CHARLEVOIX COUNTY ROAD COMMISSION

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TURN-KEY TRUCK AND EQUIPMENT SPECIFICATIONS FOR (2) WORK-READY TRUCKS

~ Trucks to be 62,000 lb. minimum GVW tandem drive class 8 ~
~ Trucks and new equipment shall be the most recent model year ~
~Corrosion protected steel cab will be considered only if aluminum cab is not available ~
~ Equipment to be purchased and installed locally ~

These vehicles are intended for maximum use, year around. They will be used as construction hauling units from off-road pit sites and as road maintenance units. Each unit will be equipped with hydraulic operated underbody scraper, front mounted one-way plow, 10 to 12 yard dump body and slide-in sander, rear x-auger/spinner assembly, and a 9 foot right rear mounted wing plow.

The Road Commission may consider an approved equivalent, but will only consider bids offering complete work ready trucks. The trucks and equipment shall be of predominantly North American content, and shall not require proprietary fluids or lubricants. All bid prices must be firm for at least sixty (60) days after bid date. The Charlevoix County Road Commission is tax exempt; therefore, bids shall not include any taxes. Payment(s) to the appropriate parties will be made within (45) days after delivery and acceptance, provided all specifications are met.

Warranty work for the truck chassis and drivetrain shall be under an in-house warranty repair plan, where Charlevoix County Road Commission is credited for parts purchased and labor performed (based on labor guidelines) for warranty work. Any limitation to the in-house warranty repair plan must be explained on bidder's letterhead titled "Exceptions and Comments". All components shall have a minimum 12-month/100,000 mile warranty, effective on date CCRC places each truck into service. See special requirements under engine, transmission, and rear axle warranty.

Bidder shall explain any specification deviations on bidder's letterhead titled "Exceptions and Comments", identified by item number and included with each bid. The following specifications shall be considered minimum requirements:

Item #1: **Wheel Base:** Minimum wheel base needed for equipment installer to maintain tightest turn radius.

Item #2: **Cab to Axle:** Approximately 132" back of cab to center of tandems to meet equipment installer's requirements.

Item #3: **Front Axle:** 20,000# set back axle with oil bath hubs. Grease fittings on tie rod ends, kingpins and drag link ends. Factory front axle alignment accurate to .030 of an inch.

Item #4: **Rear Axles:** 46,000 lb. Tandem; Meritor model #RT-46-164P drive axles with 52" spread; 4.56:1 gear ratio (CCRC shop foreman shall review gear ratio after bid award with truck bidder to determine best gear ratio and whether changing specified ratio would benefit CCRC); full rear main differential locks with in-cab control and warning light; inter-axle lock with in-cab control and warning light; magnetic drain plugs; synthetic gear lube. Laser factory axle alignment accurate to .030 of an inch.

Item #4A: **Rear Axle Warranty:** 3-Year standard manufacturer warranty.

Item #5: **Suspension:**

Item #5A: **Front:** 23,000# Taper-leaf springs with all greasable spring pins, and two heavy duty gas charged tubular type shocks.

Item #5B: **Rear:** Peterbilt 46,000# "Air Trac" or Hendrickson HAS460 heavy-duty air-ride suspension manufacturer certified for off road use with four heavy-duty tubular type shocks. The air ride suspension system shall include level valve (at rear of front drive), dash-mounted pressure gauge, and a manual dump system with in-cab control and indicator light. (46,000# Airliner and other options shall be offered on bidder's company letterhead and accompany bid)

Item #6: **Engine:** Paccar MX 12.9 Liter engine with maximum brake horsepower of 455 HP and torque of 1650 ft./lbs. @ 1100 RPM or Detroit Diesel DD13 with maximum brake horsepower of 450 HP @ 1800 RPM and torque of 1650 ft./lbs. @ 1100. Engine to be equipped with the following: Factory engine compression brake; fan clutch and override switch; front PTO adapter below radiator (No Cut-Outs); silicone radiator hoses w/constant torque clamps; silicone heater hoses with constant torque clamps; cab heater shut-off valves (1/4 turn ball valves); gear reduction starter; pad mount alternator rated @ 130 amps with good low RPM capabilities.

Item #6A: **Safety/Accessibility:** An operator, standing on the ground, must be able to check all fluid levels.

Item #6B: **Engine Warranty:** A 2 year/100,000 mile standard warranty coverage and 5 year/ 100,000 mile extended warranty coverage on engine, ECM, and aftertreatment system with no deductible as a minimum. (Other extended warranty options for engine, ECM and after-treatment shall be offered on bidder's company letterhead with per unit cost and accompanying bid)

Item #6C: **Diagnostic Tools (1 per bid not 1 per truck):** Engine manufactures CD's or manuals covering operation, maintenance, parts, service, and diagnosis. PC diagnosis tools, software, and/or upgrades needed to read codes and data for troubleshooting diagnostic codes. (CCRC currently has "Davie 4" PC based for Paccar Engines with USB link but nothing for Detroit Diesel)

Item #7: **Transmission/Drive Shafts:** Eaton Fuller UltraShift VHP 13 speed, 1650 ft/lb torque, automated manual transmission with dash mounted control, synthetic gear lube and dual output speed sensors. 1810 HD front driveshaft with single mid-ship bearing, and 1710 rear driveshaft both with half-round end yokes, zerk fittings, and coated driveshaft splines.

