

**TECHNICAL SPECIFICATIONS**

**FOR**

**Leon County Solid Waste Division  
Gum Road Transfer Station  
Tire Wash Installation**

Prepared for:

**Leon County Office of Resource Stewardship  
Solid Waste Division  
7550 Apalachee Parkway  
Tallahassee, Florida 32311**

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Set #: \_\_\_\_\_

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

**1.2 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Shop Drawings: For steel reinforcement. Material certificates.

**1.3 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA'S "Certification of ready mixed concrete production facilities."

**PART 2 - PRODUCTS**

**2.1 FORM- FACING MATERIALS**

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

**2.2 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Plan-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI'S "Manual of standard practice."

## 2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout product.
  - 1. Portland Cement: ASTM C 150, Type I/II. Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class F.
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, graded, 3/4-inch normal maximum coarse-aggregate size.
  - 1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94 and Potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494, Type A.
  - 2. Retarding Admixture: ASTM C 494, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

## 2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, Monomolecular Film Forming, Manufactured for Application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, Burlap Cloth from Jute or Kenaf, Weighing Approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, Polyethylene Film or White Burlap-Polyethylene Sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B, Dissipating.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, TYPE 1, Class A.

## 2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, Asphalt-Saturated Cellulosic Fiber.

## 2.6 CONCRETE MIXTURES

A. Prepare Design Mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Cementitious Materials: Use Fly Ash, Pozzolan, Ground Granulated Blast-Furnace Slag, and Silica Fume as needed to reduce the total amount of Portland Cement, which would otherwise be used, by not less than 40 percent.

C. Proportion Normal- weight concrete mixture as follows:

1. Minimum compressive strength: 4000 PSI at 28 days.

2. Maximum water-cementitious materials ratio: 0.50.

3. Slump limit: 5 inches

4. Air Content: 5-½ percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch normal maximum aggregate size.

5. Air Content- Do not allow air content of troweled finished floors to exceed 3 percent.

## 2.7 FABRICATING REINFORCEMENT

A. Fabricate Steel Reinforcement According to CRSI'S "Manual of Standard Practice."

## 2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, Batch, Mix, and Deliver Concrete According to ASTM C 94, and Furnish Batch Ticket Information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-½ hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## **PART 3 – EXECUTION**

### **3.1 FORMWORK**

- A. Design, erect, shore, brace and maintain formwork according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are on size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete.

### **3.2 EMBEDDED ITEMS**

- A. Place and Secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

### **3.3 STEEL REINFORCEMENT**

- A. General: Comply with CRSI'S "Manual of Standard Practice" for placing reinforcement.

### **3.4 JOINTS**

- A. General- Construct joints true to line with faces perpendicular to surface plane of concrete.

### **3.5 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Hot-Weather Placement: Comply with ACI 301.

### 3.6 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with the tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to view.
- B. Smooth-formed finish- as cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to view.

### 3.7 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

### 3.8 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture curing: Keep surfaces continuously moist for not less than seven days.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions.

### 3.9 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by architect. Remove and replace concrete that cannot be repaired and patched to architect's approval.

### 3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
  1. Testing Services: Tests shall be performed according to ACI 301.

END OF SECTION 033000

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# **DIVISION 11 - EQUIPMENT WHEEL WASHING SYSTEM**

## **PART 1 – GENERAL**

### **1.1 RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### **1.2 SUMMARY**

A. This Section includes the vehicle wheelwashing system and equipment and accessories, including:

1. Wheelwashing elements and piping.
2. Spray walls and side spray wall equipment.
3. Wheelwashing pumps (1 required).
4. Controls for wheelwashing system, including vehicle entrance and exit sensors.
5. 5000 Gallon Pump Compartment Water Tank
6. Catch pan under the wash platform designed for gravity flow into floor drain

### **1.3 WHEELWASHING SYSTEM DESCRIPTION**

A. Furnish a completely automatic, modular, touchless heavy-duty drive-through wheelwashing and water reclamation system for mobile and/or permanent applications, suitable for vehicles having weights and dimensions allowed on public roads.

