



# **EXHIBIT "B"**

## **ELECTRIC RAILCAR MOVER TECHNICAL SPECIFICATION**

**TECHNICAL SPECIFICATION for ELECTRIC RAILCAR MOVER**  
**NYSDOT PIN 3935.89.301, Contract DR#39098**



**DESCRIPTION**

0.1	<p>The purpose of the below technical specification is for the Port of Oswego to purchase one (1) Electric Railcar Mover to support handling of railcars for its growing rail dependent customers. The railcar mover provided shall be capable of continuously operating during a normal eight (8) hour shift, shall have a typical full battery recharging time of 8 hours (based on a 480 volt, 3-phase power source), and shall have the capability to handle (push or pull) a minimum of ten (10) loaded railcars along the Port's primary operating and yard tracks.</p> <p>The railcar mover supplied to this contract specification shall meet or exceed the requirements described herein. Technical specification compliance and acceptance is determined at the discretion of the Port of Oswego. The supplied unit shall be new, and of the latest design of a model in current production or an update of an existing model. The supplied unit shall also be furnished with identical equipment, options and features as listed below. It shall be furnished completely assembled, fully serviced, and ready for immediate operation. The right is reserved to reject any and all bids proposing to furnish equipment, which, in the opinion of the Agency's Engineers and/or Staff, is not satisfactory for the Port of Oswego's use in the proposed application.</p>
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**GENERAL**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
1.1	Railcar mover shall be 100% electrically powered.			
1.2	The equipment furnished shall be new and a model in current production. The equipment shall be delivered fully assembled, complete with standard equipment and all accessories specified, fully serviced, and made ready for operation.			
1.3	The railcar mover shall meet all applicable FRA and OSHA standards and requirements.			
1.4	Railcar mover shall be able to push or pull a minimum of 10 loaded railcars.			
1.4.1	Located on Track E and the East Connector Track between the East Terminal and the Fitzgibbons Yard, the maximum continuous track grade is 1.04%.			
1.4.2	The greatest degree of track curvature is 19°-45" on located on Track C.			
1.4.3	Average railcars assumed to gross ~140 tons each.			
1.5	Railcar Mover shall have a maximum speed of at least 10 miles per hour (mph).			

**TRACTIVE EFFORT OR DRAW BAR PULL**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
2.1	Under normal weather conditions, railcar mover shall be capable of moving at least 10 full, empty, or any combination of full/empty railcars without the drive wheels spinning; (reference 1.4)			
2.2	Railcar mover shall be four-wheel drive.			
2.3	Railcar mover shall have a desirable minimum tractive effort of 45,000lbs (push/pull) single coupled without weight transfer to or from loaded or empty railcars.			
2.4	Railcar mover shall not:			
2.4.1	Utilize supplemental weights to meet tractive requirements.			
2.4.2	Require lifting of coupled rail cars to borrow weight to improve and/or achieve maximized tractive effort.			
2.4.3	Require double-coupling to maximize tractive effort.			
2.4.4	Experience a reduction in pulling capacity when coupled directly to an empty railcar.			
2.5	There is no restriction on the overall weight of the railcar mover.			

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**FRAME**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
3.1	Railcar mover shall have heavy-duty frame fabricated from grade A-36 or better cold rolled plate steel, featuring all welded plate construction.			

**COUPLERS**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
4.1	Railcar mover shall have two heavy-duty cast steel couplers for positive coupling and uncoupling with Association of American Railroads; AAR (standard U.S. railroad design) coupler and automatic locking knuckle.			
4.2	Shall have spring loaded air operated knuckle release couplers controlled from operator's station inside of cab.			

**POWER STEERING**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
5.1	Shall be hydraulic power steering type on front wheels, controlling the front axle.			

**HYDRAULIC SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
6.1	Shall have constant pressure hydraulic system with single pump load sensing circuitry, electrical controls, and diagnostic pressure gauge.			