Item #7A: **Transmission Warranty:** 5-year as provided by manufacturer.

Item #8: **Frame and Bumper:** Spaded frames will not be accepted. Minimum 3/8" frame rail thickness with minimum 1/4" steel liner thickness to meet the following specifications: 28.9 section modulus; 110,000 PSI tensile steel; 3,175,000 resistance to bending moment with integral front rail extensions continuing a minimum of 18" in front of grille. Cross-members shall be 3-piece, C-channel w/cast gussets. AF (after frame) shall be 63" minimum. Frame to have "0" rake. Bolt-on wrap-around front bumper with anti-slip flat top plates.

Item #9: **Clutch:** 15 1/2" two plate, auto adjust, pull-type clutch with brake; remote grease hose for throw-out bearing. Torque rating shall be 1650 ft/lbs with a 3600# plate load.

Item #10: **Steering:** TRW TAS85 steering gear with cooler and frame mounted reservoir. Tilt/telescopic steering column with Glidekote steering shaft splines.

Item #11: **Brakes:** Full air brake system with Meritor 6S6M ABS with diagnostics. Front and rear shall be S-cam type 16 1/2" X 7" drum brakes with Meritor automatic slack adjusters, Meritor Q Plus premium brakes and dust shields. Air parking brake system shall include 30/30 brake chambers on both drive axles.

Item #12: **Air System:**

Item #12A: **Air Compressor:** 15.9 CFM minimum, water-cooled air compressor.

Item #12B: **Air Tanks:** Painted steel tanks, with pull cord drain valves, mounted inside frame and forward of front drive axle to meet equipment installer's requirements.

Item #12C: **Air Dryer:** Bendix AD-IS EP air dryer with heater. Air Dryer shall be mounted in a protected location accessible for maintenance, yet not interfering with equipment.

Item #12D: **Supplemental Air:** A style "A" male air coupling, incorporated with a Milton #S1093-4 in-line check valve, shall be mounted at the left rear corner of the dump box. This rear-mounted fitting allows a driver to charge air system reducing in-shop run time.

Item #12E: **Trailer Air:** Airlines shall end at color-coded glad hands with covers at rear of frame.

Item #13: **Radiator:** Must meet or exceed engine manufacturer's requirements with no cut outs or holes for PTO shaft and an adequate opening under radiator for PTO shaft.

Item #14: **Air Cleaner:** Air cleaner shall be mounted under the hood with air inlet drawing from the driver's side of cab. Air cleaners mounted on left side will be accepted if under hood is not available.

Item #15: **Battery Box/Step Combination:** Heavy-duty construction with battery barrier mat lining bottom of box and aluminum cover. Unit shall incorporate non-slip step(s), and

shall be mounted under the driver's side of cab with a minimum ground clearance of 24".

Item #15A: **Batteries:** A minimum of (3) 700 CCA batteries.

Item #16: **Tool Box /Step Combination:** Heavy-duty construction with aluminum cover and non-slip step(s) incorporated into unit. Unit shall be mounted under passenger's side of cab with a minimum 24" ground clearance.

Item #17: **Exhaust System:** Single vertical tailpipe mounted at back passenger side of cab. After Treatment Device (ATD) mounted at back of cab inside from tailpipe. Diesel Exhaust Fluid (DEF) tank shall be a minimum of 20 gallon capacity and location must be preapproved by CCRC's shop foreman. High mount exhaust system with stainless steel safety shields, piping and clamps must have 24-inch ground clearance, 3-inch frame clearance and a curved outlet chromed standpipe to deflect exhaust away from cab and box. Exhaust system configuration shall not interfere with combination tanks, scraper, dump body, or auxiliary battery box.

Item #18: **Scraper Mounting Clearance:** Between the rear edge of the front fender and 40" rear of the cab, there shall be a 24" minimum ground clearance with vehicle at maximum loaded weight.

Item #19: **Tires and Wheels:** Steel belted radials on hub-piloted wheel as specified other tires or wheels must be preapproved by CCRC's shop foreman.

Item #19A: **Steers:** Bridgestone M860 315/80R 22.5 20 ply tires mounted and balanced on 22.5X9.00 Alcoa #893657 aluminum wheels which are offset to allow shorter turn radius.

Item #19B: **Drives:** Michelin XDN-2 12R22.5 tires mounted and balanced on 22.5X8.25 aluminum wheels Alcoa #885677.

Item #19C: **Spares (Wheels only):** One spare 22.5 X 9.00 aluminum wheel Alcoa #893657 per truck and two spare 22.5 X 8.25 aluminum wheels Alcoa #885677 per truck.

