder shall be controlled by the chassis air accessory power supply.

(3) Locking device shall be adjustable at each side of the dump body.

(4) The tailgate latch cross shaft assembly shall be supported on each end by bushings.

(5) Lubrication points on the tailgate latch cross shaft shall facilitate easier greasing by means of grooved bushings and/or shafts.

(6) Grease fittings at each end of the tailgate cross shaft shall be visible and accessible from the outside face of the dump body.

9. Ladder: Each side of the body shall have a built-in ladder between the top and bottom rail. Ladder shall consist of two formed handrails constructed of at least 3/16" steel. Ladder shall have two anti-skid metal steps welded between the hand rails. Aligned with each of these units shall be a pull out style two-rung ladder. Location of the ladders shall be such that operator does not have to climb over the tarp bow when the tarp is retracted. Ladders shall be a minimum of 14" wide.

10. Toolbox: A toolbox measuring approximately 18" x 18" x 24" shall be installed on the right hand outside frame rail.

11. Hoist:

a. Hoist shall be a forward set, trunnion mount, head lift, double-acting cylinder.

b. The hoist should be designed to accept a Model CS 120 MAILHOT cylinder or approved equivalent. The cylinder sleeves shall be nitride coated. Sub-frame or dog house mounted hoists will not be accepted.

c. A flared body bracket will be attached to either the hoist frame or body understructure to align body in position and keep from moving side to side.

12. Brake, Turn And Tail Lights: Lighting shall meet all Federal and State DOT specifications, which requires an independent running light on the rear corners.

a. All lights shall be LED and mounted in shockproof rubber grommets.

b. All lights shall be connected to a one piece wiring harness with molded connectors.

c. Each rear corner post shall have a Whelen series 400 weldment equipped with rectangular stop/turn taillight and backup light. Suitable make and model is Whelen 400 Series, or approved equivalent.

13. Raised Body Indicator: A sealed proximity switch shall be mounted near the hoist assembly to control a raised body indicator light and buzzer. The light and buzzer shall be powered by the chassis electric accessory power supply. A dash or console mounted indicator light shall be provided and be plainly visible to the seated operator. The indicator light shall be red and flash when the dump body is raised. The buzzer shall be of sufficient decibel level to be plainly audible by the driver while in transit.

14. Mud Flaps: Friction type mud flap brackets to be attached to the underside of the dump body at the rear. Brackets shall allow replacement of the mud flap by removing only one fastener. Mud flaps shall be 24" wide and long enough to satisfy FMVSS. Front mud flap brackets to be attached to underside of bed. Front mud flaps shall be 24' wide, anti-sail and long enough to keep rear tires from throwing debris on the back of the cab. All mud flaps shall have no dealer or manufacturer advertisements.

15. Hydraulic Couplers: The driver's side of the dump body shall have three (3) male couplers for the spreader. The female half of each hydraulic quick coupler set shall be provided.

16. Hydraulic Tubing: The driver's side rear corner post of the dump body shall have an access plate, forward facing, with male bulkhead fittings. Appropriately sized hydraulic tubing shall extend from the bulkhead fitting down the inside of the corner post and exit at a point which allows connection with the spreader hydraulic hoses from the valve body. Hydraulic tubing shall be routed in a manner as to not interfere or contact the tailgate latching mechanism.

17. Tarp: A fully automatic two (2) arm type tarp system shall be installed. It shall be an electric system operated from the cab. The arms and tarp protecting windshield shall be aluminum and form arches that provide maximum clearance and fit for loading material into body. The tarp shall be designed for hot asphalt. The width of the tarp shall be within 4" of the inside width of the dump body. The arm springs shall be adjustable and designed for side mounting on the dump body. The elbows of the tarp arms shall be bolted to the arms. The tarp arms shall have a 45 degree swept angle. The tarp shall be controlled by the chassis electric accessory power supply. Shall be Aero Series 575 or approved equivalent. Tarp system shall include a twin arm tarp tensioning device that attaches to the primary arms and pivots to the forward end of the dump body when the tarp is deployed to prevent sailing. Shall be Aero 0311-980042 or approved equivalent.

18. Paver Lip: A paver or asphalt lip shall be bolted on the rear of the dump body apron using no less than ten (10), ½ inch, grade eight bolts. Paver lip shall be mounted at an angle no less than 24 degrees but no more than 28 degrees. Paver lip length shall be such as to provide approximately 20" of overhang, measured from the rear face of the rear hitch plate to the rear edge of the paver lip.

19. Rear Hitch Plate And Pintle Hitch:

    a. A ¾" thick steel rear hitch plate shall be securely welded and gusseted to rear of frame rails.

    b. Plate shall have service and emergency trailer glad hands positioned away from the center of the rear hitch plate to prevent interference with a trailer tongue when making tight turns. Glad hands shall be mounted to a bulkhead fitting installed in the plate and have tethered removable covers.

    c. The seven (7) pin trailer connection furnished with the chassis shall be mounted through the rear hitch plate in a suitable location.

    d. A four (4) pin female electric connector shall be mounted through the rear hitch plate in a suitable location. Connector shall be a Hopkins Model 52004 or approved equivalent.

    e. Two (2) Buyers Products B50 or approved equivalent DOT "D" rings, with 20-ton capacity each shall be securely welded to the rear hitch plate.

    f. All items mounted on the rear hitch plate (except the pintle hitch) shall be mounted as high as practical, leaving a smooth, clear area when the pintle hitch is removed.

    g. A Buyers Products PH30 rigid pintle hitch or approved equivalent shall be installed on the rear hitch plate using grade eight (8) hardware. Hitch shall be adjustable in height. Settings shall be 24", 26 ¼", 28 ½", 30 ¾" centerline height above the ground plus or minus 1".

    h. A rear chipper bar shall be installed on the pintle plate flange. Unit must bolt on with a minimum of four (4) 5/8" grade eight (8) bolts per side. Unit shall be constructed of 3 ½" x 4" angle or 4" channel and 1 ¾" cold roll bar stock. Width of the bar shall be 17". Hitch height shall be 14" from the ground to the center of chipper bar. There shall be a minimum of 6" clearance between the top of the chipper bar and the bottom of the rear hitch plate.

20. LED Warning Light System: Truck shall be equipped with an LED warning light system. System shall emit light that is amber in color and shall provide 360 degrees of visibility in a horizontal plane around the truck. Lights shall be mounted in rubber grommets and independently programmable. Wiring harness for warning lights shall be without splices. Lights shall operate with the key switch in the on and off position while capable of automatically shutting off after 12 hours of operation with the key switch in the off position. Dash or console mounted LED indicator lights shall illuminate when the warning lights are operating. Lights shall operate by two (2) position bi-stable switch. The lighting system shall consist of the following as a minimum.

    a. Two (2) lights recessed into the front corners of the body's cab shield at a 45-degree angle. Lights shall be Peterson 60 Series or approved equivalent.

b. One (1) Whelen Series 400 light weldment shall be recessed into each of the dump body's rear corner posts. Weldments shall be equipped with Whelen Series part number *DOT-3404A, ADD 4 TIR3* warning lights. Weldments shall include Whelen LED backup lights and, stop/turn, tail lights. Tail light height shall not exceed 72".

21. Electrical And Illumination Installation:

a. All installed wiring must be of adequate size to handle the anticipated loads of all electrical components. All wiring must be uninterrupted and complete with no splices.

b. All wiring must be color coded.

c. All wire terminal ends (spade, ring, etc.) shall be crimped, soldered to the wires and heat shrank or weatherproof connectors. Scotch-Loc fasteners and/or crimp butt connectors are not acceptable for any connection.

d. All electrical connections shall be protected with dielectric silicone grease.

e. All wiring shall be enclosed in a protective wiring loom, conduit or wrapped harness.

f. The edges of all holes through which wiring must pass shall be protected with a grommet.

g. Low current circuits, such as the spreader light or relay activation circuits shall be controlled by the chassis electric accessory power supply.

h. High current circuits, such as the tarp motor circuit shall be powered directly from the battery and protected by a master resettable breaker or a fusible link.

i. Body Builder installed wiring going to the rear of the frame and dump body shall be grouped together and bound. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

j. All wiring to lamps shall be stress relieved within 6" of the lamp.

k. Wiring routed through the hydraulic enclosure sides shall be routed through a sealed compression type strain relief or a molded bulkhead fitting.

l. A four wire electric cable shall be routed from the cab auxiliary switches to the four pin electrical connector mounted on the rear hitch plate. The electric cable shall contain one ground wire and three switch controlled wires. One wire to control each of the following spreader functions: strobe light, work light and electric pump motor.

22. Air Powered Accessory Installation:

a. All lines shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All lines shall be routed or shielded to protect them from heat sources.

c. Air lines shall be colored, identifying individual circuits with each circuit being a different color.

d. Body Builder installed accessory air lines going to the rear of the frame and dump body shall be grouped together and bound with the Body Builder installed wiring going to the rear of the frame and dump body. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

e. All air powered accessories shall be controlled by the chassis air accessory power supply.

11. Auxiliary Snowplow Headlights: (If factory installed snowplow lights or a suitable factory installed bracket is available, it may be submitted for approval)

a. Front auxiliary halogen headlights shall be Truck-Lite model 645 or approved equivalent.

b. Auxiliary headlights shall not obstruct the driver's vision and be mounted approximately 64" from ground level and at approximately the same width apart as truck's headlamps.

c. Light shall be secured to a fender mounted 3-point assembly bracket. Bracket shall be made from stainless steel.

d. All fasteners attaching the bracket to the fender shall be stainless steel and be secured using locknuts.

e. Reinforced rubber washers or grommets shall insulate the bracket from the hood. Fasteners attaching the bracket to the hood shall be insulated from the hood by a 2" minimum diameter rubber washer or grommet and 2" minimum diameter plated washer.

f. Auxiliary headlights shall be grounded back to chassis' ground using a minimum 14-gauge wire.

12. Color: Dump Body, hitch plate and other associated metal components shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Painting shall be accomplished by industries best practices; aerosol paint is not acceptable in this application. Finish painting of the inside bottom of the body is not necessary.

E. Hydraulic System:

1. Hydraulic Tank:

a. The hydraulic tank shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. The tank shall be mounted to provide no less than 3" of clearance between the cab and tank.

c. Tank shall come complete with all mounting hardware including but not limited to, frame mounting angles, bolts with poly locknuts and springs.

d. Tank shall be a minimum 30-gallon capacity with full baffle to prevent sloshing.

e. Tank and baffle shall be constructed of 10-gauge stainless steel.

f. Tank shall have a screened filler neck with a breather cap.

g. A sight/temperature gauge shall be mounted on the outside of the tank, and be easily visible. Sight/temperature gauge housing shall be all aluminum.

h. Tank bottom shall have a 3" NPT port for suction.

i. Suction strainer shall be 2" NPT with a 3-5 psi built in bypass, and have a full flow ball valve installed at the tank suction fitting. A heavy plastic wire tie shall be installed to insure the ball valve remains in the open position unless it is intentionally closed.

j. Tank shall have ¾" NPT port with a magnetic plug for draining the tank.

k. Tank shall have a ¾" NPT port for the pump case drain.

l. Tank back shall have 3/8" NPT port for the solenoid drain.

m. Tank back shall have a ½" NPT port for the low oil sensor.

n. Tank top shall come with provision for a tank-mounted filter on the passenger side.

2. Hydraulic Return Filter Assembly: Assembly shall be mounted on the top of the hydraulic reservoir with a 10-micron replaceable cartridge element and a built in bypass and a bypass condition indicator. The bypass condition indicator shall be installed so its face can be seen from the driver's seat. The assembly shall have a minimum capability of 80 GPM and contain one (1) 1 ¼" NPT port. All return oil shall pass through a return filter.