**RAIL WHEELS**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
7.1	Rail wheels shall be a minimum of 16" diameter austempered (heat-treated) forged or cast steel with tapered tread contour meeting the Association of American Railroads, (AAR) profile specifications.			
7.2	A minimum of eight (8) rail wheels, (4 front, 4 back) shall be provided.			
7.3	Rail wheels shall have the capability to move up/down independently from each other.			
7.4	Front and rear heavy duty railway axles with hydraulic pump motor(s) appropriately sized.			
7.5	Rail wheels shall be controlled from the operator's station inside of cab.			
7.6	Railcar mover rail gauge shall be 56.5".			

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**ROAD WHEELS/TIRES**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
8.1	Railcar mover shall be equipped with rubber pneumatic road tires, such as 12x20, 12x24, 14x24.			
8.2	Wheels shall have solid disc drop center rims.			
8.3	Suspension shall be semi-elliptic leaf springs on the front and rear axles.			

**RAIL BRAKING SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
9.1	Shall be a fully proportional air over hydraulic power brake system.			
9.2	The air tank shall be an independent tank from other air related systems and sized appropriately for the rail braking system.			
9.3	AAR Glad hand connections located at both front and rear.			
9.4	Emergency stop located on dash panel.			
9.5	Rail brake valve(s) protected with safety filter for harsh environmental conditions.			

**ROAD BRAKING SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
10.1	Shall be a full proportional air over hydraulic power brake system.			
10.2	Shall be anti-lock brake system (ABS) type.			
10.3	In the event of a lockup, there shall be an ABS valve to control vehicle brake pressure to minimize any drive wheel slippage.			
10.4	Foot and dash controls located at the drivers station for road control.			
10.5	The air tank shall be an independent tank from other air related systems and sized appropriately for the road braking system.			

**PARKING/EMERGENCY BRAKE SYETM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
11.1	Shall be electric over hydraulic.			
11.2	Transmission shall not be able to be engaged if parking brake is enabled.			
11.3	Shall have parking brake indicator inside of cab.			
11.4	Shall have means to hand activate/operate emergency brake in case of low oil pressure or an electrical or hydraulic failure.			

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**PRIMARY DRIVE SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
12.1	Shall have a forward/neutral/reverse switch standard.			
12.2	Shall have the ability to electronically set the maximum machine speed to comply with site specific speed zones.			
12.3	Drive system motor(s) shall be protected for adverse weather, environmental conditions and exposure; i.e. IP65.			

**PRIMARY DRIVE SYSTEM BATTERY**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
13.1	Shall be thin plate pure lead (TPPL).			
13.2	Shall have a minimum of an 80-volt system for the drive system			
13.3	Shall have a centralized battery filling system with visual floater indicating battery fluid level(s)			
13.4	Shall have a typical full battery recharging time of 8 hours based on a 480 volt, 3-phase power source.			
13.5	Shall have an opportunity charge of 25% minimum of 1 hour based on a 480 volt, 3-phase power source.			
13.6	Railcar mover will preferably have an on-board charging system vs. free-standing charger installations.			
13.6.1	Charging system shall be compatible for a 480 volt, 3-phase source.			
13.6.2	240 volt and/or 120 volt single phase sources may be provided.			
13.5.3	A minimum of two (2) charging chords of 50' minimum length shall be provided for connection to each charging voltage capability provided.			
13.7	For free standing charging systems:			
13.7.1	A minimum of two (2) charging units (ground mounted or wall mounted) with charging chords of 50' minimum in length shall be provided.			
13.7.2	Charging units shall be provided with all hardware and accessories necessary for the Owner to install and connect into their existing power sources.			
13.8	The railcar mover shall include a built in safety mechanism to prevent from being switched/turned on while being recharged.			