Item #20: **Cab:** Aluminum full-size conventional cab with air bag suspension shocks, leveling valve and tracking rod. (severe duty corrosion protected steel cabs will only be considered if aluminum cabs are not available.)

Item #20A: **Cab Dimensions:** Driver comfort is a main issue. A cab that limits leg or head room will not be considered. The driver's seat in the furthest rearward position shall not contact the back of cab. An extended cab must be bid if standard cab is restrictive in any of these areas.

Item #20B: **Cab Features:** Standard hood with reinforced upper corners at grille opening (no butterfly openings) must be full tilt, spring assist with fender flares and stationary rigid mounted stainless steel grille allowing hood to clear 37" wide plow frame when open; dual door stop in drivers door; tilt/telescopic steering column with 18" steering wheel; ignition and doors keyed alike; drivers seat shall be high back fabric air ride with dual arm rest, 3-point seat belt and lumbar control; passenger seat shall be

fabric non-air with 3-point seat belt; cocoa colored interior with black rubber floor and rubber mats (no carpeting); tinted safety glass; outside stainless steel sun visor; passenger door lower view window; interior noise reduction package; severe service cab package; thermal insulation cab package; right and left sun visors; drivers door arm rest; dual West Coast-type heated mirrors with in-cab control; dual 8" spot mirrors; electric windshield wipers/washers with delay; dual cab grab handles; fresh air heater/defroster with factory air conditioning; dual air horns with protectors; electric (city) horn; open grate expanded metal steps; power right-hand window; factory installed AM/FM w/Blue Tooth radio with (2) speakers; dome light; cruise control. Switch panel to control engine brake on/off and each of 3 stages shall be factory installed. A minimum of (3) extra toggle switches shall be factory installed in panel board. Step lighting under both sides of cab; two 10" wide stainless steel roof mounted brackets (one over each door) for over-head beacon lights. Body, engine and chassis wiring shall use weather pack connections and wires shall be numbered every four (4) inches or less. Plug-in auto reset circuit breakers shall replace all fuses (except mini fuses) in junction box.

Item #21: **Instruments and Gauges:** Electric tachometer with integral hour meter, speedometer with integral odometer and trip odometer, oil temperature gauge, coolant temperature gauge, voltmeter, outside air temp gauge, fuel level gauge, mechanical dual air pressure gauge, air suspension pressure gauge, oil pressure gauge, air cleaner restriction indicator, low oil pressure light, and standard warning lights.

Item #22: **Truck Paint:** Frame and chassis shall be gloss black. Cab and hood shall be Two Stage (basecoat/clearcoat) Omaha Orange with flat black no-glare hood top reaching to lower side of upper hood radius.

Item #23: **Electrical:** Full battery disconnect switch with indicator light shall break the negative cable(s) and be located near the batteries. Battery cables shall be double ought (00) or larger with heat shrink and corrosion protective grease at all terminal ends (cable splices will not be accepted).

Item #23A: **Trailer Electrical:** Electric to end with 7-prong bullet-type female connector at rear of frame; wired to standard and shall have protective boot at 7-prong connector.

Item #24: **Combination Tanks:** Monroe behind the cab tank set, no exceptions. Tanks must meet all drop & pressure tests and be U.L. certified. Tanks shall be 7-gauge 201 or 304 stainless steel and installed behind the cab. Fuel tank shall be located at driver's side. Hydraulic at either side dependant on exhaust aftertreatment configuration. Tanks shall sit in a full mounting saddle with spring-loaded hold-down straps and cushion pads. Tanks shall have permanent decals as to contents being either "DIESEL FUEL" or "HYDRAULIC OIL". Fuel transport tank shall belong to dealer and not included in the bid.

Item #24A: **Diesel Fuel:** 110 gallon capacity, to have internal baffles, 1/2" drain port, bronze vented fuel cap with retention chain, and Isspro RA-9531-ISS-LP fuel sending unit

Item #24B: **Hydraulic Oil:** 40 gallon capacity, with screened fill pipe, internal baffle for separation and long oil level sight tube. Tank will have 3" supply port with Zinga

model #Z2030-02 mesh suction strainer and a 2 1/2" 1/4 turn ball valve. Return filter will be a Zinga model #RF1215 with 10 micron filter element in top of tank.

Item #25: **Dump Body:** Extra heavy built, 10 to 12 cubic yard capacity Crysteel dump body with full 3 year warranty and a 50/50 warranty on the following 2 years. Sides, front, gate, and cab shield shall be #4 polished 201 stainless steel.

Item #25A: **Body:** Inside dimensions shall be 156" long X 84" wide, 52" headboard, 44" tailgate heights, and 44" side heights. Sides and front shall be constructed of 7 gauge 201 #4 polished stainless steel. The sides shall be one continuous piece with no seams, boxed top rail with slopes to shed dirt, and formed "V" side braces (2) per side. Full depth corner pillars shall be 8 1/2" wide with 4" radius front and 18" wide rear both sloped to shed dirt.