3. Hydraulic Pump:

a. Pump shall be crankshaft driven.

b. The piston pump shall be load sensing type with a minimum capability of 48 GPM and 3000 PSI at 2500 RPM.

c. Pump shall have side ports in order to avoid multiple 90-degree bends in suction lines. Rear ports are not acceptable.

d. The case drain shall be positioned as high as possible and directed back to the reservoir without passing through the return line filter.

e. The pump shall have an option for an internal bleed down compensator, a 1 ¼" keyed shaft drilled and tapped, a 1" split flange pressure port and a 2" split flange suction port.

f. A normally closed 12VDC low oil shut down valve shall mount directly to the pump pressure port and be activated by the low oil level switch in the tank.

g. The pump must have a pressure gauge port integral to the rear cover of the pump.

h. Pump shall be Sauer-Danfoss Model JRL075, or approved equivalent.

4. Hydraulic Pump Drive:

a. The driveline shall be 1280/1310 series solid shaft type and be installed according to manufacturer's instructions to assure proper alignment.

b. Pump shall be driven off the engine crankshaft.

c. Pump shaft shall have a companion flange that unbolts from the driveshaft for easy belt replacement and come complete with all crosses, pump end yoke and flange for engine.

d. All hardware used for installation of pump driveshaft shall meet or exceed driveline manufacturer's specification. Manufacturer's torque specifications shall be adhered to on all driveshaft installation hardware.

5. Hydraulic Function Control Valves:

a. The valve shall be load sensing type with a mobile stackable design.

b. The valve shall be all cast iron design and all sections must be of the same valve series.

c. The valve shall be capable of a nominal 35 GPM with published flow curves to 40 GPM.

d. The valve shall be pressure and flow compensated.

e. Inlet and outlet ports shall be ¾" O-ring, all working ports shall be minimum 5/8" O-ring.

f. The valve shall be equipped with a 0 -3000 psi gauge installed in inlet.

g. Valve shall be arranged as follows:

(1) Inlet cap with top ported pressure and tank, load sensing ports.

(2) Double acting cylinder spool for hoist 0-32 GPM proportional 12VDC operated, with spring return to neutral. Section shall have manual handle overrides with stroke limiters and 500 PSI down side load sense relief.

(3) Single acting cylinder spool for plow lift, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-15 GPM main spool. Section shall have manual handle overrides and stroke limiters. Plow float shall be incorporated and controlled by console.

(4) Double acting cylinder spool for plow left/right, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(5) Single acting 0-15 GPM spool for auger, proportional 12VDC spring to center with manual override.

(6) Single acting 0-7 GPM spool for spinner, proportional 12VDC spring to center with manual override.

(7) Single acting 0-7 GPM spool for pre-wet, proportional 12VDC spring to center with manual override.

(8) Spreader and pre-wet sections shall be part of a manifold assembly that has a pressure reducing valve and solenoid drain and has the ability to have a cartridge added for ice control applications.

6. Hydraulic Function Control Valve Enclosure:

a. The hydraulic function control valve enclosure shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. Hydraulic valve shall be mounted in a weather tight enclosure.

c. Hydraulic valve enclosure shall consist of three (3) pieces, the enclosure body, valve mounting plate and the lid.

d. Enclosure body and valve plate shall be constructed of 3/16" stainless steel minimum.

e. The lid shall be constructed of 10-gauge stainless steel with a minimum 1" lip all around to help seal.

f. The sides of the body shall have formed mounting angles as an integral part.

g. Valve plate shall go to the inside of the enclosure for ease of mounting.

h. There shall be a formed Buna gasket to seal the valve plate to the enclosure.

i. The top and front of the enclosure shall be open with the lid off.

j. The valve shall be bulkhead fitting mounted to valve plate and ports will exit through the front of the enclosure.

k. Outside lip of enclosure shall have a gasket all the way around for weatherproofing when lid is installed.

l. Lid shall be held on with four (4) spring tension latches on each side.

m. Lid shall have two (2) lifting handles.

n. Shall have multiport electric board to connect to each valve coil that must be plug-and-play with an IP68 rating. Having to install connectors will not be acceptable.

o. If sufficient room exist between the cab and dump body the hydraulic valve enclosure shall be mounted parallel to the frame. If there is not enough room for parallel mounting of the enclosure, it may be mounted at a 90-degree angle to the frame and should be centered between the cab and dump body.

7. Snowplow Cushion Valve:

a. A double relief cushion valve shall be installed for front snowplow angle and scraper left/right.

b. The valve shall be set at 2000 PSI and have #8 SAE O-ring ports.

c. The valve shall be constructed of a high-tensile cast iron body with ball and spring type relief with hardened seats.

d. The valve shall be installed at the front bumper/snowplow hitch.

e. Valve shall consist of O-ring thread ports.

8. Hydraulic Hoses:

a. Suction hose from the reservoir to the pump shall be SAE 100R4 type of adequate size for the displacement of the pump. Hose shall be connected to the pump and reservoir ball valve with a king nipple, and double clamped with T-bolt type stainless steel super clamps.

b. All hoses, with the exception of the suction hose, shall be rated for a minimum working pressure of 3000 PSI.

c. All hoses, with the exception of the suction hose, shall have swivel ends or swivel adapters.

d. Hoses connecting to valve assembly shall have 90 degree female JIC swivel ends.

e. Pressure hose shall be 1" ID and rated at a minimum 2000 PSI with female JIC swivels at both ends.

f. Return hose shall be 1 ¼" SAE 100R4 type with female JIC swivels at both ends.

g. Hoist hoses shall be 1" ID with female JIC swivels at both ends.

h. Snowplow hoses shall be 3/8" ID with female JIC swivels at both ends.

i. Auger hose to the left rear corner of the dump body shall be ¾" ID with female JIC swivels at both ends. The auger circuit shall have a capped "tee" installed at the valve enclosure, enabling later installation of another hose routed to the front of the truck.

j. Spinner hose to the left rear corner of the dump body shall be ½" ID with female JIC swivels at both ends.

k. Spreader return hose to the left rear corner of the dump body shall be 1" ID with female JIC swivels at both ends. The spreader return circuit shall have a capped "tee" installed at the return filter assembly, enabling later installation of another hose routed to the front of the truck.

l. Pump case drain shall be ¾" ID minimum with female JIC swivels at both ends, and also have a ¾" NPT ball valve installed at the reservoir.

m. Load sense line shall be 3/8" ID with female JIC swivels at both ends.

9. Hydraulic Quick Disconnect Couplings: (See Dump Body section for detailed layout and mounting of couplers) for each hydraulic quick disconnect installed on the truck, whether male or female, the mating end of the coupling shall be provided.

a. All hydraulic couplers shall be full flow Aeroquip FD45, Parker 60 Series or approved equivalent. A dust cap or plug shall be furnished with every male and female quick coupler.

b. The front snowplow lift circuit shall be equipped with a male 3/8" coupler installed in the front bumper. A 34" x 3/8" ID hose with a female 3/8" coupler shall be installed on the hydraulic lift cylinder.

c. The snowplow cushion valve shall be equipped with a male 3/8" coupler and a 34" x 3/8" ID hose with a female 3/8" coupler.

d. The spinner circuit shall have a ½" male coupler at the left rear corner of the dump body.

e. The auger circuit shall have a ¾" male coupler at the left rear corner of the dump body.

f. The spreader return circuit shall have a 1" male coupler at the left rear corner of the dump body.

10. Hydraulic Pre-Wet System:

a. Liquid pumping system shall come complete with all plumbing, pumps, enclosure and mounting hardware.

b. The spray system shall be completely controlled by a Freedom 2.1 or approved equivalent ground speed spreader control system.

c. System shall run off a section in valve stack.

d. Liquid pump shall be a corrosion resistant bronze design.

e. Pump shall be self priming, pulse free, positive displacement design.

f. Unit shall come with a precision machined stainless steel shaft.

g. Pump shall have oil-less carbon graphite bushings oversized for increased durability and longevity.

h. Pump shall have flush port for pre-fill or flush of mechanical seal chamber.

i. Pump shall come with a long wearing, drip-less mechanical shaft seal.

j. Pump shall also come with bronze gears for good durability.

k. Pump shall come with a built in 45 PSI relief valve to protect against excessive pressurization.

l. Pump shall have a continuous duty rating of 125 PSI.

m. Pump shall be plumbed through a 0-15 GPM flow meter which is constructed of non-corrosive material.

n. Pump shall be capable of 9 GPM at 45 PSI.

o. Hydraulic connections shall be bulkhead type, mounted in bottom of enclosure.

p. All hydraulics inside enclosure shall be hard plumbed.

q. Pumps shall be mounted in a Nema 4x style weather tight enclosure.

r. All plumbing shall be included for a four (4) nozzle system with check valves.

11. "TPE" Wiring Specification:

a. Wiring and harness system shall meet ISO rating IP68 and NEMA 6.

b. The connectors shall be zinc die cast E-coated. (Similar to a MIL spec. connector)

c. Each shall have three (3) sealing points, the lock ring itself, a raised portion of the molded plastic around each pin and a viton O-ring that seals the whole connector.

d. The cable jacket shall be TPE thermoplastic elastomer and molded to the connectors.

e. Connectors and harness shall be rated and tested for a temperature range from -30C degrees to +70C degrees.

f. Connectors shall be tested to be water tight when submerged in 6' of water for 24 hours, in 275' of water for 1 hour and when subjected to a 1000 PSI pressure wash.

g. The connectors shall be designed to have no corrosion after 500 hours in a 35C degree salt spray.

h. Cabling shall be rated excellent in low temperature flexibility and in its resistance to oxidation, heat, oil, weather, sun, ozone, abrasion, electrical priorities, flame, water, acid, alkali, gasoline, benzol, toluol, degreaser solvents and weld slag.

i. All cabling for the hydraulic and pre-wet systems shall be this type.

12. Spreader Control:

a. Control shall have three (3) PWM output channels.

b. One (1) channel shall be ground speed oriented conveyor/spreader, one (1) channel for spinner and one (1) channel for a liquid function.

c. Liquid function shall be programmable for either a pre-wet or ice control function.

d. Control shall have a simple operator interface of 3 buttons, two knobs and an interactive touch screen.

e. Knobs shall be rotary encoders with no maximum or minimum limit position.

f. Programming of unit shall not require the use of an ancillary device.

g. Touch screen shall be used for calibration of unit.

h. There shall be a minimum 2.0 USB port on the unit for downloading data and upgrading software or capabilities of the system.

i. To prevent glare at night, there shall be a "night mode" for the touch screen.

j. The front panel shall be backlit for night viewing.

k. The unit shall be supplied with a minimum of 8MB of RAM and 4MB of memory.

l. There shall be a field replaceable fuse which is easily accessible to protect the system.

m. Help screens for trouble shooting and calibration shall be embedded in the on board software.

n. The system shall support remote blast and remote pause functions.

o. Control shall be open loop with no feedback sensor.

p. PWM circuits shall be current regulated to reduce hysteresis.

q. There shall be an input to sense a stall of the spreader.

r. A float input circuit shall be provided to automatically turn off liquid system at low level.

s. Storm totals shall be available either on screen or via USB download.

t. Spreader control shall be mounted in a factory made control console that also controls the functions for body and plow.