### **1.4 PERFORMANCE REQUIREMENTS**

- A. Operation: As the vehicle approaches the wheelwashing unit the wash cycle and related water recycling operations shall be automatically activated by the vehicle passing through the entrance sensor. Length of the continuous wash platforms must allow for greater than 13 ft drive through length. A technically coordinated spray system creates an effective washing result for the complete length of the vehicle as the vehicle is driven in a fixed path between tire guides at a slow speed (30-40 feet per minute) through the wash platform. The angled profile construction of the continuous wash platform base areas flexes open the tire profiles and therefore supplements the cleaning effect. As the vehicle exits the wash platform, the system is deactivated by passing through an exit sensor.
1. A specially developed nozzle characteristic including side (18 degree spray angle) and bottom (15 degree spray angle) nozzles ensures for an efficient pressurized water spray profile for targeted cleaning of the tire profiles, outer and inner wheel surfaces and part of the chassis. The spray nozzles are so arranged that the vehicle driver's sight is not impaired during the wash cycle and that only a minimum of over spray is transferred into the surrounding area.
  2. The length of the wash cycle is dependent on operating conditions and is controlled by the speed of the vehicle across the wash platform.

3. The wheelwashing system shall also be equipped with an adjustable timed shut off which stops the system after the set time has elapsed after the vehicle enters the system, to allow drivers of stopped or stalled vehicles to exit the vehicle after the wash system stops.
4. As the vehicle is driven through the wheelwash at 30-40 feet per minute, the wheelwashing system shall satisfactorily remove all visible transfer building floor sludge (TBFS) from the vehicle's tires and tire-grooves and wheel wells, to prevent track-out of TFBS by a truck's tires out of the Owner's premises.

B. Minimum design capacity in vehicle wash cycles per hour shall be up to 60 at 1-minute wash cycle.

C. The supplier is solely responsible for the equipment performance. Should the equipment not Perform, as per these specification requirements, the supplier shall modify, add and/or alter the equipment supplied at his own expense until the performance is satisfactory.

D. The water reclamation system shall be capable of reclaiming water from the wheelwashing system and discharge by gravity to an owner provided floor drain.

1. A single hot dipped galvanized channel with integrated slope shall be supplied to allow gravity collection and discharge via which the washed sludge and dirty water directed into customer supplied floor drain. The channel shall be removable and is integrated with each of 15.5 inch high wash platform wash elements .The channel is fixed transversely and joined in the center for flow out the entrance side of wash platform, with a centered distance from each end of each wheelwash platform of 78.75 inches.
2. The wheelwash system's slurry quality pump is to be placed in the pump chamber of the above ground 5000 gallon freshwater supply tank. The pumps will be capable to pump abrasive slurries without compressors or filters, other than the integrated pump screens, to filter the reclaimed water. The pump and integrated screen system are to be designed to not allow the passing of larger than ¼ inch solids to the wheelwash platform.
3. The wash pump is to be designed for maximum cleaning effectiveness flow and pressure at 49 ft to 72 ft of head.
4. The pump is to be designed for a complete rebuild cost of components under \$780 USD.
5. Water delivery from the pump chamber of the above ground tank to the wheelwash platform shall be via direct 4 inch id supply line to provide for an efficient pressurized water spray profile at the wheelwash platform. The water delivery system will be capable to pump wash water without headers.
6. The system must be able to continuously supply 225 gallons of water for the wheelwash pump regardless of traffic volume (subject to 1.4 B).
7. Prior to final acceptance of the system by the owner, the supplier shall demonstrate the continuous operating capacity of the reclamation system in relation to the wheelwashing system.

## 1.5 SUBMITTALS

A. Product Data:

1. Submit Product Data in strict accordance with requirements of these specifications and the General Requirements.

2. Submit the below listed technical information, concept design drawings and layouts for the Engineer. The quality of these drawings shall be such that the Engineer shall be able to determine and make changes required to related civil construction, electrical and mechanical work and installation work shown in the Contract Documents to accommodate the system supplier's proposed system. The set of drawings submitted shall consist of, but not be limited to, the following:

- a. CAD Equipment general layout longitudinal section.
- b. CAD Equipment general layout side view.
- c. CAD Equipment general layout cross-section.
- d. CAD Wheelwashing and Water discharge drawings.
- e. Detailed listing of pumps, valves and other components used within the system and operation and maintenance data and instructions.

B. Operation and Maintenance Data: For Wheelwashing System to include emergency, operation, and maintenance manuals.

C. Warranties: Special warranties specified in this Section.

#### 1.6 QUALITY ASSURANCE

A. The wheel wash system, pumping equipment and all electrical controls shall be designed and supplied by one supplier.

B. Supplier shall have been regularly engaged in the engineering, manufacturing and supply of the wheelwash systems for a period of not less than Twenty five years and a minimum of 1000 wheelwash systems installed and operating. All similar items shall be the products of one manufacturer. The equipment offered shall be the latest standard product, modified as necessary to meet conditions of the project.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of the named supplier listed in the Products section of this specification and are based on the specific systems indicated.