Item #25B: **Tailgate:** 9-panel fully boxed 7 gauge 201 #4 polished stainless steel with lifting loop centered in top to aid in tailgate removal. All horizontals (including top) shall be sloped to shed dirt; upper and lower dog leg slotted chain keepers to make gate double acting shall include 3/8" hi-test chain of sufficient length to allow tailgate to lie flat. Heavy-duty hardware, 1 1/4" diameter pins (both uppers and lowers) and trip linkage to have zerks for lubrication, 3 1/2" air cylinder mounted in the rear to insure cylinder shaft is fully retracted when gate is closed and operated by an in-cab control.

Item #25C: **Floor**: 1/4" thick AR 450 steel with 6" side-to-floor and 6" front-to-floor radius, complete body shall be continuous weld.

Item #25D: **Understructure:** Shall be the 8" I-beam western style non cross-member understructure.

Item #25E: **Cab Shield:** Shall be constructed of 7 gauge 201 #4 polished stainless steel continuous weld inside and outside. Shield shall be at cab height and reach forward to approximately 4" behind cab. Cab shield shall accommodate tarp system and exhaust.

Item #25F: **Box Accessories:** (2) body safety props; heavy 1/2" thick mud flaps (anti-sail type) at front and rear of tandems (no advertising on flaps); stainless steel fold down ladder on the drivers side rear of dump body (exact location to be determined at installation); stainless steel shovel holder at dump body's left front corner.

Item # 25G: **Paint:** Entire dump body excluding under structure shall be left bare polished stainless steel. Understructure shall be primed, painted black and undercoated.

Item #26: **Hoist:** Marathon M63117 inverted cylinder hoist system with floating cradle. Cylinder shall be 6", 3 stage, 2500 PSI with 49.3 ton capacity. All pivot points (cylinder pins, hinges, etc.) shall be greasable except for composite bearings. Hoist system shall include heavy-duty greasable rear hinges with removable pins. Hoist shall be controlled with truck hydraulics and have a full 3 year warranty followed by a 50/50 2 year warranty

Item #27: **Tarp System:** Roll-Rite model #6416, 12 volt direct drive system. System shall consist of the following: roller bearing gear motor; shielded tarp spool mounted in top front of cab shield; heavy duty aluminum tarp arms with angles to keep arms clear for box loading; heavy duty 20' mesh tarp; 4-spring system with aluminum tension bow; indicator light; switch and circuit breaker. Wiring from in-cab switch to tarp motor shall be properly clamped and protected with no in-line butt connections.

Item #28: **V-Box Slide-In Sander:** Heavy-duty 201 stainless steel spreader with an approximate capacity of 9 cubic yards. 304 stainless steel may be used in place of 201 stainless steel. All welding shall be continuous. All bolts and nuts shall be stainless steel. Stainless steel shall be unpainted, other metal shall be primed and painted gloss black.

Item #28A: **Spreader Hopper:** Shall be constructed of 10 gauge 201 stainless steel with a 2" double crimped form for greater strength. Dimensions shall be 13' long X 84" outside width X 56" tall. Body shall be designed to make efficient use of dump body yet clear hoist cylinder dog-house.

Item #28B: **Long Sills**: Shall be manufactured of 7 gauge 201 stainless steel and continue beyond the spreader chain to support the spinner assembly. Shall be slotted at both ends to accommodate easy drive and idler shaft removal.

Item #28C: **Cross Sills and Floor Runners**: Cross sills shall be 3" X 3/16" formed 201 stainless steel channel. Floor runners shall be 4 1/2" X 1 1/2" rolled channel ran lengthwise and have rolled in bottom edges to increase box contact area.

Item #28D: **Side Supports**: Shall be 10 gauge 201 stainless steel and shall extend the full angled side height of the hopper, placed approximately 2' on center.

Item #28E: **Lift Hooks**: There shall be a stainless steel lift loop located at each upper corner.

Item #28F: **Rear End-Plate**: Shall be 10 gauge 201 stainless steel sloped down and in at 70° reinforced inside and supported for maximum strength.

Item #28G: **Conveyor Floor**: Shall be 3/16" 201 stainless steel bolted to 2" X 1 1/2" formed 201 or 304 stainless steel end floor supports with stainless steel bolts. Intermediate supports shall be 1 1/2" formed 201 stainless steel angle cross braces located on 12" centers.

Item #28H: **Conveyor System**: Shall be 24" wide with 10 gauge 201 stainless steel replaceable chain shields. Shall have a 50:1 gear box mounted on 2" diameter steel driveshaft, powered by a direct drive hydraulic motor with feed-rate sensor. The driveshaft shall support the (2) keyed 8-tooth cast-gray iron sprockets that drive the chain. The 2' idler shaft and keyed sprockets shall be adjustable, through the self-aligning 4-bolt flange bearings, from sander's rear with the two heavy-duty spring-loaded adjuster shafts. Design shall allow 4" of adjustment. Bearings shall have grease extension hoses to the rear.