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**TRACTION CONTROL**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
14.1	Railcar mover shall have traction control monitoring rail wheels and tires capable of detecting any tire slip.			
14.2	There shall be an indication alerting the operator that traction control is activated.			
14.3	When traction control is activated, the railcar mover automatically reduces the throttle to a predetermined setting. An air knife/air blade system or a sand application system may be engaged to further improve tractive effort. Throttle advance is restricted until traction is maintained.			
14.4	Railcar mover shall be outfitted with either an air knife/air blade system or a sand application system to provide improved tractive effort in adverse conditions.			
14.4.1	It is recommended that air knife/air blade systems be secured to the rail gear.			
14.4.2	It is recommended that sand application system be secured to front and rear rail wheels. Sanding shall be activated in either direction of travel. Sand shall be dispersed electronically or by air operated valves from operators' station inside of cab.			
14.4.3	Sand application system shall have means of being either disabled or removed when not in use.			
14.4.4	Sand application system boxes shall be polyethylene or other non-metallic or corrosion prone material.			
14.4.5	Sand application system boxes shall be 800lb minimum capacity (total).			
14.5	Air tank(s) for an air knife/air blade or sand application system may either be:			
14.5.1	An independent tank from other air related systems and sized appropriately, or			
14.5.2	Coupled to the rail wheel braking air system without stealing air capacity to assist in train braking or recharging times.			

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**ELECTRICAL SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
15.1	Shall have a minimum of an 80-volt system for the drive system and a 12-volt system for the electrical, lighting, and control system.			
15.2	The 12-volt electrical, lighting and control system may either be integrated with main drive electrical system or an independent system however, both systems shall be capable of being recharged using the same common charging system, chords, and accessories.			
15.3	Shall be protected for adverse weather, environmental conditions and exposure			
15.4	Shall have sealed (rubber coated) wiring harness and terminals.			
15.5	Shall have instrument panel enclosure sealed.			

**LIGHTS**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
16.1	Railcar mover shall have forward and rear tail/stop lights, turn signals with four (4) way flashers, front and rear sealed beam head lights, track mounting lights, and any other lights that would be required for night operation.			
16.2	Lighting shall be LED unless otherwise noted.			
16.3	Shall have two (2) flashing orange strobe lights, switch activated from the operator's console.			
16.4	Shall have switched interior dome lights to adequately see operator's station.			
16.5	Shall include two (2) manually operated post mount spotlights with one mounted on either side of the operator's cab.			
16.5.1	Shall be operable from the operator's seats.			
16.5.2	Shall have a minimum beam length of 500 feet.			
16.5.3	Shall have a minimum candlepower of 200,000.			
16.6	Shall have adequate light on ladders and any walkway deck(s) to safely enter and exit railcar mover.			
16.7	Lighting shall be integrated on the 12-volt system for the electrical, lighting, and control system.			
16.8	All lighting shall be protected for adverse weather, environmental conditions and exposure.			

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**AIR SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
17.1	Railcar mover shall have minimum air capacity of 160 cfm @ 125 psi.			
17.2	Shall have two (2) Association of American Railroads (AAR) Glad hand connections (style "F") at front and rear, with isolation valve at end of machine.			
17.2.1	Shall have lever operated pressure control for rail brake control and emergency stop button, both located at operator station inside of cab.			
17.2.2	Rail brake control valve and emergency stop button shall have filtered air.			
17.3	To supply air to open doors, car mover shall have two (2) Association of America (AAR) Glad hand connections (style "L") located at front and rear of machine with isolation valve at each point.			
17.3.1	Air supply shall come directly from rail brake air tank.			
17.3.2	Air supply to Glad-hand connections shall be filtered.			
17.3.3	Air supply shall have check valve preventing air entry back to machine.			
17.4	Shall have dryers capable to dry 100% of the air volume.			
17.5	Shall have cold weather package to prevent air from freezing.			
17.6	Shall have all air drains piped to a central location on the side of the cab. These lines shall be piped so as not to allow water to accumulate in the line and possibly freeze.			