13. Console Design: (Certified Power SG07010*** or approved equivalent)

a. Shall be totally modular control arm design for a variety of joystick controls, spreader controls and switch configurations.

b. Unit shall be provided with two (2) fully proportional joysticks for hoist and plow control.

c. Shall have a single axis control with dead man switch for hoist.

d. Shall have a dual axis "+" design for snowplow up/down, and left/right control.

e. Armrest style console shall be fully adjustable to accommodate automatic or manual transmissions and mount like it is part of the driver's seat.

f. Unit shall be fully adjustable left and right.

g. Auxiliary switches shall be the "Touch Guard" type.

h. Switches shall control items similar to the following:

Strobe lights
Work lights
Low oil indicator
Body up indicator
Change filter indicator
Plow float indicator

i. Switches shall be capable of being backlit in two colors. One color when the system is powered on and an alternative color when activated.

j. Switches shall be programmable for either maintained or momentary without changing the switch itself.

k. Switches shall be capable of sensing a ground fault with the circuit running.

l. Unit shall come with full schematic documentation.

m. All indicators shall be on the in cab display and show up in English stating the function. Indicator lights will not be accepted.

14. Hydraulic Installation:

a. All hoses shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All hoses shall be routed or shielded to protect them from heat sources.

c. Teflon tape shall not be used in the hydraulic system.

d. Hydraulic hoses shall not be secured to any factory installed chassis wiring, cables, hoses or lines.

e. Hydraulic hoses shall not be secured in the same bundle with any electrical wiring.

f. Hydraulic hoses shall be bundled together and routed by themselves.

g. Hoses shall be adequately supported and securely fastened to withstand snow and icing conditions.

h. Hydraulic hoses running to the rear of the truck shall be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

i. Each hose going to the dump body shall have a 90-degree bulkhead mounted JIC elbow installed at the rear of the truck frame near the dump body hinge. These elbows shall split each hose going to the dump body into two (2) hoses allowing for easier routing and replacement.

j. Hydraulic ports shall be O-ring type unless otherwise specified.

F. Front Mount Snowplow: 433-mm009

1. General: Snowplow with power reversing moldboard, for use on a truck equipped with central hydraulics. The snowplow provided shall be designed and approved by the manufacturer for installation on a truck which has a front gross axle weight rating of 18,000 pounds.

2. Reversing Frame & Front Push Tube: Shall be constructed using a minimum 5" x 5" x 0.38" or 6" x 4" x 0.38 structural steel tubing properly reinforced to withstand severe snow plowing conditions. Front push tube shall be a minimum of 116" in length. Front push tube shall have a minimum of ten welded ears to attach the moldboard assembly. Ears shall be made of minimum 5/8" thick steel. All joints shall be continuously welded and reinforced.

3. A-Frame: Shall be engineered and constructed to be an integral component of the push frame. Shall contain two (2) double acting heavy duty power reversing hydraulic cylinders with a minimum 4" diameter bore. Cylinders shall be equipped with a minimum 2" diameter rod. Cylinder rod shall be nitride coated. The reversing cylinders shall maintain the angle of the moldboard once the desired plowing angle is reached. The unit shall be equipped with a hydraulic cushion valve to protect hydraulic cylinders in the event of an impact with a fixed object. Cylinders shall be equipped with hydraulic lines of sufficient length to connect to supply lines on the front bumper of the truck. The mounting plate that attaches the snowplow push frame to the truck hitch shall be equipped with mounting flanges made of 1" metal. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins.

4. Moldboard: Curved moldboard no less than ten (10) feet in length. Shall be constructed of no less than 3/16" steel with a minimum of eight (8) vertical ribs. Moldboard shall be equipped with full length horizontal ribs according to manufacturer's standard for plow size and type. Moldboard height shall be no less than 36" but shall not exceed 42". Shall be extended curve design to prevent snow from coming over the top of moldboard at high speed. Shall have multi-position adjustment for lay-back to achieve optimal plowing angle. When set at the optimal plowing angel the top of the moldboard curve shall extend forward of the cutting edge by no less than twelve (12) inches. Shall have mailbox ends equipped with sight markers at least 36" in height. Shall have cutting angle adjustment of no less than 35º left and right of center. Shall be equipped with two (2) compression type spring safety trips capable of at least three (3) attack angle settings ranging from 10 to 30 degrees. Shall include stops attached to the moldboard assembly which contact the reversing frame front push tube before the trip springs becomes fully compressed. The moldboard assembly shall be capable of tripping at least 15 degrees past vertical before contacting the stops, at any attack angle. Shall have a minimum of five (5) hinge points. There shall be a minimum of 116" between the outer most hinge points with a minimum of three more hinge points spaced between.

5. Snow Shield: The moldboard shall be equipped with a full length rubber snow shield mounted on the top forward edge. Shall be made of a minimum of two ply rubber matting no less than 1/4" thick. Snow shield shall be affixed to the moldboard using a minimum 0.25" x 2" metal strip and an adequate number of bolts to secure it in position.

6. Cutting Edge: Cutting edge shall be a minimum 3/4" x 6" high carbon steel with holes AASHTO spaced. Cutting edge shall be equipped with a minimum of two (2) wear blocks behind the cutting edge. Each wear block shall have a minimum of 26 square inches of wear surface. Wear blocks shall be made of a material with a minimum Brinell hardness of 181-240.

7. Level Lifting Device: Snowplow shall be equipped with a level lifting device that keeps the moldboard level when lifted or when being reversed. Device shall be complete with all chains, hooks, clevises and hardware necessary for proper operation.

8. Jack: The snowplow shall be equipped with a screw type adjustable jack to assist in the instillation and removal of the unit from the truck hitch.

9. Truck Hitch: Low profile, front frame mounted universal plow hitch with fold down and adjustable lift arm. Shall be capable of self-storing lift cylinder. The lift cylinder shall be a minimum 4" diameter bore and of sufficient length to properly lift snowplow. Hitch shall be capable of carrying plows from 10' to 14' in length. The lift arm mounting frame shall be constructed using a minimum of ½" x 3" angle welded to a 10" structural channel which forms the lift frame. Cheek plates shall be ½" x 12" tapered. Rocker angles and plates shall be utilized above and below the truck frame to keep the hitch from loosening and moving forward. The cheek plates and rocker plates will be welded to the truck hitch by the upfitter. Lift arm bracket and lower drop bar retaining/connecting lugs shall be fabricated from ¾" thick plate. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins. (Hitches using braces running from the lift frame to the front axle of the vehicle are not acceptable).

10. Bumper: Two (2) bumper wings (right side and left side) shall be provided as an integral portion of the plow hitch. Each bumper wing shall be constructed using 10" HD structural channel. The wings shall be approximately the same height as the truck manufacturer's standard front bumper and shall be swept back to conform to the vehicle front hood and fenders. The bumper wings sections shall be bolted to the vehicle through the hitch cheek plate and the truck frame.

11. Weight: Snowplow assembly shall weigh a minimum of 2,000 pounds.

12. Color: Front Bumper, Snowplow Hitch and Lift Assembly shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Manufacturer's standard color is acceptable on the reversing frame, A-frame and moldboard.

G. Chemical Spreader: 356-mm093-7.5 SS SP TS

1. General: This specification is intended to cover a 7.5 cubic yard minimum struck capacity hydraulic driven chemical and material spreader for use in ARDOT dump trucks. The spreader shall also be equipped with a liquid calcium chloride spray system designed to operate in conjunction with the hydraulically driven chemical pump mounted on the truck.

2. Type: Shall be designed for mounting in dump body with spinner at the rear and below floor of dump body. The spreader shall be a self-contained unit with hopper type body, conveyor system, hydraulic drive, spinner and all necessary components integrally mounted as single unit. Shall have the capacity to spread material to a maximum width of no less than 24'.

3. Hopper Body: Hopper shall have a minimum struck capacity of 7.5 cubic yards. Shall be electrically welded construction, adequately reinforced, with no less than 10 gauge 304 stainless steel sides and ends. Sides to slope approximately 45 degrees to allow material to feed into conveyor by gravity. Bottom shall be constructed of no less than 7 gauge 304 stainless steel. Front of hopper shall be sloped to allow spreader to be mounted in a dump body which has the hydraulic cylinder hoist housing in the front of the body. (Refer to Paragraph 11 for hydraulic cylinder hoist housing dimensions.) All hopper hardware shall be stainless steel. In addition, any long sills, crossmembers or side supports used in the design of the spreader shall be constructed of 304 stainless steel.

4. Top Screen: A top screen to keep oversize material from entering hopper shall be provided with the spreader.

5. Conveyor: Shall have a minimum overall width of 24" and be designed to handle sand, cinders and de-icing chemicals discharging material to spinner at rear of spreader. Shall be equipped with spring loaded idler adjusters to maintain proper conveyor tension.

6. Drive: Conveyor and spinner shall be driven by hydraulic motors. Drive to conveyor and spinner assembly to be as regularly furnished by manufacturer. Shall be designed to operate on an open center hydraulic system with a minimum output of 15 gpm at 1,500 psi. (Hydraulic pump will be furnished by ARDOT.)

7. Spinner Assembly: Spreader shall be equipped with a "Urethane Spinner" consisting of a one-piece polyurethane disc with a minimum of four (4) molded fins. Spinner disc shall have a minimum diameter of 18" and have a vertical adjustment of no less than 12". Spinner shaft shall be mounted on anti-friction bearings with grease fittings or direct to hydraulic motor. The spinner chute shall be constructed of no less than 10 gauge 304 stainless steel. Unit shall have a minimum of three (3) adjustable 304 stainless steel material deflectors to help regulate spreading pattern. Spinner assembly shall be designed so that it may be hinged up for storage or to discharge material that may be left in the spreader.

8. Feed Gate: Material discharge to spinner chute to be controlled by an adjustable 304 stainless steel discharge gate with positive locking device.

9. Mounting: Spreader shall be designed for mounting in a dump body which is devoid of hydraulic cylinder hoist housing in the front of the body. Body has an inside length of 13', an inside width of 86" and is mounted on a tandem axle truck with 118" cab to axle measurement. Hold down equipment for dump body mounting shall be furnished. Spreader shall be equipped with lifting bails.

10. Front Bearing Grease Extensions: Shall have front bearing grease extension tubes to allow greasing of front bearings. The grease tubes shall either extend to the rear of the spreader or approximately 40" above the dump body floor and be flexible enough so greasing will not interfere with normal bearing adjustment. The tubes shall be attached to the sides of the spreader with straps made of nylon or a similar material.

11. Liquid Spray System Components: The spray system components provided shall work in conjunction with a pre-existing hydraulically driven chemical pump and control system on the truck. The system shall include a hose kit with a minimum of two (2) spray nozzles and reservoirs. The kit shall also include all necessary hoses and fittings to connect the spray system to the truck mounted pumping system located at the rear of the trucks dump body on the driver's side. Spray system shall be capable of continuous spraying of calcium and magnesium chloride, glycol, liquid urea, or other liquid de-icing solutions directly onto the material as it leaves the conveyor and before it reaches the spinner. All parts that come in contact with liquid de-icing solutions shall be corrosion resistant. All components shall be rated at no less than 150 psi working pressure.

    a. Sprayer Reservoirs: A minimum of two (2) reservoirs with a capacity of no less than 100 gallons each shall be provided. Reservoirs shall be molded polyethylene construction and be complete with replaceable screen line strainer, shut-off valves and mounting hardware. The reservoirs shall be angle formed to allow for mounting to the sides of the chemical and material spreader specified above. (Sides of spreader are to have an approximate 45° slope). The reservoirs shall be designed so that one (1) reservoir is mounted on each side of the spreader with all fill openings, shut-off valves, etc.

readily accessible. Reservoirs shall be plumbed together with a minimum 1-1/2" ID hose with a tee located on the left rear corner of the spreader.

b. Nozzles: There shall be a minimum of two (2) spray nozzles equipped with necessary cores, discs and mounting hardware.