Item #28J: **Conveyor Chain**: Shall be heat-treated 2.25 pitch self-cleaning pintle-type with a 21,000# per strand tensile strength. Crossbars shall be 3/8" X 1 1/2" on 4 1/2" centers, welded both top and bottom. System shall include front and rear wipers.

Item #28K: **Feed Gate**: Shall be 12" X 18", 7 gauge 201 stainless steel adjusted with self-locking screw-type jack giving ruler accurate metering.

Item #28L: **Main H-Beam**: Shall be 6" X 9.0 lbs. wide flange bolt-in beam. Shall be elevated 3" above the top edge of hopper providing a longitudinal brace and hinge point for the top screens. Beam bolts shall be stainless steel.

Item #28M: **Top Screens**: Shall be constructed of 1/2" carbon steel rods welded to form 4" X 4" rectangular mesh sections formed by a combination of 1/4" X 1 1/2" flat steel and 2' angle iron with edge support reinforced by 1/4" X 1" flat steel bars. Each section shall be secured to the H-beam with (2) non-freeze 5/8" rod hinges.

Item #28N: **Mounting and Securing**: Front tie downs shall be a combination of D-rings, slip hooks, 3/8" chain and adjuster rods. Rear mounting to consist of 1 1/4" cold roll round stock boxed into 5" X 1/4" 201 SS formed channel at ends. Channel shall be welded and gusseted to sander long sills, locked in position through tailgate linkage and have a 1" gap from box lip for cleaning.

Item #29: **Rear Cross-Auger/Spinner Assembly**: Cross auger shall be full width, 304 or 201 stainless steel, dual discharge, offset 3" to left with right side Roller Stator, 45 cubic inch, 1-1/4" 14-spline, direct drive motor. Auger trough shall be 3/16" 304 or 201 SS continuously welded with 1/4" 304 or 201 SS extended one piece end plates continuously welded to trough and unobstructed top and bottom cleanouts. Auger shall be 9" diameter 4" pitch with 3/8" flighting welded to a 2 7/8" OD tube. Tube shall have1-1/2" shaft at idler end supported by a 4-bolt flange bearing. Self-leveling adjustable 304 or 201 SS spinner assembly with 20" diameter polly six fin disc driven by a Roller Stator 3 cubic inch hydraulic motor with seal saver design through a cast iron replaceable hub.

Item #30: **Front Plow Hitch:** Husting style heavy duty 34" wide Quick Hitch, top of hitch shall be gusseted with 3/8" plate. Plunger pins shall have grease zerks and secondary locking tabs. Lift arm shall include booster arm with (3) 1/2" grab hooks. Plow cylinder shall be a hydraulic double-acting cylinder with a 3" diameter bore, 10" stroke and a Socatri 1000 shaft. Hitch shall be bolted to a heavy-duty structural channel, 10" minimum, front bumper with flare back ends. Hitch shall include 1/2" X 2" bar stock upper bracing and 1" X 4" lower bracing. Lower bracing shall extend back between front spring hangers and bolt to truck frame rails. Hitch, bumper, and bracing shall be installed with bolts. Unit shall be primed and painted gloss black. Factory bumper shall be used instead of channel bumper if approved.

Item #31: **One-Way Rigid Front Mounted Plow:** No-trip plow shall be right hand discharge, nose height shall be 36", wing-tip height shall be 73", cut shall be 9 1/2' and cutting angle shall be set at 38°. Unit shall have the following features: 3/8" thick land slide plate, 5/8" X 8" cutting edge AASHO top punched, (2) 6" X 16" cast shoes, boomerang-style rockers, adjustable shoe bar with pins, heavy-duty push frame, 34" Husting quick hitch plow section installed with 3" offset and heavy-duty top yoke assembly manufactured of 2" X 4" X 1/4" wall tubing. Plow shall be 100% welded, sandblasted, and painted orange front and flat black back with powder coat or urethane. See Item #39 for identification requirements.

Item #32: **Lighting:** All connections shall use heat shrink and dielectric grease or seal-tight connectors. All rear lights shall be connected in a Betts Dri-Seal #35104 junction box (except for tarp cables). Junction box shall be mounted on dump body's left rear outside with protective plate. All wiring shall be well secured and protected in vulnerable areas. Tarp cables shall be in PVC to rear of truck and wire loom in exposed areas.

Item #32A: **Plow Lights:** Nordic model N520 auxiliary plow lights and turn signals shall be hood mounted on custom built 1/4" X 4" aluminum brackets with inner hood support plates and wired to a in-cab 6-way switch. Height of lights shall be determined at installation time.

Item #32B: **Front Strobes:** Star model 258HTDAL-AG lights, each installed on factory strobe brackets (one located over each door), to include in-cab switch, wiring & Weather Pack connectors.

Item #32C: **Rear Strobes:** Ecco model 3965AG or approved equivalent oval strobe lights. (1) Light mounted in each side as high as possible in dump body's rear post.