D. The equipment specified herein shall be MobyDick Wheelwashing Systems manufactured by Frutiger Company AG.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store received materials at project site or other contractor-controlled location and handle delivered materials in accordance with system supplier's instructions.

#### 1.8 COORDINATION

A. Coordinate layout and installation of wheelwashing system and components and with other construction shown on the drawings.

- B. Coordinate size and location of concrete with the project Structural Engineering firm qualified to provide concrete specifications. Concrete, reinforcement, and formwork requirements are specified in Division 3 by the project-engineering firm.

## 1.9 WARRANTY

- A. Special Warranty: Warranty on the Wheelwashing system components and accessories supplied by the system supplier, in which system supplier agrees to repair or replace components that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
  - 1. Operation: noisy, rough or substandard operation of system or individual system components.
  - 2. Parts: loose, damaged or missing parts.
  - 3. Finish: Abnormal deterioration.
  - 4. System effectiveness: dirt removal from vehicle's tires.
- B. Warranty Period: Two years from date of Substantial Completion for Items A. 1. Through 4 above.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:

- 1. The equipment specified herein shall be MobyDick Wheelwashing Systems manufactured by Frutiger Company AG.

### 2.2 WHEELWASHING SYSTEM

- A. Description:

- 1. Furnish and supervise the installation of an integrated wheelwashing system consisting of two each, one-piece continuous wash elements with internal water carrying channels; integrated 2-tier tire guides, modular polymer splash walls, quick coupler removal and directionally adjustable 2 tier PVC side spray bar assemblies with integrated nozzles; with pump, check valves and piping; controls and accessories, as shown on the drawings. The wheelwash system shall operate automatically through the entry and exit controls. Overall dimensions, with a drive-through track width of 114 inches are (157.5 inches x 140 inches x 68 inches) and weight of ca 9,800 lbs.
- 2. The wheelwash water spray pattern shall not extend above the 53-inch height spray walls supplied such that wind drift of the water spray will carry beyond the spray walls and drainage sumps when no vehicle is present on the wheelwash platform.

- B. Wheelwashing System

- 1) Wheelwash elements shall be a minimum of two hot-dip galvanized wash elements (left/right) each 157.5" long x 37" wide x 15.5" high to allow for ground-level access after on-site matching of the road to the entry and exit areas. The wash elements have an

integrated, internal sludge/water drainage slope and are a self-supporting robust steel construction consisting of internal hot dipped galvanized water-carrying channel sections and angled profiles, designed to take a maximum axle load of 33,069 lbs.

- 2) The galvanized metal center spacer/water diverter system shall establish the drive through track width of 114 inches and consist of two spacer plates and three middle elements with sloping sides constructed from galvanized checker plate.
- 3) The Wheelwash element system for complete washing of the tire profiles, outer and inner wheel surfaces and part of the chassis such that the static spray nozzle manifolds consisting of 130 nozzles of 7 mm diameter are integral with the wheelwash platform structure and such that the truck tires drive over the spray manifold assemblies. The truck tires must roll on and contact the spray nozzle manifolds with all nozzles being protected.
- 4) The Wheelwash elements on which the tires ride shall be constructed of water carrying triangular tubes and angle iron at right angles to the tire travel with angle aligned upward to flex the tires as the vehicle traverses the platform with specially developed nozzle characteristic including side (18 degree spray angle) and bottom (15 degree spray angle) nozzles ensures for an efficient pressurized water spray profile for targeted cleaning of the tire profiles, outer and inner wheel surfaces and part of the chassis in order to maximize the discharge of dirt from between the tire grooves while being sprayed by the wheelwash system.
- 5) The wheelwash elements shall be designed with integrated two tier galvanized tire guides. The integrated tire guides shall be (11.8 inches high) each shall consist of two levels of (3.9 wide x 5.9" high) tubular constructed steel 5 mm thick.
- 6) The centered single hot dipped galvanized transversely fixed wash water slurry collection channel with integrated slope shall be removable with lifting points and is integrated with each of 15.5 inch high wash platform wash elements. The channel is specially designed to direct discharge water and sludge to the center where it will then flow to entrance side of wash platform to drain by gravity into floor drain.
- 7) The wheelwash elements load carrying capability of the triangular tubes shall be a minimum of 33,069 lbs.
- 8) The wheelwash system shall have a minimum of 1 submersible sludge quality pump with integrated screen assemblies, check valves and clean water well piping, the pump being a minimum of 7.4 hp (480 V, 60 Hz) and able to deliver individually a maximum of 225 gallons per 30 second wash cycle. At 49 ft to 72 ft of head, the pump is capable of operating with a flow of 570 GPM and approximately 22-psi lower wash element nozzle pressure with a completely filled water system.
- 9) The continuous wash platform elements of 157.5 inches with integrated static and sidewall spray nozzle assemblies shall cover a distance longer than an entire width and circumference of the R2400 rotating tire when traversing the wheelwash platform.
- 10) The wheelwash system must be equipped on both sides with 2 sections of molded polymer splash walls that shall run the full length of the wheelwash platform. The splash walls will be constructed as four panels. Each splash wall panel section shall be 78 3/4 in long x 53 inch high and 1.9" thick and will be slid into 3 support bracket assemblies and fixed without use of nuts, bolts or screws. The splash wall panels shall be movable by one man.