12. Color: 304 stainless steel components to be unpainted. Non-stainless steel parts to be painted black or aluminum.

H. Delivery Requirements: Unit shall be delivered with snowplow and chemical spreader specified above completely installed and ready for operation. Pins, couplers, hydraulic hoses or any other items required for proper installation and operation of the snowplow and chemical spreader shall be furnished. Chemical spreader shall be secured to the dump body in accordance to manufacturer's recommendations.

I. Warranty:

1. Cab and chassis shall have truck manufacturer's regular warranty and service as regularly furnished on new vehicles sold to the public. Warranty data shall be furnished with each unit.

2. The dump body, hydraulic system, and all other incidental equipment furnished under this specification shall be warranted against defective material and workmanship for a minimum period of (12) months (365 days) from date unit is placed in operation by ARDOT.

   a. Warranty should include all parts, labor and transportation costs to the location of equipment.

   b. If equipment cannot be repaired on location, warranty shall include cost of transport to the facility where the repair work will be done.

3. Warranty repairs are to be performed by any authorized dealership of the manufacturer; however, the Successful Bidder will be ultimately responsible for coordinating repairs and insuring that warranty repairs are completed in a timely manner.

4. If any warranty literature submitted with the bid conflicts with ARDOT warranty requirements, the conflict(s) shall be specifically noted, corrected and included with the bid or the conflict(s) will be considered an exception to warranty specifications and the bid rejected.

5. Recent prior failure to provide warranty-work, parts, replacement parts or service, in a timely manner, for equipment from the same manufacturer or dealer shall be grounds for the rejection of any submitted bid, or for the denial of any otherwise qualified low bidder, whether such failure is attributable to the manufacturer or the dealer of the equipment. For the purposes of this paragraph "timely manner" means a period of time not exceeding thirty (30) calendar days to provide requested warranty-work, parts, replacement parts, or service. For the purposes of this paragraph "manufacturer" means the original manufacturer of the equipment and its successor or successors, regardless of number, and whether acquired by sale, merger, or otherwise. For the purposes of this paragraph "replacement part" means a part redesigned by a manufacturer to correct a design or engineering defect and which replacement part is capable of providing dependable performance in normal operation conditions for its normal service life without failure. Such bid or bids may be rejected by the Department until such failure or failures have been remedied to the satisfaction of the Department and until such manufacturer or dealer is providing such warranty-work, parts, replacement parts, and service in a timely manner.

**ARKANSAS DEPARTMENT OF TRANSPORTATION**

**SPECIFICATION 20-69-038**

**FOR**

**TANDEM AXLE CAB AND CHASSIS**
**58,000 POUNDS GVWR**
**WESTERN STYLE 13' DUMP BODY**
**WITH**
**EATON ULTRASHIFT TRANSMISSION**
**CENTRAL HYDRAULICS**
**10' SNOWPLOW AND CHEMICAL SPREADER**

## 1. General Specifications:

A. Current Model: Units furnished under this specification shall be the latest improved model in current production, as offered to commercial trade, built for the U.S. market, and shall be of quality workmanship and material. Units manufactured for foreign markets will not be accepted. All equipment offered under this specification shall be new. Used, reconditioned, shopworn, demonstrator, prototype or discontinued models are not acceptable. Manufacturers of the units supplied must have been in the business of producing operational units for at least two years and must have recently sold similar units to domestic governmental agencies. The model furnished must have been in production for a minimum of one year, or be the latest version of a previous model. Bidder(s) will be required to submit documentation substantiating the aforementioned requirements. A list of user references may also be required.

B. Literature: Manufacturers literature, verifying adherence of proposed unit to each line item addressed in this specification, shall be submitted with the bid. If any literature and/or specifications of items conflict with ARDOT specifications, the conflict(s) shall be specifically noted, corrected and submitted with the bid.

C. Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that equipment offered is in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet. However, no implication is made by the Arkansas Department of Transportation that deviations will be acceptable.

D. Manuals: The successful bidder shall furnish one (1) Operator's Instruction Manual with each unit delivered and one (1) copy each of Shop Repair Manual and Parts Book to each FOB point.

The successful bidder may provide Shop Repair Manuals and Parts Manuals on computer media (CD, DVD, USB Drive, etc.) in lieu of printed manuals.

E. All parts, accessories and tools necessary for satisfactory operation of unit shall be furnished whether or not they are specifically mentioned in this specification (including standard equipment as regularly furnished by manufacturer as shown on printed literature and specifications - unless specifically excluded by this specification).

F. Parts Inventory & Service Facilities: The successful bidder shall maintain a representative inventory of replacement parts and service facilities for servicing equipment bid on.

G. Demonstration: The Arkansas Department of Transportation reserves the right to require a demonstration, under actual working conditions, of equipment bid under this specification before award is made. The demonstration would be performed (free of any charge) by the bidder or an authorized representative at a mutually acceptable location. If requested, the bidder should be prepared to demonstrate the equipment within thirty (30) days after notification. Failure of the bidder to perform a satisfactory demonstration within the specified time may be grounds for rejection of the bid.

H. Drawings: Professional quality drawings which depict the layout of the chassis will be provided with the bid**.**

I. Inspection: The ARDOT reserves the right to inspect bodies during manufacture, or prior to their installation, for compliance with specifications and to inspect hydraulics installation during work in progress. Location of hoists on truck chassis shall be approved by ARDOT prior to installation. All workmanship shall be first class (no welding on truck frame to install dump body hoist). Any unit delivered under this specification is subject to rejection if there is evidence of poor workmanship by either the vendor or the original manufacturer.

J. Due to the nature of work performed by ARDOT, body-hoist combinations furnished under this specification may be subject to use under adverse conditions such as dumping on road shoulders at a slight angle and spot dumping of loads. The design

and strength characteristics of the entire dump unit shall be such that the unit structural members and the hoisting system shall suffer no deformation, damage or structural failure resulting from raising a full payload under these conditions.

K. Delivery Requirements: It will be the responsibility of the Successful Bidder to guarantee delivery of the cab & chassis as specified, including items or equipment installed by a third party contractor, within the quoted time.

L. Cooperative Purchasing: Other tax-supported entities* in Arkansas (cities, counties, state agencies, school districts, etc.) may purchase from this Contract on an individual basis under the same specifications and conditions, and at the pricing set forth by each vendor, all at the discretion of each vendor in each case. Prices could be reduced by a vendor for minor alterations in conditions (changing order quantities, deleting options, etc.) as agreed by both parties, but could not be raised above the contract bid price except for any additional freight charges. Vendors would not be required to sell to any such entity under this contract, and those entities would not be obligated to purchase from the contract.

Each entity wishing to purchase from the contract must make contact directly with the appropriate vendor(s). The Highway Department shall remain "out of the loop" for such transactions: all contact, orders, invoices, payments, etc. regarding such transactions must take place exclusively between the tax-supported entity and the vendor. The Department shall be held harmless of any and all liability arising from such transactions.

* Tax-supported entities are defined as those receiving more than half of total funding from appropriated tax funds.

## 2. Unit Specifications:

A. General: This specification is designed to provide the Arkansas Department of Transportation with tandem axle trucks for maintenance operations. The truck's uses will consist of material hauling, trailer towing, and operation of hydraulically controlled 13' material spreader and front mount snowplow.

B. Cab and Chassis:

1. GVWR: 58,000 pounds, minimum.

2. Cab to Axle: Nominal effective CA of 118" with vertical exhaust stack.

3. Intended Use: Twelve (12) cubic yard dump body.

4. Front Tires And Wheels: Two (2) 315/80R22.5 steel belted tubeless radials - load range "L" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 9" rim section. All tires must have speed restriction that exceeds 65 MPH.

5. Rear Tires And Wheels: Nine (9) 11R22.5 steel belted tubeless radials - load range "H" minimum. Shall be mounted on 22.5" diameter tubeless type, hub piloted steel disc with 220 mm center hole, 285.75 mm ten (10) hole bolt circle diameter and not less than 8.25" rim section. All tires must have speed restriction that exceeds 65 MPH.

6. Engine: Liquid cooled 4 cycle diesel with a minimum piston displacement of 11.8 liters. Shall have an advertised rating of no less than 350 SAE gross horsepower and a minimum of 1,350 lb. ft. SAE gross torque. Governed speed shall be no less than 2,000 RPM. Shall have full flow oil filter(s), fuel filters, dry type air cleaner, 12-volt electrical equipment with no less than 160-amp alternator and maintenance free batteries as regularly furnished with engine specified. Engine shall be equipped with a block heater rated at no less than 1,000 watts which will operate on 120 volts AC.

7. Emissions: The engine emission control system shall be programed to allow regeneration to occur even if the truck is being used in an urban or low speed highway applications.

8. Engine Brake: Jacobs engine brake, or equal. Designed to use engine compression to retard engine speed. Shall be capable of utilizing all engine cylinders for braking effect.

9. Front Power Take-Off: Engine to be equipped with provision for front PTO drive. Shall include the necessary crankshaft adapter for attaching a shaft type drive and any other items required for this provision. If the PTO driveshaft passes through the radiator, charge air cooler, and/or air conditioning condenser it shall be shielded by a steel encasement of sufficient strength to prevent damage to surrounding components in the event of driveshaft failure.

10. Cooling System: As recommended and regularly furnished by the manufacturer for use with the engine size and PTO provision specified above with anti-freeze protection to -20° F, or lower.

11. Exhaust System: Vertical exhaust stack with curved outlet. Exhaust stack to be equipped with a heat shield. If the DPF is part of the exhaust stack, the clearance to the dump body must be pre-approved.

12. Engine Shutdown: Engine safety shutdown system with manual or automatic override to include the following features: low oil pressure - warning bell/buzzer plus shutdown, high coolant temperature - warning bell/buzzer plus shutdown and low coolant level - warning bell/buzzer plus light or shutdown.

13. Throttle Control: Engine shall be equipped with an in-cab throttle control for use with PTO. Shall be electronic control type.

14. Transmission: Eaton Fuller Ultra-Shift FO-16E308LL-VCS.

15. Clutch: Heavy-duty type with torque capacity for engine furnished.

16. Steering: Hydraulic actuated power steering as regularly offered by manufacturer.

17. Front Axle: I Beam Type with wet seals, outboard mounted drums and a minimum capacity of 18,000 pounds.

18. Front Springs: As required to meet axle capacity specified above.

19. Rear Axle and Suspension: Tandem with power divider, inter-axle differential lock out control and Hendrickson RT or RTE equalizing beam type suspension. Shall be full floating with wet seals, outboard mounted drums and have a minimum capacity of 40,000 pounds. Ratio provided shall achieve a maximum theoretical electronic governed speed of no less than 69 MPH and still provide acceptable startability and gradeability under loaded conditions for on/off highway applications.

20. Air System: Air compressor shall have a minimum capacity of 15 cfm and draw air through the engine air cleaner. Air system shall be equipped with a heated air dryer.

21. Brakes: Factory installed full air operated two shoe type with automatic slack adjusters and dust shields on front and rear. Rear brakes shall have spring set parking brakes. Brake chambers on the drive axles must be located inside the rear tire envelope to prevent chambers from interfering with pull-type asphalt spreader rollers.

22. Trailer Controls: Shall be equipped with full trailer brake controls providing air brake and electrical hookup for straight truck with trailer applications. Shall include hand control valve and tractor protection valve. Air lines and 7-wire electric cable shall be routed to end of frame. Air lines to be equipped with glad hands and tethered removable covers. Electric cable shall be equipped with 7-wire receptacle.