Item #32D: **Work Lights:** Ecco model EW2471 LED or approved equivalent. A total of (3): (1) installed on each side in scraper area, (1) rear mounted in spinner area. Shall include in-cab switch, wiring and heat-shrink connections. Exact location to be determined by Charlevoix County Road Commission Shop Foreman at installation.

Item #32E: **Fog Lights**: One set of LED fog lights shall be mounted in the lower plow frame cross-brace. System shall have in-cab switch and heat-shrink connections.

Item #32F: **Stop/Tail/Turn/ID/Back-Up Lights:** Oval style heads shall be mounted in dump box rear corner post. The lights shall be positioned with rear strobe lights on top, Maxima #M63100 18-LED stop/tail/turn lights next down and Maxima #M63324 18-LED back-up lights on bottom. Each rear corner post shall have an internal deflector to keep mud and snow from stressing the wiring. Three rear LED ID lights shall be mounted below tailgate in box plate. Rear side LED ID lights shall be located low in box corner post at approximately the same height as front side marker lights.

Item #33: **UNDERBODY SCRAPER:** Monroe Model HD 4500, 12' Underbody Scraper, CCRC Shop Foreman shall direct placement height.

Item #33A: **Hanger Board:** Designed and engineered for optimum strength. 1/2" formed plate reinforced with 1/2" X 7-1/2" flat plate to make full 1" thickness. 3.25" X .344" mechanical tube outer hinge tubes. 3/4" bar reinforced full length of the hinge. 3/4" thick trunion arms with replacable and greasable 2" solid round blade cylinder case support pins. Outer trunion arms shall be bolted to hangerboard with replaceable and greasable 2" solid round blade cylinder case support pins. Shall include a manifold bracket on each side of hangerboard for grease line kit.

Item #33B: **Hinge Shaft:** 2 1/2" OD X 96" long with (4) grease points and (3) hinge points. The (2) outer hinges shall be 3-1/4" OD X 6" long with .344 wall thickness. Center hinge shall be 3 3/4" OD X 10 3/4" long with .344 wall thickness. Each outer hinge shall have one (1) 1/2" wraparound gusset. Center hinge to have two (2) 1/2" thick

wraparound gussets and thrust bearing wear plates to prevent side-to-side moldboard shifting.

Item #33C: **Moldboard:** 1" thick X 20" high X 12' long with integral pressed in lower offset shall be heat-treated 1045 steel, 185 Brinell hardness, and 89 ksi tensile. Two (2) 1/2" X 6" X 6' double beveled cutting edges standard highway punched.

Item #33D: **Shocks & Housing:** Cushioned by (2) extra heavy duty cushion springs, housing to have (2) 1/2" thick flange retaining plates held by (4) 5/8" bolts with lock nuts, housing to be slotted to relieve contaminants. Trunion mounts shall be 2 3/4" OD mechanical tubing and have .344" wall thickness.

Item #33E: **Actuating Cylinders:** To be 3 1/2" bore X 10" stroke with 2" socatri 1000 piston rods with poly pac seals and cast steel heads. 1/2" hoses and piping (supported with poly clamps) to be externally mounted for easy access. Prince in-line pressure valve shall be installed and set at 400 PSI.

Item #33F: **Circle and Center Pin:** 1" solid one piece full contact with infinite positions (no notches), minimum cut-out for power reverse cylinder travel, and full front circle ears as to have clamps in full contact of circle at 45 degree angle for maximum circle bearing surface. Heavy-duty 5" diameter, hardened, and zinc coated center pin. Pin shall be greasable with three port grease journal and 5/16" wide X 3/16" deep grease groove around pin. Center pin to be piloted into hangerboard and attached with (3) 3/4" bolts to prevent hole elongation.

Item #33G: **Clamps:** 20-1/2" long X 7" deep X 1" thick, shaped contour of the circle with 3/8" thick UHMW wear plates. Clamps must remain fully on the circle throughout the entire circle rotation.

Item #33H: **Reverse Cylinders and Hardware:** (2) 4" double acting cylinders with 1/2" #8 SAE ports, 2" socatri 1000 rods, poly pac seals, and cast steel heads. 3" OD X 2" ID anchor pin bosses with 2" hardened, zinc coated, removable pivot pins with spiral grease grooves (greasable at each end). Prince cross over relief valve, set at 2200 PSI, to protect reversing cylinders from shock impacts.

Item #33J: **Mounting Legs:** H-bar style constructed with 1" X 4" bar stock attached to the truck using 3/4" NC grade 8, electronically plated, corrosion resistant bolts, SAE washers and nuts. (3/4" thick custom tapered 35" X 26" X 22" full plate steel construction with 7" X 7" cut out for ease of cleaning can be used instead of H-bars only if necessary for frame mounting)

Item #33K: **Paint:** All parts shall be shot blasted and powder coat painted TG1C polyester black prior to assembly, with minimum curing time of 25 minutes, at a cure temperature of no less than 400°. Equipment installer shall paint over the first 12" of blade ends with urethane orange paint to match cab color.