**COLD WEATHER PACKAGE**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
18.1	Railcar Mover shall include an overall "Cold Weather" package to maximize operational capability and performance during winter months. The package shall include the following:			
18.1.1	Hydraulic reservoir heater(s).			
18.1.2	Air dryer(s) on all air compressors capable of drying 100% of the air volume.			
18.1.3	All air drains plumbed to a central location on the side of the cab. These lines shall be plumbed so as not to allow water to accumulate in the line and possibly freeze.			
18.1.4	Heat tape on air drain piping and release valve to prevent freezing			
18.1.5	Any other pertinent cold weather features. Please List & Describe			



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**OPERATOR CAB**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
19.1	Railcar mover shall have full width totally enclosed cab featuring 360-degree visibility.			
19.2	Seats			
19.2.1	Shall have minimum of two (2) air ride seats complete with 2-inch wide (minimum) retractable seat belts.			
19.2.2	Shall have driver's seat located on left side.			
19.2.3	Driver's seat shall be cloth, heated, with fully adjustable fore/aft position, seat back angle, bottom cushion height, arm rest angle and airsuspension stiffness.			
19.3	All controls shall be easily accessible from the operator position.			
19.4	Shall have hand throttle, vehicle brake, train brake, and emergency stop all conveniently located on a console.			
19.5	Camera system shall include:			
19.5.1	1 touchscreen monitor, color video display. Monitor shall be large enough and capable of displaying video from all cameras simulataneuosly.			
19.5.2	General 360 degree camera system of railcar mover exterior.			
19.5.3	Video camera(s) shall be installed within the cab monitor operator and passenger activities.			
19.5.4	2 video cameras mounted above guide wheels (1 front, 1 rear).			
19.5.5	2 video cameras mounted above couplers (1 front, 1 rear).			
19.5.6	Cameras shall provide color video along with infrared capability for use during lowlight/night time conditions.			
19.6	Shall have interior sound levels under 79 dba and exterior sound levels under 109 dba.			
19.7	Shall have a safety mechanism to prevent sudden change of direction during operation.			
19.8	Shall have two (2) side doors. Doors shall lock open 90 degrees with the capability to open and close door from the operators seat. Doors shall have a swing out glass window.			
19.9	Shall have filtered outside air supply.			
19.10	Shall have heater and air conditioning.			
19.11	Shall have minimum of two (2) window defrost fans.			
19.12	Shall have tinted glass and adjustable sunscreens for front and rear windows.			
19.13	Shall have front and rear electric windshield wipers for good visibility in adverse weather conditions.			
19.14	Shall have isolation mounts between cab and body/frame.			
19.15	Shall have digital instrumentation.			
19.16	Shall include a minimum of two (2) 12V outlets [USB Type A or Socket (Car/Cigarette Lighter Type)].			
19.17	Floor of cab shall have a non-slip, high traction finish or coating.			
19.18	Shall have ladders with hand grabs located on either side of cab. Ladders shall have inclined steps with breakaway lower steps. Steps shall have large, aggressive-tread surfaces.			

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**MIRRORS**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
20.1	Shall have west coast style mirrors to see clearly down both sides of rail. External mirrors shall include heated defrost.			
20.2	Shall have capability to see both couplers from operator's station inside of cab.			
20.3	Shall be able to see rail wheels from operator's stations inside of cab.			

**AUDIBLE WARNING SYSTEM**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
21.1	Shall have two dual blast type air horns, one facing each forward and rearward.			
21.2	Shall have an automatic back-up alarm for use during road operation.			

**SYSTEM SAFETY AND PROTECTION**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
22.1	Railcar mover shall have drive system shut down protection to include at minimum:			
22.1.1	Low battery power			
22.1.2	High battery temperature			
22.1.3	Low battery fluid			
22.1.4	High drive system motor(s) temperature			
22.2	Shall have a vigilance (anti "cowboy") type system that monitors the machines functions based on an operator's actions and overrides actions, i.e. acceleration and braking rates, etc., based on pre-programmed criteria to protect the condition of the machine, safety of the operator, safety of surrounding rail cars, equipment, infrastructure, workers, etc.			
22.3	Shall have ability to provide maintenance reminders based on hours of usage and/or specific component statistics.			
22.4	Shall have a minimum of two (2) exterior mounted emergency stop buttons; one located on either side of the machine.			
22.5	Railcar mover shall include any and all fire related safety equipment and appurtenances deemed necessary to suppress, control, or extinguish battery electrical fires, specifically pertaining to the main drive system batteries which the Port or local fire department would not have readily available.			