23. Frame: Section modulus and yield strength of frame material shall provide a minimum RBM of 2,500,000. Shall have 20” minimum integral front frame extension.

24. Ground Clearance: Frame mounted components (fuel tanks and fuel tank brackets, steps, air tank, battery boxes, etc.) shall have a minimum of 13” ground clearance.

25. Cab: Conventional cab as regularly furnished by manufacturer, complete with insulation and all interior trim. Cab glass shall include windshield, roll-up windows in doors and rear cab glass as a minimum. Shall have key type lock on right and left doors, factory installed fresh air heater-defroster unit, grab handle on each side, right and left sun shades and fitted rubber floor mats.

    a. Cab Mounts: Air suspension type rear cab mounts.

    b. Instruments: Shall include the following as a minimum:

        (1) Speedometer/odometer

        (2) Electric tachometer

        (3) Ammeter or volt meter

        (4) Oil pressure gauge

        (5) Coolant temperature gauge

        (6) Air brake pressure gauge

    c. Air Conditioning: Factory installed air conditioning. Shall include tinted glass all around.

    d. Tilt Steering Column: Factory installed.

e. Windshield Wipers: Dual electric intermittent windshield wipers with washers.

f. Plow Light Harness: Factory installed wiring harness with connector for installation of snowplow lights. Harness must provide circuits for high and low beam headlights, marker lights and turn signals with factory installed dash mounted switch.

g. Ground Speed Harness: Factory installed wiring harness to provide the body builder a connection for ground speed signal. Body builder connection point to be located inside the cab.

h. Auxiliary Switches: Shall be equipped with a minimum of six (6) rocker switches mounted in the instrument panel for use by bodybuilder or end user to supply power to work lights, warning lights and other auxiliary electrical devices.

i. Seats: Air suspension driver's seat and non-suspension passenger's seat. Shall include driver's and passenger's seat belts.

j. Radio: Factory installed electronic AM/FM/WB radio.

k. Heated Mirrors: Dual Heated West Coast Sr. type mirrors no less than 7" x 16" with adjustable brackets and auxiliary convex mirrors, 8" round or 6" x 6" rectangular.

l. Air Horn: Single or dual trumpet air horn.

26. Hood: Tilting fiberglass or composite hood and fenders with stationary grill and tilt assist mechanism.

27. Front Bumper: Delete.

28. Lights: Shall be equipped with dual beam headlights, parking lights, clearance lights, automatic backup lights, directional turn signals with column mounted switch and hazard flasher switch. Rear signals to be wired for stop and tail lights in addition to directional signals.

29. Backup Alarm: Shall be equipped with an electric backup alarm meeting the requirements of SAE J994 with a minimum sound level output of 97 decibels.

30. Fuel Tank(s): Single or dual fuel tanks with instrument panel fuel gauge. Minimum fuel capacity of 100 gallons.

31. Color: Cab, hood, fenders and wheels shall be Sherwin Williams F8W2030 Frost White Acrylic Enamel, or equal. Grill, bumper and mirrors shall be as regularly furnished by manufacturer.

C. Dump Body:

1. General: Shall be Western Style crossmemberless and capable of accommodating a material spreader with a 13' hopper body and attached liquid storage tanks. The floor, sides and main long sill are to be full length with no cross-splices. All boxed areas of the dump body shall be sealed. Hinge pins shall be removable. All grease zerks shall be threaded. Drive-in zerks are not acceptable. All threaded holes for grease zerks shall be of sufficient depth to prevent the zerk from bottoming out when tightened. All welds shall be continuous. All welds, areas of slag deposits or torch cut areas shall be ground to produce a smooth surface. When welding, on the truck or chassis, areas that could be damaged by splatter or heat shall be protected.

   a. Capacity: Shall be 12 cubic yards struck measure.

   b. Inside Length: No more than 13 foot.

   c. Inside Width: No less than 86 inches.

   d. Outside Width: 95 inches – 100 inches.

   e. Side Height: No less than 42 inches.

   f. Tailgate Height: No more than 42 inches.

2. Material: The dump body main long sills and top rail shall be constructed using high strength steel tubing or approved equivalent.

   a. Main Long Sills: ¼ inch.

b. Floor: ¼ inch (AR-450).

c. Tailgate: ¼ inch (AR-450).

d. Sides: 3/16 inch (AR-450).

e. Front: 3/16 inch (AR-450).

f. Formed Top Rail: 3/16 inch.

3. Mounting:

a. Pivot Pin: Rear edge of pivot pin shall be no more than 1 inch forward from the rear face of the rear hitch plate.

b. Dump Body Pivot: Shall be 12 inches from the centerline of the pivot pin to the rear face of the dump body not including the tailgate. Pivots shall facilitate thorough greasing. Bushings shall have an internal radial groove aligned with the grease fitting. Pivot pins shall be drilled and cross-drilled.

c. The distance from the rear face of the rear hitch plate to the center line of the rear drive axle shall be no less than 21" or no more than 22". Rear drive axle tires shall not extend past the rear face of the rear hitch plate.

d. Dump Body: Shall be mounted a minimum of 3" from the hydraulic tank, excluding the sub frame of the tank and hoist.

e. Ground Strap: A 4-gauge battery cable ground strap shall be installed from the dump body to the truck frame. The strap shall be attached to the truck frame by no less than a 5/16" cadmium plated bolt with star washers on both sides of the strap eye to insure a good ground.

4. Body Props: A storable body prop shall be provided for each side of the dump body. Pivots for the body props shall be greasable and body props shall be designed to withstand the down-pressure of the hoist without damaging the dump body, chassis, or any related components. Body props shall be designed to hold the dump body at a minimum angle of 22 degrees when deployed.

5. Cab Protector: The three quarter (3/4) cab protector shall not interfere with the cab mounted vertical exhaust pipe. The cab protector shall be mounted, welded, and gusseted to prevent flexing or vibration. The side plates shall be constructed using high strength steel with a minimum thickness of 7-gauge. The outer front corners shall be angled at 45 degrees in order to provide mounting spaces for the installation of Whelen 5V3A Series or approved equivalent in each front corner. The lights shall be visible from both the front and the side of the cab protector.

6. Sides: Sides shall have a formed, debris shedding top rail. Sides shall have no provision for extension boards. Each side of the body shall have a walk rail of approximately 1/4" x 1-1/2" flat steel. Top of walk rail shall be approximately 12" from bottom of body.

7. Shovel Rack: A steel shovel rack shall be welded to the driver's side of the dump body. The holder shall be spring loaded and formed to clamp down on the shovel handle and hold it securely to the side of the dump body while the truck is traveling at road speed.

8. Tailgate: The tailgate shall be double acting, and vertically straight with offset hinges for positive closure. The latching mechanism for the tailgate control hooks shall be air operated. Tailgate shall have boxed upper, lower, side, and intermediate horizontal rib supports. Tailgate shall be equipped with chains and hooks (or keyhole eyes) for lowering to any position. Lift handles shall be welded on each side just above the bottom support rib. When tailgate is lowered parallel to body floor, the inside surface of the tailgate shall provide a smooth level joint between the tailgate and the body floor.

a. Removal: A hinged "D" ring shall be mounted top and center of the tailgate to provide a lifting hook for removal.

b. Anchor Points: Anchor points for the tailgate chains shall be made from 3/8 inch thick steel and be lapped on the outside of the dump body with a minimum of 1-inch overlap. Keyhole slot in anchor points shall be configured so that when installed, the link of the tailgate chain nested in the anchor is no more than 1 inch away from the rear face of the dump body at the farthest point.

c. Top Hinge Pins: The top hinge pins shall be minimum 1-inch diameter and pivot through a greasable bushing. One end shall be tapered approximately 30 degrees for ease of alignment. 30 degree taper shall be no less than 1/8 inch or no more than ¼ inch in length.

d. Lower Pins: The lower pins shall be a minimum of 1-1/8 inch diameter. Tailgate shall, without assistance from the locking device, seal against the floor and side sheets of the dump body, with no more than a 1/16 inch gap at any point. With the tailgate closed and the locking device open, tailgate lower pins shall have no less than 1/8 inch or more than ¼ inch gap between the forward edge of the pin and the forward edge of the cradle.

e. License Plate Bracket: A license plate bracket shall be welded on the left hand side of the tailgate, at approximately half the height of the tailgate.

f. Tailgate Latch:

(1) An over-center locking device on each side of the dump body shall hold the tailgate securely closed. Latching arms shall be forged steel.

(2) The locking device shall be operated by a 3 1/2" diameter air cylinder, which shall be mounted between the long sills. Air cylinder shall be controlled by the chassis air accessory power supply.

(3) Locking device shall be adjustable at each side of the dump body.

(4) The tailgate latch cross shaft assembly shall be supported on each end by bushings.

(5) Lubrication points on the tailgate latch cross shaft shall facilitate easier greasing by means of grooved bushings and/or shafts.

(6) Grease fittings at each end of the tailgate cross shaft shall be visible and accessible from the outside face of the dump body.

9. Ladder: Each side of the body shall have a built-in ladder between the top and bottom rail. Ladder shall consist of two formed handrails constructed of at least 3/16" steel. Ladder shall have two anti-skid metal steps welded between the hand rails. Aligned with each of these units shall be a pull out style two-rung ladder. Location of the ladders shall be such that operator does not have to climb over the tarp bow when the tarp is retracted. Ladders shall be a minimum of 14" wide.

10. Toolbox: A toolbox measuring approximately 18" x 18" x 24" shall be installed on the right hand outside frame rail.

11. Hoist:

a. Hoist shall be a forward set, trunnion mount, head lift, double-acting cylinder.

b. The hoist should be designed to accept a Model CS 120 MAILHOT cylinder or approved equivalent. The cylinder sleeves shall be nitride coated. Sub-frame or dog house mounted hoists will not be accepted.

c. A flared body bracket will be attached to either the hoist frame or body understructure to align body in position and keep from moving side to side.

12. Brake, Turn And Tail Lights: Lighting shall meet all Federal and State DOT specifications, which requires an independent running light on the rear corners.

a. All lights shall be LED and mounted in shockproof rubber grommets.

b. All lights shall be connected to a one piece wiring harness with molded connectors.

c. Each rear corner post shall have a Whelen series 400 weldment equipped with rectangular stop/turn taillight and backup light. Suitable make and model is Whelen 400 Series, or approved equivalent.

13. Raised Body Indicator: A sealed proximity switch shall be mounted near the hoist assembly to control a raised body indicator light and buzzer. The light and buzzer shall be powered by the chassis electric accessory power supply. A dash or console mounted indicator light shall be provided and be plainly visible to the seated operator. The indicator light shall be red and flash when the dump body is raised. The buzzer shall be of sufficient decibel level to be plainly audible by the driver while in transit.

14. Mud Flaps: Friction type mud flap brackets to be attached to the underside of the dump body at the rear. Brackets shall allow replacement of the mud flap by removing only one fastener. Mud flaps shall be 24" wide and long enough to satisfy FMVSS. Front mud flap brackets to be attached to underside of bed. Front mud flaps shall be 24' wide, anti-sail and long enough to keep rear tires from throwing debris on the back of the cab. All mud flaps shall have no dealer or manufacturer advertisements.

15. Hydraulic Couplers: The driver's side of the dump body shall have three (3) male couplers for the spreader. The female half of each hydraulic quick coupler set shall be provided.