- 11) The wheelwash system shall have two sets of two tier PVC side spray bar assemblies. Each spray wall assembly shall have 2 inch diameter schedule 40 PVC pipe, color grey with nozzle systems consisting of a total 17 integrated 6mm side spray nozzles, top tier nozzles at 30 degree angle lower tier nozzles at 20 degree angle. The spray bar assemblies are removable and attached to the wash element platforms with cam and lock fittings. Each spray bar assemblies are modular with three subassemblies. The spray bar assemblies shall have threaded couplers that allow the spray bars to be rotated to allow for field adjustable spray angle changes. The spray bar assemblies shall run the full length of the wheelwash platform. .
- 12) The wheelwashing system must be capable of emptying the continuous wash platform elements and side compartments of wash water effluent back into the sewer lines within 60 minutes of its last use to prevent water freezing in the wheelwash system during the winter periods.
- 13) The system shall include a 5000 gallon steel tank functioning as a pump compartment shall be made of robust steel construction. The water level in the tank will be controlled by automatic level control with overflow. All construction parts are chemically pre-treated, prepared with a special primer and finished in RAL-Color 6029 Green with external dimensions: 228 3/8 inch x 87 inches x 57 inches and a total volume ca. 5000 gallons useful volume. The 5000 gallon tank shall have a 2 piece weir assembly with lift eyes. The 2 pieces shall interlock to form a complete weir.
- 14) The system shall be designed to convert to a completely in-ground or surface mounted system, with or without scraper conveyor automatic solids collection/removal and scalable to a 2 tire revolution platform length with the addition of Frutiger Company MobyDick Conline system components to a total of 6 wheelwash system designs.

D. Electric Control Panels and Components:

1. Stainless Steel Control enclosure panel with complete electrical system with ALLEN BRADLEY components with Standard UL 508A and CSA C22.2 No14-05 CERTIFICATION. Control panels shall be designed for operation on a 440/480/ Volt, 3 phases, 60-Hertz system, and shall be of a central open loop design. Control panels that are not UL/CSA certified are not acceptable.
2. System power is 7.4 hp, 480v, 3pH, 10 Amps operating
3. System activation and stoppage switches shall consist of two IP 67 data sensors.
4. The sensors will be placed in self-supporting hot dipped galvanized stands .The sensor stand head housing shall have an integrated rotation plate to provide for sensor focus directional changes in the field.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine site and project conditions for compliance with requirements for, installation tolerances, and other conditions affecting performance.
- B. Examine roughing-in for process water and potable piping systems to verify actual locations of piping connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Electric Control Panels and Components:

1. Control panels shall be designed for operation on a 440/480 Volt, 3 phase, 60 Hertz system, with a short circuit capacity of 25,000 amperes RMS symmetrical available at the incoming line terminals of the control panel.
2. System activation sensor shall be designed to be activated by all fleet vehicles used by the owner. Each activator shall be pre-mounted and wired to a watertight junction box equipped with built-in drainage holes.

### 3.2 WHEELWASHING SYSTEM INSTALLATION

- A. Install equipment in accordance with manufacturers' supplied assembly drawings.
- B. Equipment supplier shall undertake the commissioning of the system and make all required adjustments to ensure proper operation.
- C. The equipment manufacturer's representative shall start-up the system. The owner will have operating personnel present during the start-up and equipment training.
- D. The owner's personnel shall be trained for a minimum of 5 hours in the system assembly, operation and maintenance.
- E. The supplier shall provide the owner the names and the addresses of all factory-authorized regional service and maintenance personnel to assist in future service.

### 3.3 CLEANING

- A. Clean the wheelwashing system and components after startup and testing and before final acceptance by Owner.
- B. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finishes.

**END OF SECTION**