Item #34: **Hydraulic System:** Front mounted, crankshaft driven, hydraulic pump, to operate a front plow hoist up & down, scraper up & down, scraper reverse, double acting dump body hoist, wing plow up & down, sander bed chain, dual direction cross-auger and spinner. A Danfoss 8.9 cu. in./rev. load sense piston pump with a 1300 Series Spicer

driveshaft to supply Rexroth model #M4-12 LSA 8-bank mid inlet valve with adjustable main relief. Pump shall be protected by a low oil shut-down system with momentary override. Valves shall be mounted in auxiliary battery box located under cab at passenger side. Dump body valve shall be 33 GPM and include combination port and anti-cavitation cartridge. Plow valve shall be 13 GPM double acting, scraper valves shall be 16 GPM double acting, wing valve shall be 19 GPM, sander main chain valve shall be 15 GPM single acting, cross auger shall be 15 GPM double acting, and spinner valve shall be 7 GPM single acting. A total of 5 (five) Apsco VM air controls with offset handles and locking box handle housed in custom-built pedestal and mounted between the seats. Pedestal height shall be even when driver's seat in its lowest position and as far forward as possible without transmission access cover interference. Controls shall be plumbed with DOT approved plastic air lines to Apsco air actuators controlling scraper up/down, plow up/down, wing up/down, scraper reverse, and box up down. Bosch Rexroth 530 controller shall regulate the sander functions with electronic proportional controls, main chain speed sensing, and ground speed sensing. The Rexroth 530 controller shall sense truck speed from an unshared speed sensor located at transmission tail shaft housing which shall be factory wired to inside of cab. The cross auger and spinner hydraulics shall have stainless steel quick couplers at the rear of the truck to allow cross auger/spinner assembly removal and protective plugs and caps to cover all quick coupler ends when detached. The wing hydraulics shall have stainless steel quick couplers at the rear of the truck to allow moldboard, push arm and rear lift cylinder removal and also have protective plugs and caps to cover all quick coupler ends. The Rexroth 530 shall have the following features: choice of (4) materials; granular and liquid control; troubleshooting; blast duration timer; GSI switch; manual mode control, for use in the event of a system failure. Rexroth 430 controller shall be securely pedestal mounted at mid-dash level at angle that eases use and visibility yet not restrict passenger area, exact location shall be preapproved by Charlevoix County Road Commission's shop foreman. The wing hydraulics shall incorporate an adjustable sequencing valve with built in lock valves to prevent both heel and toe from drifting down and incorporate an adjustable metering valve to control the speed at which blade drops when going to plow position. All hydraulic pipes shall be stainless steel. Hydraulic system shall also include the following: all necessary fittings, adapters, rubber-coated clamps lined with abrasive protection sleeve, extension hangers, and hoses with abrasive resistant sleeve covering in all high wear areas. Complete system shall be installed, filled with applicable hydraulic oil and tested. All pressures shall be set to factory specifications.

Item #35: **Pull Points:** A total of 4 pull points (one at each frame corner) reinforced and bored to accept a 1 5/8" screw pin. (2) C & M #357, 20-ton working load anchor-type shackle to be included. 20-ton working load to be considered into the design of pull points and Charlevoix County Road Commission Shop Foreman must approve pull points.

Item #36: **Wing Plow:** Monroe model 9D FWMB Para-Glide 9' Patrol Wing mounted right side of truck just behind scraper. The fully operational wing shall be hydraulic lift and incorporate the "Ottawa Wing Bracket"(no cable or chain lift will be accepted).

Item #36A: **Moldboard:** Moldboard shall be 3/16" A36 steel with top of moldboard formed into a 2-3/4" X 1" channel. Bottom angle shall be 4" X 4" X 3/4" reinforced between cutting edge bolt holes with (10) 3" X 3" X 1/2" gussets and shall include (6) 1/2" moldboard reinforcement ribs tapered from 4" at bottom to 2-1/2" at top. There shall

be two (2) horizontal reinforcement angles between the discharge end's last two ribs, bottom 4" X 3" X 1/2" reinforcement angle shall have seven (7)evenly spaced 5/8"holes for push arm adjustment, top 4" X 4" X 1/2' reinforcement angle shall have seven (7) evenly spaced 5/8" holes for push arm adjustment. Pivot pin shall be 1-1/2" steel. Front attachment pivot plate shall be 1/2" steel, completely boxed and supported with 1/2" and 3/16" plate. Pivot plate for the 1-1/2" pivot bolt shall be a minimum of .625" wall and welded to the inside and outside of the moldboard. A 1/2" safety stop eyelet and a 1/2" centered lift loop shall be on the front of the moldboard. The bolt retaining the moldboard shall be 1-1/2"-7 X 7" G8 HHCS zinc plated with castle nut and cotter pin. Bolt shall be drilled for cotter pin. All welds shall be 100 % continuous. Moldboard shall be powder coated orange.