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**Gauges, Instruments, and Alarms**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
23.1	At a minimum railcar mover shall have following gauges visible from operator's stations inside of cab:			
23.1.1	Battery health indicator(s)			
23.1.2	Voltage(s), main drive system and secondary electrical system(s)			
23.1.3	Charging indicator(s)			
23.1.4	Drive system motor(s) health indicator(s)			
23.1.5	Speedometer			
23.1.6	Service brake pressure			
23.1.7	Rail brake air pressure			
23.1.8	Rail air tank pressure			
23.1.9	Front and rear rail wheel pressure			
23.1.10	Hydraulic fluid temperature			
23.1.11	Hour meter			
23.1.12	Any other pertinent gauges. Please List & Describe			
23.2	At a minimum the railcar mover shall have the following alarms complete with audio and visual warnings:			
23.2.1	Low battery power			
23.2.2	High battery temperature			
23.2.3	Low battery fluid			
23.2.4	High drive system motor(s) temperature			
23.2.5	Low service air pressure			
23.2.6	Low rail brake air pressure			
23.2.7	Low road brake air pressure			
23.2.8	Low hydraulic pressure			
23.2.9	Low hydraulic fluid level			
23.2.10	Low/poor traction			
23.2.11	Straight ahead indicator			
23.2.12	Any other pertinent alarms. Please List & Describe			

**WARRANTY**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
24.1	The successful bidder shall furnish a standard written warranty covering the entire railcar mover for a minimum period of five (5) years or five thousand (5,000) hours, whichever occurs first.			
24.2	The warranty shall be full coverage and include all parts, labor and transportation. There shall not be any charge for any service call or maintenance work performed under the warranty.			

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**SERVICE**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
25.1	Railcar mover shall have all points requiring service be mounted in open area or accessible through inspection plates.			
25.2	Railcar mover shall have a standard cellular based remote management system with web interface to monitor critical system parameters from a remote location with no annual subscription fees.			
25.3	The successful bidder shall be a fully authorized dealer with trained/certified service staff and parts supply readily available. Successful bidder's main facility and shop should be located no more than 250 miles from the Port of Oswego.			

**TRAINING**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
26.1	The successful bidder shall be responsible for training railcar operators and mechanics and shall certify to the department head that the operators and mechanics have successfully completed the training classes.			
26.2	Training for operators and mechanics shall be performed at the time of delivery.			
26.3	Training shall include and may not be limited to, operation, daily maintenance, safety, and periodic and routine maintenance.			
26.4	Training shall be provided to the Port and local fire department within 30 days of delivery of the railcar mover on how to approach, address, control, suppress and extinguish an electrical fire, specifically pertaining to the railcar movers main drive system batteries.			
26.5	Trainers may be provided either directly from the manufacturer or a manufacturer-certified distributor. Trainers shall be certified by the manufacturer/factory. Non-certified or independent trainers will not be accepted.			

**MANUFACTURERS LITERATURE**

Specification Number	Specification Description	Specification Compliance		
		Compliance	Non-Compliance	Notes
27.1	The bidder shall supply all applicable manufacturers' literature for the components of all equipment to be supplied under this bid.			
27.2	The successful bidder shall provide the following manuals, written in English language, at the time of delivery.			
27.2.1	Two (2) parts manuals			
27.2.2	Two (2) repair manuals			
27.2.3	Four (4) operating manuals			
27.3	Manuals shall be printed and each copy accompanied with a USB thumb drive.			