16. Hydraulic Tubing: The driver's side rear corner post of the dump body shall have an access plate, forward facing, with male bulkhead fittings. Appropriately sized hydraulic tubing shall extend from the bulkhead fitting down the inside of the corner post and exit at a point which allows connection with the spreader hydraulic hoses from the valve body. Hydraulic tubing shall be routed in a manner as to not interfere or contact the tailgate latching mechanism.

17. Tarp: A fully automatic two (2) arm type tarp system shall be installed. It shall be an electric system operated from the cab. The arms and tarp protecting windshield shall be aluminum and form arches that provide maximum clearance and fit for loading material into body. The tarp shall be designed for hot asphalt. The width of the tarp shall be within 4" of the inside width of the dump body. The arm springs shall be adjustable and designed for side mounting on the dump body. The elbows of the tarp arms shall be bolted to the arms. The tarp arms shall have a 45 degree swept angle. The tarp shall be controlled by the chassis electric accessory power supply. Shall be Aero Series 575 or approved equivalent. Tarp system shall include a twin arm tarp tensioning device that attaches to the primary arms and pivots to the forward end of the dump body when the tarp is deployed to prevent sailing. Shall be Aero 0311-980042 or approved equivalent.

18. Paver Lip: A paver or asphalt lip shall be bolted on the rear of the dump body apron using no less than ten (10), ½ inch, grade eight bolts. Paver lip shall be mounted at an angle no less than 24 degrees but no more than 28 degrees. Paver lip length shall be such as to provide approximately 20" of overhang, measured from the rear face of the rear hitch plate to the rear edge of the paver lip.

19. Rear Hitch Plate And Pintle Hitch:

    a. A ¾" thick steel rear hitch plate shall be securely welded and gusseted to rear of frame rails.

    b. Plate shall have service and emergency trailer glad hands positioned away from the center of the rear hitch plate to prevent interference with a trailer tongue when making tight turns. Glad hands shall be mounted to a bulkhead fitting installed in the plate and have tethered removable covers.

    c. The seven (7) pin trailer connection furnished with the chassis shall be mounted through the rear hitch plate in a suitable location.

    d. A four (4) pin female electric connector shall be mounted through the rear hitch plate in a suitable location. Connector shall be a Hopkins Model 52004 or approved equivalent.

    e. Two (2) Buyers Products B50 or approved equivalent DOT "D" rings, with 20-ton capacity each shall be securely welded to the rear hitch plate.

    f. All items mounted on the rear hitch plate (except the pintle hitch) shall be mounted as high as practical, leaving a smooth, clear area when the pintle hitch is removed.

    g. A Buyers Products PH30 rigid pintle hitch or approved equivalent shall be installed on the rear hitch plate using grade eight (8) hardware. Hitch shall be adjustable in height. Settings shall be 24", 26 ¼", 28 ½", 30 ¾" centerline height above the ground plus or minus 1".

    h. A rear chipper bar shall be installed on the pintle plate flange. Unit must bolt on with a minimum of four (4) 5/8" grade eight (8) bolts per side. Unit shall be constructed of 3 ½" x 4" angle or 4" channel and 1 ¾" cold roll bar stock. Width of the bar shall be 17". Hitch height shall be 14" from the ground to the center of chipper bar. There shall be a minimum of 6" clearance between the top of the chipper bar and the bottom of the rear hitch plate.

20. LED Warning Light System: Truck shall be equipped with an LED warning light system. System shall emit light that is amber in color and shall provide 360 degrees of visibility in a horizontal plane around the truck. Lights shall be mounted in rubber grommets and independently programmable. Wiring harness for warning lights shall be without splices. Lights shall operate with the key switch in the on and off position while capable of automatically shutting off after 12 hours of operation with the key switch in the off position. Dash or console mounted LED indicator lights shall illuminate when the warning lights are operating. Lights shall operate by two (2) position bi-stable switch. The lighting system shall consist of the following as a minimum.

    a. Two (2) lights recessed into the front corners of the body's cab shield at a 45-degree angle. Lights shall be Whelen 5V3A, 5 Grommet Series.

b. One (1) Whelen Series 400 light weldment shall be recessed into each of the dump body's rear corner posts. Weldments shall be equipped with Whelen Series part number *DOT-3404A, ADD 4 TIR3* warning lights. Weldments shall include Whelen LED backup lights and, stop/turn, tail lights. Tail light height shall not exceed 72".

21. Electrical And Illumination Installation:

a. All installed wiring must be of adequate size to handle the anticipated loads of all electrical components. All wiring must be uninterrupted and complete with no splices.

b. All wiring must be color coded.

c. All wire terminal ends (spade, ring, etc.) shall be crimped, soldered to the wires and heat shrank or weatherproof connectors. Scotch-Loc fasteners and/or crimp butt connectors are not acceptable for any connection.

d. All electrical connections shall be protected with dielectric silicone grease.

e. All wiring shall be enclosed in a protective wiring loom, conduit or wrapped harness.

f. The edges of all holes through which wiring must pass shall be protected with a grommet.

g. Low current circuits, such as the spreader light or relay activation circuits shall be controlled by the chassis electric accessory power supply.

h. High current circuits, such as the tarp motor circuit shall be powered directly from the battery and protected by a master resettable breaker or a fusible link.

i. Body Builder installed wiring going to the rear of the frame and dump body shall be grouped together and bound. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

j. All wiring to lamps shall be stress relieved within 6" of the lamp.

k. Wiring routed through the hydraulic enclosure sides shall be routed through a sealed compression type strain relief or a molded bulkhead fitting.

l. A four wire electric cable shall be routed from the cab auxiliary switches to the four pin electrical connector mounted on the rear hitch plate. The electric cable shall contain one ground wire and three switch controlled wires. One wire to control each of the following spreader functions: strobe light, work light and electric pump motor.

22. Air Powered Accessory Installation:

a. All lines shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All lines shall be routed or shielded to protect them from heat sources.

c. Air lines shall be colored, identifying individual circuits with each circuit being a different color.

d. Body Builder installed accessory air lines going to the rear of the frame and dump body shall be grouped together and bound with the Body Builder installed wiring going to the rear of the frame and dump body. This bound harness shall then be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

e. All air powered accessories shall be controlled by the chassis air accessory power supply.

11. Auxiliary Snowplow Headlights: (If factory installed snowplow lights or a suitable factory installed bracket is available, it may be submitted for approval)

a. Front auxiliary halogen headlights shall be Truck-Lite model 645 or approved equivalent.

b. Auxiliary headlights shall not obstruct the driver's vision and be mounted approximately 64" from ground level and at approximately the same width apart as truck's headlamps.

c. Light shall be secured to a fender mounted 3-point assembly bracket. Bracket shall be made from stainless steel.

d. All fasteners attaching the bracket to the fender shall be stainless steel and be secured using locknuts.

e. Reinforced rubber washers or grommets shall insulate the bracket from the hood. Fasteners attaching the bracket to the hood shall be insulated from the hood by a 2" minimum diameter rubber washer or grommet and 2" minimum diameter plated washer.

f. Auxiliary headlights shall be grounded back to chassis' ground using a minimum 14-gauge wire.

12. Color: Dump Body, hitch plate and other associated metal components shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Painting shall be accomplished by industries best practices; aerosol paint is not acceptable in this application. Finish painting of the inside bottom of the body is not necessary.

E. Hydraulic System:

1. Hydraulic Tank:

a. The hydraulic tank shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. The tank shall be mounted to provide no less than 3" of clearance between the cab and tank.

c. Tank shall come complete with all mounting hardware including but not limited to, frame mounting angles, bolts with poly locknuts and springs.

d. Tank shall be a minimum 30-gallon capacity with full baffle to prevent sloshing.

e. Tank and baffle shall be constructed of 10-gauge stainless steel.

f. Tank shall have a screened filler neck with a breather cap.

g. A sight/temperature gauge shall be mounted on the outside of the tank, and be easily visible. Sight/temperature gauge housing shall be all aluminum.

h. Tank bottom shall have a 3" NPT port for suction.

i. Suction strainer shall be 2" NPT with a 3-5 psi built in bypass, and have a full flow ball valve installed at the tank suction fitting. A heavy plastic wire tie shall be installed to insure the ball valve remains in the open position unless it is intentionally closed.

j. Tank shall have ¾" NPT port with a magnetic plug for draining the tank.

k. Tank shall have a ¾" NPT port for the pump case drain.

l. Tank back shall have 3/8" NPT port for the solenoid drain.

m. Tank back shall have a ½" NPT port for the low oil sensor.

n. Tank top shall come with provision for a tank-mounted filter on the passenger side.

2. Hydraulic Return Filter Assembly: Assembly shall be mounted on the top of the hydraulic reservoir with a 10-micron replaceable cartridge element and a built in bypass and a bypass condition indicator. The bypass condition indicator shall be installed so its face can be seen from the driver's seat. The assembly shall have a minimum capability of 80 GPM and contain one (1) 1 ¼" NPT port. All return oil shall pass through a return filter.

3. Hydraulic Pump:

a. Pump shall be crankshaft driven.

b. The piston pump shall be load sensing type with a minimum capability of 48 GPM and 3000 PSI at 2500 RPM.

c. Pump shall have side ports in order to avoid multiple 90-degree bends in suction lines. Rear ports are not acceptable.

d. The case drain shall be positioned as high as possible and directed back to the reservoir without passing through the return line filter.

e. The pump shall have an option for an internal bleed down compensator, a 1 ¼" keyed shaft drilled and tapped, a 1" split flange pressure port and a 2" split flange suction port.

f. A normally closed 12VDC low oil shut down valve shall mount directly to the pump pressure port and be activated by the low oil level switch in the tank.

g. The pump must have a pressure gauge port integral to the rear cover of the pump.

h. Pump shall be Sauer-Danfoss Model JRL075, or approved equivalent.

4. Hydraulic Pump Drive:

a. The driveline shall be 1280/1310 series solid shaft type and be installed according to manufacturer's instructions to assure proper alignment.

b. Pump shall be driven off the engine crankshaft.

c. Pump shaft shall have a companion flange that unbolts from the driveshaft for easy belt replacement and come complete with all crosses, pump end yoke and flange for engine.

d. All hardware used for installation of pump driveshaft shall meet or exceed driveline manufacturer's specification. Manufacturer's torque specifications shall be adhered to on all driveshaft installation hardware.

5. Hydraulic Function Control Valves:

a. The valve shall be load sensing type with a mobile stackable design.

b. The valve shall be all cast iron design and all sections must be of the same valve series.

c. The valve shall be capable of a nominal 35 GPM with published flow curves to 40 GPM.

d. The valve shall be pressure and flow compensated.

e. Inlet and outlet ports shall be ¾" O-ring, all working ports shall be minimum 5/8" O-ring.

f. The valve shall be equipped with a 0 -3000 psi gauge installed in inlet.

g. Valve shall be arranged as follows:

(1) Inlet cap with top ported pressure and tank, load sensing ports.

(2) Double acting cylinder spool for hoist 0-32 GPM proportional 12VDC operated, with spring return to neutral. Section shall have manual handle overrides with stroke limiters and 500 PSI down side load sense relief.

(3) Single acting cylinder spool for plow lift, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-15 GPM main spool. Section shall have manual handle overrides and stroke limiters. Plow float shall be incorporated and controlled by console.

(4) Double acting cylinder spool for plow left/right, proportional 12VDC operated with spring return to neutral. Pressure compensated 0-17 GPM main spool. Section shall have manual handle overrides and stroke limiters.

(5) Single acting 0-15 GPM spool for auger, proportional 12VDC spring to center with manual override.

(6) Single acting 0-7 GPM spool for spinner, proportional 12VDC spring to center with manual override.