Item #36B:**Cutting Edge:** Cutting edge shall be 9' X 8" X 5/8" AASHO punched recurved style. Three (3) heavy-duty cast iron shoes, one at each end and one centered shall be bolted on with cutting edge. Shoes shall be approximately 75 pounds each and shall be made with an approximate 10 degree bottom angle to match attack angle of moldboard.

Item #36C:**Front Wing Mount/Para-Glide Structure w/Ottawa Wing Bracket:** Front wing mount shall be 4" X 6" X 1/2" cross tube passing through two (2) 36" X 12" X 1/2" flat plates secured to outsides of truck frame behind scraper. Para-Glide structure shall be no more than 24" high and 14" wide. Post weldment shall be manufactured with .75" inside mounting plate and a matching .5" outer plate. A .375" Ex-Ten 50 front base plate will set the width of the post, support the .5" inner lower hinge brackets and the .75" bottom cylinder mounts. Internal reinforcement with a .5 HSLA radius plate shall be welded to both side plates and the front base plate. The post weldment will serve as anchor for three trailing link assemblies. The upper and lower link arms shall be .75" radius bar with a 1.75" machined hole in each end. The upper arm assembly shall be reinforced with a 2.5" schedule 80 pipe at front. The lower arm assembly will be reinforced with 2.5"schedule 80 pipe at the front anchor and .5" HSLA X 5" plate to the rear. The lift/float link will be .5" bar with a radius at the anchor end, reinforced with a 2.5" schedule 80 pipe. The rear of the lift link will be 1" plate reinforced with .625" bar and will include two .625" upper cylinder mounts. The rear lift weldment shall have an outer 1" and inner .5" bar with radius ends and machined 1.75" holes. Bars shall be spaced and supported with two (2) 2.5" schedule 80 pipes and two (2) .5" X 4" triangular gussets. The hinge shall consist of three 1" radius ears that have 1.438" machined holes, spaced evenly and reinforced with two (2) 2" X 2" X .25" angles. All 1.75" holes will have Rc 50 hardened bushings. Hinge pins shall be 1.5" OD, case hardened to Rc 55-60. Hinge pins shall be retained with machine bushings and .25" roll pins. There shall be grease zerks. Lift cylinder shall be 3" ID X 5" stroke with a 1.5" industrial hard chrome rod. Hydraulic port(s) shall be .562-18 ORB. Cylinder shall be attached within the post with 1" stress proof pins, machine washers and roll pins. Prior to assembly, the post will be shot blasted, washed and prepped prior to powder coating black.

Item #36D:**Rear Wing Mount:** Rear wing mount shall be fabricated from 5" X 7" X 3/8" mild steel tubing, and shall include two (2) 28" X 18" X 1/2" frame attaching plates with 5" X 7" openings. Rear channel push arm/cylinder mounting plate shall include two (2) 1/2" plates, flame cut with three (3) offset mounting holes to mount the rear push

arms and the heel lift cylinder. The upper rear push arm shall be equipped with an external slide assembly to allow for mechanical float and attachment of the heel lift cylinder. The rear push arms and heel lift cylinder shall be attached with 1-1/4" stress proof pins for quick attach and detach. Lifting action for the heel end of the wing shall be a single 3" bore X 15" stroke, double acting hydraulic cylinder with 2" nitrated rod, 3/4"-16 ORB ports, and polypak seals. There shall be two (2) rear wing 2-1/2", schedule 80, adjustable, spring cushioned, 6' long lift arms when fully extended, including safety shear pins. All fabricated components shall be shot blasted and washed prior to powder coating.
Mounting components shall be powder coated black.

Item #37: **Automatic Greasing System:** A Grease Jockey Centralized On-Board Chassis Lubrication system with air pump, flexible reservoir and sixty point capability shall be supplied loose with each truck. Grease system shall include everything needed to grease truck, underbody scraper, wing plow, and dump body hoist as required. System installation shall not be included in bid, CCRC will install system.

Item #38: **Delivery, Manuals, Training:** Trucks shall be delivered to Charlevoix County Road Commission, 1251 Boyne Avenue, Boyne City, MI 49712. One set of manuals covering operation, maintenance, parts, and service for entire truck and equipment shall be furnished with each truck at delivery. Specific software shall be substituted for manuals when available. Equipment installer shall provide 4 hours of driver and mechanic training on all equipment aspects within one week of delivery at Charlevoix County Road Commission, 1251 Boyne Avenue, Boyne City, MI 49712 at a set, agreed upon date.

Item #39: **Identification:** Individual 3" tall, three digit, identification numbers shall be welded on the underbody hanger-board, slide-in sander, wing plow and one-way plow, all prior to any painting. Charlevoix County Road Commission Shop Foreman shall direct number assignment and exact location.

Item #40: **Special Requirements:** The title fee must be included in the bid. A line setting sheet for each truck shall be provided at delivery. Units shall meet all current State and Federal Safety Standards as a minimum.