(7) Single acting 0-7 GPM spool for pre-wet, proportional 12VDC spring to center with manual override.

(8) Spreader and pre-wet sections shall be part of a manifold assembly that has a pressure reducing valve and solenoid drain and has the ability to have a cartridge added for ice control applications.

6. Hydraulic Function Control Valve Enclosure:

a. The hydraulic function control valve enclosure shall be of the upright design and mounted on top of the frame rails positioned between the cab and the dump body.

b. Hydraulic valve shall be mounted in a weather tight enclosure.

c. Hydraulic valve enclosure shall consist of three (3) pieces, the enclosure body, valve mounting plate and the lid.

d. Enclosure body and valve plate shall be constructed of 3/16" stainless steel minimum.

e. The lid shall be constructed of 10-gauge stainless steel with a minimum 1" lip all around to help seal.

f. The sides of the body shall have formed mounting angles as an integral part.

g. Valve plate shall go to the inside of the enclosure for ease of mounting.

h. There shall be a formed Buna gasket to seal the valve plate to the enclosure.

i. The top and front of the enclosure shall be open with the lid off.

j. The valve shall be bulkhead fitting mounted to valve plate and ports will exit through the front of the enclosure.

k. Outside lip of enclosure shall have a gasket all the way around for weatherproofing when lid is installed.

l. Lid shall be held on with four (4) spring tension latches on each side.

m. Lid shall have two (2) lifting handles.

n. Shall have multiport electric board to connect to each valve coil that must be plug-and-play with an IP68 rating. Having to install connectors will not be acceptable.

o. If sufficient room exist between the cab and dump body the hydraulic valve enclosure shall be mounted parallel to the frame. If there is not enough room for parallel mounting of the enclosure, it may be mounted at a 90-degree angle to the frame and should be centered between the cab and dump body.

7. Snowplow Cushion Valve:

a. A double relief cushion valve shall be installed for front snowplow angle and scraper left/right.

b. The valve shall be set at 2000 PSI and have #8 SAE O-ring ports.

c. The valve shall be constructed of a high-tensile cast iron body with ball and spring type relief with hardened seats.

d. The valve shall be installed at the front bumper/snowplow hitch.

e. Valve shall consist of O-ring thread ports.

8. Hydraulic Hoses:

a. Suction hose from the reservoir to the pump shall be SAE 100R4 type of adequate size for the displacement of the pump. Hose shall be connected to the pump and reservoir ball valve with a king nipple, and double clamped with T-bolt type stainless steel super clamps.

b. All hoses, with the exception of the suction hose, shall be rated for a minimum working pressure of 3000 PSI.

c. All hoses, with the exception of the suction hose, shall have swivel ends or swivel adapters.

d. Hoses connecting to valve assembly shall have 90-degree female JIC swivel ends.

e. Pressure hose shall be 1" ID and rated at a minimum 2000 PSI with female JIC swivels at both ends.

f. Return hose shall be 1 ¼" SAE 100R4 type with female JIC swivels at both ends.

g. Hoist hoses shall be 1" ID with female JIC swivels at both ends.

h. Snowplow hoses shall be 3/8" ID with female JIC swivels at both ends.

i. Auger hose to the left rear corner of the dump body shall be ¾" ID with female JIC swivels at both ends. The auger circuit shall have a capped "tee" installed at the valve enclosure, enabling later installation of another hose routed to the front of the truck.

j. Spinner hose to the left rear corner of the dump body shall be ½" ID with female JIC swivels at both ends.

k. Spreader return hose to the left rear corner of the dump body shall be 1" ID with female JIC swivels at both ends. The spreader return circuit shall have a capped "tee" installed at the return filter assembly, enabling later installation of another hose routed to the front of the truck.

l. Pump case drain shall be ¾" ID minimum with female JIC swivels at both ends, and also have a ¾" NPT ball valve installed at the reservoir.

m. Load sense line shall be 3/8" ID with female JIC swivels at both ends.

9. Hydraulic Quick Disconnect Couplings: (See Dump Body section for detailed layout and mounting of couplers) for each hydraulic quick disconnect installed on the truck, whether male or female, the mating end of the coupling shall be provided...

a. All hydraulic couplers shall be full flow Aeroquip FD45, Parker 60 Series or approved equivalent. A dust cap or plug shall be furnished with every male and female quick coupler.

b. The front snowplow lift circuit shall be equipped with a male 3/8" coupler installed in the front bumper. A 34" x 3/8" ID hose with a female 3/8" coupler shall be installed on the hydraulic lift cylinder.

c. The snowplow cushion valve shall be equipped with a male 3/8" coupler and a 34" x 3/8" ID hose with a female 3/8" coupler.

d. The spinner circuit shall have a ½" male coupler at the left rear corner of the dump body.

e. The auger circuit shall have a ¾" male coupler at the left rear corner of the dump body.

f. The spreader return circuit shall have a 1" male coupler at the left rear corner of the dump body.

10. Hydraulic Pre-Wet System:

a. Liquid pumping system shall come complete with all plumbing, pumps, enclosure and mounting hardware.

b. The spray system shall be completely controlled by a Freedom 2.1 or approved equivalent ground speed spreader control system.

c. System shall run off a section in valve stack.

d. Liquid pump shall be a corrosion resistant bronze design.

e. Pump shall be self priming, pulse free, positive displacement design.

f. Unit shall come with a precision machined stainless steel shaft.

g. Pump shall have oil-less carbon graphite bushings oversized for increased durability and longevity.

h. Pump shall have flush port for pre-fill or flush of mechanical seal chamber.

i. Pump shall come with a long wearing, drip-less mechanical shaft seal.

j. Pump shall also come with bronze gears for good durability.

k. Pump shall come with a built in 45 PSI relief valve to protect against excessive pressurization.

l. Pump shall have a continuous duty rating of 125 PSI.

m. Pump shall be plumbed through a 0-15 GPM flow meter which is constructed of non-corrosive material.

n. Pump shall be capable of 9 GPM at 45 PSI.

o. Hydraulic connections shall be bulkhead type, mounted in bottom of enclosure.

p. All hydraulics inside enclosure shall be hard plumbed.

q. Pumps shall be mounted in a Nema 4x style weather tight enclosure.

r. All plumbing shall be included for a four (4) nozzle system with check valves.

11. "TPE" Wiring Specification:

a. Wiring and harness system shall meet ISO rating IP68 and NEMA 6.

b. The connectors shall be zinc die cast E-coated. (Similar to a MIL spec. connector)

c. Each shall have three (3) sealing points, the lock ring itself, a raised portion of the molded plastic around each pin and a viton O-ring that seals the whole connector.

d. The cable jacket shall be TPE thermoplastic elastomer and molded to the connectors.

e. Connectors and harness shall be rated and tested for a temperature range from -30C degrees to +70C degrees.

f. Connectors shall be tested to be water tight when submerged in 6' of water for 24 hours, in 275' of water for 1 hour and when subjected to a 1000 PSI pressure wash.

g. The connectors shall be designed to have no corrosion after 500 hours in a 35C degree salt spray.

h. Cabling shall be rated excellent in low temperature flexibility and in its resistance to oxidation, heat, oil, weather, sun, ozone, abrasion, electrical priorities, flame, water, acid, alkali, gasoline, benzol, toluol, degreaser solvents and weld slag.

i. All cabling for the hydraulic and pre-wet systems shall be this type.

12. Spreader Control:

a. Control shall have three (3) PWM output channels.

b. One (1) channel shall be ground speed oriented conveyor/spreader, one (1) channel for spinner and one (1) channel for a liquid function.

c. Liquid function shall be programmable for either a pre-wet or ice control function.

d. Control shall have a simple operator interface of 3 buttons, two knobs and an interactive touch screen.

e. Knobs shall be rotary encoders with no maximum or minimum limit position.

f. Programming of unit shall not require the use of an ancillary device.

g. Touch screen shall be used for calibration of unit.

h. There shall be a minimum 2.0 USB port on the unit for downloading data and upgrading software or capabilities of the system.

i. To prevent glare at night, there shall be a "night mode" for the touch screen.

j. The front panel shall be backlit for night viewing.

k. The unit shall be supplied with a minimum of 8MB of RAM and 4MB of memory.

l. There shall be a field replaceable fuse which is easily accessible to protect the system.

m. Help screens for trouble shooting and calibration shall be embedded in the on board software.

n. The system shall support remote blast and remote pause functions.

o. Control shall be open loop with no feedback sensor.

p. PWM circuits shall be current regulated to reduce hysteresis.

q. There shall be an input to sense a stall of the spreader.

r. A float input circuit shall be provided to automatically turn off liquid system at low level.

s. Storm totals shall be available either on screen or via USB download.

t. Spreader control shall be mounted in a factory made control console that also controls the functions for body and plow.

13. Console Design: (Certified Power SG07010*** or approved equivalent)

a. Shall be totally modular control arm design for a variety of joystick controls, spreader controls and switch configurations.

b. Unit shall be provided with two (2) fully proportional joysticks for hoist and plow control.

c. Shall have a single axis control with dead man switch for hoist.

d. Shall have a dual axis "+" design for snowplow up/down, and left/right control.

e. Armrest style console shall be fully adjustable to accommodate automatic or manual transmissions and mount like it is part of the driver's seat.

f. Unit shall be fully adjustable left and right.

g. Auxiliary switches shall be the "Touch Guard" type.

h. Switches shall control items similar to the following:

Strobe lights
Work lights
Low oil indicator
Body up indicator
Change filter indicator
Plow float indicator

i. Switches shall be capable of being backlit in two colors. One color when the system is powered on and an alternative color when activated.

j. Switches shall be programmable for either maintained or momentary without changing the switch itself.

k. Switches shall be capable of sensing a ground fault with the circuit running.

l. Unit shall come with full schematic documentation.

m. All indicators shall be on the in cab display and show up in English stating the function. Indicator lights will not be accepted.

14. Hydraulic Installation:

a. All hoses shall be routed in a manner to minimize rub points and bends. Critical rub points shall be wrapped for protection.

b. All hoses shall be routed or shielded to protect them from heat sources.

c. Teflon tape shall not be used in the hydraulic system.

d. Hydraulic hoses shall not be secured to any factory installed chassis wiring, cables, hoses or lines.

e. Hydraulic hoses shall not be secured in the same bundle with any electrical wiring.

f. Hydraulic hoses shall be bundled together and routed by themselves.

g. Hoses shall be adequately supported and securely fastened to withstand snow and icing conditions.

h. Hydraulic hoses running to the rear of the truck shall be secured to a painted metal strap, approximately 1 ¼" x ¼" in size. This strap shall be secured to the top of the frame cross members away from the side rails.

i. Each hose going to the dump body shall have a 90-degree bulkhead mounted JIC elbow installed at the rear of the truck frame near the dump body hinge. These elbows shall split each hose going to the dump body into two (2) hoses allowing for easier routing and replacement.

j. Hydraulic ports shall be O-ring type unless otherwise specified.

D. Front Mount Snowplow: 433-mm009

1. General: Snowplow with power reversing moldboard, for use on a truck equipped with central hydraulics. The snowplow provided shall be designed and approved by the manufacturer for installation on a truck which has a front gross axle weight rating of 18,000 pounds.

2. Reversing Frame & Front Push Tube: Shall be constructed using a minimum 5" x 5" x 0.38" or 6" x 4" x 0.38 structural steel tubing properly reinforced to withstand severe snow plowing conditions. Front push tube shall be a minimum of 116" in length. Front push tube shall have a minimum of ten welded ears to attach the moldboard assembly. Ears shall be made of minimum 5/8" thick steel. All joints shall be continuously welded and reinforced.

3. A-Frame: Shall be engineered and constructed to be an integral component of the push frame. Shall contain two (2) double acting heavy duty power reversing hydraulic cylinders with a minimum 4" diameter bore. Cylinders shall be equipped with a minimum 2" diameter rod. Cylinder rod shall be nitride coated. The reversing cylinders shall maintain the angle of the moldboard once the desired plowing angle is reached. The unit shall be equipped with a hydraulic cushion valve to protect hydraulic cylinders in the event of an impact with a fixed object. Cylinders shall be equipped with hydraulic lines of sufficient length to connect to supply lines on the front bumper of the truck. The mounting plate that attaches the snowplow push frame to the truck hitch shall be equipped with mounting flanges made of 1" metal. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins.

4. Moldboard: Curved moldboard no less than ten (10) feet in length. Shall be constructed of no less than 3/16" steel with a minimum of eight (8) vertical ribs. Moldboard shall be equipped with full length horizontal ribs according to manufacturer's standard for plow size and type. Moldboard height shall be no less than 36" but shall not exceed 42". Shall be extended curve design to prevent snow from coming over the top of moldboard at high speed. Shall have multi-position adjustment for lay-back to achieve optimal plowing angle. When set at the optimal plowing angel the top of the moldboard curve shall extend forward of the cutting edge by no less than twelve (12) inches. Shall have mailbox ends equipped with sight markers at least 36" in height. Shall have cutting angle adjustment of no less than 35º left and right of center. Shall be equipped with two (2) compression type spring safety trips capable of at least three (3) attack angle settings ranging from 10 to 30 degrees. Shall include stops attached to the moldboard assembly which contact the reversing frame front push tube before the trip springs becomes fully compressed. The moldboard assembly shall be capable of tripping at least 15 degrees past vertical before contacting the stops, at any attack angle. Shall have a minimum of five (5) hinge points. There shall be a minimum of 116" between the outer most hinge points with a minimum of three more hinge points spaced between.

5. Snow Shield: The moldboard shall be equipped with a full length rubber snow shield mounted on the top forward edge. Shall be made of a minimum of two ply rubber matting no less than 1/4" thick. Snow shield shall be affixed to the moldboard using a minimum 0.25" x 2" metal strip and an adequate number of bolts to secure it in position.

6. Cutting Edge: Cutting edge shall be a minimum 3/4" x 6" high carbon steel with holes AASHTO spaced. Cutting edge shall be equipped with a minimum of two (2) wear blocks behind the cutting edge. Each wear block shall have a minimum of 26 square inches of wear surface. Wear blocks shall be made of a material with a minimum Brinell hardness of 181-240.

7. Level Lifting Device: Snowplow shall be equipped with a level lifting device that keeps the moldboard level when lifted or when being reversed. Device shall be complete with all chains, hooks, clevises and hardware necessary for proper operation.

8. Jack: The snowplow shall be equipped with a screw type adjustable jack to assist in the instillation and removal of the unit from the truck hitch.

9. Truck Hitch: Low profile, front frame mounted universal plow hitch with fold down and adjustable lift arm. Shall be capable of self-storing lift cylinder. The lift cylinder shall be a minimum 4" diameter bore and of sufficient length to properly lift snowplow. Hitch shall be capable of carrying plows from 10' to 14' in length. The lift arm mounting frame shall be constructed using a minimum of ½" x 3" angle welded to a 10" structural channel which forms the lift frame. Cheek plates shall be ½" x 12" tapered. Rocker angles and plates shall be utilized above and below the truck frame to keep the hitch from loosening and moving forward. The cheek plates and rocker plates will be welded to the truck hitch by the upfitter. Lift arm bracket and lower drop bar retaining/connecting lugs shall be fabricated from ¾" thick plate. Mounting flanges shall be set on 30 ½" centers with pin holes sized for 1 ¼" pins. (Hitches using braces running from the lift frame to the front axle of the vehicle are not acceptable).

10. Bumper: Two (2) bumper wings (right side and left side) shall be provided as an integral portion of the plow hitch. Each bumper wing shall be constructed using 10" HD structural channel. The wings shall be approximately the same height as the truck manufacturer's standard front bumper and shall be swept back to conform to the vehicle front hood and fenders. The bumper wings sections shall be bolted to the vehicle through the hitch cheek plate and the truck frame.

11. Weight: Snowplow assembly shall weigh a minimum of 2,000 pounds.

12. Color: Front Bumper, Snowplow Hitch and Lift Assembly shall be primed and painted Sherwin Williams F1B-4009 Gloss Black Enamel, or equal. Manufacturer's standard color is acceptable on the reversing frame, A-frame and moldboard.

E. Chemical Spreader: 356-mm093-7.5 SS SP TS

1. General: This specification is intended to cover a 7.5 cubic yard minimum struck capacity hydraulic driven chemical and material spreader for use in ARDOT dump trucks. The spreader shall also be equipped with a liquid calcium chloride spray system designed to operate in conjunction with the hydraulically driven chemical pump mounted on the truck.

2. Type: Shall be designed for mounting in dump body with spinner at the rear and below floor of dump body. The spreader shall be a self-contained unit with hopper type body, conveyor system, hydraulic drive, spinner and all necessary components integrally mounted as single unit. Shall have the capacity to spread material to a maximum width of no less than 24'.

3. Hopper Body: Hopper shall have a minimum struck capacity of 7.5 cubic yards. Shall be electrically welded construction, adequately reinforced, with no less than 10 gauge 304 stainless steel sides and ends. Sides to slope approximately 45 degrees to allow material to feed into conveyor by gravity. Bottom shall be constructed of no less than 7 gauge 304 stainless steel. All hopper hardware shall be stainless steel. In addition, any long sills, crossmembers or side supports used in the design of the spreader shall be constructed of 304 stainless steel.

4. Top Screen: A top screen to keep oversize material from entering hopper shall be provided with the spreader.

5. Conveyor: Shall have a minimum overall width of 24" and be designed to handle sand, cinders and de-icing chemicals discharging material to spinner at rear of spreader. Shall be equipped with spring loaded idler adjusters to maintain proper conveyor tension.

6. Drive: Conveyor and spinner shall be driven by hydraulic motors. Drive to conveyor and spinner assembly to be as regularly furnished by manufacturer. Shall be designed to operate on an open center hydraulic system with a minimum output of 15 gpm at 1,500 psi. (Hydraulic pump will be furnished by ARDOT.)

7. Spinner Assembly: Spreader shall be equipped with a "Urethane Spinner" consisting of a one-piece polyurethane disc with a minimum of four (4) molded fins. Spinner disc shall have a minimum diameter of 18" and have a vertical adjustment of no less than 12". Spinner shaft shall be mounted on anti-friction bearings with grease fittings or direct to hydraulic motor. The spinner chute shall be constructed of no less than 10 gauge 304 stainless steel. Unit shall have a minimum of three (3) adjustable 304 stainless steel material deflectors to help regulate spreading pattern. Spinner assembly shall be designed so that it may be hinged up for storage or to discharge material that may be left in the spreader.

8. Feed Gate: Material discharge to spinner chute to be controlled by an adjustable 304 stainless steel discharge gate with positive locking device.

9. Mounting: Spreader shall be designed for mounting in a dump body which is devoid of hydraulic cylinder hoist housing in the front of the body. Body has an inside length of 13', an inside width of 86" and is mounted on a tandem axle truck with 118" cab to axle measurement. Hold down equipment for dump body mounting shall be furnished. Spreader shall be equipped with lifting bails.

10. Front Bearing Grease Extensions: Shall have front bearing grease extension tubes to allow greasing of front bearings. The grease tubes shall either extend to the rear of the spreader or approximately 40" above the dump body floor and be flexible enough so greasing will not interfere with normal bearing adjustment. The tubes shall be attached to the sides of the spreader with straps made of nylon or a similar material.

11. Liquid Spray System Components: The spray system components provided shall work in conjunction with a pre-existing hydraulically driven chemical pump and control system on the truck. The system shall include a hose kit with a minimum of two (2) spray nozzles and reservoirs. The kit shall also include all necessary hoses and fittings to connect the spray system to the truck mounted pumping system located at the rear of the trucks dump body on the driver's side. Spray system shall be capable of continuous spraying of calcium and magnesium chloride, glycol, liquid urea, or other liquid de-icing solutions directly onto the material as it leaves the conveyor and before it reaches the spinner. All parts that come in contact with liquid de-icing solutions shall be corrosion resistant. All components shall be rated at no less than 150 psi working pressure.

    a. Sprayer Reservoirs: A minimum of two (2) reservoirs with a capacity of no less than 100 gallons each shall be provided. Reservoirs shall be molded polyethylene construction and be complete with replaceable screen line strainer, shut-off valves and mounting hardware. The reservoirs shall be angle formed to allow for mounting to the sides of the chemical and material spreader specified above. (Sides of spreader are to have an approximate $45^{o}$ slope). The reservoirs shall be designed so that one (1) reservoir is mounted on each side of the spreader with all fill openings, shut-off valves, etc. readily accessible. Reservoirs shall be plumbed together with a minimum 1-1/2" ID hose with a tee located on the left rear corner of the spreader.

b. Nozzles: There shall be a minimum of two (2) spray nozzles equipped with necessary cores, discs and mounting hardware.

12. Color: 304 stainless steel components to be unpainted. Non-stainless steel parts to be painted black or aluminum.

F. Delivery Requirements: Unit shall be delivered with snowplow and chemical spreader specified above completely installed and ready for operation. Pins, couplers, hydraulic hoses or any other items required for proper installation and operation of the snowplow and chemical spreader shall be furnished. Chemical spreader shall be secured to the dump body in accordance to manufacturer's recommendations.

G. Warranty:

1. Cab and chassis shall have truck manufacturer's regular warranty and service as regularly furnished on new vehicles sold to the public. Warranty data shall be furnished with each unit.

2. The dump body, hydraulic system, and all other incidental equipment furnished under this specification shall be warranted against defective material and workmanship for a minimum period of (12) months (365 days) from date unit is placed in operation by ARDOT.

   a. Warranty should include all parts, labor and transportation costs to the location of equipment.

   b. If equipment cannot be repaired on location, warranty shall include cost of transport to the facility where the repair work will be done.

3. Warranty repairs are to be performed by any authorized dealership of the manufacturer; however, the Successful Bidder will be ultimately responsible for coordinating repairs and insuring that warranty repairs are completed in a timely manner.

4. If any warranty literature submitted with the bid conflicts with ARDOT warranty requirements, the conflict(s) shall be specifically noted, corrected and included with the bid or the conflict(s) will be considered an exception to warranty specifications and the bid rejected.

5. Recent prior failure to provide warranty-work, parts, replacement parts or service, in a timely manner, for equipment from the same manufacturer or dealer shall be grounds for the rejection of any submitted bid, or for the denial of any otherwise qualified low bidder, whether such failure is attributable to the manufacturer or the dealer of the equipment. For the purposes of this paragraph "timely manner" means a period of time not exceeding thirty (30) calendar days to provide requested warranty-work, parts, replacement parts, or service. For the purposes of this paragraph "manufacturer" means the original manufacturer of the equipment and its successor or successors, regardless of number, and whether acquired by sale, merger, or otherwise. For the purposes of this paragraph "replacement part" means a part redesigned by a manufacturer to correct a design or engineering defect and which replacement part is capable of providing dependable performance in normal operation conditions for its normal service life without failure. Such bid or bids may be rejected by the Department until such failure or failures have been remedied to the satisfaction of the Department and until such manufacturer or dealer is providing such warranty-work, parts, replacement parts, and service in a timely manner.